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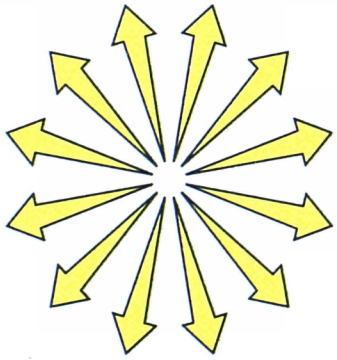
PANORAMA of EC INDUSTRY 93



An extensive review of the situation and outlook of the manufacturing and service industries in the European Community

Commission of the European Communities

PANORAMA of EC INDUSTRY 93

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COMMISSION OF THE EUROPEAN COMMUNITIES

Cataloguing data can be found at the end of this publication

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All professional associations/organisations known to the Commission which represent industry at the European level were asked to contribute material on their sector. At the end of each monograph, addresses and telephone and fax numbers of the respective professional association concerned are indicated.

The many consultants and associations that contributed to this edition of Panorama are listed at the very end of the publication.

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Message from Jacques Delors

President of the Commission of the European Communities

With the completion of the internal market on 1 January 1993, the Community turned a page in its history.

New stages in its development, including the establishment of the European Economic Area, the quest for agreements with the countries of Central and Eastern Europe and the renewed attempt to conclude the GATT negotiations, will soon be reached and will ultimately enable the economic and commercial frontiers of the Old Continent to be extended even further.

We must welcome the fact that these major accomplishments have come about during what has been a short period of time in the Community's existence.

The successful construction of these landmarks, indispensable as they are for better integration of Europe's tremendous economic potential, is indisputable proof of the dynamism which characterizes the action of all European citizens.

The Community will now have to consolidate these successes internally by implementing the Treaty on European Union, and in particular by pressing ahead with economic and monetary union, the positive effects of which will strengthen the competitive position of Community firms wherever they do business.

The considerable expansion of the internal dimension of the Community market, together with the harmonization of technical product requirements and the freedom to operate on the basis of common rules, now provides our firms with an environment comparable, if not superior, to that of our major competitors in the world at large. There can be no doubt that this will allow our firms to adopt the strategies they need to meet the challenges ahead with success and confidence.

Despite the progress already made, we should not underestimate these challenges, foremost among which is the slowdown in global economic activity. To overcome them, the Community will have to continue with policies combining rigour and imagination on the part of both governments and individuals. And this in a context where firms are having to come to terms with global competition and with new constraints, linked in particular to the need to protect the environment, to explore new technologies and to anticipate major industrial changes.

It is against this background that I am particularly pleased to present this fourth edition of the Panorama of EC Industries. This European Commission publication has the great merit of being an essential reference work for many people from the business, political and academic worlds, as well as of contributing to improving our knowledge of the various sectors of Community industry.

I would invite everyone for whom better knowledge of the various aspects of our industrial activity is indispensable for their own work and discussions to draw from this publication the information and inspiration they need.

Jacques Delors

Preface by Martin Bangemann

Vice-President of the Commission of the European Communities

Since 1 January 1993 operators in the Community have been able to do business in the largest domestic market in the world. In the space of a few years, the European Community has managed the remarkable feat of creating a single market from twelve separate, national markets. This success has been possible only because Member States and firms recognized a large home market as being essential to maintain international competitiveness.

Following the removal of border controls and technical trade barriers, businesses can now supply a single product for the whole of the single market. Manufacturers no longer have to produce for twelve separate markets. This increases competition enormously on the European home market. European firms must respond to the increasing pressure of competition by being increasingly cost-conscious if they are to continue to be successful in the market place. Nor is it any longer enough to measure success by the yardstick of Europe alone. The international competitiveness of European firms has to be gauged against our competitors on world markets, since these are the relevant markets for most products. Only manufacturers who produce to world market standards have a real chance of success.

The primary objective of the European Community's industrial policy is to increase the international competitiveness of European firms. To achieve this we must not rely on copying our competitors, for this would only lead to dependence on them. We must rather build on the economic strengths which undoubtedly exist in the Community. Above all, these include demanding standards and a skilled workforce. Even more important, however, is a business environment geared towards competition so that there can be fair competition between European firms. Government intervention and maintenance subsidies prevent the necessary structural change and so intensify structural crises. That is why strict discipline as regards subsidies is one of the most important pillars of industrial policy, even during an economic slowdown. A return to the old race to subsidize serves no-one, not even those receiving the subsidies. European industrial policy must accelerate structural change and promote the widespread use of new technologies. Here the Community authorities should not try to usurp the role of market forces. But wherever government action is necessary, it must be taken with the specific objective of increasing productivity and offering incentives for technological innovation. The 'European way' is based just as much on the belief in the free play of market forces as on government responsibility for maintaining and increasing international competitiveness. The inclusion in the Maastricht Treaty of the "Industry" chapter now makes this clear for all to see.

The success of European industry will not come solely from mastery of the latest technologies. International competitiveness depends increasingly on the capacity to optimize production processes. The largest productivity reserves are found in improved organization of work and structuring of operations. Nowadays the key to economic success no longer lies only in the ability to invent, but also in the capacity to translate inventions into mass production more rapidly and efficiently than the competition. That involves flexible production processes and closer cooperation between manufacturers and suppliers. Small and medium-sized firms are just as important to the economic success of the Community as are large firms. Highly-specialized suppliers are as dependent on the success of large European firms on world markets as large firms are reliant on rapid and reliable subcontractors. This can gradually lead to a development partnership which will be one factor in ensuring the competitiveness of European industry. The internal market offers European industry new prospects for the future. What we must do now is try to realize them.

Martin Bangemann

Introduction by Riccardo Perissich

Director-General for Industrial Affairs
of the Commission of the European Communities

Businesses and governments must share the responsibility for meeting the challenges and responding to the opportunities presented to industry by the global economic situation. This presupposes that individuals must have access to as much information as possible so that they can judge the merits of the policies adopted.

In 1992 the European Information Association awarded "Panorama of EC Industry" its "Award for Excellence" for official publications containing information on Europe.

This award confirms that "Panorama" has now become a standard reference document and a working tool for a very large number of businesses and business analysts.

Its success is without doubt the result of the originality of its production process, based as this is on close cooperation between the European trade associations representing the different sectors of industry and the Commission's specialized departments and units, which work daily with the associations to promote the competitiveness of Community industry.

This fourth edition of "Panorama" is published at a time when the Community has reached a fundamental milestone in its process of integration.

The completion of the internal market in 1993, in which Directorate General III of the European Commission has played an extremely active part, represents the realization of a major objective of Community action and the successful completion of deliberate efforts to build the largest integrated market in the world.

Anticipation of the benefits of the Single Market has already led to profound changes in the structure of the Community's industry and service sectors, making them more flexible, better adapted to the new demands of competitiveness, and more in line with the wishes of Europe as a whole for healthy competition.

Taking advantage of the particularly favourable economic climate at the end of the 1980s, most sectors were able to adapt their strategies to better coverage of Community markets and increased operational efficiency.

However, the changes already implemented will have to continue in order to meet the challenges posed by the creation of the European Economic Area, the gradual opening-up to the market economy by the countries of Central and Eastern Europe and the conclusion of the GATT Agreements.

Businesses will have to be active in their pursuit of these important changes, despite the deterioration in company profitability caused essentially by the slow-down in economic activity affecting the economies of the industrialized countries. This is the background against which Community action on industry, whose principles were set out in the Commission communication "Industrial policy in an open and competitive environment", will have to be broadened to encourage completion of the work outstanding.

This new edition of "Panorama" reflects the progress already made on industrial competitiveness and international opening-up of markets, and takes account of the uncertainties thrown up by the latest economic developments.

For many sectors it was difficult to prepare forecasts, but they will contribute to clarifying future prospects and facilitating business decisions. Forecasts were produced thanks to the joint efforts of the authors of the monographs, trade associations and Eurostat (the Statistical Office of the European Communities), whose contribution and statistical knowledge greatly helped the authors in their work.

As in previous editions, efforts have been made to increase sectoral coverage and harmonize statistical information so as to supplement existing sets and analyses. This is particularly true of service sectors, for which better quality information is now available.

A large number of associations have updated and expanded their previous year's contribution. Many others have provided statistics or partial reports. All the associations whose names appear at the end of the sectoral studies were consulted on the contents of the texts now being published and were thus able to make comments and observations.

This particular feature is an essential element in the production of this book and gives it a unique character compared with other publications dealing with industry. It also explains why the opinions expressed in a number of analyses do not necessarily coincide with the views held at the Commission and therefore commit only the authors, whose names are given at the end of the monographs. A number of the sectoral analyses were written by experts or by the Commission departments responsible for industry.

Overall responsibility for this edition falls to the Unit for competitiveness and general industrial policy questions in the Directorate-General for Internal Market and Industrial Affairs of the European Commission, which contracted the technical coordination and editing to an outside consultancy.

A number of changes in presentation in the work as a whole and its various chapters have been made in order to make the text clearer and bring it more into line with the wishes of a large part of the readership.

As in each edition, the special issues in the first part of "Panorama" cover questions of topical interest. Thus, the monographs deal with progress on completion of the Single Market, the problems of the defence industry, urban transport, cooperation between SMEs, and the growth of mergers and acquisitions in the Community.

The sectoral analyses should be read independently of each other, bearing in mind that while every effort has been made to achieve consistency of information, statistical data cannot be cumulated across sectors.

I would like to thank all the contributors and those who played an active part in producing the fourth edition of Panorama. I can assure them that DG III is particularly pleased with the final result.

Riccardo Perissich

Panorama 1993 time frames and statistics

Panorama 1993 provides a comprehensive picture of industry and services within the European Community. It is intended for all those requiring an update on the present situation and probable future developments in the manufacturing and service industries in the EC.
Panorama opens with a "special features" section, which takes a global approach to a number of horizontal subjects of topical interest. The main part of the book - the industry reviews - provides a microeconomic survey of EC industry and services, tracing the major developments in production, employment, trade and structural change and includes, in most cases, detailed statistical data and forecasts.

Time frame

The industry reviews and forecasts were written during the second and third quarters of 1992. Time series run from 1982 onwards, and the latest data is limited to 1991. Gaps in the data were filled by estimates wherever information was available, and these estimates are footnoted in the tables.

All figures for 1992 are estimates. Forecasts, if available, were provided by the associations or consultants involved in the compilation of individual reports.

Industry classification system

The selection and ordering of industries and services included in Panorama is based on the NACE coding system. This system classifies economic activity in terms of the nature of goods and services produced or by the nature of the production process employed. It is arranged on the decimal system and is subdivided into divisions (1-digit codes), classes (2-digit codes), groups (3-digit codes), sub-groups (4-digit codes) and items (5-digit codes). Panorama is primarily focused on the '3-digit' level.

More detailed information on the NACE codes is contained in the General Industrial Classification of Economic Activities within the European Community published by Eurostat (1985 reprint of the 1970 edition). This publication is available from the usual outlets for Community publications.

Although most chapters are headed by the appropriate NACE code, some do not have a NACE code indicated as the sector represents too small a fraction of the total NACE group. This is particularly common in the service sectors.

Revisions to the NACE classification have been incorporated in a Council Regulation (OJ L293, 24th October 1990) and will start being used for data collection over the next few years. One of the objectives of this revision is a further breakdown of some service and industrial categories. Even when a NACE code appears beneath the sector title this should be regarded with caution. In some cases the NACE classification does not exactly coincide with the industrial sector under discussion. Each chapter includes a preliminary section explaining the sectoral coverage in the chapter in question, and indicating the extent to which this deviates from the NACE classification. There are cases where an overlap occurs between sectors and therefore data cannot be cumulated.

Statistical data

The statistical data in Panorama should be regarded with caution, particularly for the more recent years where data have often been estimated. The two main sources of data are Eurostat and the professional associations. Data sources are indicated for each statistical table.

For manufacturing industries each chapter includes a summary table containing the main indicators for the industry. These cover apparent consumption (defined as production + imports - exports), net exports (the trade balance of the Community with the rest of the world), production and employment.

Data in the tables are in current ECU unless otherwise stated. Indices (reference year: 1985=100) have been calculated for production and trade data providing easier reference for trend changes. The productivity measure used in certain monographs is based on value added at factor cost in 1985 prices per person employed.

Every effort has been made to include data for all 12 Member States. All figures are on a pre-unification basis, and exclude East Germany unless otherwise stated. However, where data are not available for the EC-12, country coverage is clearly indicated in the footnotes appearing below each table. Production figures for the USA and Japan derived from their respective censuses of manufacturers have also been included. To compare the Panorama of EC Industry with the US Industry Outlook, Eurostat can provide you with a table correlating NACE to the US SIC.

Production and employment

Data for production and employment come from annual enquiries conducted by Member States to **all firms with 20 or more employees**. The exceptions to this are Spain and Portugal where the coverage is for firms of all sizes. Figures are generally available at the NACE 3-digit level. The production data exclude VAT, and the employment data relate to persons employed excluding home workers. The definitions are standardised, and so the figures are comparable across industries and countries.

Estimates are not supplied to Eurostat by Member States for the firms not covered by the enquiries, and the figures under-report actual employment and production. Where this is significant, either industry association sources are used or a note is made in the commentary. Derived statistics which are calculated from both production and trade statistics will also be affected. Apparent consumption will be understated, and import penetration ratios and export rates will be overstated.

Gaps in Eurostat's data for production and employment have where possible been filled by estimation. Denmark provided

final data up to 1990; Germany, Spain, Luxembourg, the Netherlands, and the United Kingdom up to 1989; and the remaining countries provided data up to 1988. EC totals contain estimates for missing countries, and these are not specifically footnoted.

Estimates are derived from short-term indicators such as indices of production, producer prices and employment. Data for 1991 are based on indicators for the early months of the year, but also take into account independent sectoral forecasts. Eurostat's estimates are only made for the NACE 2-digit and 3-digit level. Gaps in industry association figures at the 4 or 5-digit level have normally not been filled due to the scarcity of statistics at this level.

Exchange rate conversion and deflators

All data are reported in ECU, and national currencies have been converted at the average exchange rate prevailing for the year in question. The exchange rates used for the conversions are stated in the 'Annex' section at the end of the 'Highlights' chapter. Producer price indices have been used to deflate production and value added data. In cases where the corresponding NACE 3-digit index has not been available, the NACE 2-digit index has been used. For Portugal, where such indicators are not yet available, the corresponding retail price indices have been taken.

Trade data

The trade data are reported in terms of Community trade flows with the rest of the world. In most cases, these data are based on Eurostat figures. Export valuations are generally fob (free on board, i.e. excluding freight and insurance costs) whereas import data are cif (i.e. inclusive of carriage, insurance and freight). Import statistics may generally be regarded as slightly more accurate than export statistics due to greater ease of data collection in the former case.

All trade figures are in current ECU. For comparative purposes, the ratio of exports to imports (X/M) has been calculated for each set of trade data.

Trade figures for Spain and Portugal before 1984 have been estimated from non-Eurostat sources.

Table of contents

Chapter 5: Non-metallic minerals

Chapter 6: Chemicals

Chapter 7: Metal products

Chapter 8: Mechanical engineering

Chapter 9: Electrical and electronic engineering

Chapter 10: Electronic engineering

Chapter 11: Transport equipment

Chapter 12: Instrument engineering

Chapter 13: Food, drink and tobacco

Chapter 14: Textiles, leather, footwear and clothing

Chapter 15: Wood processing

Chapter 16: Pulp, paper, printing and publishing

Chapter 17: Rubber and plastics

Chapter 18: Other manufacturing industries

Chapter 19: Construction

REVIEWS AND FORECASTS: SERVICE SECTORS

Chapter 20: Distribution

Chapter 21: Tourism

Chapter 22: Transport services

Chapter 23: Financial services

Chapter 24: Business services

Chapter 25: Information services

Chapter 26: Social services

Chapter 27: Audiovisual services

Q U E S T I O N N A I R E

FOR THE ATTENTION OF READERS OF PANORAMA OF EC INDUSTRY

This is the fourth edition of "Panorama of EC Industry" published by the Office for Official Publications of the European Communities. We would be grateful if you could complete this short questionnaire which will enable us to adapt future editions of Panorama to your needs.

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Quality of information	--	-	0	+	++
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Quality of information	--	-	0	+	++
Comprehensiveness of the information	--	-	0	+	++
Choice of subjects for the "special features"	--	-	0	+	++
Quality of the "special features"	--	-	0	+	++

6) For what reasons do you read Panorama ? (several answers possible)

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For information about specific sectors	( )
Statistics	( )
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Consulting Panorama on a database CD-ROM	Yes	No
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.....

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Special Features

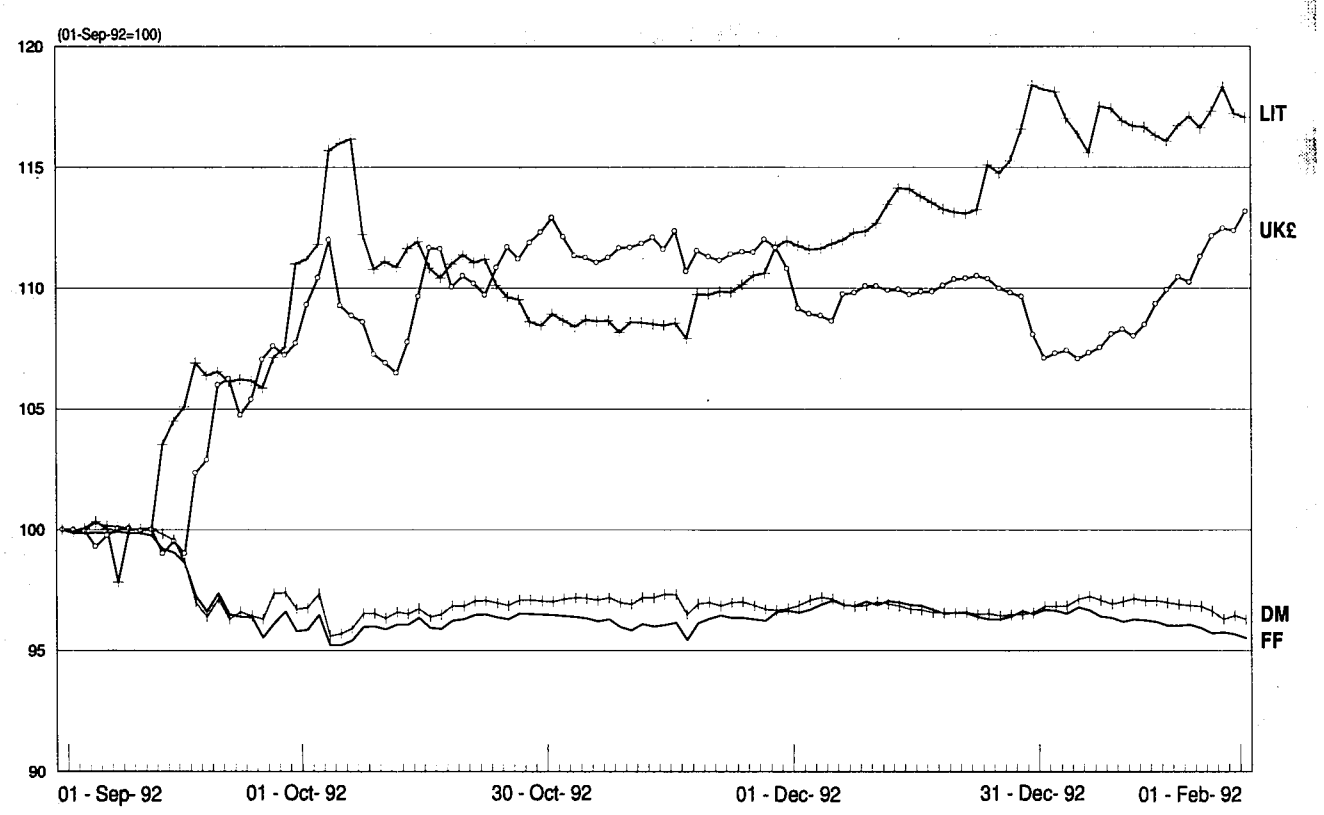
Highlights

INTRODUCTION

This fourth edition of the Panorama of EC Industry was prepared during the second half of 1992, in the midst of major turbulence on exchange rate markets and declining business and consumer confidence. In 1993 and beyond, Europe's industry will have to face a new set of challenges, while policy makers address a number of issues that could not be resolved before the end of 1992, as had originally been planned:

- The Maastricht Treaty, which shapes the new Europe, is still awaiting ratification by some of the Member States.
- The UK pound and the lira, which had to drop out of the EMU at the end of September, have not yet rejoined, despite Italy's hopes to bring the lira back into the system as soon as possible. During the first months of 1993, speculators were still putting pressure on some of the system's weaker currencies, sometimes doing so successfully (as with the Irish punt), other times less so (with the French franc).
- By the end of 1992, no agreement had yet been reached within the framework of the Uruguay Round. The change in US administration mid-January leaves little prospects of a rapid conclusion to the Uruguay Round.
- The modernisation of the economy of the East German Laender is proving to be much more expensive than had originally been anticipated. It is draining resources in Germany and leaving little room for a monetary expansion in the EC in early 1993.
- Chaos is what best characterises the present situation in the former planned economies. The unstable political situation in the countries of Eastern Europe discourages foreign direct investment in these regions.

Figure 1: Changes in exchange rates of selected currencies against the ECU



Source: DRI Europe

Furthermore, the US economy continued to post only moderate rates of growth at the end of 1992. Hopes of a stronger recovery began to subside as President Clinton seemed to step back on some of his election promises. As always when economic conditions are poor, the possibility of protectionist measures arises. Should some of the world's governments yield to pressures for increased protection of what are viewed as "strategic" industries, world trade growth prospects would be dampened, which would threaten the recovery.

In Japan, the economic situation was still deteriorating in the early months of 1993, with little hope of a recovery before the second half of the year at best.

Europe's industry has been affected unevenly by these various factors. Some sectors seem to have continued navigating virtually unaffected by the storm whereas others, already hurt by the growth recession of the early 1980s, by the unfavourable exchange rate developments in the mid 1980s, and by the enhanced competition from new suppliers on the world market, experienced a serious blow. Among these casualties, are the iron and steel and computer industries and defence.

In these troubled times, this *Panorama of EC Industry* attempts to give a clear picture of the present state of Europe's industry, of its relative strengths and weaknesses, and of the ways businesses themselves are trying to cope with the current problems. In the first part of this *Panorama*, a number of issues of particular relevance for Europe's industry today are discussed. Such issues include recent trends in cross-border mergers and acquisitions, and in direct foreign investment (both within the EC and by EC companies in the rest of the world), the impact of the completion of the Single Market on European industry and an analysis of the EC firms' relative performance in patented technologies. In the second part of *Panorama*, Europe's economy has been broken down into over 180 industrial and services sectors, each of which is the subject of a special chapter.

The present article provides an overview of the key issues that are discussed in this fourth edition of the *Panorama*. It compares the relative performance of sectors in Europe over the past five years, highlighting those factors that will influence these sectors future growth potential. The analysis has implications for both future restructuring needs or policy. In many of areas, the Commission of the European Communities has already developed an action plan, which is outlined wherever appropriate.

THE EC ECONOMY IN 1993 AND BEYOND

In September of last year, Europe's currency regime fractured and came close completely to breaking apart under the strain caused by high German interest rates resulting from the cost of unification. The prospect of the French referendum on Maastricht provided the trigger that set attacks on one currency after another, starting with the most vulnerable (the lira and sterling) and progressing to the peseta, the Irish punt, the Danish krone and even to the fundamentally strong French franc (Figure 1).

These repeated attacks on the EMS currencies further undermined business confidence, dashing hopes of a rapid recovery in the beginning of 1993. Still, it is the long-term impact of these currency movements, more than the short-term one, that is most alarming. Indeed, the short term-impact on growth of the turmoil in the money markets has not been that considerable. The EC economic outlook had already started to darken considerably over the summer of 1992, with evidence accumulating of an incipient recession in Germany and a deepening recession in the United Kingdom. The problem - high real interest rates - has now become so deeply rooted into the system that even if interest rates were to come down significantly in the early months of 1993, the EC economy would not be able to switch immediately from a recession mode to one of rapid growth.

The present state of the EC Member States' economies and the prospects for 1993 and beyond are discussed in greater depth in the special feature on "Sectoral Prospects", in the first part of this book. This situation can be summarised as follows:

- Germany, hit by high interest rates, rapid labour cost increases and the D-Mark's appreciation, will see its economy contract in 1993. The German economy is suffering from the unwinding of the unification boom and from the deterioration in its competitiveness relative its main trading partners. Most economic indicators for Germany point to a negative rate of growth this year: order books are falling, business confidence, as measured by the EC's business tendency surveys, has come down to a worrying level, industrial production is declining in many sectors and unemployment is rising. This, combined with the high level of interest rates, is expected to make fixed investment one of the main casualties of the recession. Although residential construction may hold up due to the shortage in housing, the outlook for business fixed investment is actually quite poor. Even the service sectors, which had held up fairly well until now thanks to the unification effect, will not hold up indefinitely.
- The French economy is one of the soundest in the EC at present. Its currency, despite the fact that it has been repeatedly under pressure from speculators, is fairly valued against the D-Mark and possibly even somewhat undervalued. High interest rates, however, are preventing the economy from benefiting from its underlying soundness. This keeps growth under the minimum level required to stabilise unemployment, which is a major cause for concern for policy makers in an election year.
- In Italy, the budget deficit and the privatisation plan dominate the agenda. The planned cuts in public spending and the increases in revenue will dampen consumer spending, while the business sector is in the midst of restructuring. The lira, which had still not re-entered the monetary system

Table 1: EC macroeconomic trends

(% annual change)	1985-89	1990	1991	1992(1)	1993(2)
GDP at constant market prices	3.1	2.8	1.4	1.1	0.7
Employment	1.1	1.6	0.2	-0.5	-0.8
Inflation (3)	4.4	4.5	5.3	4.5	4.4
Investment	5.4	3.9	-0.1	-0.1	-1.1
Investment in machinery	7.9	5.0	-0.1	-1.5	-1.7
Real unit labour costs	-1.0	-0.7	0.4	-0.4	-0.6

(1) February 1993 estimates
(2) February 1993 forecasts
(3) Deflator of consumer prices
Source: Commission Services

in the beginning of 1993, is expected to only re-enter with a wider fluctuation band and if there is a clear presumption that the new parity is "fixed but adjustable".

- In the United Kingdom, problems continue to accumulate as the weak economic growth of the past few years has sent the deficit sky-rocketing - it is now in the 7-8% range as a share of GDP. Inflation will likely rebound as soon as the economy recovers. The UK pound will not likely rejoin the EMS in the near term such that the economy ought to be able to maintain its competitiveness vis-à-vis the rest of the EC through continued devaluation of the sterling. The faster projected growth in real UK GDP this year is, in fact, principally a reflection of stronger projected growth in real net exports.

Elsewhere, the picture is not much brighter:

- In the USA, there is growing confidence that real GDP growth will be in the 2.5-3% range this year, and that it could rise well over 3% in 1994 provided that the new President introduces the package of fiscal stimulus that he promised during the election campaign. However, this is unlikely to be sufficient to lead the world economy out of the present growth recession or to solve the difficulties of those of its sectors which are presently calling most vehemently for increased protectionist measures (such as the steel sector and the aerospace industry).

- In Japan, the economic situation also continues to deteriorate rapidly. The chances of a speedy Japanese recovery have faded, and there is now little hope of much improvement before mid-to late 1993.

RECENT PERFORMANCE OF EC INDUSTRY

Figure 2 ranks 89 sectors of Europe's industry based on their average annual rate of growth in production over the period 1986-91. The bars in Figure 2 have been shaded according to whether the sectors are typically "capital goods producing sectors", "intermediate goods producing sectors" or "consumer goods producing sectors".

Generally speaking, the sectors which experienced the fastest growth over the 1986-91 period have the consumer goods producing sectors, and to some extent, intermediate goods producing sectors. Several segments of the food and drink sector recorded particularly buoyant growth, a large part of this being accounted for by German unification. In contrast, the capital goods producing sectors are among the "moderate growth" sectors, with two notable exceptions: telecommunications equipment and office and data processing equipment.

The relative weakness in the capital goods producing sectors' occurred despite the recovery of business fixed investment in the EC over the period, and is a major cause for concern given the need to maintain a modern and productive capital base in the economy to remain competitive in increasingly global markets.

By far the fastest growing sector over the 1986-91 period was the manufacture of automotive body parts. This sector recorded average growth of close to 10% per year in real terms, mainly reflecting the rapid growth in automotive vehicle sales in the late 1980s and the set-up of Japanese transplant operations in several EC Member States, in particular, the United Kingdom and Spain.

Most of the other rapidly growing sectors, such as the manufacture of pharmaceutical products, the processing of plastics, the manufacture of office machinery and data processing equipment and the production of telecommunications equipment, are high technology sectors for which demand has grown rapidly both within Europe and worldwide over the period considered. Nevertheless, in some of these sectors, the rate of growth of production in the EC, as illustrated in Figure 1, was not sufficient to prevent sometimes serious losses in market shares, as described below.

There are also some less technology intensive market segments among the fastest growing sectors. This is the case of the secondary transformation and treatment of metals, the manufacture of soft drinks, textile finishing and the manufacture of pulp, paper and board. Changes in household consumption patterns combined with generally faster growth in real disposable incomes in the EC in the second half of the 1980s encouraged the rapid expansion of the packaging sector. This boosted demand and production of sectors such as the processing of plastics, of pulp, paper and board, and the manufacture of glass and glassware. The rapid growth in the secondary transformation and treatment of metals also reflects the rapid growth of the transport equipment sectors over the period, in particular, the automotive industry and the aerospace sector.

Among the "rapid growth" sectors, which experienced an average annual rate of growth in production between 4.5% and 6% over the period, are many sectors whose demand is related to construction activity. This is the case, for instance, of the concrete, cement and plaster sector, the manufacture of household textiles, of wood manufacture, carpets, linoleum and floor coverings and even of the manufacture of domestic electrical appliances. Indeed, the construction sector itself, which is not shown on this figure, experienced rapid growth in most EC Member States over the period thanks to improved economic conditions in general, to relatively low interest rates (this followed a period of very high real interest rates in the early to mid 1980s), to the revival of business fixed investment and to the high level of demand for new housing in Germany due to the inflow of refugees from the East. Construction activity nevertheless started weakening in 1991-92, and the short term prospects for this sector are particularly downbeat. The coming years will thus see much slower growth of all sectors related to construction activity, irrespective of any price competitiveness effect.

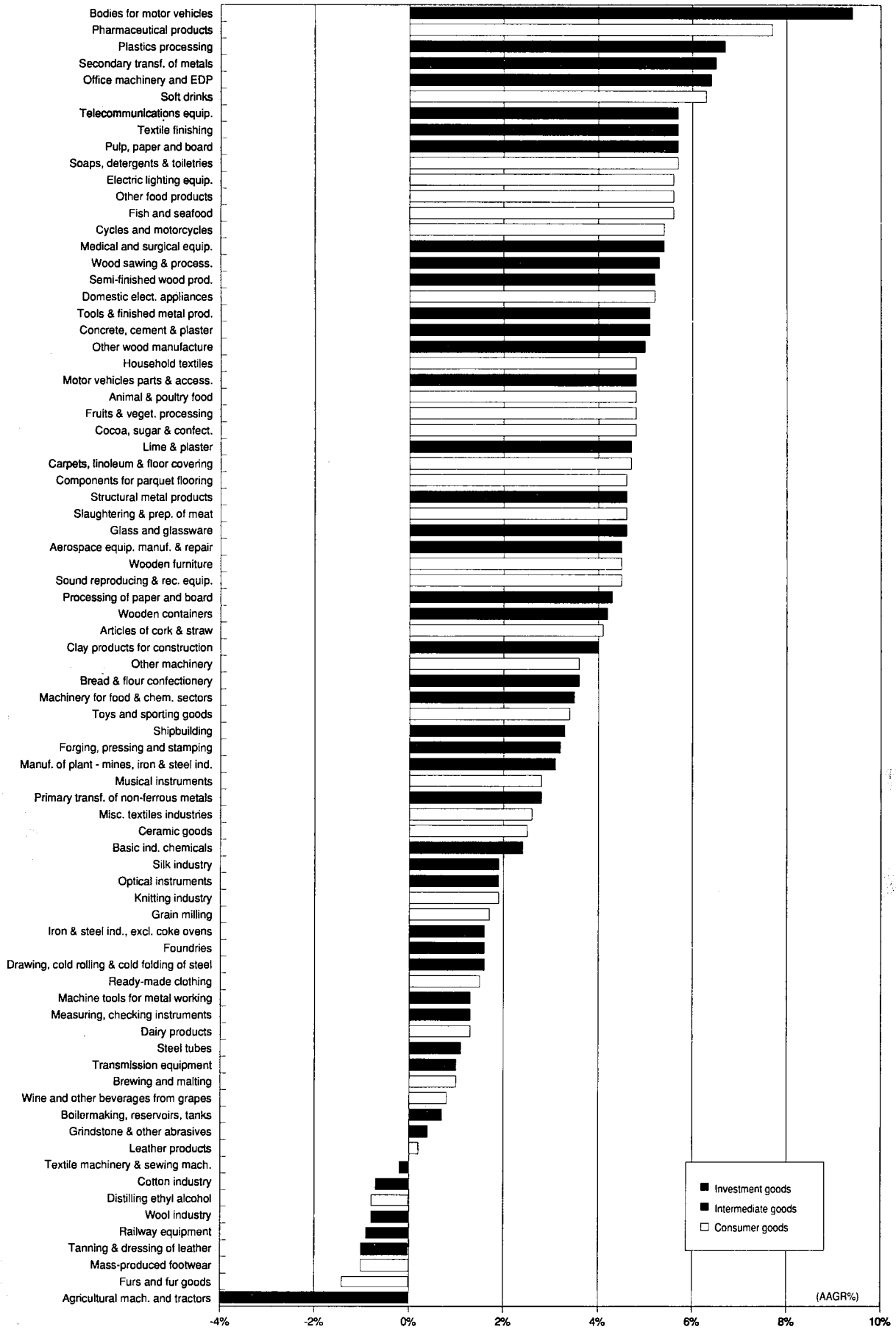
Also among the rapid growth sectors over the period 1986-91 are some "basic" consumer goods sectors such as soaps and detergents, fish and seafood, other food products, animal and poultry, the slaughtering and preparation of meat and fruit and vegetable processing. This again partly results from the German unification effect: in 1990 and 1991, the production of the food and drink sector in Germany grew respectively 12.5% and 8.8%, due to strong growing demand from the eastern Laender.

Most of the remaining food and other "basic" non-durable consumer goods producing sectors posted a growth in output which ranged between 2.5% and 4% over the period, mirroring the moderate growth of demand for such "mature" products.

Finally, among the "slow growth" sectors and the sectors whose output declined between 1986 and 1991, are many basic products related to the textiles and clothing industries (such as the cotton and wool sectors, the tanning of leather, and also the production of textile machinery), and equipment related to basic infrastructure investment by the public sector (such as railway equipment, the manufacture of transmission equipment, and the manufacture of boilers).

Figure 2, however, does not give a good idea of which sector have been the "high performance" sectors over the past 5 years from an international perspective, nor of which sectors are likely to continue posting rapid growth over the coming years. There are some sectors - even among the fastest growing ones - for which EC producers have experienced losses in market shares both at home and abroad. There are also a number of "slow" or "medium" growth sectors in which EC producers have, in fact, posted a very healthy performance over the past five years, expanding their market share at the expense of other world competitors.

Figure 2: Industrial output growth by sector, 1986-91
(average annual growth rate, in %)



Source: Eurostat

Table 2: Fast growth/high export intensive sectors, 1991

(%)	Production growth 1986-91	Export intensity	Import penetration
Office machinery and EDP	6.4	20.4	48.6
Telecommunications equipment	5.7	15.4	14.8
Electric lighting equipment	5.6	16.3	12.1
Medical and surgical equipment	5.4	34.3	37.3

Source: DRI Europe, based on Eurostat data

Given that the uncertainties that characterise future trends in the EC economy mainly result from external developments rather than from domestic developments, it is the sectors that are most trade intensive that are likely to be most vulnerable over the coming years. In particular, European Industry must overcome:

- the absence of an agreement within GATT;
- increased competitive pressure from a number of trading blocks (Eastern Europe, China, and various countries in the Far East);
- rising protectionist pressures in the USA;
- the structural problems of the US economy, and the cyclical downturn in Japan,

The analysis in the next sections aims at providing a better assessment of the relative performance of EC-based producers over the past five years compared to their world competitors.

Tables 2 to 7 classify sectors into six broad categories, depending on their average annual rate of growth of production over the period 1986-91 and the share of output that is exported.

In Table 2 are those sectors which have posted very rapid growth in output over the past five years, and which are also characterised by a high export intensity of production. These sectors are thus highly sensitive to changes in world economic conditions - in particular to changes in demand trends or to changes in the world competitive environment. Within this category, are office machinery and data processing equipment, telecommunications equipment, electric lighting equipment and medical and surgical equipment. All four sectors posted average annual growth in excess of 5% per year over the period 1986-91, and export more than 15% of their total output outside the EC. Table 2 also provides a measure of the import penetration ratio, measured as the share of imports in domestic production This rate of import penetration is particularly high in two sectors, office machinery and medical and surgical instruments, indicating that, although EC industry exports a high share of its production in these sectors, foreign producers also control a high share of the EC's internal market.

Table 3 lists those sectors which experienced buoyant growth over the past five years (i.e. in excess of 5% per year on average), but which are less export-oriented (the share of exports in production is less than 15%). These are sectors for which the rapid rate of growth in production between 1986-91 reflects more a strong rate of growth of domestic demand within the EC than a rapid growth of export markets. Among these sectors are several market segments of food and drink, which benefited from buoyant demand in unified Germany in 1990 and 1991, and a number of sectors linked to packaging and to construction activity. As in Table 2, however, we also find among these sectors a set of industries for which the rate of import penetration is very high, such as pulp, paper and board, wood sawing and processing, or cycles and motorcycles. In some cases, this reflects a lack of natural resources within the EC, but in others such as for cycles and motorcycles it does reflect competitiveness problem of the EC in global markets.

Table 4 lists those sectors which have experienced rapid but not buoyant growth over the past five years and which also have a high rate of export intensity. This list includes such sectors as aerospace equipment and repair, sound recording and reproducing apparatus, and, again, sectors linked to construction activity such as household textiles, carpets, linoleum and floor coverings. Most of the sectors are also vulnerable to competition from abroad, as the rate of import penetration

Table 3: Fast growth/low export intensive sectors, 1991

(%)	Production growth 1986-91	Export intensity	Import penetration
Bodies for motor vehicles	9.4	7.4	3.3
Pharmaceutical products	7.7	14.0	7.3
Plastics processing	6.7	9.3	7.1
Secondary transf. of metals	6.5	5.6	5.5
Soft drinks	6.3	2.4	0.4
Pulp, paper and board	5.7	7.6	47.5
Soaps, detergents and toiletries	5.7	9.7	2.0
Other food products	5.6	7.6	3.6
Fish and seafood	5.6	8.4	33.6
Cycles and motorcycles	5.4	11.5	52.3
Wood sawing and processing	5.3	4.8	96.0
Semi-finished wood products	5.2	5.8	25.2
Domestic electronic appliances	5.2	12.6	9.7
Tools and finished metal products	5.1	10.6	8.0
Concrete, cement and plaster	5.1	1.3	0.4
Other wood manufacture	5.0	9.3	19.0

Source: DRI Europe, based on Eurostat data

Table 4: Medium growth/high export intensive sectors, 1991

(%)	Production growth 1986-91	Export intensity	Import penetration
Household textiles	4.8	17.6	35.2
Carpets, linoleum & floor coverings	4.7	17.8	20.2
Aerospace equipment manuf. & repair	4.5	31.3	35.6
Sound reproducing & recording equip.	4.5	21.8	55.9
Manufacture of articles of cork & straw	4.1	21.4	22.5
Other machinery & equipment	3.6	35.7	17.0
Machinery for food & chemical sectors	3.5	30.7	11.0
Toys and sports goods	3.4	24.5	87.5
Shipbuilding	3.3	21.9	14.0
Manuf. of plant mines, iron & steel ind.	3.1	22.2	10.9

Source: DRI Europe, based on Eurostat data

in these markets exceeds the export intensity ratio - sometimes by quite a high factor.

Table 5 provides a list of "medium growth - mainly domestic demand driven" sectors which posted growth between 3% and 5% per year on average between 1986 and 1991 - and which exported less than 15% of their output to non-EC destinations. Among these are several food and related products, as well as heavy construction materials. All these sectors are expected to post slower growth in the coming years than had been the case in the late eighties, due to the general slowdown in economic activity, in particular in EC construction activity, and to the unwinding of the German unification effect, which has brought the rate of growth of basic consumer goods producing sectors such as food and drink back to "normal".

In Table 6 are sectors which grew at rates of growth significantly below the average for the EC manufacturing industry (i.e., by less than 3% per year on average between 1986 and 1991), and which are also highly export oriented. The comparatively slower rate of growth of these sectors, which are highly dependent on export markets, reflects either a slow growth of demand within the EC and worldwide or persistent losses in market shares of EC producers both domestically and abroad. The high rate of import penetration in some of these markets does seem to indicate that some of these sectors suffered from major losses in market shares over the past five years, either because of bottlenecks in supply or because of a loss in competitiveness relative to the other world producers.

Finally, in Table 7 are those sectors which are both slow growing and little export oriented, i.e. sectors for which either demand has grown only slowly over the past five years, or which have lost out to non-EC producers on the home market.

To provide a better assessment of the relative performance of the EC sectors over the 1986-91 period, and to identify those sectors that have been or will continue to be exposed to the greatest competitive challenge, we have calculated a "vulnerability" index which measures the relative change in the EC's net trade position vis-à-vis the rest of the world. This index is defined as the change in the rate of export intensity between 1986 and 1991, minus the change in the rate of import penetration over the same period.

A high negative value of the vulnerability index thus indicates that there has been a deterioration in the net trade position of the EC vis-à-vis the rest of the world between 1986 and 1991, whereas a positive value indicates that the net trade position of the EC (measured in volume terms) has improved between 1986 and 1991, either because export intensity has risen more than the rate of penetration of imports, or because there has been an absolute decline in the rate of penetration of imports over the period.

Table 8 ranks those sectors which have posted the strongest deterioration in their net trade position vis-a-vis the rest of

Table 5: Medium growth/low export intensity sectors, 1991

(%)	Production growth 1986-91	Export intensity	Import penetration
Motor vehicles parts & accessories	4.8	13.7	7.7
Animal & poultry food	4.8	2.9	2.1
Fruits & vegetables processing	4.8	8.8	21.5
Cocoa, sugar & confectionery	4.8	6.5	2.4
Lime & plaster	4.7	2.1	1.8
Components for parquet flooring	4.6	3.5	6.4
Structural metal products	4.6	8.4	3.0
Slaughtering and preparation of meat	4.6	5.1	5.1
Glass and glassware	4.6	11.0	7.5
Wooden furniture	4.5	9.2	6.4
Processing of paper and board	4.3	7.2	6.6
Manufacture of wooden containers	4.2	2.1	2.0
Clay products for construction	4.0	3.4	0.4
Bread and flour confectionery	3.6	3.0	0.8
Forging, pressing and stamping	3.2	4.0	2.5

Source: DRI Europe, based on Eurostat data

Table 6: Slow growth/high export intensity sectors, 1991

(%)	Production growth 1986-91	Export intensity	Import penetration
Manufacture of musical instruments	2.8	30.0	68.2
Primary transf. of non-ferrous metals	2.8	19.0	55.9
Miscellaneous textiles industries	2.6	26.7	16.3
Manufacture of ceramic goods	2.5	20.1	7.3
Optical instruments	1.9	52.4	85.9
Knitting industry	1.9	20.0	41.7
Steel drawing, cold rolling & cold folding	1.6	15.8	8.7
Manuf. of ready-mixed clothing	1.5	15.6	39.0
Machine tools for working metals	1.3	26.9	16.9
Measuring, checking instruments	1.3	21.9	15.4
Steel tubes	1.1	30.7	12.3
Transmission equipment	1.0	24.7	15.9
Grindstone & other abrasives	0.4	24.8	17.1
Manufacture of leather products	0.2	45.8	66.4
Textile machinery and sewing machinery	-0.2	56.3	15.6
Cotton industry	-0.6	34.8	23.2
Distilling of ethyl alcohol	-0.8	26.5	2.7
Railway equipment	-0.9	28.1	7.9
Tanning and dressing of leather	-1.0	25.1	24.6
Mass-produced footwear	-1.0	26.4	29.7
Furs and fur goods	-1.4	53.8	35.6
Agricultural machinery and tractors	-4.0	24.5	9.6
Articles of asbestos	-14.9	18.1	7.5

Source: DRI Europe, based on Eurostat data

the world between 1986 and 1991, while Table 9 lists those sectors which have seen a relative improvement in their net trade position over the period considered.

Figure 3 indicates, for each of the above-mentioned sectors, whether the change in the net trade position results from a change in import penetration, from gains (or losses) on the export side, or from a combination of both. Figure 7 shows the performance of the various industrial sectors according to a combination of two criteria, namely the export/import ratio (X/M) and the share represented by exported goods in relation to output. This gives an idea of both the intensity of trade (mainly due to specialisation within sectors) and the competitive position of those sectors.

Trade creation

In the upper right-hand quadrant of Figure 3 are those sectors for which both export intensity and import penetration have increased over the period considered - i.e. sectors for which there has been a as "trade creation" effect over the past five years. These are:

- Sound reproducing and recording equipment
- Miscellaneous textiles industries
- Ready-made clothing
- Manufacture of leather products
- Cotton industry
- Distilling of ethyl alcohol
- Railway equipment
- Dressing and tanning of leather

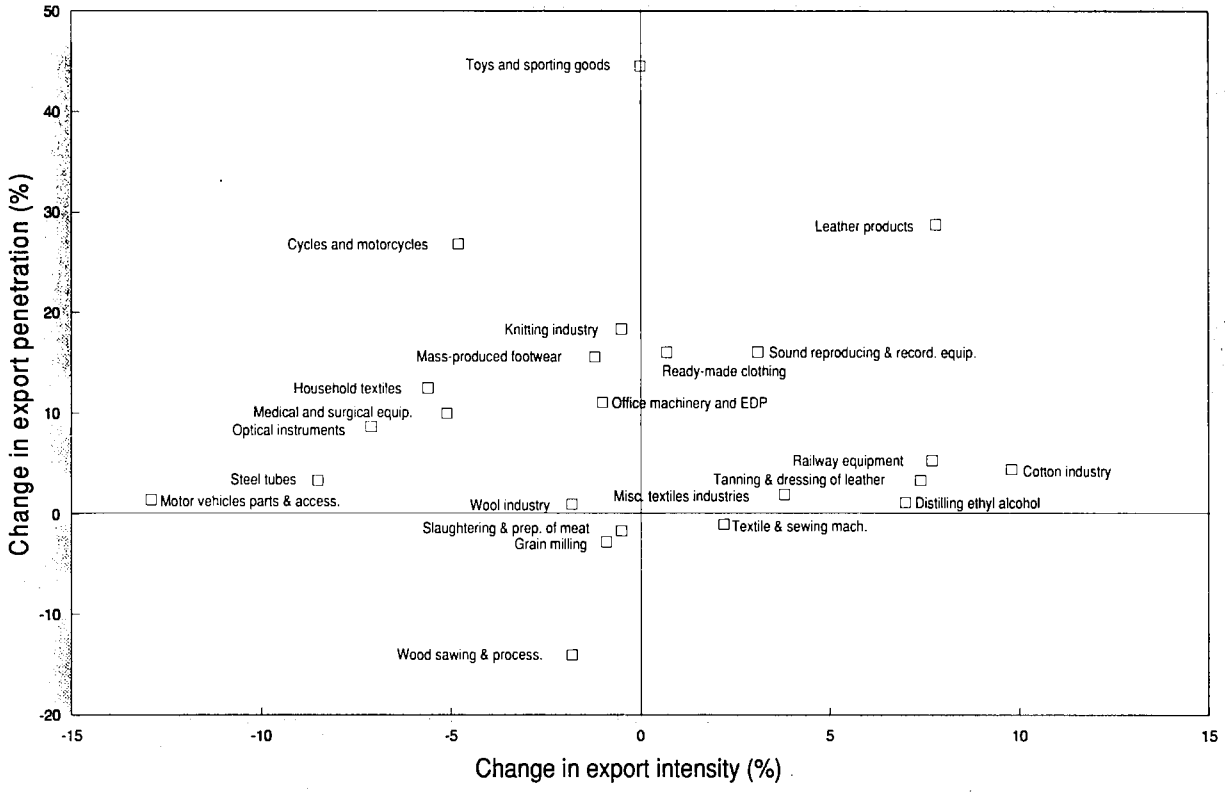
In most of these sectors, the EC has actually improved its net trade position vis-à-vis the rest of the world - the exceptions being sound reproducing and recording equipment, and ready-made clothing (see Table 8). In all other sectors, the rise in the EC's export intensity has exceeded the rise in EC import penetration over the period, which denotes a relative improvement in the competitiveness of these EC sectors on world markets. In the case of sound recording and reproducing equipment and for miscellaneous textiles, the picture is mixed since in both cases the rise in import penetration has largely exceeded that of export intensity. This reflects the increased speciali-

Table 7: Slow growth/low export intensity sectors, 1991

(%)	Production growth 1986-91	Export intensity	Import penetration
Grain milling	1.7	7.1	0.5
Iron & steel Industry, excl. coke ovens	1.6	12.7	7.3
Foundries	1.6	4.9	2.9
Dairy products	1.3	5.8	1.2
Brewing and malting	1.0	4.3	0.4
Wines and other beverages from grape	0.8	7.0	0.3
Boilermaking, reservoirs, tanks	0.7	6.8	2.1
Wool industry	-0.8	12.3	20.5

Source: DRI Europe, based on Eurostat data

Figure 3: Change in export intensity / import penetration by sector, 1986-91



Source: DRI Europe, based on Eurostat data

sation of the EC industry in certain segments of these markets, along with losses in market shares in the "mass" market segments.

Increased competitiveness of EC industry

The second quadrant of Figure 3, in the lower right-hand side of the chart, groups those sectors for which the rise in the export intensity of EC production was accompanied by a decrease in import penetration. The sectors which fall in this quadrant have thus seen their net trade position improve significantly over the period considered. The only sector which falls in this category, however, is the textile and sewing machinery sector which, despite its improved net trade position, has seen no growth in output in the EC over the period 1986-1991 and even experienced a slight decline.

Losses in competitiveness

In the upper left-hand quadrant of Figure 3 are sectors which suffered both from an increase in the rate of penetration of foreign producers in the EC market, and from a fall in the export intensity of domestic production. These are sectors in which EC-based manufacturers have lost significant market shares both at home and abroad for a number of reasons, these reasons range from uncompetitive cost increases, to un-

Table 8: Ranking of sectors most vulnerable to external competition, 1991

	(vulnerability index)
Toys and sports goods	-44.5
Cycles and motorcycles	-31.6
Leather products	-21.0
Knitting	-18.9
Household textiles	-18.1
Mass-produced footwear	-16.7
Optical instruments	-15.7
Ready-made clothing	-15.4
Medical and surgical equipment	-15.0
Motor vehicles parts and access.	-14.3
Sound reprod. and rec. equipment	-13.0
Office mach. and EDP	-12.0
Steel tubes	-11.8

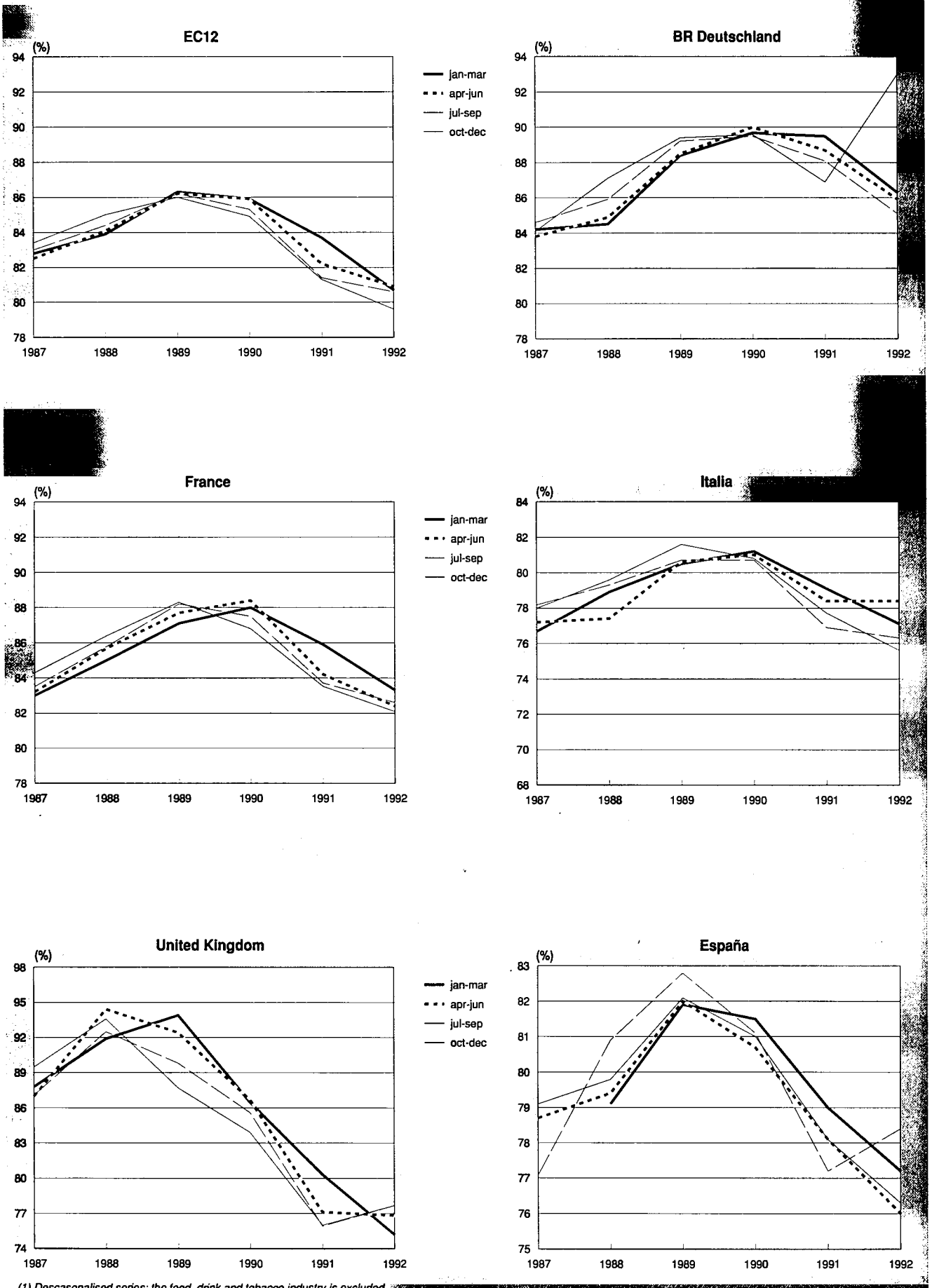
Source: DRI Europe, based on Eurostat data

Table 9: Ranking of sectors which improved their competitive position on world markets, 1991

	(vulnerability index)
Wood sawing & processing	12.2
Distilling of ethyl alcohol	5.9
Cotton industry	5.4
Tanning and dressing of leather	4.1
Textile and sewing machinery	3.3
Railway equipment	2.4
Grain milling	2.0
Miscellaneous textiles industries	1.9
Slaughtering and preparation of meat	1.2
Semi-finished wood products	1.2

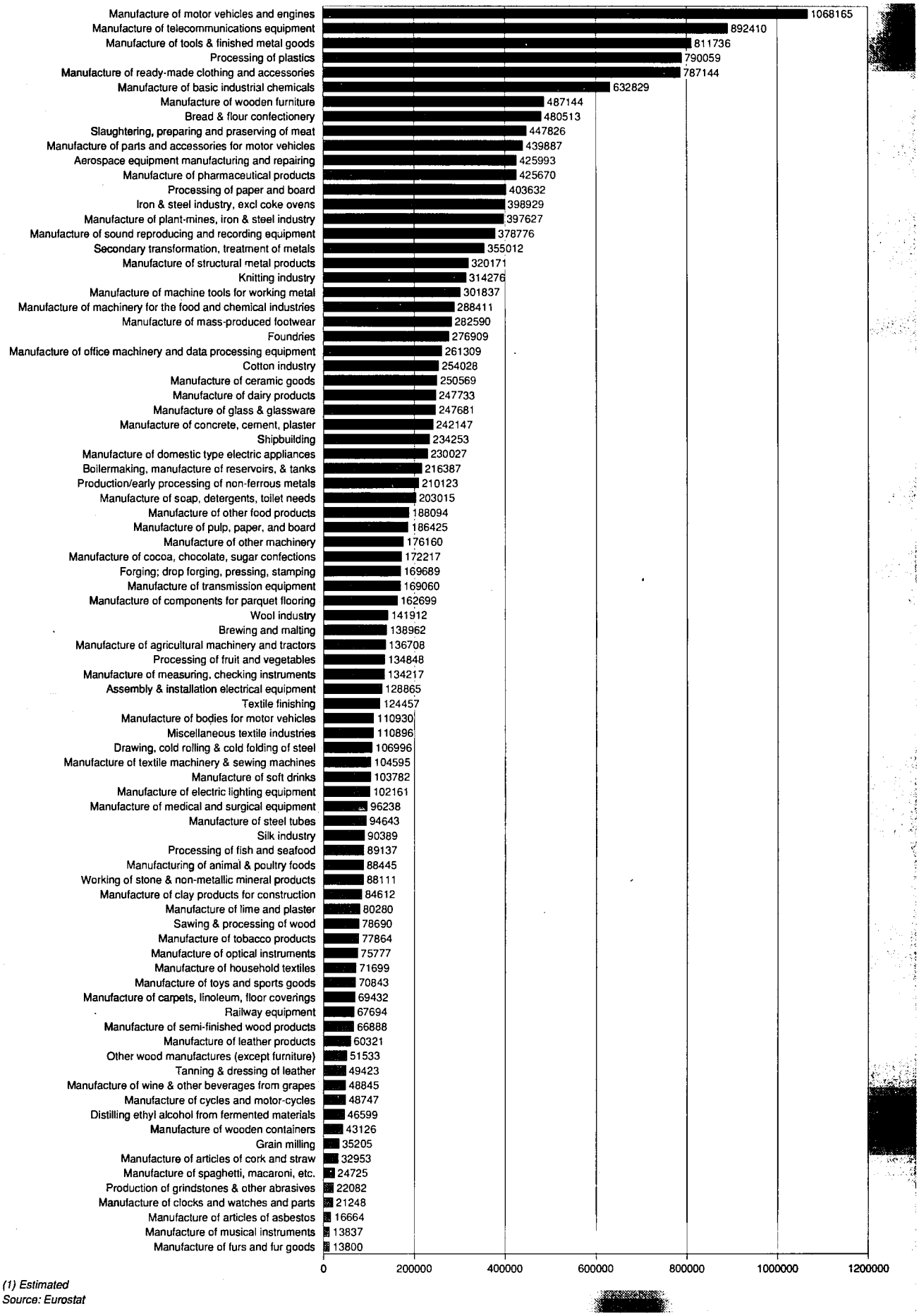
Source: DRI Europe, based on Eurostat data

Figure 4: Capacity utilisation rate in the EC manufacturing industry (1)



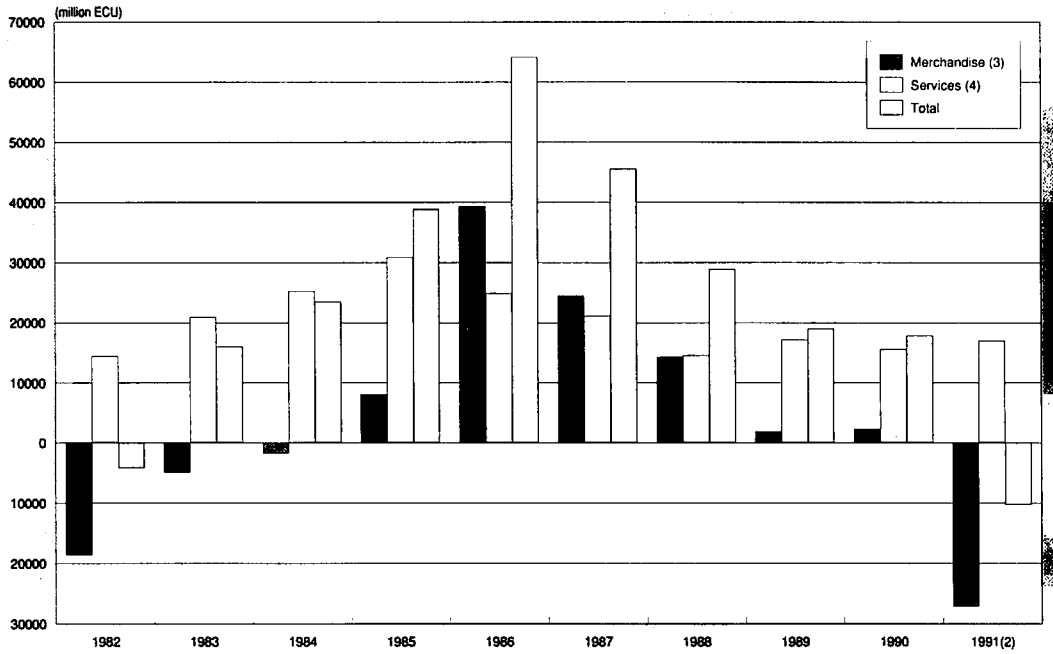
(1) Descasonalised series; the food, drink and tobacco industry is excluded
Source: Commission Services

Figure 5: Employment in the EC industry, 1991 (1)



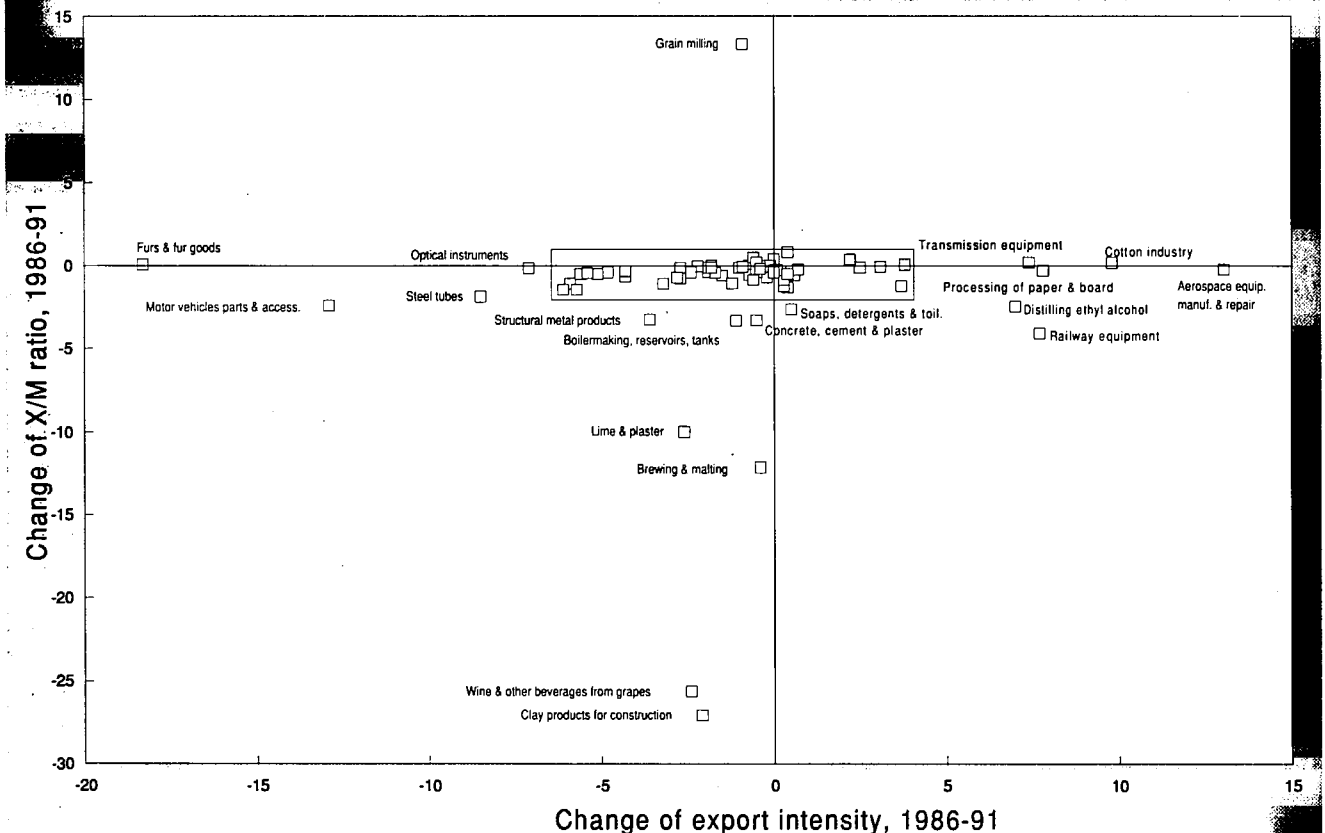
(1) Estimated
Source: Eurostat

Figure 6: EC trade balance (1)



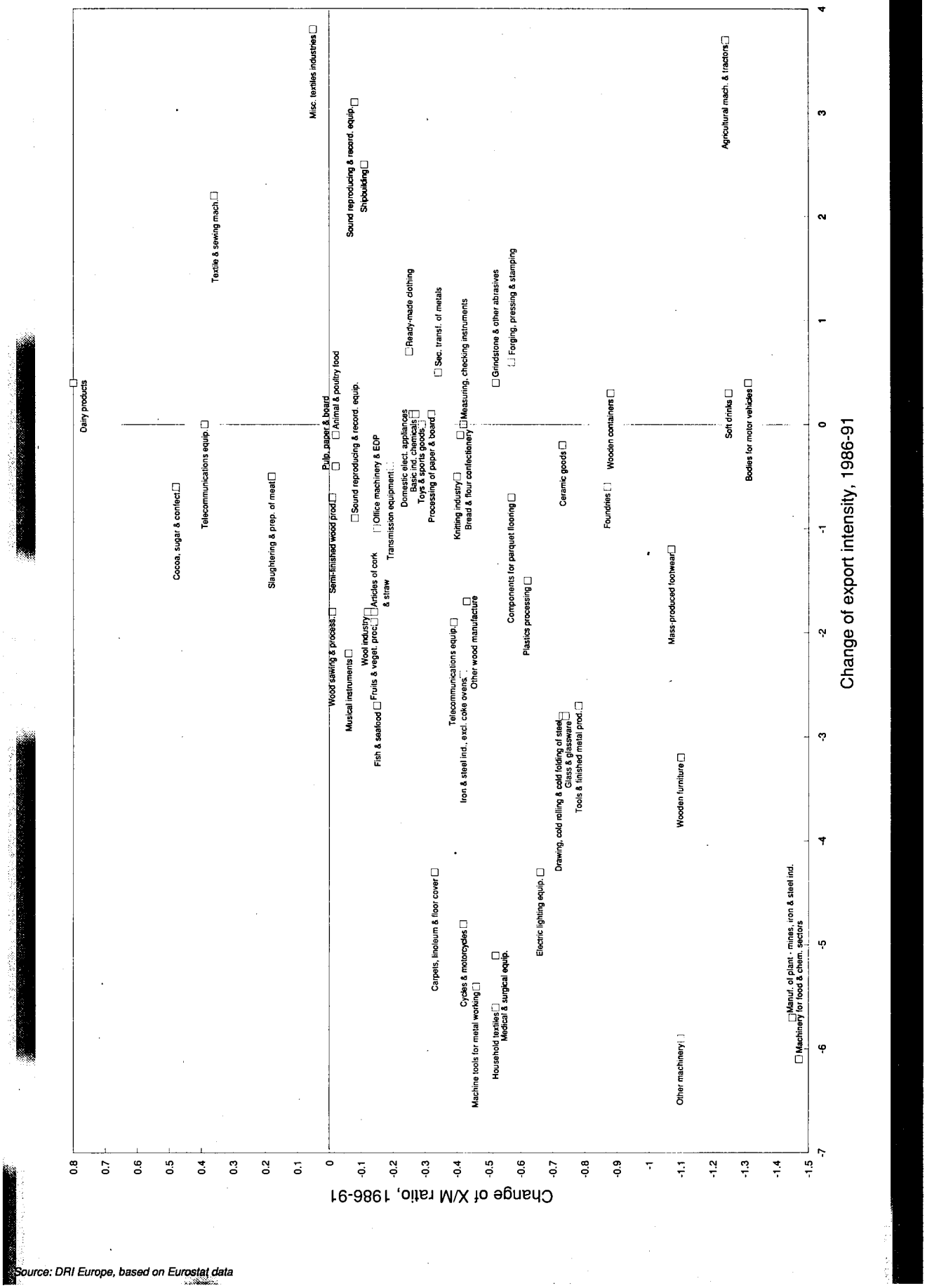
(1) Including former Eastern Germany from mid-1990
(2) Ireland is estimated
(3) FOB/FOB
(4) Transport, travel, other services
Source: Eurostat

Figure 7: Performance of EC industry in terms of exports, 1991



Source: DRI Europe, based on Eurostat data

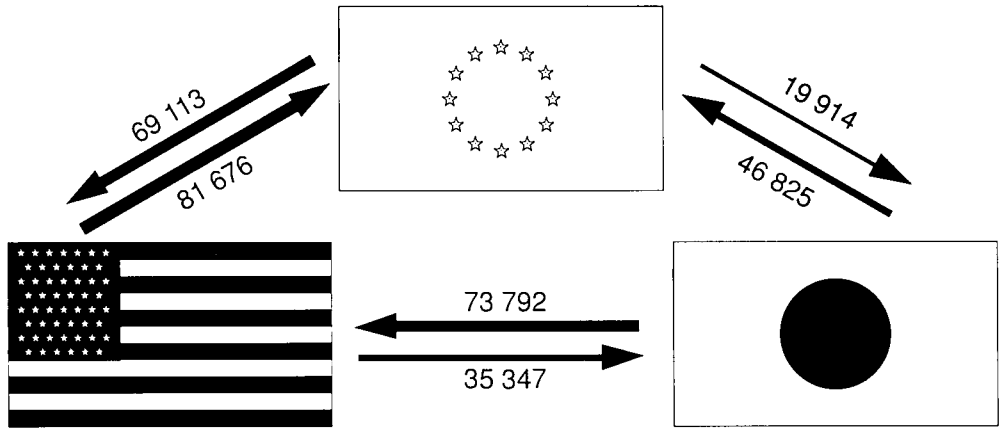
Figure 7: (continued) Performance of EC industry in terms of exports, 1991



Source: DRI Europe, based on Eurostat data

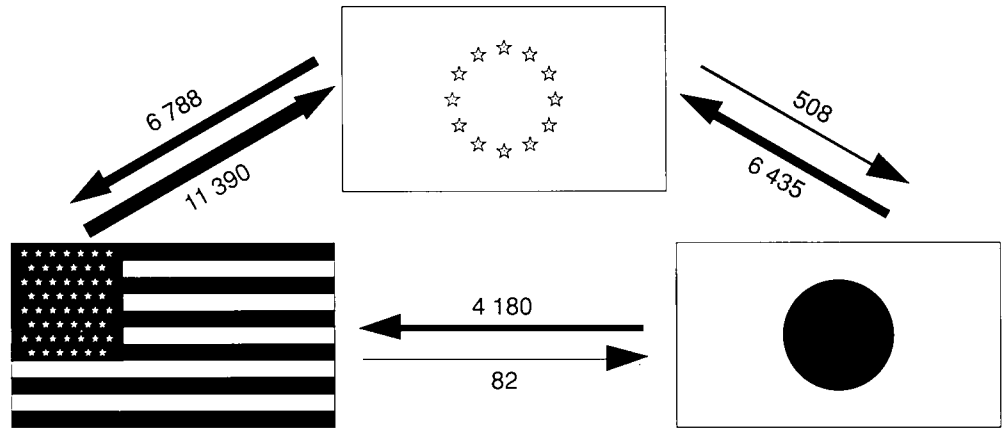
Figure 8: EC - USA - Japan, 1991 (million ECU)

Exports (1)



(1) Manufactured goods

Foreign direct investment (2)



(2) Including reinvestment profits

Source: Bank of Japan, US Department of Commerce

favourable exchange rate developments, inadequacy of demand and supply, and, in some cases, capacity problems within the EC which caused exports to switch from foreign markets back to the domestic market. Among the sectors in this list are all of the previously mentioned "vulnerable" sectors, except sound reproducing and recording equipment and ready-made clothing for which the export intensity of EC output did increase over the period, as indicated earlier. It is thus these sectors that EC policy makers and the business sector itself will have to focus their attention on if the EC industry is not to lose out completely to foreign producers in what are mostly "dynamic" market segments. Indeed, most of these "highly vulnerable" sectors are sectors for which demand has been growing in excess of 4% per year on average in real terms over the period 1986-91. These are:

- Office & EDP equipment
- Cycles and motorcycles
- Medical & surgical equipment
- Household textiles
- Motor vehicles parts & accessories
- Toys and sports goods
- Optical instruments
- Knitting
- Steel tubes
- Mass-produced footwear

Trade destruction impact

In the lower left-hand quadrant of Figure 3 are sectors for which both the rate of import penetration and the export intensity of EC production have decreased over the period considered. There has thus been a "trade destruction" effect, which is largely explained by the slow overall rate of growth of demand, which has taken place alongside an expansion of domestic production capabilities and an increase in intra-EC trade. Among these sectors are:

- Wood sawing and processing
- Semi-finished wood products
- Slaughtering and preparation of meat
- Grain milling

In addition to the sectoral vulnerabilities identified through the above analysis, the recent deterioration in the economic situation of the OECD countries and the developments in Eastern Europe have created additional problems in a number of sectors, which are not yet apparent from this analysis of trade flows between 198691. The three main "problem areas" are pulp and paper, basic chemicals and the steel industry.

In the first two sectors, it is the rapid turnaround in demand in the early 1990s, combined with the fact that the companies in the sector launched massive investments in capacity expansion during the 1980s when the business climate was much sounder, which are at the origin of the problems experienced by these sectors now. This over-investment has created world-wide excess capacity problems and has sent both prices and profits falling.

In the steel industry, rather than an expansion of production capacities within the EC, it is the massive inflow of steel products from Eastern Europe at a time of falling EC demand and the depreciating dollar which explain the difficulties to which the sector is confronted today. Since the peak of the market in 1989, prices have fallen by 25-30%, and now stand near the 1982 levels. Steel imports from Eastern Europe have, in the meantime, increased by close to 20% per year on average, reaching a total of 2.7 million tonnes in 1991. This has seriously hit the profitability of EC steel producers.

The products imported from the central European countries are essentially destined to the construction sector, as these consist of products such as wire rods and concrete reinforcing bars. These low value-added products account for about 6% of the EC's iron and steel consumption. The inflow of low-priced imports from the East has nevertheless led to a significant decline in EC production from 1990 onwards.

The problems currently faced by the EC steel industry are more structural than cyclical. Indeed, EC demand for iron and steel is expected to remain approximately stable over the coming years, in view of the slow projected economic growth and a continuation of past trends in steel use per unit of GDP. There is, in fact, in all industrialised economies a gradual substitution of steel by other materials, such as plastics. At the same time, the EC's external trade balance, which was 2.7 million tonnes lower in 1991-92 than had originally been forecast by the Commission (COM(90) 201 final of May 7, 1990), is expected to continue to shrink. The widening of the deficit in 1991-92, was due both to a 2 million tonne shortfall in exports (compared to what had originally been forecast), and to higher rise in imports than previously anticipated (by 0.7 million tonnes). The shortfall in exports mainly reflected lower exports to the USA (due to the falling dollar) and to the former Soviet Union.

A contraction of the markets for iron and steel products in Eastern Europe and the CIS will inevitably result from the falling level of economic activity in these regions in the short run, and, in the longer run, by a move away from metal products in line with what has been observed in the industrialised countries. This will likely divert an even greater share of steel production from these countries to the EC. At the same time, mounting protectionism pressures in the US put this export market at risk for EC producers.

Within the EC, it thus appears indispensable to launch a new phase of restructuring, which would be aimed at eliminating excess capacities in critical areas. In a recent communication (SEC (92) 2160 Final), the Commission of the EC outlines the strategy that ought to be followed by all actors in the iron and steel sector in order to achieve the necessary restructuring. Although the Commission stresses the fact that the initiative lies with the companies themselves, it nevertheless proposes a specific package of measures to reduce the adjustment costs for these companies. In particular, financial incentives will be granted by the EC to reduce the social costs linked to the restructuring, such as the reconversion of the labour force. It is estimated that approximately ECU 240 million will be devoted over a three-year period to the problem of the reconversion of employment. Financial assistance to offset the capital costs of restructuring (contribution to the fixed costs or related to the closure of some installations) will also be available, but will have to originate from the CECA budget and be agreed upon by the Council level.

On the external front, the Commission insists on the need to maintain a "fair and loyal" trading environment at world level, and is negotiating with the other world countries on that basis. A strict monitoring of trade flows, and of the price at which the products are being sold will be undertaken in order to take action where necessary in a timely fashion. Safeguard clauses will be negotiated with some main steel producing countries, in particular with the countries of Eastern Europe, in order to avoid dumping.

The Commission finally hopes to be able to contribute to the decision of which production capacities will have to be dismantled, in order to ensure that it is the least effective ones that are eliminated and that the restructuring takes place in an orderly fashion. The communication includes suggestions as to how the choice of capacities to close could be made.

THE EC'S POLICY RESPONSE

The main concern identified in the previous section are the negative trends in the net trade balance of a number of industries and losses in relative market share of EC producers both at home and abroad. The completion of the Internal Market should provide the basis for improved competitiveness of the EC industry by creating new market opportunities and through the greater competition that will ensue from market integration. Beyond the measures set out in the Internal Market programme, which depend on timely transposition into national law and effective implementation in each Member State for their impact to be maximised, the Commission presented its proposals for measures to accompany industrial change in its document on the future financing needs of the Community (COM 92/2000). The European Council at Edinburgh decided on the future allocation of Community resources between the different policies. Community efforts in the field of adaptation to industrial change will be concentrated in five main areas: trans-European networks, research, development and technology policy, small and medium-sized enterprises, human resources - in particular through the implementation of a new Objective Four of the European Social Fund to cover those already in employment and through specific programmes financed under the European Regional Development Fund.

More detail on the specific challenges facing each sector of Europe's industry, as well as on the various measures that have been adopted or that are proposed either by the Member States or by the Commission in order to enhance the competitiveness of given sectors or facilitate trade - such as the harmonisation of norms and standards and the opening-up of previously restricted markets - are discussed in greater depth

in the industry and service sector monographs in the second part of this book.

CONCLUSION

This analysis has focused on identifying those sectors of EC industry that will be confronted with the biggest challenges over the coming years. This was done by analysing their trade performance over the 1986-91 period, a period characterised by the launching of the single European market programme. It may appear somewhat discouraging to find that, despite the restructuring efforts made by EC industry during the second part of the 1980s, and despite the unquestionable benefits brought about by the single market programme whose main aim was to facilitate the restructuring of EC industry around its stronger companies and to reduce production costs, there is still a long list of sectors experiencing difficulties in world markets. The fact that some of the sectors that have been losing market share both in the EC and abroad over the period 1986-91 (see Table 8) grew rapidly in terms of production over that period (such as the medical and surgical instruments sector, or the cycles and motorcycles sector) nevertheless provides motives for hope. On the other hand, it is important to keep in mind the fact that, because the creation of the single market has been a gradual and slow process, all the benefits of the programme have not yet been reaped by EC industry. The list of "problem" sectors that was drawn up in 1985 was, in fact, much longer than the one presented in Table 8. The coming years will thus hopefully see the list become shorter and shorter, as the benefits of the single market work through the economy. Because the international economic climate is so uncertain, however, policy makers have to remain vigilant.

Written by: DRI Europe

Statistical annex

Table 1: GDP at constant prices

(% annual change)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
B	1.5	0.4	2.2	0.8	1.5	2.0	5.0	3.8	3.4	1.9	1.0	0.5
DK	3.0	2.5	4.4	4.3	3.6	0.3	1.2	0.8	1.7	1.2	1.0	1.8
D(3)	-0.9	1.6	2.8	1.9	2.2	1.4	3.7	3.4	5.1	3.7	1.5	-0.5
GR	0.4	0.4	2.8	3.1	1.6	-0.7	4.1	3.5	-0.1	1.8	1.5	1.6
E	1.2	1.8	1.8	2.3	3.2	5.6	5.2	4.8	3.6	2.4	1.2	1.0
F	2.3	0.8	1.5	1.8	2.4	2.2	4.3	3.8	2.2	1.1	1.9	1.0
IRL	2.3	-0.2	4.4	3.1	-0.4	5.0	4.9	6.5	8.3	2.5	2.9	2.1
I	0.2	1.0	2.7	2.6	2.9	3.1	4.1	2.9	2.2	1.4	1.1	0.8
L	1.1	3.0	6.2	2.9	4.8	2.9	5.7	6.7	3.2	3.1	2.2	2.0
NL	-1.4	1.4	3.1	2.6	2.0	0.8	2.6	4.7	3.9	2.2	1.3	0.6
P	2.1	-0.2	-1.9	2.8	4.1	5.3	3.9	5.2	4.4	1.9	1.7	1.3
UK	1.7	3.7	2.3	3.7	4.1	4.8	4.3	2.1	0.5	-2.2	-0.9	1.4
EC	0.7	1.6	2.4	2.4	2.8	2.8	4.0	3.3	2.8	1.4	1.1	0.7
United States	-2.2	3.5	6.1	3.0	2.6	3.0	3.9	2.6	0.7	-1.3	2.0	2.4
Japan	3.2	2.7	4.3	5.0	2.6	4.1	6.2	4.7	5.2	4.4	1.5	1.5

(1) February 1993 estimates
(2) February 1993 forecasts
(3) Excluding former East Germany
Source: Commission Services

Table 2: Deflator of private consumption

(% annual change)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
B	7.8	7.1	5.7	5.9	0.7	1.9	1.6	3.5	3.1	2.9	2.4	2.8
DK	10.2	6.8	6.4	4.3	2.9	4.6	4.0	5.0	2.1	2.4	2.1	1.6
D(3)	5.1	3.3	2.6	2.1	-0.3	0.8	1.4	3.1	2.7	3.9	4.1	3.6
GR	20.7	18.1	17.9	18.3	22.1	15.7	14.3	15.2	19.7	18.4	16.0	13.5
E	14.5	12.3	11.0	8.2	9.4	5.7	5.0	6.6	6.4	6.3	6.0	5.5
F	11.8	9.7	7.9	6.0	2.9	3.3	2.9	3.6	3.2	3.2	2.6	2.7
IRL	14.9	9.2	7.3	5.0	4.6	2.9	2.5	3.7	1.7	3.2	2.9	2.2
I	17.1	14.8	12.1	9.0	6.2	5.3	5.7	6.5	5.9	6.8	5.3	5.8
L	10.6	8.3	6.5	4.3	1.3	1.7	2.7	3.6	3.6	2.9	3.4	4.7
NL	5.5	2.9	2.2	2.2	0.2	-0.9	0.5	1.2	2.3	3.3	3.1	2.7
P	20.3	25.8	28.5	19.4	13.8	10.0	10.0	12.1	12.6	11.9	9.1	6.8
UK	8.7	4.8	5.0	5.3	4.3	4.4	5.1	5.9	5.3	7.2	5.1	5.1
EC	8.7	5.1	6.1	4.7	1.5	2.1	3.8	5.2	3.8	5.3	3.4	2.3
United States	5.7	3.9	4.1	3.3	2.3	4.2	4.2	4.8	5.0	4.2	3.1	2.7
Japan	2.7	2.0	2.5	2.2	0.4	0.2	-0.1	1.8	2.6	2.6	2.4	2.6

(1) February 1993 estimates
(2) February 1993 forecasts
(3) Excluding former East Germany
Source: Commission Services

Table 3: Number of unemployed as a % of the civil working population

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
B	11.2	12.5	12.5	11.8	11.7	11.3	10.2	8.6	7.6	7.5	8.2	9.3
DK	8.9	9.2	8.7	7.2	5.5	5.6	6.4	7.7	8.1	8.9	9.5	9.5
D(3)	5.6	6.9	7.1	7.1	6.5	6.3	6.3	5.6	4.8	4.2	4.5	6.0
GR	5.8	7.9	8.1	7.7	7.4	7.4	7.6	7.4	7.2	7.7	7.7	8.5
E	16.3	17.8	20.6	21.6	21.0	20.4	19.3	17.1	16.1	16.3	18.0	19.5
F	8.0	8.2	9.7	10.1	10.3	10.4	9.9	9.4	9.0	9.5	10.1	10.8
IRL	12.5	15.2	16.8	18.2	18.2	18.0	17.3	15.7	14.5	16.2	17.8	19.2
I	8.0	8.7	9.3	9.6	10.5	10.3	10.8	10.6	9.9	10.2	10.2	10.6
L	2.4	3.5	3.1	2.9	2.6	2.5	2.0	1.8	1.7	1.6	1.9	2.0
NL	11.9	12.4	12.3	10.5	10.3	10.0	9.3	8.5	7.5	7.0	6.7	7.6
P	7.2	8.1	8.7	8.8	8.3	6.9	5.7	5.0	4.6	4.1	4.8	5.4
UK	10.3	11.0	11.0	11.4	11.4	10.4	8.5	7.1	7.0	9.1	10.8	12.3
EC	9.0	9.9	10.6	10.8	10.7	10.3	9.8	8.9	8.3	8.8	9.5	10.6
United States	9.7	9.6	7.5	7.2	7.0	6.2	5.5	5.3	5.5	6.7	7.3	7.2
Japan	2.4	2.7	2.7	2.6	2.8	2.8	2.5	2.3	2.1	2.1	2.1	2.2

(1) February 1993 estimates
(2) February 1993 forecasts
(3) Excluding former East Germany
Source: Commission Services

Table 4: Financing requirements or capacity of public authorities

(as a % of GDP at market prices)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
B	-11.5	-11.8	-9.5	-9.0	-9.4	-7.5	-6.7	-6.7	-5.7	-6.6	-6.9	-6.2
DK	-9.1	-7.2	-4.1	-2.0	3.4	2.4	0.6	-0.5	-1.4	-2.0	-2.3	-2.7
D(3)	-3.3	-2.6	-1.9	-1.2	-1.3	-1.9	-2.2	0.1	-2.0	-3.6	-3.5	-3.9
GR	-7.6	-8.1	-9.8	-13.6	-12.0	-11.6	-13.8	-17.7	-18.6	-15.2	-13.4	-9.8
E(4)	-5.6	-4.7	-5.4	-6.9	-6.0	-3.1	-3.3	-2.8	-4.0	-4.9	-4.6	-4.2
F	-2.8	-3.2	-2.8	-2.9	-2.7	-1.9	-1.7	-1.1	-1.4	-1.9	-2.8	-3.2
IRL	-13.8	-11.8	-9.8	-11.2	-11.1	-8.9	-4.8	-1.8	-2.5	-2.1	-2.7	-3.0
I	-11.3	-10.6	-11.6	-12.6	-11.6	-11.0	-10.7	-9.9	-10.9	-10.2	-10.5	-10.2
L	-1.6	1.5	2.8	6.2	4.3	2.4	3.1	5.3	5.0	-0.8	-0.4	-1.0
NL(5)	-7.1	-6.4	-6.3	-4.8	-6.0	-5.9	-4.6	-4.7	-4.9	-2.5	-3.5	-3.5
P	-10.4	-9.0	-12.0	-10.1	-7.2	-6.8	-5.4	-3.4	-5.5	-6.4	-5.6	-4.8
UK	-2.5	-3.3	-3.9	-2.9	-2.4	-1.3	1.0	0.9	-1.3	-2.8	-6.2	-8.3
EC	-5.2	-5.1	-5.1	-4.9	-4.5	-4.0	-3.4	-2.7	-4.0	-4.6	-5.3	-5.6
United States	-3.4	-4.1	-2.9	-3.1	-3.5	-2.5	-2.0	-1.5	-2.5	-3.4	-4.8	-4.8
Japan	-3.6	-3.6	-2.1	-0.8	-0.9	0.5	1.5	2.5	3.0	2.4	N/A	N/A

(1) February 1993 estimates
(2) February 1993 forecasts
(3) Excluding former East Germany
(4) Break in series 1985/86
(5) Break in series 1986/87
Source: Commission Services

Table 5: Total number of employed

(% annual variation)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
B	-1.03	-0.14	0.56	0.65	0.45	1.47	1.62	1.05	-0.29	-0.64	-0.67
DK	0.29	1.73	2.51	2.61	0.85	-0.57	-0.69	-0.50	-0.93	-0.67	0.08
D(2)	-1.42	0.16	0.75	1.39	0.72	0.78	1.46	3.00	2.57	0.84	-0.96
GR	1.03	0.35	0.94	0.34	-0.08	1.59	0.42	1.14	-1.59	-0.49	-0.10
E	-0.46	-2.39	-1.31	1.40	4.51	3.36	3.55	2.81	0.24	-1.60	-1.60
F	-0.39	-0.93	-0.31	0.10	0.29	0.80	1.11	0.99	0.41	-0.23	-0.30
IRL	-1.92	-1.87	-2.18	0.19	-0.09	1.02	-0.09	3.30	-0.09	0.09	0.09
I	0.64	0.39	0.89	0.77	0.40	0.85	0.06	1.11	0.77	0.10	0.00
L	-0.32	0.57	1.39	2.61	2.79	3.06	3.66	4.30	3.65	1.48	1.51
NL	-1.91	-0.06	1.54	1.98	1.40	1.59	1.90	2.34	1.31	0.40	-0.43
P	-1.15	-1.53	0.00	-2.71	0.50	0.08	1.04	0.84	0.91	-0.21	-0.51
UK	-1.18	2.59	1.25	0.12	2.10	3.31	2.97	0.74	-3.08	-2.27	-1.67
EC	-0.64	0.19	0.52	0.67	1.18	1.56	1.58	1.60	0.16	-0.46	-0.78
United States	1.01	4.85	2.41	1.75	3.53	2.84	2.37	1.21	-1.60	0.74	1.00
Japan	1.51	0.34	0.56	0.85	0.85	1.67	1.96	2.11	1.92	0.50	0.20

(1) February 1993 estimates
(2) Excluding former East Germany
Source: Commission Services

Table 6: Investment in the construction industry at constant prices

(% annual change)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
EC	-0.06	-0.06	-1.79	3.92	3.02	6.59	5.92	3.50	0.32	1.25	-0.43
B	-6.39	-6.06	-0.65	3.03	2.99	14.69	7.52	14.75	-4.77	3.79	-2.79
DK	1.93	8.79	8.94	18.05	1.15	-5.52	-5.70	-4.63	-8.10	-4.46	4.50
D(2)	1.72	1.55	-5.61	2.70	0.00	3.06	4.78	5.32	4.08	4.45	0.50
GR	5.36	-6.97	3.24	-0.78	-4.94	9.15	4.00	2.20	-6.45	-3.07	3.16
E	-1.98	-5.19	1.98	6.49	9.91	12.44	15.15	10.81	4.30	-3.40	-3.30
F	-3.42	-2.87	-0.37	3.64	3.19	6.70	7.26	2.74	0.60	2.34	0.15
IRL	-14.34	-2.00	-7.12	-4.62	-7.57	1.92	15.07	11.73	-1.42	2.48	3.00
I	1.57	-0.81	-0.51	1.94	-0.74	2.33	3.89	2.46	1.23	0.40	-0.73
L	-13.31	-3.78	-2.15	5.69	8.89	8.80	4.61	7.93	7.11	6.01	3.30
NL	-3.90	3.81	-0.07	5.04	1.86	10.29	2.28	0.59	-2.10	0.00	-0.62
P	-3.42	-9.25	-5.86	8.53	9.55	10.08	3.52	5.27	4.52	2.47	2.71
UK	4.98	6.12	-2.38	6.13	10.96	13.43	5.37	-0.55	-8.39	-1.35	-1.55

(1) February 1993 estimates
(2) Excluding former East Germany
Source: Commission Services

Table 7: Investment in equipment at constant prices

(% annual change)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
EC	0.71	3.81	8.34	4.20	7.88	10.12	8.99	5.00	-0.13	-1.48	-1.69
B	-2.57	13.65	2.32	5.31	7.17	15.93	21.15	10.85	-1.93	0.74	-4.01
DK	2.23	17.88	16.24	16.59	-8.93	-8.59	5.67	3.76	2.75	-11.98	-0.62
D(2)	5.62	-0.14	9.86	4.33	5.03	6.76	9.97	13.30	9.08	-2.02	-4.04
GR	-8.42	-4.18	7.85	-12.67	-5.25	8.47	18.02	8.14	3.29	4.33	6.11
E	-4.72	-7.34	9.10	15.76	23.19	16.60	12.88	1.43	-2.49	0.17	0.26
F	-3.16	-0.64	9.99	4.31	6.71	10.82	6.41	4.08	-2.44	-4.33	-1.38
IRL	-3.36	-1.95	-7.41	1.55	0.86	0.13	19.61	7.24	-11.61	0.52	1.21
I	-3.33	9.63	1.90	2.63	11.90	11.65	5.08	3.47	0.66	-0.70	-1.59
L	-6.89	2.72	-20.52	87.09	18.68	16.09	-16.94	10.86	11.45	3.55	1.72
NL	9.83	8.81	15.53	10.15	1.90	5.02	5.25	7.62	2.65	-0.81	-0.82
P	-11.13	-29.64	-4.45	14.34	26.65	23.27	10.04	5.84	0.86	4.79	3.92
UK	4.77	11.26	10.75	-0.96	8.70	13.00	11.58	-3.62	-11.91	0.57	-0.03

(1) February 1993 estimates
(2) Excluding former East Germany
Source: Commission Services

Snapshots

Table 1: Ranking of EC manufacturing industry by production (2-digit level), 1991 (1)
(million ECU)

NACE	Manufacturing sector	Rank	Production	Employment (2)	Extra-EC exports	Extra-EC imports	AAGR (%) (3)
4100	Food, drink and tobacco	1	434 389	2 455 938	26 115	20 679	2.80
2601	Chemical industry	2	294 723	1 794 274	47 780	35 596	3.13
3500	Motor vehicles	3	262 066	1 838 758	31 689	22 086	3.15
3400	Electrical engineering	4	258 398	2 777 591	42 480	51 227	4.28
3200	Mechanical engineering	5	221 247	2 370 868	68 398	32 979	1.50
3100	Metal articles	6	177 685	2 184 777	13 756	8 913	3.46
4700	Paper, printing and publishing	7	169 222	1 469 438	9 661	20 096	4.65
2200	Production and preliminary processing of metals	8	124 169	811 921	21 313	28 519	1.24
4800	Rubber and plastics	9	104 951	1 151 765	10 739	8 259	4.25
2400	Manufacture of non-metallic minerals	10	100 551	1 032 294	8 581	4 012	3.43
4300	Textile industry	11	89 473	1 137 927	15 578	18 494	1.47
3600	Other transport	12	77 838	790 127	21 193	22 988	3.29
4600	Timber and wooden furniture	13	73 535	923 033	5 584	12 277	3.86
4500	Footwear and clothing	14	63 089	1 155 662	11 800	22 968	0.87
3300	Office machinery and data processing machinery	15	48 512	261 309	9 907	23 772	5.28
3700	Instrument engineering	16	23 694	335 546	8 224	11 274	2.29
4400	Leather goods	17	9 405	109 744	3 046	3 699	-0.48

(1) Except for trade data, figures are estimated
(2) Number of employees
(3) 1986-1991; production in constant prices
Source: Eurostat

Table 2: Exchange rates, 1980-1992 (1)
(1 ECU = ... National currency)

	BFR	DKR	DM	DR	PTA	FF	IRL	LIT	HFL	ESC	UKL	USD	YEN
1970	51.11	7.667	3.741	30.67	71.36	5.678	0.4259	638.9	3.700	29.38	0.4259	1.022	368.0
1975	45.57	7.123	3.049	39.99	71.16	5.319	0.5600	809.5	3.135	31.50	0.5600	1.241	367.7
1980	40.60	7.827	2.524	59.32	99.70	5.869	0.6760	1189.2	2.760	69.55	0.5985	1.392	315.0
1981	41.29	7.923	2.514	61.62	102.68	6.040	0.6910	1263.2	2.775	68.49	0.5531	1.116	245.4
1982	44.71	8.157	2.376	65.34	107.56	6.431	0.6896	1323.8	2.614	78.01	0.5605	0.980	243.5
1983	45.44	8.132	2.271	78.09	127.50	6.771	0.7150	1349.9	2.537	98.69	0.5870	0.890	211.4
1984	45.44	8.146	2.238	88.34	126.57	6.872	0.7259	1381.4	2.523	115.68	0.5906	0.789	187.1
1985	44.91	8.019	2.226	105.74	129.16	6.795	0.7152	1448.0	2.511	130.25	0.5890	0.763	180.6
1986	43.80	7.936	2.128	137.42	137.46	6.800	0.7335	1461.9	2.401	147.09	0.6715	0.984	165.0
1987	43.04	7.884	2.072	156.22	142.19	6.928	0.7754	1494.7	2.334	162.58	0.7047	1.154	166.6
1988	43.43	7.952	2.074	167.58	137.60	7.036	0.7757	1537.3	2.335	170.06	0.6644	1.182	151.5
1989	43.38	8.049	2.070	178.84	130.41	7.024	0.7768	1510.5	2.335	173.41	0.6733	1.102	151.9
1990	42.43	7.856	2.052	201.41	129.32	6.914	0.7678	1521.9	2.312	181.11	0.7139	1.273	183.7
1991	42.22	7.909	2.051	225.22	128.47	6.973	0.7678	1533.2	2.311	178.61	0.7010	1.239	166.5
1992	41.59	7.810	2.020	246.98	132.51	6.849	0.7607	1595.3	2.275	174.70	0.7376	1.298	164.2

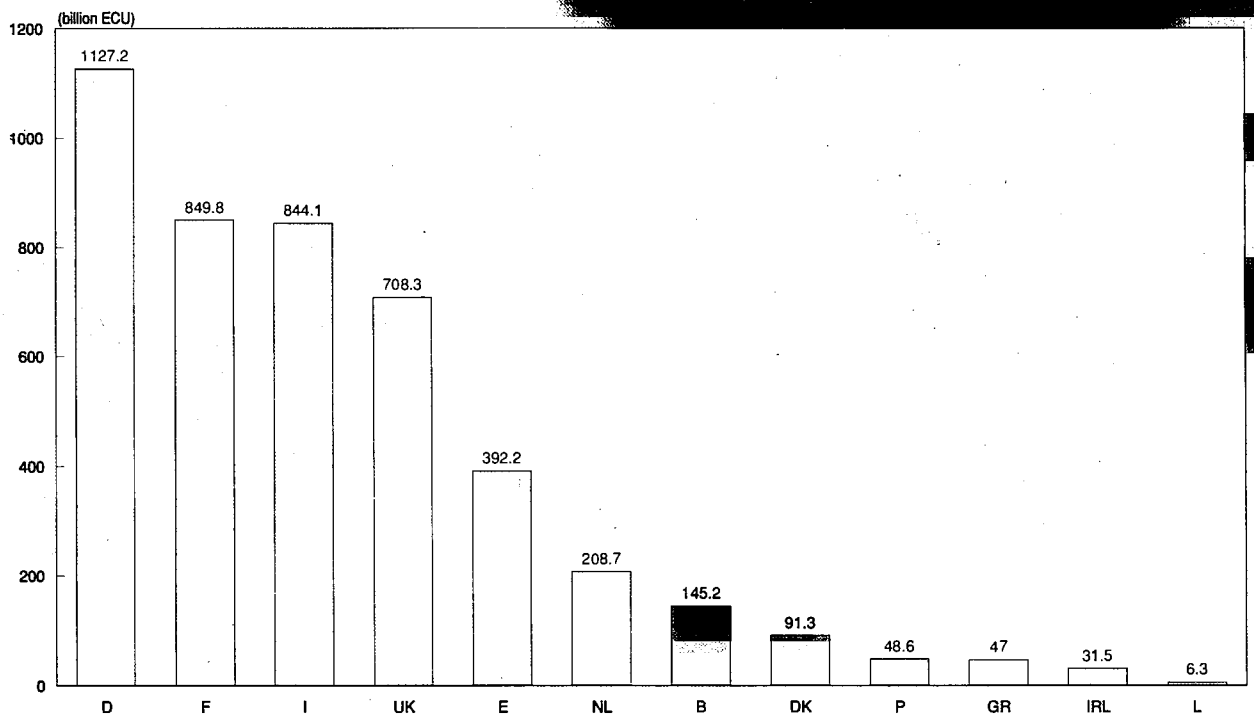
(1) Annual average
Source: Eurostat

Table 3: Ranking of EC manufacturing sub-sectors by production, 1991 (1)

NACE	Manufacturing sector	Rank	Production (2)	Employment (3)	AAGR (%)(4)
2510	Manufacture of basic industrial chemicals	1	114 445	632 829	2.37
3440	Manufacture of telecommunications equipment	2	79 917	892 410	5.74
4830	Processing of plastics	3	77 711	790 059	6.76
3280	Manufacture of other machinery and equipment	4	75 822	790 184	1.70
4120	Slaughtering, preparing and preserving of meat	5	75 043	447 826	4.59
3160	Manufacture of tools & finished metal goods	6	70 392	811 736	5.10
2570	Manufacture of pharmaceutical products	7	65 188	425 670	7.71
4130	Manufacture of dairy products	8	64 017	247 733	1.28
2210	Iron & steel industry, excl coke ovens	9	63 909	398 929	1.62
3300	Man. of office machinery and data processing equip	10	48 512	261 309	6.37
3640	Aerospace equipment manufacturing and repairing	11	48 380	425 993	4.50
4720	Processing of paper and board	12	44 290	403 632	4.32
4530	Manufacture of ready-made clothing and accessories	13	42 879	787 144	1.49
3250	Manufacture of plant-mines,iron & steel industry	14	42 783	397 627	3.13
3530	Man. of parts and accessories for motor vehicles	15	41 469	439 887	4.80
4670	Manufacture of wooden furniture	16	38 611	487 144	4.48
3450	Manufacture-sound reproducing and recording equip	17	38 536	378 776	4.45
2240	Production/early processing of non-ferrous metals	18	37 934	210 123	2.84
2580	Manufacture of soap, detergents, toilet needs	19	37 516	203 015	5.68
4230	Manufacture of other food products	20	33 252	188 094	5.62
4710	Manufacture of pulp, paper, and board	21	33 061	186 425	5.69
4220	Manufacturing of animal & poultry foods	22	29 629	88 445	4.79
3240	Man. of mach. for the food and chemical industries	23	28 888	288 411	3.52
3140	Manufacture of structural metal products	24	28 660	320 171	4.60
2430	Manufacture of concrete, cement, plaster	25	27 046	242 147	5.05
4270	Brewing and malting	26	25 531	138 962	1.01
4190	Bread & flour confectionery	27	24 842	480 513	3.57
3130	Secondary transformatin, treatment of metals	28	24 682	355 012	6.47
3220	Manufacture of machine tools for working metal	29	24 027	301 837	1.34
3460	Manufacture of domestic type electric appliances	30	23 949	230 027	5.18
4210	Manufacture of cocoa, chocolate, sugar confections	31	23 053	172 217	4.75
2470	Manufacture of glass & glassware	32	22 614	247 681	4.58
4360	Knitting industry	33	21 376	314 276	1.90
3110	Foundries	34	19 844	276 909	1.60
3150	Boilermaking, manufacture of reservoirs, & tanks	35	18 410	216 387	0.73
4320	Cotton industry	36	18 145	254 028	-0.59
3610	Shipbuilding	37	18 010	234 253	3.34
4280	Manufacture of soft drinks	38	17 872	103 782	6.25
4140	Processing of fruit and vegetables	39	17 103	134 848	4.79
3270	Manufacture of other machinery	40	16 568	176 160	3.59
2420	Manufacture of cement, lime and plaster	41	16 371	80 280	4.74
2480	Manufacture of ceramic goods	42	15 994	250 569	2.45
4510	Manufacture of mass-produced footwear	43	14 950	282 590	-1.00
3120	"Forging; drop forging, pressing, stamping"	44	13 707	169 689	3.24
2230	Drawing, cold rolling & cold folding of steel	45	13 060	106 996	1.57
4240	Distilling ethyl alcohol from fermented materials	46	12 575	46 599	-0.82
3210	Manufacture of agricultural machinery and tractors	47	12 244	136 708	-4.02
4630	Manufacture of wooden components and parquet flooring	48	12 179	162 699	4.60
3260	Manufacture of transmission equipment	49	12 179	169 060	1.04
2220	Manufacture of steel tubes	50	12 047	94 643	1.07
4310	Wool industry	51	11 993	141 912	-0.85
3520	Manufacture of bodies for motor vehicles	52	11 780	110 930	9.38
4160	Grain milling	53	11 183	35 205	1.65
4370	Textile finishing	54	10 432	124 457	5.73
2450	Working of stone & non-metallic mineral products	55	9 934	88 111	5.90
4250	Manufacture of wine & other beverages from grapes	56	9 713	48 845	0.83
4330	Silk industry	57	9 366	90 389	1.93
3710	Manufacture of measuring, checking instruments	58	9 312	134 217	1.31
4150	Processing of fish and seafood	59	9 229	89 137	5.55
3230	Manufacture of textile machinery & sewing machines	60	8 228	104 595	-0.24
3470	Manufacture of electric lighting equipment	61	8 115	102 161	5.64
4620	Manufacture of semi-finished wood products	62	8 083	66 888	5.18
4390	Miscellaneous textile industries	63	7 965	110 896	2.59
4380	Manufacture of carpets, linoleum, floor coverings	64	7 869	69 432	4.67
3720	Manufacture of medical and surgical equipment	65	6 811	96 238	5.38
2410	Manufacture of clay products for construction	66	6 421	84 612	3.99
4410	Tanning & dressing of leather	67	6 114	49 423	-0.96
4940	Manufacture of toys and sports goods	68	5 993	70 843	3.38
4610	Sawing & processing of wood	69	5 912	78 690	5.28
3630	Manufacture of cycles and motor-cycles	70	5 453	48 747	5.52
3730	Manufacture of optical instruments	71	5 445	75 777	1.92
3620	Railway equipment	72	4 774	67 694	-0.90
4650	Other wood manufactures (except furniture)	73	3 571	51 533	4.98
4420	Manufacture of leather products	74	3 292	60 321	0.18
4640	Manufacture of wooden containers	75	3 065	43 126	4.23
4660	Manufacture of articles of cork and straw	76	2 114	32 953	4.08
2460	Production of grindstones & other abrasives	77	1 558	22 082	0.36
4920	Manufacture of musical instruments	78	962	13 837	2.84
4560	Manufacture of furs and fur goods	79	671	13 800	-1.39
2440	Manufacture of articles of asbestos	80	616	16 664	-14.85

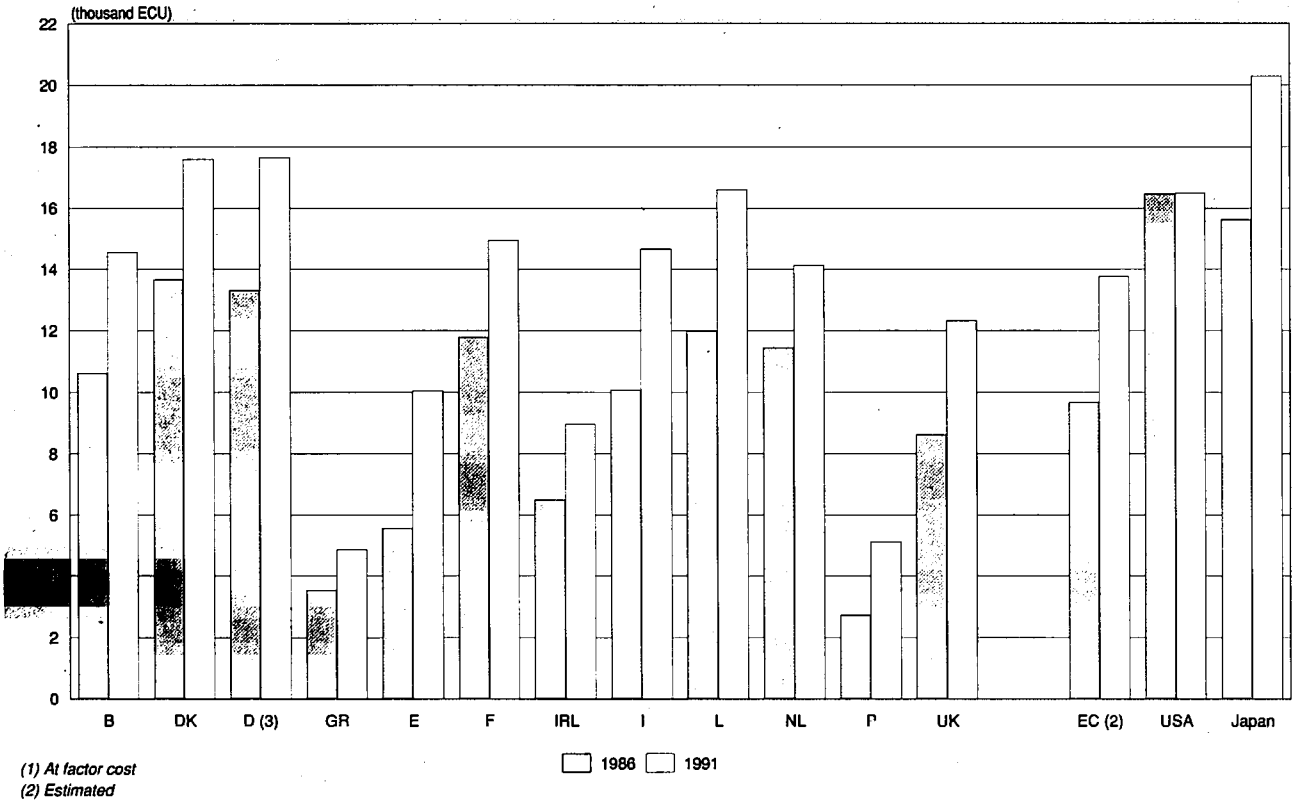
(1) Estimated
(2) Production in current prices (million ECU)
(3) Number of employees
(4) 1986-1991; production in constant prices
Source: Eurostat

Figure 1: GDP by Member State, 1991 (1)



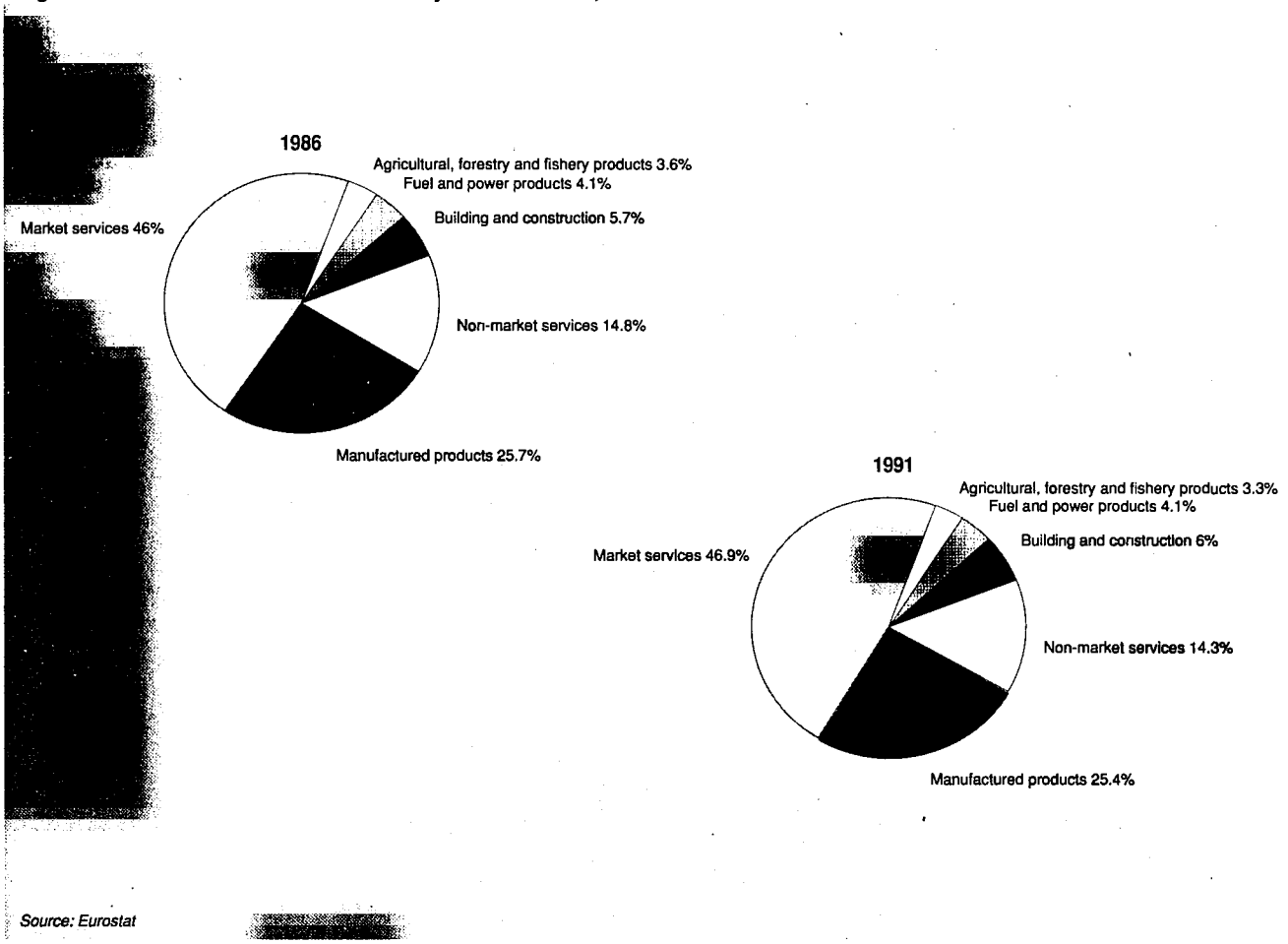
(1) At current prices, at factor cost
Source: Eurostat

Figure 2: GDP per capita (1)



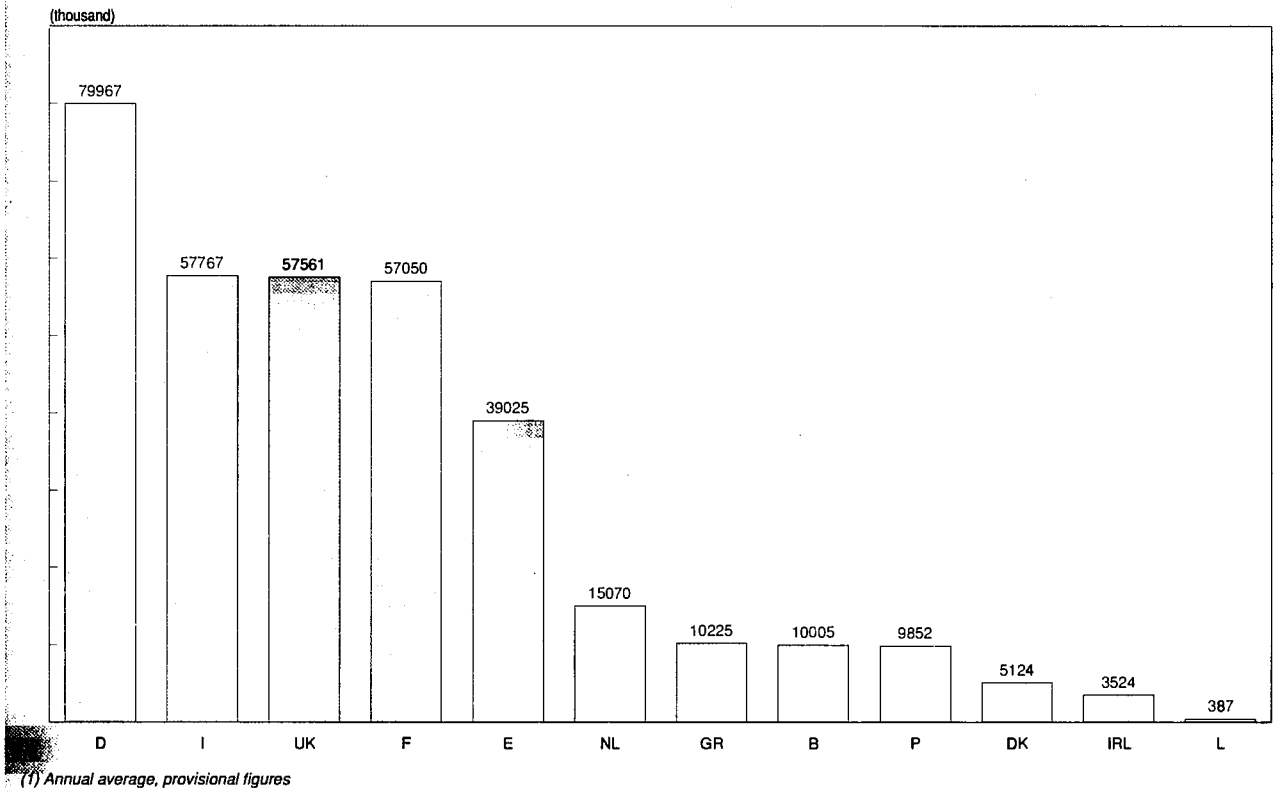
(1) At factor cost
(2) Estimated
(3) Excluding former Eastern Germany
Source: Eurostat

Figure 3: Distribution of EC value added by main activities, 1986 and 1991



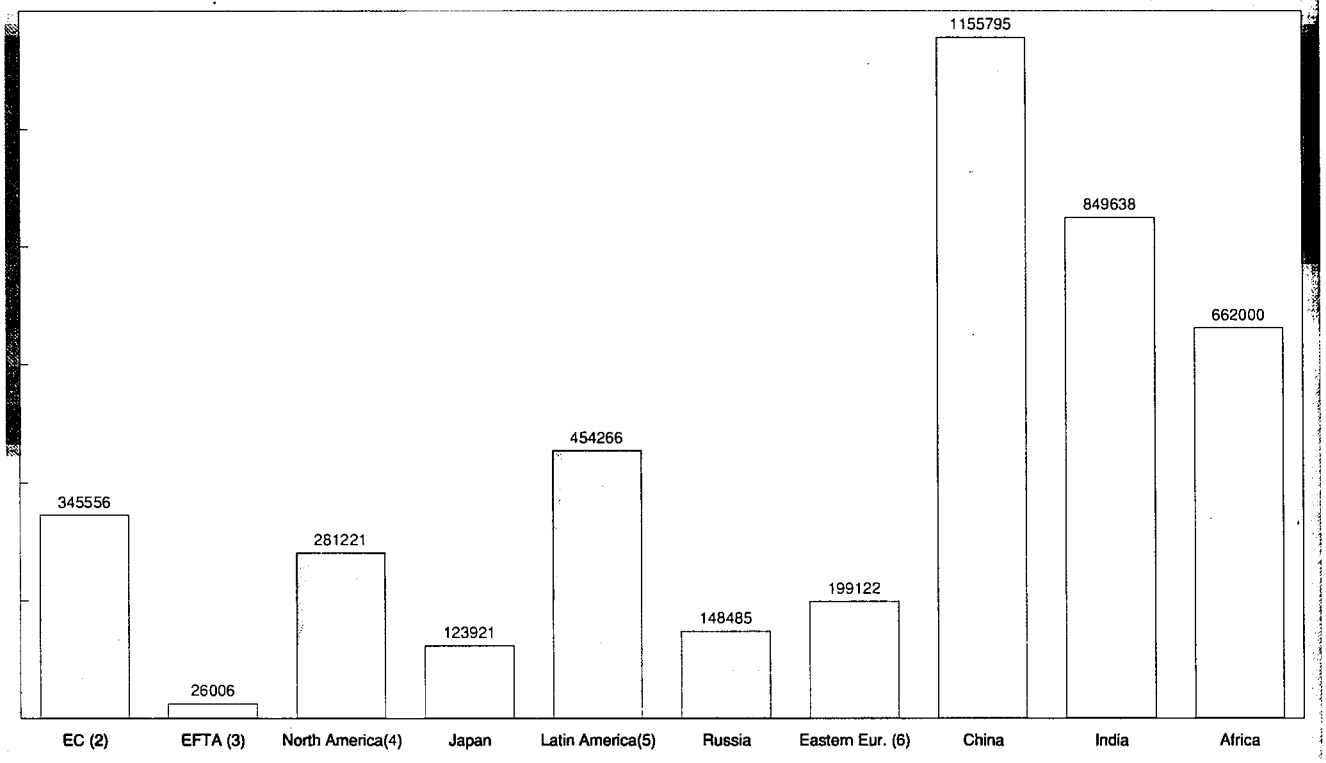
Source: Eurostat

Figure 4: EC population by Member State, 1991 (1)



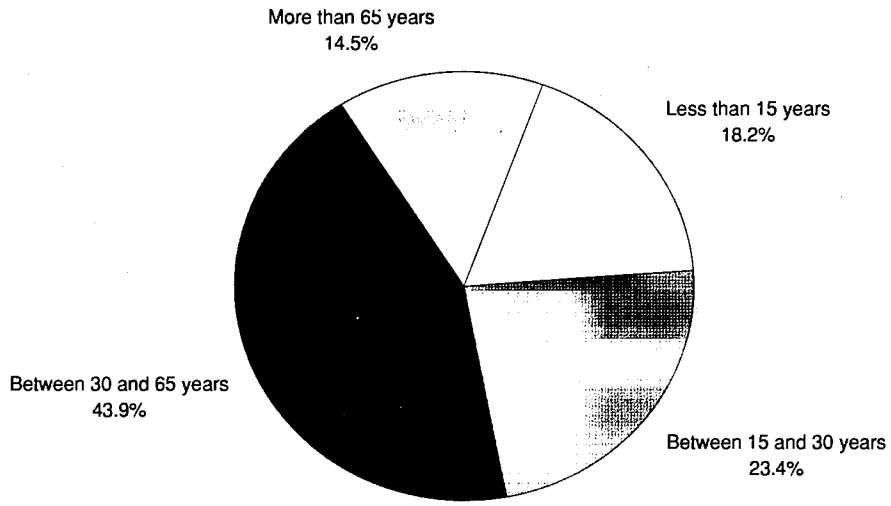
(1) Annual average, provisional figures
Source: Eurostat

Figure 5: International comparison of the EC population, 1991 (1)



(1) Figures are calculated on an average annual basis, except for Latin America and Eastern Europe where mid-year estimates are used
(2) Includes former German Democratic Republic
(3) Excludes Switzerland
(4) United States and Canada
(5) Includes Central America, South America and the Caribbean (excluding Bermuda and St. Pierre and Miquelon)
(6) Albania, Belarus, Bulgaria, former Czechoslovakia, Estonia, Hungary, Latvia, Lithuania, Republic of Moldavia, Poland, Romania, Ukraine and former Yugoslavia
Source: United Nations

Figure 6: Distribution of the EC population by age group, 1991 (1)



(1) Annual average
Source: Eurostat

The world's largest industrial groups

INTRODUCTION

This chapter introduces the Top 200 industrial groups in the world and the Top 200 groups in Europe (including both manufacturing and services) classified according to 1990 turnover (consolidated figures). Where possible, 1991 figures are included in the listings. Turnover does not include excise taxes. Profits are shown as the consolidating company's share of total net income (after taxes). Figures have been converted to ECU using the 12 month moving average exchange rate during each company's fiscal year. Employee figures show either a year-end or yearly average number, as published.

A large number of groups have very diversified activities. When broken down on a sector basis, groups have been put in the sector which accounts for the greatest share of their turnover. Concerning breakdown by region and country, the criterion is that of the group's origin.

In a global economy characterised by multinational companies present in several continents and with ever more diversified activities, the criterion of location loses its significance in many cases.

All figures are extracted from the Commission's Data Base on Large Enterprises (DABLE).

THE WORLD'S LEADING INDUSTRIAL COMPANIES

The slowdown in the global economy in 1990 was strongly felt by the world's 200 largest industrial groups.

Total turnover of the 200 largest industrial groups in 1990 reached 3 078 billion ECU, exactly the same turnover as in 1989 (in current value). The growth rate for the period 1986-90 was 6%, hiding a growth rate of 8.1% for the period 1986-89.

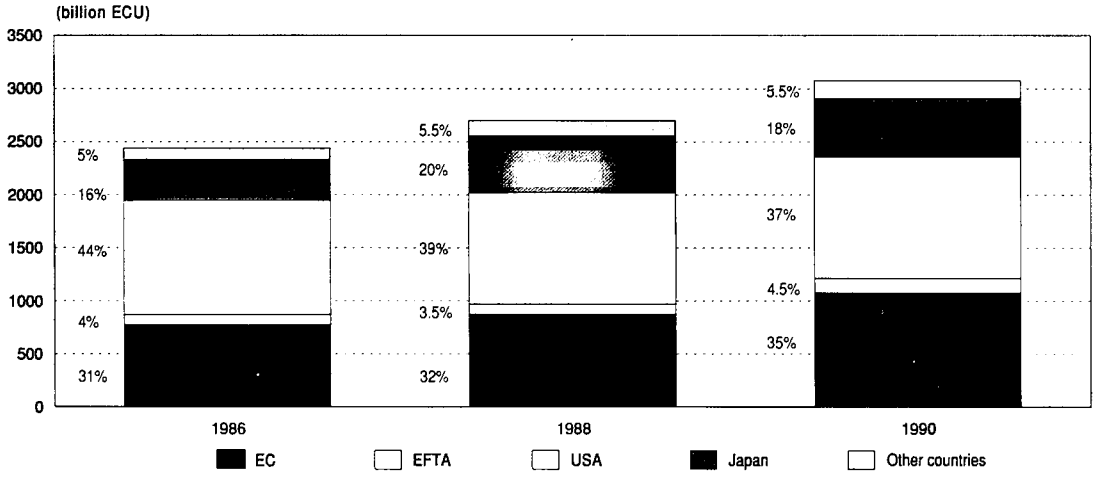
In addition, figures reported for 1991 indicate that the growth rate achieved by the same sample of enterprises will not exceed inflation.

Employment growth was less than one percent in 1990 compared to a rise of 6% since 1986. Fourteen out of the 25 biggest employers are European firms, twice as many as the seven American representatives in this list (see Table 3).

The 25 biggest sales increases are evenly distributed across Europe, USA and Japan each of which have eight companies in the Top 25.

Missing from the rankings, as a result of the Gulf War, is Kuwait Petroleum, number 93 in last year's list.

Figure 1: The 200 largest industrial groups in the world
Turnover growth at current prices



Source: DABLE

Comparative achievement of the Community groups

The American industrial groups represent 37% of the global turnover of the Top 200. EC groups are just behind at 35%, EFTA groups at 4.5%, the Japanese groups at 18% and other countries' groups at 5.5%.

The trend since 1986 shows a continuously weakening presence of American groups in the absolute number of companies in the Top 200 as well as in their share of global turnover. The statistics show that the Top 200 of 1986 included 79 American groups with 45% of total turnover; in 1988 the Top 200 had 71 groups with 39% of total turnover and in 1990, 68 American groups had 37% of total turnover.

Japan's spectacular rise in the first half of the 1980s seems to have slowed by the end of the decade. Japan had 40 groups in the Top 200 in 1990.

Table 1
The Top 200 of world industry

(number of companies)	1986	1988	1990
EC	61	62	67
EFTA	12	14	12
USA	79	71	68
Japan	36	43	40
Other	12	10	13

Source: DABLE

The leading position of Europe is now clearly established. EC's share of turnover rose from 31% in 1986, and 32% in 1988 to 35% in 1990 with respectively 61, 62 and 67 groups. EFTA's share remained static. In terms of the number of groups in the Top 200, the EC and EFTA overtook the USA in 1989 for the first time (76 against 72). In 1990 the gap widened: 79 European companies for 68 American ones. Furthermore, Europe pushed the USA into second place in turnover terms in 1990: 39.5% against 37% (see Figure 1).

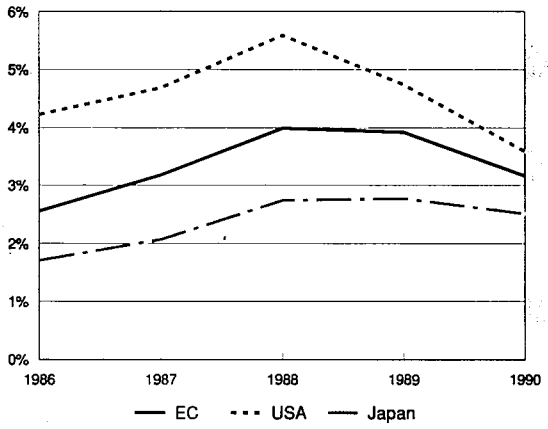
Table 2
Groups showing a loss

Year	Number
1986	18
1987	9
1988	7
1989	7
1990	15

Source: DABLE

The 67 EC companies that feature in the 1990 Top 200 list can be broken down by nationality as follows: Germany 24, United Kingdom 14, France 13, Italy 9, Netherlands 3, Spain and Belgium 2.

Figure 2: The 200 largest industrial groups in the world
Net profit / turnover



Source: DABLE

Figure 3: The largest Community groups
Net profit / turnover

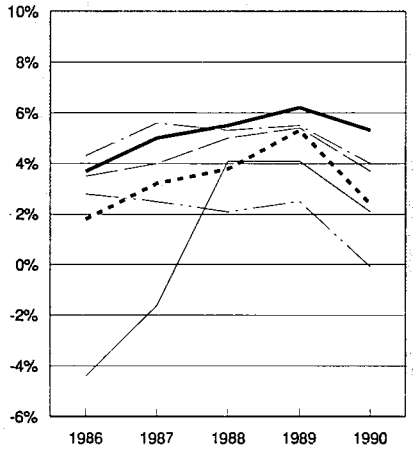


Figure 4: The largest American groups
Net profit / turnover

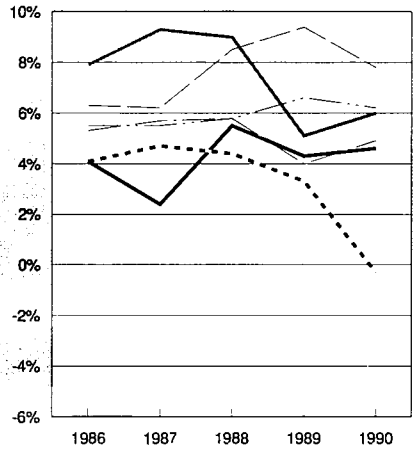
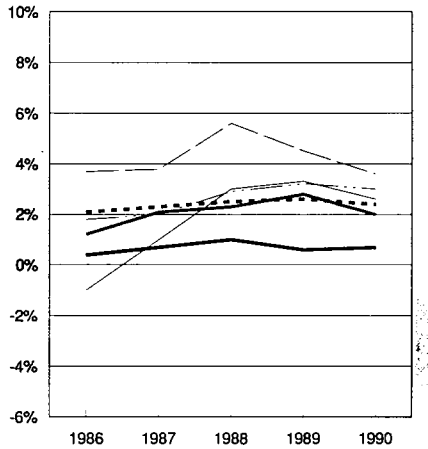
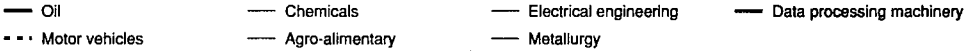


Figure 5: The largest Japanese groups
Net profit / turnover by sector





Source: DABLE

Table 3
The largest industrial groups in the world, 1990

The 25 largest profit earners
Net income
(million ECU)

1	Royal Dutch Shell	EC	5 044
2	IBM	USA	4 719
3	Exxon	USA	3 927
4	General Electric	USA	3 373
5	Philip Morris	USA	2 775
6	Toyota Motor	JPN	2 582
7	IRI	EC	2 353
8	British Petroleum	EC	2 342
9	Du Pont (E.I.) De Nemours	USA	1 811
10	Chevron	USA	1 691
11	Unilever	EC	1 556
12	Elf Aquitaine	EC	1 533
13	Mobil	USA	1 520
14	Amoco	USA	1 500
15	Matsushita Electric	JPN	1 403
16	Merck	USA	1 396
17	Procter & Gamble	USA	1 382
18	Bristol Myers Squibb	USA	1 370
19	Hanson	EC	1 354
20	Peugeot	EC	1 336
21	ENI	EC	1 336
22	Atlantic Richfield	USA	1 323
23	Nestlé	EFTA	1 287
24	Hitachi	JPN	1 248
25	Pemex	MEX	1 171

Number of representatives:	EC	8
	EFTA	1
	USA	12
	Japan	3
	Others	1

The 25 most profitable
Net income / turnover
(%)

1	Merck	USA	23.2
2	Bristol Myers Squibb	USA	17.0
3	Hanson	EC	13.6
4	Coca-Cola	USA	13.5
5	Smithkline Beecham	EC	11.4
6	Johnson & Johnson	USA	10.2
7	Minnesota Mining & Mfg	USA	10.0
8	Atlantic Richfield	USA	9.4
9	IBM	USA	8.7
10	Fuji Photo Film	JPN	8.5
11	Broken Hill Proprietary	AUS	8.4
12	General Electric Company	EC	8.3
13	BTR	EC	8.2
14	Emerson Electric	USA	8.1
15	Philip Morris	USA	8.0
16	Anheuser-Busch	USA	7.8
17	Sandoz	EFTA	7.8
18	Pemex	MEX	7.7
19	Ericsson	EFTA	7.6
20	General Electric	USA	7.5
21	American Brands	USA	7.2
22	Allied-Lyons	EC	7.1
23	Dow Chemical	USA	7.0
24	Amoco	USA	6.8
25	Grand Metropolitan	EC	6.8

Number of representatives:	EC	6
	EFTA	2
	USA	14
	Japan	1
	Others	2

The 25 richest
Net worth
(million ECU)

1	Royal Dutch Shell	EC	41 720
2	IBM	USA	35 752
3	Exxon	USA	28 388
4	Pemex	MEX	27 221
5	General Motors	USA	26 740
6	Toyota Motor	JPN	25 106
7	IRI	EC	24 964
8	Ford Motor	USA	19 306
9	Matsushita Electric	JPN	18 758
10	General Electric	USA	18 311
11	Petroleos De Venezuela	VEN	17 408
12	British Petroleum	EC	16 577
13	Hitachi	JPN	15 431
14	Mobil	USA	14 402
15	Du Pont (E.I.) De Nemours	USA	13 738
16	Chevron	USA	12 448
17	Amoco	USA	11 842
18	Elf Aquitaine	EC	11 498
19	Kraft General Foods	USA	11 042
20	FIAT	EC	10 759
21	Philip Morris	USA	10 425
22	ENI	EC	9 690
23	Nissan Motor	JPN	8 929
24	Ciba-Geigy	EFTA	8 718
25	Siemens	EC	8 499

Number of representatives:	EC	7
	EFTA	1
	USA	11
	Japan	4
	Others	2

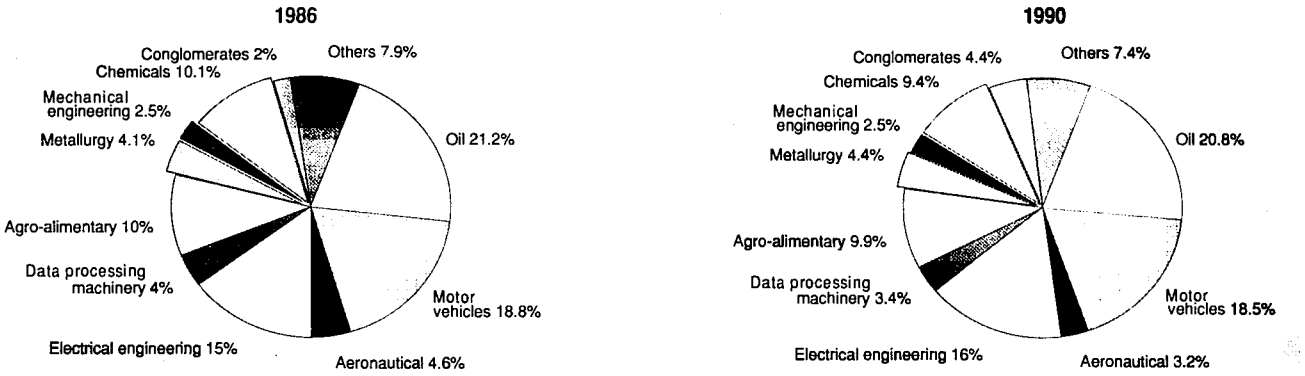
The 25 biggest employers
(employees)

1	General Motors	USA	761 400
2	IRI	EC	419 500
3	Daimler-Benz	EC	376 785
4	IBM	USA	373 816
5	Siemens	EC	373 000
6	Ford Motor	USA	370 383
7	Hitachi	JPN	309 757
8	Pepsico	USA	308 000
9	FIAT	EC	303 238
10	Unilever	EC	301 000
11	General Electric	USA	298 000
12	Philips	EC	272 800
13	Volkswagen	EC	267 997
14	B.A.T. Industries	EC	217 373
15	ABB	EFTA	215 154
16	Matsushita Electric	JPN	210 848
17	Alcatel-Alsthom	EC	205 500
18	Nestlé	EFTA	199 021
19	United Technologies	USA	192 600
20	Samsung	KOR	187 000
21	Robert Bosch	EC	179 636
22	Hoechst	EC	172 890
23	Bayer	EC	171 000
24	Philip Morris	USA	168 000
25	Pemex	MEX	167 952

Number of representatives:	EC	12
	EFTA	2
	USA	7
	Japan	2
	Others	2

Source: DABLE

Figure 6: The 200 largest industrial groups in the world
Turnover by sector



Source: DABLE

Falling margins everywhere

Aggregated profits for the global Top 200 companies tumbled by 19% in 1990. The overall net profit/turnover ratio slipped from 4.1% in 1989 to 3.4% in 1990. The biggest fall was in the USA (from 4.7 to 3.6%) and the smallest in Japan (from 2.8 to 2.5%) (see Figure 2). It is already apparent that the profit drop in 1991 will be greater than in 1990.

Among the 25 largest profit earners the USA have twelve representatives. The EC occupies eight places in this list (see Table 3).

An exception to the malaise are the pharmaceutical giants. Four out of the top six of the most profitable companies are from the pharmaceutical sector.

The number of Top 200 companies reporting losses rose dramatically in 1990 to fifteen: seven American, six European and two Japanese. In 1988 and 1989 there were only seven. Considering that four out of the 1991's top seven racked up losses (General Motors, Ford, IBM and IRI), the loss reporting companies could be doubled in 1991. Philips reported the largest loss in 1990 (2 billion ECU), followed by General

Petroleum refining

Figure 7.1
Turnover in 1986
(million ECU)

Exxon	USA	71 052
Royal Dutch Shell	EC	65 881
Mobil	USA	45 613
British Petroleum	EC	40 493
Texaco	USA	32 139
Chevron	USA	24 756
ENI	EC	23 178
Amoco	USA	18 585
Elf Aquitaine	EC	17 601
Atlantic Richfield	USA	14 728
Total	EC	14 072
Kuwait Petroleum	KWT	13 606
Petrobras	BRA	12 961
Pemex	MEX	11 241
Nippon Oil	JPN	10 713
Phillips Petroleum	USA	9 949
SUN	USA	9 532
Petroleos De Venezuela	VEN	9 424
Idemitsu Kosan	JPN	9 280
USX-Marathon Group	USA	9 124
Showa Shell Sekiyu K.K.	JPN	8 045
Petrofina	EC	7 652
Unocal	USA	7 607
Ashland Oil	USA	7 557
Statoil	EFTA	6 778
Imperial Oil	CAN	5 086
Nesté	EFTA	5 068
Total Raffinage Distribution	EC	4 586

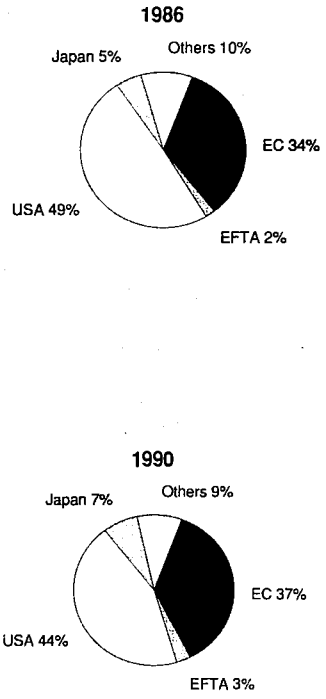


Figure 7.2
Turnover in 1990
(million ECU)

Royal Dutch Shell	EC	83 034
Exxon	USA	82 720
Mobil	USA	46 299
British Petroleum	EC	46 172
ENI	EC	32 882
Texaco	USA	32 062
Chevron	USA	30 265
Elf Aquitaine	EC	25 325
Amoco	USA	21 958
Total	EC	18 537
Petroleos De Venezuela	VEN	18 117
Pemex	MEX	15 228
Atlantic Richfield	USA	14 117
Nippon Oil	JPN	13 497
Petrobras	BRA	12 219
Idemitsu Kosan	JPN	11 272
Repsol	EC	10 922
Phillips Petroleum	USA	10 664
USX-Marathon Group	USA	10 413
Petrofina	EC	10 229
Nesté	EFTA	9 589
SUN	USA	9 260
Statoil	EFTA	9 104
Showa Shell Sekiyu K.K.	JPN	8 970
Unocal	USA	8 345
Imperial Oil	CAN	7 538
Ashland Oil	USA	7 041
Nippon Mining Co	JPN	6 534
RWE-DEA	EC	6 049
Mitsubishi Oil	JPN	6 029

Source: DABLE

Motors (1.6 billion ECU), Occidental Petroleum (1.3 billion ECU) and Michelin (0.7 billion ECU). In 1991, General Motors recorded the largest loss ever reported by a non government-owned company (3.6 billion ECU).

Figures 3, 4 and 5 show the development of the net margin (net profit/turnover ratio) by sector and by economic area for the Top 200 companies. These three graphs show clearly that the recession has been felt by almost all sectors all over the world in 1990. Preliminary figures for 1991 are not encouraging either.

Sector profiles

What began as a gentle decline in overall margins in 1989 progressively worsened during 1990. Startlingly, margins even turned negative for the American automobile sector and for EC's electrical engineering sector.

The distribution of turnover by sector did not significantly change in the period 1986-1990 (see Figure 6). In the following categories the groups are classified by the sector of activity which best represents the company as a whole (the conglomerates, i.e. groups with very diversified activities have not been considered).

Petroleum refining

Tumult in the Middle East restrained petroleum supplies. The result was a sparkling year for the oil companies. The biggest beneficiary was Royal Dutch Shell that passed Exxon as number one in the oil business. All the US oil companies moved to a lower place on the list in 1990 compared to 1986 and the share of the US groups in the total turnover was down 5% since 1986. On the other hand, the number of US representatives in the Top 200 remained unchanged at eleven. EC companies came up from seven representatives in 1986 to eight in 1990, accounting together for 37% of the total turnover (34% in 1986).

The biggest jump on the list was achieved by Petroleos de Venezuela which rose from the 115th place in 1989 to 47th place in 1990.

The average number of employees per company diminished from 49 000 in 1986 to 46 000 in 1990.

Motor vehicles and components

Europe and the USA both have 36% of turnover in 1990.

Profits dipped worldwide in 1990. In the USA margins began to decline in 1987 to the extent that, for the big three (General Motors, Ford Motor and Chrysler), they became negative in 1990. In 1991 the situation worsened dramatically: all four American representatives in the Top 200 were in the red: General Motors experienced the biggest loss ever reported by a non-government owned company and Ford Motor, the biggest loss in its history.

Total employment for the four US majors in 1990 was down by 9% compared to 1986. The eight Japanese representatives saw a rise in employment of 30% and the eight from the EC, of 9%.

Early indications in the accounts of Japanese carmakers (fiscal year end March 1992) point to considerable drops in profits. Nissan even warns of a future loss.

Electrical engineering / electronics

The relative importance of this sector in the Top 200 improved by 1% in 1990 compared to 1986. However, the number of groups diminished by 3 to 28 (one Japanese company more but four less Americans). It is therefore not surprising that the US share in turnover felt from 27% in 1986 to only 18% in 1990%.

The seven EC groups totalled 22% of turnover in 1990, 1% less than in 1986. The number of employees, however, was reduced by over 4%. Philips lost seven places in the ranking of the world's 200 largest industrial groups and made a loss in 1990 of 2 billion ECU.

Japan made up 37% of total turnover in 1990, 2% more than in 1986. For the eight Japanese groups that are both in the 1986 and in the 1990 Top 200, the number of employees soared by 41%. The slowdown of the economy touched the

Motor vehicles and components

Figure 8.1
Turnover in 1986
(million ECU)

General Motors	USA	104 525
Ford Motor	USA	63 760
Toyota Motor	JPN	54 645
Daimler-Benz	EC	30 773
Nissan Motor	JPN	25 939
Volkswagen	EC	24 804
Chrysler	USA	22 962
FIAT	EC	19 949
Renault	EC	19 274
Honda Motor	JPN	17 411
Peugeot	EC	15 428
Volvo	EFTA	12 008
Mitsubishi Motors	JPN	10 616
Mazda Motor	JPN	10 400
Robert Bosch	EC	10 205
BMW	EC	7 310
Nippondenso	JPN	6 123
Isuzu Motors	JPN	6 101
Suzuki Motor	JPN	5 278
Saab-Scania	EFTA	5 030
Audi	EC	4 655

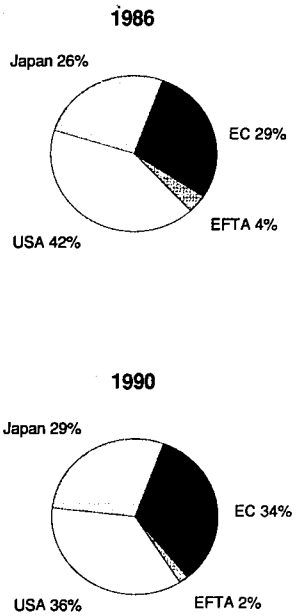


Figure 8.2
Turnover in 1990
(million ECU)

General Motors	USA	96 640
Ford Motor	USA	76 551
Toyota Motor	JPN	53 778
Daimler-Benz	EC	41 570
FIAT	EC	37 758
Volkswagen	EC	33 091
Nissan Motor	JPN	32 330
Renault	EC	23 664
Chrysler	USA	23 359
Honda Motor	JPN	23 314
Peugeot	EC	23 088
Robert Bosch	EC	15 507
Mitsubishi Motors	JPN	15 164
Mazda Motor	JPN	14 712
BMW	EC	13 214
Volvo	EFTA	11 034
Isuzu Motors	JPN	8 390
Nippondenso	JPN	8 208
Suzuki Motor	JPN	6 780
TRW	USA	6 404
Audi	EC	5 895

Source: DABLE

Figure 9.1
Turnover in 1986
(million ECU)

General Electric	USA	35 797
Hitachi	JPN	29 431
Matsushita Electric	JPN	27 587
Philips	EC	22 915
Siemens	EC	21 786
Toshiba	JPN	20 077
Samsung	KOR	16 834
NEC	JPN	14 870
Mitsubishi Electric	JPN	12 793
CGE	EC	11 894
Lucky-Goldstar	KOR	11 649
Westinghouse Electric	USA	10 910
Daewoo	KOR	10 098
Thomson	EC	9 147
Sony	JPN	7 977
Electrolux	EFTA	7 581
General Electric Company	EC	7 575
Raytheon	USA	7 430
Sanyo Electric	JPN	7 122
Sharp	JPN	6 972
Asea	EFTA	6 376
TRW	USA	6 136
Motorola	USA	5 986
Honeywell	USA	5 468
Emerson Electric	USA	5 284
AEG	EC	5 272
CSF(Thomson)	EC	5 238
Texas Instruments	USA	5 057
Martin Marietta	USA	4 832
Ericsson (L.M.)	EFTA	4 519

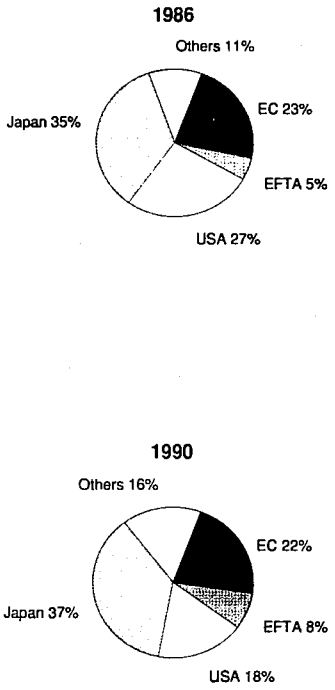


Figure 9.2
Turnover in 1990
(million ECU)

General Electric	USA	45 203
Hitachi	JPN	41 934
Samsung Group	KOR	36 158
Matsushita Electric	JPN	35 768
Siemens	EC	30 784
Toshiba	JPN	25 449
Philips	EC	24 066
Lucky-Goldstar	KOR	23 621
ABB Asea Brown Boveri	EFTA	21 025
Alcatel-Alsthom	EC	20 790
NEC	JPN	20 047
Sony	JPN	19 602
Mitsubishi Electric	JPN	17 974
Daewoo	KOR	17 536
Electrolux	EFTA	10 935
Thomson	EC	10 880
Rockwell International	USA	10 191
Westinghouse Electric	USA	10 124
Motorola	USA	8 533
General Electric Company	EC	8 511
Sharp	JPN	8 109
Sanyo Electric	JPN	8 051
Raytheon	USA	7 265
Finmeccanica	EC	6 766
AEG	EC	6 393
Emerson Electric	USA	6 235
Ericsson (L.M.)	EFTA	6 062
Matsushita Electric Works	JPN	5 643

Source: DABLE

Japanese electronic sector in 1991, resulting in lower annual profits.

The most spectacular performance in this sector comes from the three Korean groups: Samsung, Lucky-Goldstar and Daewoo. With 21% more employees, they doubled their total turnover in five years and claimed 16% of total turnover in 1990. The Samsung group is now the third electronics group in the world after General Electric and Hitachi. The highest rate of growth, however, was obtained by Sony with an average annual growth rate of 25.2% that brought the company from the 98th place in 1986 to a rank of 45th in 1990.

Data processing and office machinery

The data processing and office machinery sector is represented in 1990 by six companies. NCR fell out of the Top 200.

In both years IBM occupied first place. In 1986, IBM's turnover was 14% bigger than the total of the next six others

Data processing and office machinery

Figure 10.1
Turnover in 1986
(million ECU)

IBM	USA	52 103
Fujitsu	JPN	10 862
Digital Equipment	USA	8 724
Unisys	USA	7 556
Hewlett-Packard	USA	7 443
Olivetti	EC	4 976
NCR	USA	4 963

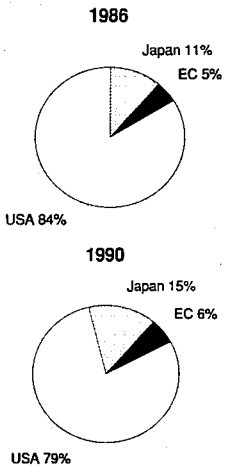


Figure 10.2
Turnover in 1990
(million ECU)

IBM	USA	54 105
Fujitsu	JPN	16 105
Digital Equipment	USA	11 167
Hewlett-Packard	USA	10 706
Unisys	USA	7 927
Olivetti	EC	5 964

Source: DABLE

Aerospace

Figure 11.1
Turnover in 1986
(million ECU)

Boeing	USA	16 613
United Technologies	USA	15 930
Rockwell International	USA	13 119
McDonnell Douglas	USA	12 985
Allied Signal	USA	11 990
Lockheed	USA	10 444
General Dynamics	USA	9 040
Northrop	USA	5 702
Textron	USA	5 107
Aérospatiale	EC	4 977
British Aerospace	EC	4 675

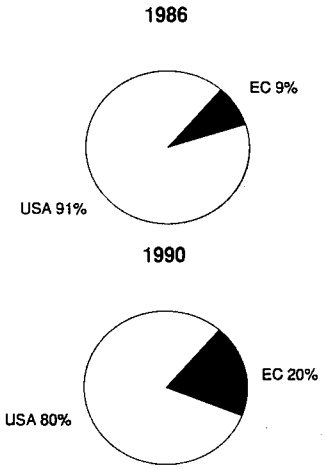


Figure 11.2
Turnover in 1990
(million ECU)

Boeing	USA	21 633
United Technologies	USA	16 893
British Aerospace	EC	14 730
McDonnell Douglas	USA	12 736
Allied Signal	USA	9 676
General Dynamics	USA	7 975
Lockheed	USA	7 806
Textron	USA	6 205
Deutsche Aerospace	EC	6 103

Source: DABLE

combined. By 1990 however those six together had 5% more sales than IBM.

Japan's strength in this sector is underestimated because in this analysis the groups have been put in the sector which accounts for the largest share of their turnover keeping companies as Toshiba, NEC and Canon out of the data processing and office machinery sector.

Aerospace

This sector is largely dominated by American companies. Japan is not present in the Top 200. The EC managed to take 20% of the Top 200 in 1990 especially thanks to the steep climb of British Aerospace from rank 187 in 1986 to rank 63 in 1990 (average annual growth rate of 33.2%). All the other companies lost places in the 1990 list. France's Aerospatiale bailed out of the Top 200.

Chemicals

Twenty-six companies of the Top 200 belong to the chemical industry. For six of these companies, the main activity is the manufacture of pharmaceutical products.

EC companies produce 45% of total turnover of this sector at the Top 200 level, 3% more than in 1986. The American companies lost 3% and now account for 38% of total turnover.

Chemicals

Figure 13.1
Turnover in 1986
(million ECU)

Du Pont (E.I.) De Nemours	USA	27 437
Bayer	EC	19 145
BASF	EC	19 014
Hoechst	EC	17 860
Procter & Gamble	USA	17 746
ICI	EC	15 106
Dow Chemical	USA	11 298
Ciba-Geigy	EFTA	9 058
Montedison	EC	8 727
Rhône-Poulenc	EC	7 747
Norsk Hydro	EFTA	7 495
DSM	EC	7 376
Johnson & Johnson	USA	7 119
Monsanto	USA	6 994
Akzo	EC	6 501
Union Carbide	USA	6 449
Mitsubishi Kasei	JPN	6 199
Baxter International	USA	5 635
Asahi Chemical Industry	JPN	5 491
Colgate-Palmolive	USA	5 068
American Home Products	USA	5 009
Bristol Myers Squibb	USA	4 916
Solvay & Cie	EC	4 893
Sandoz	EFTA	4 747
Fuji Photo Film	JPN	4 568
Pfizer	USA	4 551
Roche Holding	EFTA	4 441

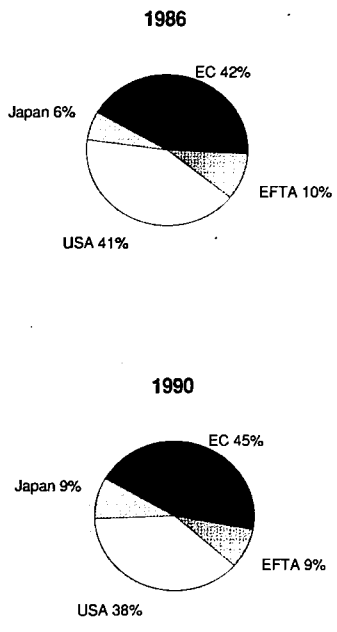


Figure 13.2
Turnover in 1990
(million ECU)

Du Pont (E.I.) De Nemours	USA	31 129
BASF	EC	22 000
Hoechst	EC	21 812
Procter & Gamble	USA	20 777
Bayer	EC	20 247
ICI	EC	18 036
Dow Chemical	USA	15 501
Rhône-Poulenc	EC	11 374
Ciba-Geigy	EFTA	11 157
Enichem (ex Enimont)	EC	9 897
Johnson & Johnson	USA	8 805
Bristol Myers Squibb	USA	8 074
Norsk Hydro	EFTA	7 657
Akzo	EC	7 443
Asahi Chemical Industry	JPN	7 054
Monsanto	USA	7 051
Sandoz	EFTA	7 003
Mitsubishi Kasei	JPN	6 851
Smithkline Beecham	EC	6 658
Baxter International	USA	6 350
Merck & Co	USA	6 014
Solvay & Cie	EC	6 003
Union Carbide	USA	5 974
Fuji Photo Film	JPN	5 878
Henkel	EC	5 843
Sumitomo Chemical	JPN	5 802

Source: DABLE

Metallurgy

Figure 12.1
Turnover in 1986
(million ECU)

Thyssen	EC	14 825
Nippon Steel	JPN	13 224
Usinor Sacilor	EC	10 630
LTV	USA	7 392
NKK	JPN	6 626
USX-US Steel	USA	6 245
Kobe Steel	JPN	6 002
Kawasaki Steel	JPN	5 632
Sumitomo Metal	JPN	5 479
Broken Hill Proprietary	AUS	5 445
Degussa	EC	5 037
Aluminum Co of America	USA	4 745
Metallgesellschaft	EC	4 518
British Steel	EC	4 476

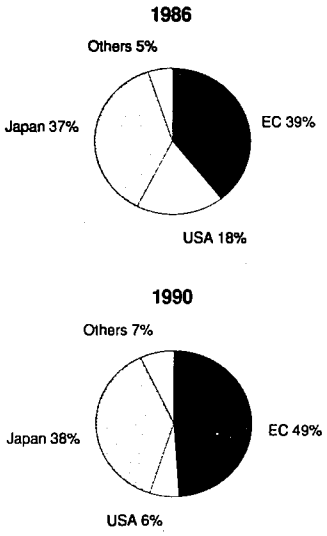


Figure 12.2
Turnover in 1990
(million ECU)

Thyssen	EC	17 630
Nippon Steel	JPN	17 393
Usinor Sacilor	EC	13 892
NKK	JPN	10 521
Broken Hill Proprietary	AUS	9 788
Metallgesellschaft	EC	9 660
Viag	EC	9 443
Aluminum Co of America	USA	8 396
Kobe Steel	JPN	7 888
British Steel	EC	7 100
ILVA (IRI)	EC	6 974
Degussa	EC	6 784
Kawasaki Steel	JPN	6 425
Sumutomo Electric	JPN	6 276
Sumitomo Metal	JPN	6 270

Source: DABLE

The top positions in the list of the most profitable companies in the Top 200 are occupied by two American pharmaceuticals: Merck (net margin 23.2%) and Bristol Myers Squibb (16.9%). (See Table 3).

Metallurgy

The EC dominates the metallurgy sector at the Top 200 level after years of heavy losses and considerable restructuring. In 1986, eight out of the fourteen companies figuring in the 1986 Top 200 made a loss. The results were all positive in 1990 although not as high as in 1988 and 1989.

Also the growth of employment is higher than the average of the Top 200 companies: +13% since 1986 for the eleven companies represented in the Top 200 in 1986 as well as in 1990.

Agro-Alimentary

The agro-alimentary industry produced 10% of the total sales of the world's largest 200 industrial companies in 1986 as well as in 1990.

This sector is dominated by the USA and Europe. Since 1986, the USA has lost three companies in the Top 200 and 7% of

Agro-alimentary

Figure 14.1
Turnover in 1986
(million ECU)

Unilever	EC	23 051
Nestlé	EFTA	21 601
Philip Morris	USA	21 025
RJR Nabisco Holdings	USA	16 244
B.A.T. Industries	EC	13 422
Pepsico	USA	9 445
Sara Lee	USA	9 124
Kraft General Foods	USA	8 888
Coca-Cola	USA	8 813
Conagra	USA	8 436
Grand Metropolitan	EC	8 295
Anheuser-Busch Cos	USA	7 805
Dalgety	EC	7 168
IBP	USA	6 935
Barlow Rand	SAF	6 285
Taiyo Fishery	JPN	6 172
Archer-Daniels-Midland	USA	6 133
Ralston Purina	USA	5 884
Pillsbury	USA	5 743
American Brands	USA	5 349
Borden	USA	5 085
BSN	EC	4 943
General Mills	USA	4 864
CPC International	USA	4 625
Allied-Lyons	EC	4 465

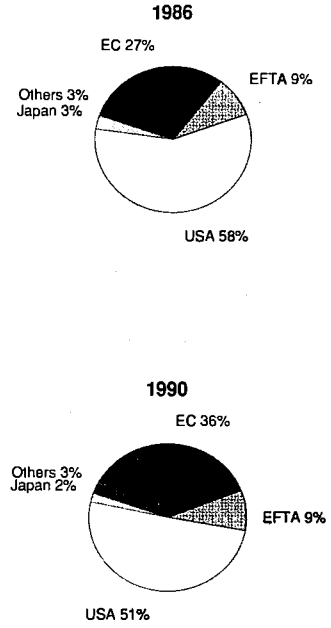


Figure 14.2
Turnover in 1990
(million ECU)

Philip Morris	USA	34 746
Unilever	EC	31 124
Nestlé	EFTA	26 256
Kraft General Foods	USA	20 449
Conagra	USA	15 319
B.A.T. Industries	EC	14 705
Pepsico	USA	13 956
Grand Metropolitan	EC	13 098
Ferruzzi Finanziaria	EC	11 001
RJR Nabisco Holdings	USA	10 880
Sara Lee	USA	10 014
Barlow Rand	SAF	8 726
Anheuser-Busch	USA	8 422
Coca-Cola	USA	8 025
IBP	USA	7 984
BSN	EC	7 634
Sucres & Denrées	EC	6 762
Archer-Daniels-Midland	USA	6 688
Dalgety	EC	6 514
American Brands	USA	6 483
Allied-Lyons	EC	6 179
Eridania Zuccherifici	EC	6 049
Borden	USA	5 984
Hillsdown Holdings	EC	5 891
Ralston Purina	USA	5 847
Taiyo Fishery	JPN	5 838

Source: DABLE

Table 4
The world's 200 largest industrial groups
(million ECU)

Rank	Name	Country	Turnover 1990	Profits 1990	Employees 1990	Turnover 1991	Profits 1991	Employees 1991	Sector
1	General Motors	USA	96 640	-1 557	761 400	98 268	-4 018	756 300	Motor vehicles
2	Royal Dutch Shell	UK/NL	83 034	5 044	137 000	82 777	3 424	133 000	Oil
3	Exxon	USA	82 720	3 927	104 000	82 786	4 508	101 000	Oil
4	Ford Motor	USA	76 551	674	370 383	71 065	-1 818	332 700	Motor vehicles
5	IBM	USA	54 105	4 719	373 816	52 154	-454	344 553	Office machinery/computers
6	Toyota Motor	JPN	53 778	2 582	96 849	55 386	2 425	102 423	Motor vehicles
7	IRI	I	53 741	2 353	419 500	51 725	-205	407 169	National conglomerate
8	Mobil	USA	46 299	1 520	67 300	45 926	1 549	67 500	Oil
9	British Petroleum	UK	46 172	2 342	118 050	46 474	591	115 250	Oil
10	General Electric	USA	45 203	3 373	298 000	47 797	3 570	284 000	Electrical eng/electronics
11	Hitachi	JPN	41 934	1 248	309 757	47 836	786	324 292	Electrical eng/electronics
12	Daimler-Benz	D	41 570	824	376 785	46 300	912	379 252	Motor vehicles
13	FIAT	I	37 758	1 065	303 238	37 777	725	287 957	Motor vehicles
14	Samsung Group	KOR	36 158		187 000	31 530	251	187 377	Electrical eng/electronics
15	Matsushita Electric Indl	JPN	35 768	1 403	210 848	44 855	800	242 246	Electrical eng/electronics
16	Philip Morris	USA	34 746	2 775	168 000	38 689	3 161	166 000	Agro-alimentary
17	Volkswagen	D	33 091	491	267 997	37 190	996	267 009	Motor vehicles
18	ENI	I	32 882	1 336	130 745	33 125	657	131 248	Petroleum refining
19	Nissan Motor	JPN	32 330	265	138 326	38 642	610	143 916	Motor vehicles
20	Texaco	USA	32 062	1 137	39 199	30 001	1 042	40 181	Petroleum refining
21	Du Pont (E.I.) De Nemours	USA	31 129	1 811	143 961	30 709	1 129	132 578	Chemicals
22	Unilever	UK/NL	31 124	1 556	301 000	33 059	1 645	298 000	Agro-alimentary
23	Siemens	D	30 784	754	373 000	35 489	898	402 000	Electrical eng/electronics
24	Chevron	USA	30 265	1 691	54 208	29 349	1 041	55 123	Petroleum refining
25	Veba	D	26 671	541	106 877	29 127	538	116 979	Conglomerate
26	Nestlé	CH	26 256	1 287	199 021	28 453	1 392	201 139	Agro-alimentary
27	Toshiba	JPN	25 449	655	162 000	28 433	238	168 000	Electrical eng/electronics
28	Elf Aquitaine	F	25 325	1 533	90 000	28 761	1 404	86 900	Petroleum refining
29	Philips	NL	24 066	-1 953	272 800	24 646	424	240 000	Electrical eng/electronics
30	Renault	F	23 664	175	157 378	23 751	441	147 195	Motor vehicles
31	Lucky-Goldstar	KOR	23 621	233	94 500	18 605	99	100 000	Electrical eng/electronics
32	Chrysler	USA	23 359	53	124 000	22 669	-433	124 000	Motor vehicles
33	Honda Motor	JPN	23 314	413	85 500	26 443	390	86 000	Motor vehicles
34	Peugeot	F	23 088	1 336	159 100	22 956	792	156 800	Motor vehicles
35	BASF	D	22 000	518	134 647	21 831	513	129 434	Chemicals
36	Amoco	USA	21 958	1 500	54 524	20 385	944	54 120	Petroleum refining
37	Hoechst	D	21 812	728	172 890	22 995	535	179 332	Chemicals
38	Boeing	USA	21 633	1 086	160 500	23 596	1 261	155 700	Aerospace
39	ABB Asea Brown Boveri	CH/S	21 025	467	215 154	23 309	474	214 399	Electrical eng/electronics
40	Alcatel-Alsthom	F	20 790	597	205 500	22 943	792	213 100	Electrical eng/electronics
41	Procter & Gamble	USA	20 777	1 382	89 000	20 762	1 362	94 000	Chemicals
42	Kraft General Foods	USA	20 449	417	111 000	22 657	152		Agro-alimentary
43	Bayer	D	20 247	914	171 000	20 663	853	164 200	Chemicals
44	NEC	JPN	20 047	275	117 994	22 722	92	128 320	Electrical eng/electronics
45	Sony	JPN	19 602	634	112 900	23 009	723	119 000	Electrical eng/electronics
46	Total	F	18 537	572	46 024	20 497	833	49 365	Petroleum refining
47	Petróleos de Venezuela	VEN	18 117	1 024	51 883	18 037	357	54 850	Petroleum refining
48	ICI	UK	18 036	862	132 100	17 796	772	123 600	Chemicals
49	Mitsubishi Electric	JPN	17 974	432	97 002	20 130	217	102 704	Electrical eng/electronics
50	Thyssen	D	17 630	299	152 708	17 773	152	148 250	Metallurgy
51	Daewoo	KOR	17 536	96	85 831	18 298		85 831	Electrical eng/electronics
52	Nippon Steel	JPN	17 393	494	72 929	19 445	472		Metallurgy
53	Occidental Petroleum	USA	17 007	-1 323	55 000	8 127	305	24 700	Extraction
54	United Technologies	USA	16 893	588	192 600	16 866	-822	185 100	Aerospace
55	Fujitsu	JPN	16 105	448	145 872	20 724	73	155 779	Office machinery/computers
56	Robert Bosch	D	15 507	273	179 636	16 359	241	177 123	Motor vehicles
57	Dow Chemical	USA	15 501	1 085	62 080	15 139	758	62 219	Chemicals
58	Conagra	USA	15 319	244	74 718	17 183	301	80 787	Agro-alimentary
59	Pemex	MEX	15 228	1 171	167 952	15 466	526	166 896	Petroleum refining
60	Mitsubishi Motors	JPN	15 164	140	25 300	18 587	178	40 313	Motor vehicles
61	USX Consolidated	USA	15 150	641	51 523	13 851	-468	46 996	Petroleum refining
62	Eastman Kodak	USA	14 823	551	134 450	15 631	14	133 200	Instrument engineering
63	British Aerospace	UK	14 730	363	129 100	15 051	-80	115 700	Aerospace
64	Mazda Motor	JPN	14 712	144	34 507	16 393	56	35 000	Motor vehicles

Rank	Name	Country	Turnover 1990	Profits 1990	Employees 1990	Turnover 1991	Profits 1991	Employees 1991	Sector
65	B.A.T. Industries	UK	14 705	569	217 373	15 903	587	212 316	Agro-alimentary
66	Mitsubishi Heavy Industries	JPN	14 550	534	58 041	16 798	636		Mechanical engineering
67	INI	E	14 366	81	146 251	15 297	-464	140 925	Conglomerate
68	Atlantic Richfield	USA	14 117	1 323	27 300	13 714	571	27 700	Petroleum refining
69	Pepsico	USA	13 956	855	308 000	15 783	869	338 000	Agro-alimentary
70	Usinor Sacilor	F	13 892	457	97 000	13 907	-434	97 845	Metallurgy
71	Nippon Oil	JPN	13 497	134	9 531	17 012	229		Petroleum refining
72	Xerox	USA	13 288	474	110 000	13 479	365	109 400	Instrument engineering
73	Bayerische Motoren Werke	D	13 214	336	70 948	14 541	367	74 385	Motor vehicles
74	Grand Metropolitan	UK	13 098	885	138 149	12 477	940	122 178	Agro-alimentary
75	McDonnell Douglas	USA	12 736	216	121 190	14 837	286	109 123	Aerospace
76	Petrobras	BRA	12 219	402	60 542	10 455	500	53 857	Petroleum refining
77	Mannesmann	D	11 641	231	123 997	12 105	191	125 188	Mechanical engineering
78	Oiag	AUT	11 504	55	77 781	11 740	19	78 689	Conglomerate
79	Tenneco	USA	11 376	440	92 000	10 997	-543	89 000	Mechanical engineering
80	Rhône-Poulenc	F	11 374	188	91 571	12 013	152	89 051	Chemicals
81	Idemitsu Kosan	JPN	11 272	28	5 178				Petroleum refining
82	Ruhrkohle	D	11 170	55	119 457	12 026	32	122 469	Extraction
83	Digital Equipment	USA	11 167	64	124 000	10 687	-474	121 000	Office machinery/computers
84	Ciba-Geigy	CH	11 157	585	94 141	11 879	721	91 665	Chemicals
85	Péchiney	F	11 094	709	70 460	10 667	118	70 749	Metal products
86	Volvo	S	11 034	-135	68 797	10 319	91	63 582	Motor vehicles
87	Ferruzzi Finanziaria	I	11 001	163	44 569	11 581	75	44 949	Agro-alimentary
88	Electrolux	S	10 935	98	150 892	10 560	50	130 300	Electrical eng/electronics
89	Repsól	E	10 922	522	21 571	13 164	546	20 848	Petroleum refining
90	Thomson	F	10 880	-358	105 500	10 202	0	105 000	Electrical eng/electronics
91	RJR Nabisco Holdings	USA	10 880	-362	55 000	12 065	296	56 000	Agro-alimentary
92	Hewlett-Packard	USA	10 706	598	92 000	11 512	600	89 000	Office machinery/computers
93	Phillips Petroleum	USA	10 664	424	22 411	10 145	79	22 682	Petroleum refining
94	NKK	JPN	10 521	160	22 346	11 629	48	44 291	Metallurgy
95	USX-Marathon Group	USA	10 413	398	26 062	9 911	-57	24 352	Petroleum refining
96	Minnesota Mining & Mfg	USA	10 258	1 030	89 601	10 765	931	88 477	Instrument engineering
97	Petrofina	B	10 229	511	23 800	10 182	386	17 069	Petroleum refining
98	Rockwell International	USA	10 191	514	101 923	9 383	472	87 004	Electrical eng/electronics
99	International Paper	USA	10 160	446	69 000	10 225	321	70 500	Paper and paper products
100	Westinghouse Electric	USA	10 124	210	115 774	10 298	-874	113 664	Electrical eng/electronics
101	Sara Lee	USA	10 014	406	107 800	9 512	411	113 400	Agro-alimentary
102	Hanson	UK	9 973	1 354	80 000	10 969	1 476	70 000	Conglomerate
103	Saint-Gobain	F	9 969	530	104 987	10 758	403	104 653	Building materials
104	Georgia-Pacific	USA	9 928	286	63 000	9 276	-64	57 000	Paper and paper products
105	Enichem (ex Enimont)	I	9 897	-58	49 000	8 755	-484	37 017	Chemicals
106	Broken Hill Proprietary	AUS	9 788	822	51 000	10 064	902	51 000	Metallurgy
107	Bridgestone	JPN	9 688	24	95 276	10 566	45	83 081	Rubber products
108	Allied Signal	USA	9 676	362	105 800	9 523	-220	98 300	Aerospace
109	Metallgesellschaft	D	9 660	91	32 224	10 296	9	38 173	Metallurgy
110	Neste	SF	9 589	193	11 278	10 785	73	13 426	Petroleum refining
111	Viag	D	9 443	142	55 848	11 501	153	74 122	Metallurgy
112	BTR	UK	9 422	773	105 594	9 607	789	104 950	Conglomerate
113	Canon	JPN	9 383	333	54 381	11 195	312	62 700	Instrument engineering
114	Preussag	D	9 279	152	72 268	12 373	243	71 654	Conglomerate
115	SUN	USA	9 260	156	20 926	8 198	-106	16 963	Petroleum refining
116	MAN	D	9 227	173	66 626	9 229	308	64 604	Mechanical engineering
117	Statoil	N	9 104	411	13 222	9 890	341	13 943	Petroleum refining
118	Michelin & Cie	F	9 054	-694	140 826	9 681	-100	140 000	Rubber products
119	Time Warner	USA	9 029	-178	41 000	9 676	-80	41 700	Printing and publishing
120	Caterpillar	USA	9 009	165	59 662	8 217	-326	53 636	Mechanical engineering
121	Showa Shell Sekiyu K.K.	JPN	8 970	54	2 346	8 072	159	3 024	Petroleum refining
122	Goodyear Tire & Rubber	USA	8 837	-30	104 703	8 779	60	97 420	Rubber products
123	Johnson & Johnson	USA	8 805	896	82 200	10 019	1 176	82 700	Pharmaceuticals
124	Barlow Rand	SAF	8 726	271	158 400	8 977	236	150 902	Agro-alimentary
125	Motorola	USA	8 533	391	105 000	9 129	365	102 000	Electrical eng/electronics
126	General Electric Company	UK	8 511	707	118 529	8 205	713	104 995	Electrical eng/electronics
127	Anheuser-Busch	USA	8 422	660	45 432	8 851	756	44 836	Agro-alimentary
128	Aluminum Co of America	USA	8 396	231	63 700	7 956	50	65 600	Metallurgy
129	Isuzu Motors	JPN	8 390	-43	24 470	8 986	-365	26 254	Motor vehicles
130	Unocal	USA	8 345	314	17 518	7 796	59	17 248	Petroleum refining
131	Stora Kopparbergs Bergsl.	S	8 273	168	69 691	8 969	68	66 813	Paper and paper products
132	Nippondenso	JPN	8 208	342	53 585	8 873	364	54 965	Motor vehicles
133	Sharp	JPN	8 109	254	36 539	9 362	235		Electrical eng/electronics

Rank	Name	Country	Turnover 1990	Profits 1990	Employees 1990	Turnover 1991	Profits 1991	Employees 1991	Sector
134	Bristol Myers Squibb	USA	8 074	1 370	52 900	8 982	1 655	53 500	Pharmaceuticals
135	Sanyo Electric	JPN	8 051	96	55 124	9 428	100	56 079	Electrical eng/electronics
136	Coca-Cola	USA	8 025	1 083	24 000	9 314	1 302	28 900	Agro-alimentary
137	IBP	USA	7 984	38	25 950	8 361	1	26 500	Agro-alimentary
138	General Dynamics	USA	7 975	-501	98 100	7 044	301	75 300	Aerospace
139	Unisys	USA	7 927	-342	75 300	6 993	-1 122	60 300	Office machinery/computers
140	Kobe Steel	JPN	7 888	143	25 225	8 763	164	26 705	Metallurgy
141	Lockheed	USA	7 806	263	73 000	7 896	248	72 300	Aerospace
142	Norsk Hydro	N	7 657	422	33 042	7 656	-143	34 957	Chemicals
143	BSN	F	7 634	446	45 254	9 469	560	59 158	Agro-alimentary
144	Fried. Krupp	D	7 587	79	59 044	7 386	119	53 115	Mechanical engineering
145	Imperial Oil	CAN	7 538	331	14 702	6 477	114	11 936	Petroleum refining
146	Akzo	NL	7 443	314	69 800	7 288	299	65 200	Chemicals
147	Raytheon	USA	7 265	437	76 700	7 465	476	71 600	Electrical eng/electronics
148	British Steel	UK	7 100	272	56 100	6 534	-48	49 100	Metallurgy
149	Weyerhaeuser	USA	7 074	309	40 621	7 004	-81	38 669	Paper and paper products
150	Bertelsmann	D	7 065	263	45 500	7 347	274	45 110	Printing and publishing
151	Asahi Chemical Industry	JPN	7 054	231	27 018	7 863	184		Chemicals
152	Monsanto	USA	7 051	428	41 081	7 135	238	39 281	Chemicals
153	Ashland Oil	USA	7 041	150	33 400	7 319	114	33 000	Petroleum refining
154	Sandoz	CH	7 003	548	52 640	7 577	628	53 400	Pharmaceuticals
155	Alcan Aluminium	CAN	6 865	426	57 000	6 237	-29	54 000	Metal products
156	Mitsubishi Kasei	JPN	6 851	77	19 109	7 322	14	21 524	Chemicals
157	Degussa	D	6 784	72	35 005	6 489	48	34 482	Metallurgy
158	Suzuki Motor	JPN	6 780	87	23 277	7 518	119		Motor vehicles
159	Fletcher Challenge	NZL	6 775	370	40 000	6 061	292	35 000	Paper and paper products
160	Finmeccanica	I	6 766	68	55 000	5 822	-370	56 153	Electrical eng/electronics
161	Sucres et Denrées	F	6 762	-67	5 600				Agro-alimentary
162	Asahi Glass	JPN	6 700	254	19 118	7 616	224	22 354	Building materials
163	Pirelli	I	6 692	92	68 703	6 525	475	64 854	Rubber products
164	Archer-Daniels-Midland	USA	6 688	417	11 861	6 505	359	13 049	Agro-alimentary
165	Smithkline Beecham	UK	6 658	760	57 300	6 676	909	54 000	Pharmaceuticals
166	Nippon Mining	JPN	6 534	29	5 387	6 340	-98		Petroleum refining
167	Dalgety	UK	6 514	115	22 700	5 376	117	16 753	Agro-alimentary
168	American Brands	USA	6 483	467	51 760	6 745	649	47 600	Agro-alimentary
169	Kawasaki Steel	JPN	6 425	207	18 048	8 300	87	24 530	Metallurgy
170	TRW	USA	6 404	163	75 637	6 369	-113	71 262	Motor vehicles
171	AEG	D	6 393	25	76 949	6 822	-68	76 338	Electrical eng/electronics
172	Baxter International	USA	6 350	31	64 600	7 181	476	65 900	Pharmaceuticals
173	Dai Nippon Printing	JPN	6 340	235	23 769	7 492	264	27 300	Printing and publishing
174	Noranda	CAN	6 335	81	56 000	5 806	-94	51 000	Paper and paper products
175	Deere & Co	USA	6 277	333	38 493	5 501	-16	36 469	Mechanical engineering
176	Sumitomo El. Industries	JPN	6 276	174	14 348	6 715	193		Metallurgy
177	Sumitomo Metal Industries	JPN	6 270	258	19 817				Metallurgy
178	Emerson Electric	USA	6 235	505	73 700	5 843	497	69 500	Electrical eng/electronics
179	Textron	USA	6 205	222	54 000	6 297	241	52 000	Aerospace
180	Allied-Lyons	UK	6 179	439	83 243	6 529	539	78 743	Agro-alimentary
181	Hoesch	D	6 112	46	52 200	4 922	63	44 200	Mechanical engineering
182	Ericsson (L.M.)	S	6 062	458	70 238	6 119	118	71 247	Electrical eng/electronics
183	Eridania Zuccherifici	I	6 049	88	15 807				Agro-alimentary
184	RWE-DEA	D	6 049	9	5 430	6 954	14	6 359	Petroleum refining
185	Mitsubishi Oil	JPN	6 029	67	3 318				Petroleum refining
186	Merck & Co	USA	6 014	1 396	36 900	6 925	1 708	37 700	Pharmaceuticals
187	Solvay & Cie	B	6 003	394	45 671	6 031	232	45 585	Chemicals
188	Borden	USA	5 984	285	46 300	5 824	237	44 400	Agro-alimentary
189	Union Carbide	USA	5 974	241	37 756	3 938	-23	16 705	Chemicals
190	Olivetti	I	5 964	40	53 679	5 602	-299	46 484	Office machinery/computers
191	Audi	D	5 895	66	37 035	7 224	180	38 326	Motor vehicles
192	Hillsdown Holdings	UK	5 891	191	47 504	6 636	176	48 652	Agro-alimentary
193	Fuji Photo Film	JPN	5 878	498	21 946	6 593	559	23 690	Chemicals
194	Ralston Purina	USA	5 847	326	56 127	5 802	308	57 996	Agro-alimentary
195	Henkel	D	5 843	189	38 803	6 289	194	41 475	Chemicals
196	Taiyo Fishery	JPN	5 838	-31	8 208	6 350	-34	11 666	Agro-alimentary
197	News Corporation	AUS	5 816	185	38 432				Printing and publishing
198	Sumitomo Chemical	JPN	5 802	124	14 546	6 534	121	15 027	Chemicals
199	Toppan Printing	JPN	5 758	186	16 162	7 074	225	25 416	Printing and publishing
200	Matsushita Electric Works	JPN	5 643	182	23 585	6 490	210	25 219	Electrical eng/electronics

Source: DABLE

Table 5
The 200 largest companies in Europe by country

Country	1986 Number	1986 Turnover (million ECU)	1986 (%)	1990 Number	1990 Turnover (million ECU)	1990 (%)
BR Deutschland	42	356 905	26.2	42	470 077	24.9
France	44	283 292	20.8	45	397 503	21.1
United Kingdom	59	332 485	24.4	47	392 538	20.8
Italia	10	119 596	8.8	13	214 520	11.4
Nederland	9	102 237	7.5	10	118 024	6.3
Switzerland	11	62 930	4.6	10	92 646	4.9
Sweden	11	48 818	3.6	12	67 456	3.6
España	4	9 795	0.7	8	48 458	2.6
Belgique/België	5	21 208	1.6	6	33 401	1.8
Norway	2	14 273	1.1	2	16 761	0.9
Austria				2	16 046	0.9
Finland	2	7 480	0.6	2	14 139	0.8
Luxembourg				1	4 912	0.3
Danmark	1	1 786	0.1			
Total	200	1 360 895	100.0	200	1 886 482	100.0

Source: DABLE

total turnover while the EC has added four companies and 9% of total turnover. The EFTA share remained stable at 9%.

In 1990, Philip Morris surpassed Unilever and Nestlé to become the biggest thanks to an average annual growth rate of 13.4% for the period 1986-1990. Kraft General Foods turned in a rate of 23.2% and Conagra one of 16.1%.

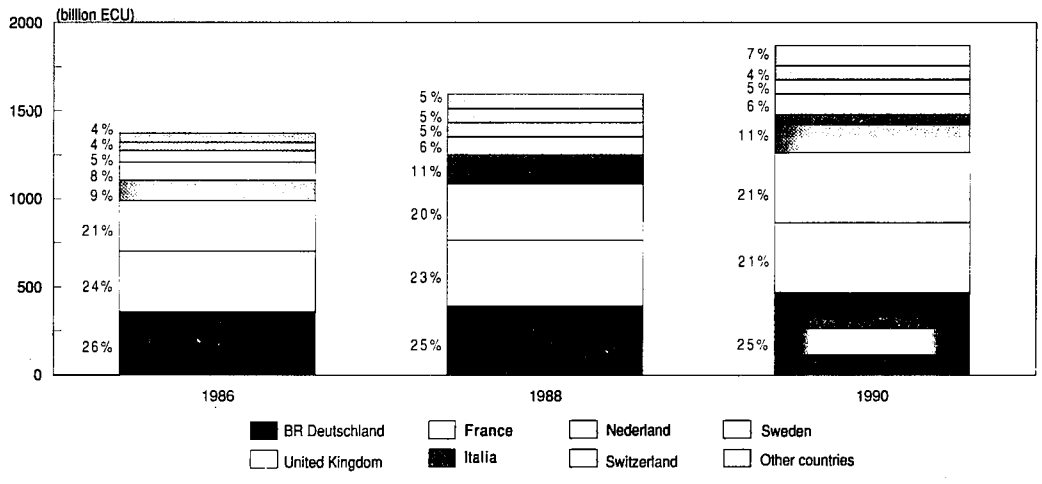
EUROPE'S LARGEST MANUFACTURING AND SERVICES COMPANIES

The 200 largest manufacturing and services groups (excluding distribution) in Europe achieved an overall turnover of 1 886 billion ECU in 1990.

The EC accounted for 172 companies and EFTA for 28, generating respectively 89% and 11% of total turnover in the 1990 Top 200. Growth of total turnover was 4.3% in 1990. The average annual growth rate for the period 1986-1990 was 8.2%.

A breakdown by country is shown in Table 5. Germany had the largest share in turnover in 1986 as well as 1990 with 42 companies in both years, but lost some ground in its proportion of total sales. Since 1986, the United Kingdom lost 12 representatives in the Top 200 and its share in total turnover slipped 3.6%, allowing France to take over the second place. Italy and Spain both considerably improved their positions. However, in a global economy, characterised by multinational companies, the criterion of location loses some significance in many cases.

Figure 15: The Top 200 European companies
Turnover growth



Source: DABLE

Figure 16: The 200 largest European companies
Net profit / turnover by sector

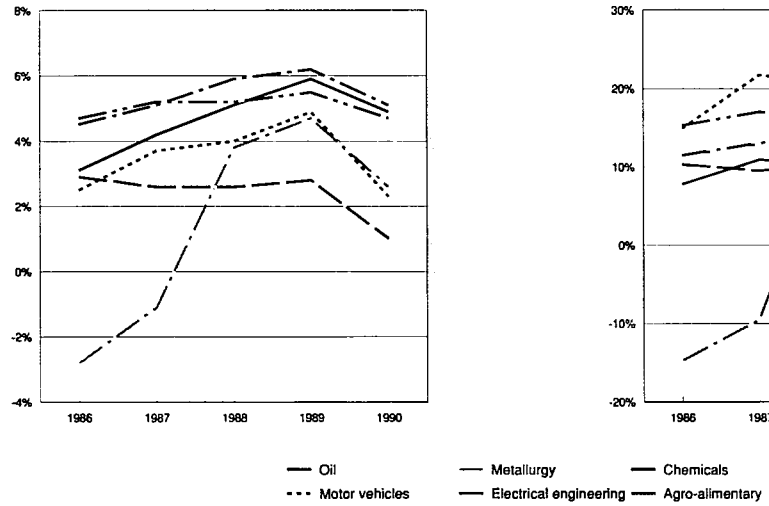
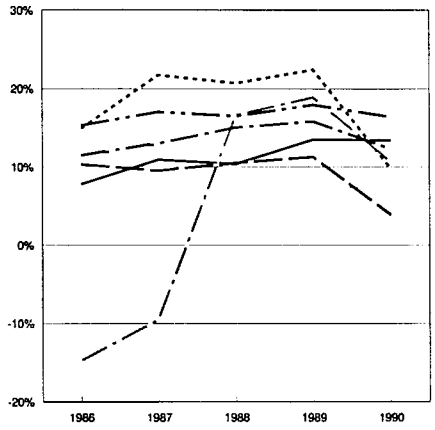


Figure 17: The 200 largest European companies
Net profit / net worth by sector



Source: DABLE

In the list of the 25 largest growth rates in 1990, the first three places are occupied by utilities. France and Sweden are well represented in this list with respectively seven and five companies.

End of record profits

Profits of the Top 200 fell by 20% in 1990, in line with the world trend. No sector was spared. After years of improvement, net margins and financial performances deteriorated in 1990 for all sectors. This is shown by the net profit/turnover ratios and the net profit/net worth ratios in Figures 16 and 17.

In 1990, 13 companies had net income levels exceeding one billion ECU (see Table 6), the top four being Royal Dutch Shell (5 billion ECU), British Telecommunications (2.9 billion ECU), IRI (2.4 billion ECU) and British Petroleum (2.3 billion ECU).

Among the Top 25 companies with the highest absolute profit levels, the remarkable performance of the UK enterprises must be underlined. There were 13 UK companies in the Top 25 largest profit-earners, compared to 4 for Germany and France and 3 for Italy.

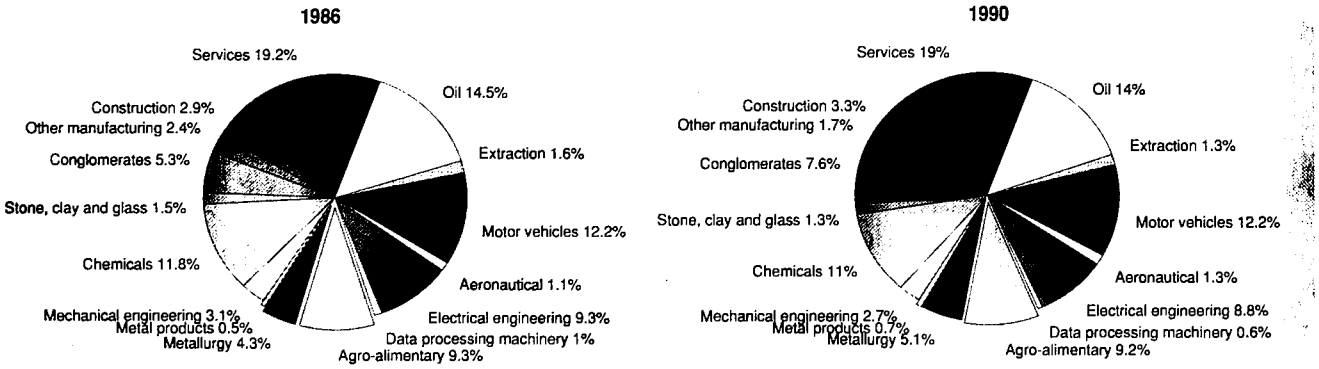
The highest return on sales was realised by Glaxo (27.8%) and Guinness (22.4%). Nine of the 25 companies with the highest return on sales were active in the service industries (see Table 6).

In 1990, a total of twenty companies in the Top 200 reported a loss, doubling the 1989 total. The transport sector was particularly battered with seven losers: the Deutsche Bundesbahn suffered the heaviest blow (2.4 billion ECU). Other big losses were reported by another German state-enterprises: Deutsche Postdienst, the Dutch companies Philips and KLM, and the French companies Machines Bull, Michelin, Thomson and Air France. Volvo is the only EFTA company in the Top 200 with a significant loss.

Employment falls

Employment growth among the Top 200 came to a halt in 1990. The total number of employees tailed off by 2.9% in

Figure 18: The 200 largest European companies
Turnover by sector



Source: DABLE

Table 6
The largest groups in Europe (EC and EFTA), 1990

The 25 largest profit-earners
Net income
(million ECU)

1	Royal Dutch Shell	UK/NL	5 044
2	British Telecom	UK	2 930
3	IRI	I	2 353
4	British Petroleum	UK	2 342
5	Unilever	UK/NL	1 556
6	Elf Aquitaine	F	1 533
7	Hanson	UK	1 354
8	Peugeot	F	1 336
9	ENI	I	1 336
10	British Gas	UK	1 293
11	Nestlé	CH	1 287
12	Glaxo Holdings	UK	1 115
13	FIAT	I	1 065
14	Bayer	D	914
15	Grand Metropolitan	UK	885
16	Imperial Chemical Industries	UK	862
17	Daimler-Benz	D	824
18	France Télécom	F	796
19	Guinness	UK	785
20	BTR	UK	773
21	Smithkline Beecham	UK	760
22	Siemens	D	754
23	Hoechst	D	728
24	Péchiney	F	709
25	RTZ	UK	709

The 25 most profitable
Net income / turnover
(%)

1	Glaxo Holdings	UK	27.8
2	Guinness	UK	22.4
3	LVMH	F	17.0
4	British Telecom	UK	15.8
5	Endesa	E	14.1
6	Hanson	UK	13.6
7	RTZ	UK	13.1
8	Cable And Wireless	UK	12.9
9	Electrabel	B	12.7
10	Smithkline Beecham	UK	11.4
11	Ptt Nederland	NL	11.1
12	Roche Holding	CH	9.8
13	British Gas	UK	9.7
14	Telefónica de España	E	9.4
15	BOC Group	UK	9.1
16	General Electric Company	UK	8.3
17	BTR	UK	8.2
18	DSM	NL	8.0
19	Sandoz	CH	7.8
20	Ericsson	S	7.6
21	National Power	UK	7.5
22	Powergen	UK	7.5
23	Allied-Lyons	UK	7.1
24	Saab-Scania	S	6.9
25	Air Liquide	F	6.8

The 25 richest
Net worth
(million ECU)

1	Royal Dutch Shell	UK/NL	41 720
2	British Gas	UK	28 645
3	IRI	I	24 964
4	British Petroleum	UK	16 577
5	British Telecom	UK	16 043
6	Elf Aquitaine	F	11 498
7	FIAT	I	10 759
8	Telefónica de España	E	10 269
9	ENEL	I	10 026
10	France Telecom	F	9 997
11	ENI	I	9 690
12	Ciba-Geigy	CH	8 718
13	Siemens	D	8 499
14	Daimler-Benz	D	8 480
15	SIP	I	8 103
16	Bayer	D	7 962
17	INI	E	7 953
18	STET	I	7 691
19	Roche Holding	CH	7 597
20	Nestlé	CH	7 582
21	Deutsche Bundesbahn	D	7 352
22	BASF	D	7 279
23	Imperial Chemical Industries	UK	7 071
24	Peugeot	F	6 885
25	Volkswagen	D	6 748

The 25 biggest employers
(employees)

1	IRI	I	419 500
2	Daimler-Benz	D	376 785
3	Siemens	D	373 000
4	FIAT	I	303 238
5	Unilever	UK/NL	301 000
6	Deutsche Postdienst	D	300 019
7	La Poste	F	298 000
8	Philips	NL	272 800
9	Volkswagen	D	267 997
10	Deutsche Bundesbahn	D	235 975
11	SNCF	F	230 221
12	British Telecom	UK	226 900
13	B.A.T. Industries	UK	217 373
14	ABB Asea Brown Boveri	CH/S	215 154
15	Deutsche Telekom	D	212 217
16	British Post Office	UK	207 438
17	Alcatel-Alsthom	F	205 500
18	Nestle	CH	199 021
19	Robert Bosch	D	179 636
20	Compagnie Générale des Eaux	F	173 105
21	Hoechst	D	172 890
22	Bayer	D	171 000
23	Peugeot	F	159 100
24	Renault	F	157 378
25	France Télécom	F	156 615

Source: DABLE

Table 7
Petroleum refining
Turnover

(million ECU)	1986		1990
Royal Dutch Shell	65 881	Royal Dutch Shell	83 034
British Petroleum	40 493	British Petroleum	46 172
ENI	23 178	ENI	32 882
Elf Aquitaine	17 601	Elf Aquitaine	25 325
Total	14 072	Total	18 537
Petrofina	7 652	Repsól	10 922
Statoil	6 778	Petrofina	10 229
Veba Oel	6 611	Nesté	9 589
Nesté	5 068	Statoil	9 104
Co Española de Petroleos	2 571	Veba Oel	8 426

Source: DABLE

1990 (meaning a loss of almost 450 000 jobs) after years of growth (2.2% in 1989, 3.7% in 1988 and 2.4% in 1987). The biggest employer in 1990 was the Italian national conglomerate IRI, followed by the German groups Daimler-Benz and Siemens, all reaching figures in excess of 350 000 employees (see Table 6).

Sector profiles

In this section, groups classified by sector of activity and based in the EC or in the EFTA countries are analysed. The groups are classified by the sector of activity which best represents the company as a whole. In some cases groups have been classified as a conglomerate. VEBA's 1990 group sales, for example, came from the following activities: electricity (20%), chemicals (19%), oil (21%), trading (31%), transportation (6%) and other services (3%). Other groups among Europe's Top 200 classified as conglomerates are: IRI, INI, OIAG, Hanson, BTR, Preussag, Anova and BET. Conglomerates share in total turnover went up from 5.3% in 1986 to 7.6% in 1990 (see Figure 18).

The biggest sector at the Top 200 level is the oil sector with 14.1% of total sales, followed by motor vehicles (12.2%), chemicals (11%) and electrical engineering/electronics (8.8%). Those percentages are only slightly different from 1986 (see Figure 18).

Petroleum refining

The increase in oil prices pushed sales up 11.4% in 1990 (ENI is not taken into account due to its very diversified activities). The average annual growth rate for the period 1986-1990 was 2.7%.

The top of the hierarchy of Europe's oil companies remained unchanged in 1990. The state-owned French company Elf Aquitaine rose from the 21st place in 1989 to the 12th place in 1990.

The profit fall was hardly felt by this sector. On the contrary, most of the European oil companies had better results in 1990 than in 1989. The number of employees rose by 5%.

Motor vehicles and components

As a result of the decrease in car demand in most European markets, Europe's carmakers had a difficult year in 1990. Total sales rose by only 3.4%, while profits dropped by 54%. In 1991 sales were merely 1% higher than in 1990 and profits dropped by a further 10.7%. Germany's car industry, however, which accounts for 55% of Europe's total turnover, realised 7% more sales in 1990 and 4.7% more in 1991, mainly due to the extraordinary boom in car demand following the reunification.

The biggest rises in Europe's Top 200 were obtained by FIAT moving ahead from place 13 in 1986 to place 5 in 1990, and BMW, from place 55 to place 37 over the same period. The Swedish carmakers stalled on the list. Volvo, the only loss maker in 1990, has lost 17 places since 1986. Saab-Scania sold a big part of its car division to General Motors and plunged 62 places in 1990.

Metallurgy

German groups generated 53% of total turnover (49% in 1986). Sales rose by 3.2% in 1990 and the number of employees by 10%.

Table 8
Motor vehicles and components
Turnover

(million ECU)	1986		1990
Daimler-Benz	30 773	Daimler-Benz	41 570
Volkswagen	24 804	FIAT	37 758
FIAT	19 949	Volkswagen	33 091
Renault	19 274	Renault	23 664
Peugeot	15 428	Peugeot	23 088
Volvo	12 008	Robert Bosch	15 507
Robert Bosch	10 205	BMW	13 214
Ford-Werke	7 838	Volvo	11 034
BMW	7 310	Ford-Werke	10 091
Saab-Scania	5 030	Audi	5 895
Audi	4 655	Saab-Scania	3 851

Source: DABLE

Table 9
Metallurgy
Turnover

(million ECU)	1986		1990
Thyssen	14 825	Thyssen	17 630
Usinor Sacilor	10 630	Usinor Sacilor	13 892
Degussa	5 037	Metallgesellschaft	9 660
Metallgesellschaft	4 518	Viag	9 443
British Steel	4 476	British Steel	7 100
EFIM	4 018	ILVA (IRI)	6 974
Cockerill Sambre	3 740	Degussa	6 784
Nuova Italsider (IRI)	3 371	Arbed	4 912
Alusuisse-Lonza Holding	3 207	Cockerill Sambre	4 777
Krupp Stahl	2 764	Krupp Stahl	3 828
Viag	2 691	Alusuisse-Lonza Holding	3 587
Hoogovens	2 537	Hoogovens	3 528
Klockner-Werke	2 172	EFIM	3 286
Johnson Matthey	1 764	Peine-Salzgitter	3 024
		Klockner-Werke	2 848
		ACEC-Union Minière	2 835

Source: DABLE

After years of heavy losses and considerable restructuring this sector saw a remarkable progression in the results since 1987. In 1988 all companies showed a profit. In 1989 net margin even exceeded 4%. In 1990, however, profits dropped by 44%.

Chemicals

Leaving pharmaceuticals aside, the chemical industry has been affected by a general fall of profits. The first ten companies all saw a regression in turnover. Thanks to pharmaceuticals, the chemical sector achieved the highest net margin (see Figure 16). The five pharmaceutical companies in the Top 200 (Sandoz, SmithKline Beecham, Roche, Glaxo and Schering) have enjoyed an average annual growth rate of 9.4% during the period 1986-1989 (3.3% for employment). Sales went down in 1990 by 1.5%, while profits rose by 7.4%, resulting in a net margin in 1990 of 11.9%. Glaxo was Europe's most profitable company in 1990 with a net income to turnover ratio of 27.8% (see Table 6).

Agro-alimentary

Growth of Europe's largest food companies was only 1.6% in 1990, while profits fell by 17%. The Anglo-Dutch number one of this sector, Unilever, did not suffer the same general malaise. It saw its sales increase by 9.6% and its profits by 11.8% in 1990. Guinness was number two in the European list of the 25 most profitable with a net margin of 22.4% (see Table 6).

The British dominated the agro-alimentary sector with 12 groups out of 22. Five British groups, however, realised lower

Table 10
Chemicals
Turnover

(million ECU)	1986		1990
Bayer	19 145	BASF	22 000
BASF	19 014	Hoechst	21 812
Hoechst	17 860	Bayer	20 247
ICI	15 106	ICI	18 036
Ciba-Geigy	9 058	Rhône-Poulenc	11 374
Montedison	8 727	Ciba-Geigy	11 157
Rhône-Poulenc	7 747	Enichem (ex Enimont)	9 897
Norsk Hydro	7 495	Norsk Hydro	7 657
DSM	7 376	Akzo	7 443
Akzo	6 501	Sandoz	7 003
Solvay & Cie	4 893	Smithkline Beecham	6 658
Glaxo Holdings	4 842	Solvay & Cie	6 003
Sandoz	4 747	Henkel	5 843
Roche Holding	4 441	Roche Holding	5 476
Henkel	4 095	DSM	4 386
Smithkline Beecham	3 941	L'Oréal	4 381
Courtaulds	3 265	L'Air Liquide	4 173
BOC Group	3 048	Glaxo Holdings	4 012
L'Air Liquide	3 034	BOC Group	3 686
L'Oréal	2 665	Nobel Industries	3 502
Schering	2 190	Schering	2 880
Harrisons & Crosfield	2 103		
Reckitt & Colman	1 981		
Sanofi	1 820		

Source: DABLE

Table 11: Agro-alimentary Turnover

(million ECU)	1986		1990
Unilever	23 051	Unilever	31 124
Nestlé	21 601	Nestlé	26 256
B.A.T. Industries	13 422	B.A.T. Industries	14 705
Grand Metropolitan	8 295	Grand Metropolitan	13 098
Dalgety	7 168	Ferruzzi Finanziaria	11 001
BSN	4 943	BSN	7 634
Allied-Lyons	4 465	Sucres et Denrées	6 762
Guinness	3 563	Dalgety	6 514
Associated British Foods	3 179	Allied-Lyons	6 179
Jacobs Suchard	2 972	Eridania Zuccherifici	6 049
Sucres et Denrées	2 928	Hillsdown Holdings	5 891
Unigate	2 845	Beghin-Say	5 437
Cadbury Schweppes	2 742	Procordia	4 851
United Biscuits	2 710	Tate & Lyle	4 712
Tate & Lyle	2 579	Cadbury Schweppes	4 397
Hillsdown Holdings	2 537	Guinness	3 512
Heineken	2 342	United Biscuits	3 394
Eridania Zuccherifici	2 160	Unigate	3 323
Rothmans International	2 159	Tabacalera	3 107
Procordia	2 146	Heineken	3 061
Tabacalera	2 063	LVMH	2 862
Northern Foods	1 946		
Rowntree	1 923		
Source Perrier	1 831		

Source: DABLE

sales in 1990 than in 1989. External growth is no longer a common situation, except for the Swedish group Procordia whose turnover soared by 70% in 1990 while its ranking jumped by 62 places.

Average annual growth rate of employees 86-90: 3.1%.

Electrical engineering/electronics

The relative importance of this sector at Top 200 level dimmed by half a percentage point to 8.8% over the period 1986-1990. In 1990 growth was only 1.7% and the number of employees diminished by 0.4%. Moreover, its net margin was only 1%. These figures are largely due to the weak performance of Philips (sales down by 1.8%, employees down by 10.5% and a loss of 2 billion ECU). In 1991 Philips was out of the red, but employment was again down, with 65 000 jobs slashed in the last two years.

Ericsson saw its sales rise by 9% and its profits by 40%. Siemens benefited from the opening of the East (1990 sales up 4.8% and profits up 6.3%), with an even stronger performance in 1991 (sales up 15.3%, profits up 19.1% and employment up 7.8%).

Table 12: Electrical engineering and electronics Turnover

(million ECU)	1986		1990
Philips	22 915	Siemens	30 784
Siemens	21 786	Philips	24 066
CGE	11 894	ABB Asea Brown Boveri	21 025
Thomson	9 147	Alcatel-Alsthom	20 790
BBC Brown Boveri	7 849	Electrolux	10 935
Electrolux	7 581	Thomson	10 880
General Electric Company	7 575	General Electric Company	8 511
Asea	6 376	Finmeccanica	6 766
AEG	5 272	AEG	6 393
CSF (Thomson)	5 238	Ericsson (L.M.)	6 062
Ericsson (L.M.)	4 519	CSF (Thomson)	5 343
Oerlikon-Buhrle Holding	2 416	Nokia	4 550
Nokia	2 412	Matra	3 514
Hawker Siddeley Group	2 396	Hawker Siddeley Group	3 044
Standard Elektrik Lorenz	2 266	Racal Electronics	2 936
Matra	2 124		
Plessey	2 064		
Racal Electronics	1 864		

Source: DABLE

Table 13: Mechanical engineering
Turnover

(million ECU)	1986		1990
Mannesmann	8 097	Mannesmann	11 641
Fried. Krupp	7 446	MAN	9 227
MAN	6 703	Fried. Krupp	7 587
Alsthom	3 487	Hoesch	6 112
Hoesch	3 463	Thyssen Industrie	3 852
SKF	2 851	SKF	3 683
Gebruder Sulzer	2 582	Gebruder Sulzer	3 527
Thyssen Industrie	2 215	Linde	2 951
Sandvik	1 813	AGIV	2 828
East Asiatic Co	1 786		
Klockner-Humboldt-Deutz	1 767		

Source: DABLE

Table 14: The service industries

(million ECU)	1986		1990	
	Number	Turnover	Number	Turnover
Utilities	14	119 294	17	150 620
Telecommunications	4	33 759	7	(2) 87 978
Postal services	4	(1) 56 142	5	39 592
Transport	10	44 551	10	60 649
Other services	2	5 902	4	19 688
Total	34	259 648	43	359 527

(1) PTT France and Deutsche Bundespost include their telecom activities.
(2) Deutsche Telecom and France Telecom included.
Source: DABLE

Mechanical engineering

The mechanical engineering sector had nine representatives in the Top 200 in 1990, i.e. two less than in 1986. Linde and AGIV were newcomers in 1990.

The average annual growth rate of the seven largest companies was 11.4% for the period 1986-1990. Employment rose in the same period by an average of 4%. The net margin was low in 1990 (1.9%), although better than in 1989 (1.3%).

The service industries

In the 1990 European Top 200 there are 43 service industry companies, i.e. nine companies more than in 1986. Their total turnover is 360 million ECU, or 19% of global turnover (see Table 14).

Among the Top 200, the average number of employees of the companies in the service industry was 87 000, less than half of the average number employed in the manufacturing companies (194 000).

Table 15: Energy
Turnover

(million ECU)	1986		1990
Electricité de France	19 686	Electricité de France	22 628
RWE	19 215	RWE	19 380
Electricity Council	16 053	ENEL	16 173
British Gas	10 986	British Gas	13 368
Nederlandse Gasunie	9 792	Nederlandse Gasunie	6 641
ENEL	9 106	National Power	6 166
Gaz de France	7 325	Gaz de France	6 046
Ruhrgas	6 110	Ruhrgas	5 941
CEA Industries	4 553	Tractebel	5 251
Intercom	2 968	Endesa	4 349
Elektrizität Westfalen	2 885	Electrabel	4 306
Electrabel	1 955	CEA Industries	4 297
Hidroelectrica Española	1 891	Powergen	3 734
		Elektrizität Westfalen	3 162
		Hidroelectrica Española	2 965

Source: DABLE

Table 16: Telecommunications Turnover

(million ECU)	1986		1990
PTT France	23 495	Deutsche Telekom	19 783
Deutsche Bundespost	23 325	British Telecom	18 528
British Telecom	13 605	France Telecom	15 859
STET	9 801	STET	13 176
SIP	7 083	Deutsche Postdienst	10 915
Post Office	5 190	SIP	10 797
PTT Nederland	4 132	La Poste	10 036
Telefónica de España	3 270	Post Office	6 616
		Telefónica de España	6 183
		PTT Nederland	6 101
		PTT Switzerland	5 924
		Cable and Wireless	3 652

Source: DABLE

Energy

Electricité de France maintained its number one position throughout the 1986-1990 period. The fastest growth was recorded by the Belgian companies Tractebel and Electrabel and the Italian ENEL.

Strikingly, the turnover of the four gas companies was 6.5% lower in 1990 than in 1986.

Telecommunications

Telecommunications services accounted for 24.5% of the 1990 global services turnover, especially because of the recent separation of Deutsche Telekom from Deutsche Postdienst and France Telecom from La Poste in 1987. These splits make a year on year comparison meaningless.

Growth of the telecom companies is undeniable: 11.5% in 1990 with a net profit/turnover ratio of 8.3%.

Transportation

In 1990, total turnover at 61 billion ECU was divided as follows: air transport, 47%, with 5 companies; rail transport, 36%, with SNCF, Deutsche Bundesbahn and British Railways; and water transportation, 16%, with P&O and Nedlloyd.

As for air transport, the five companies in the European Top 200 are Air France, Lufthansa, British Airways, Alitalia and KLM. Both turnover and employment climbed 15%. Air France, after having absorbed its major French rivals Air Inter and UTA became the biggest airlines in Europe. Apart from British Airways, all lost money in 1990, even those companies outside the Top 200 such as Iberia (INI), SAS, Swissair, Finnair and Sabena.

The accounts of 1991 show big losses continued for all companies, except KLM and Swissair.

A big shake out seems to be very likely in the coming years.

The distribution sector

The distribution sector is not represented in the preceding categories. In 1990, the United Kingdom had the most representatives (25) in the distribution Top 100, followed by France (23) and Germany (22).

In the distribution Top 25, however, Germany dominates with seven companies, followed by France and the United Kingdom with five each. The Swiss have six companies in the Top 100. The Netherlands also score well with four in the Top 25.

The distribution Top 100 annual average growth rate for the 1988-1990 period is 9.8%. The corresponding rate for employment is 6.7%.

In terms of turnover, the United Kingdom occupies only third place, with 19.5% of total turnover. France's growth rate of 17% for the last two years put them in second place with 22.4%, due to the merging of businesses. The biggest share is for Germany with 25.2%.

Table 17: Transportation Turnover

(million ECU)	1986		1990
Deutsche Bundesbahn	9 972	SNCF	10 209
SNCF	6 963	Air France	8 221
Lufthansa	4 879	Deutsche Bundesbahn	7 547
British Airways	4 711	P & O	7 038
Air France	4 531	Lufthansa	7 024
British Railways Board	3 582	British Airways	6 954
P & O	2 909	British Railways Board	4 313
Alitalia	2 547	Alitalia	3 624
KLM	2 267	Nedlloyd Groep	2 896
Swissair	2 189	KLM	2 823

Source: DABLE

Table 18: Europe's 200 largest manufacturing and service groups (million ECU)

Rank	Name	Country	Turnover 1990	Profits 1990	Employees 1990	Turnover 1991	Profits 1991	Employees 1991	Sector
1	Royal Dutch Shell	UK/NL	83 034	5 044	137 000	82 777	3 424	133 000	Oil
2	IRI	I	53 741	2 353	419 500	51 725	-205	407 169	Conglomerate
3	British Petroleum	UK	46 172	2 342	118 050	46 474	591	115 250	Oil
4	Daimler-Benz	D	41 570	824	376 785	46 300	912	379 252	Motor vehicles
5	FIAT	I	37 758	1 065	303 238	37 777	725	287 957	Motor vehicles
6	Volkswagen	D	33 091	491	267 997	37 190	996	267 009	Motor vehicles
7	ENI	I	32 882	1 336	130 745	33 125	657	131 248	Oil
8	Unilever	UK/NL	31 124	1 556	301 000	33 059	1 645	298 000	Agro-alimentary
9	Siemens	D	30 784	754	373 000	35 489	898	402 000	Electrical eng/electronics
10	Veba	D	26 671	541	106 877	29 127	538	116 979	Conglomerate
11	Nestlé	CH	26 256	1 287	199 021	28 453	1 392	201 139	Agro-alimentary
12	Elf Aquitaine	F	25 325	1 533	90 000	28 761	1 404	86 900	Oil
13	Philips	NL	24 066	-1 953	272 800	24 646	424	240 000	Electrical eng/electronics
14	Renault	F	23 664	175	157 378	23 751	441	147 195	Motor vehicles
15	Peugeot	F	23 088	1 336	159 100	22 956	792	156 800	Motor vehicles
16	Electricité de France	F	22 628	19	120 724	24 582	198	119 300	Energy
17	BASF	D	22 000	518	134 647	21 831	513	129 434	Chemicals
18	Hoechst	D	21 812	728	172 890	22 995	535	179 332	Chemicals
19	ABB Asea Brown Boveri	CH/S	21 025	467	215 154	23 309	474	214 399	Electrical eng/electronics
20	Alcatel-Alsthom	F	20 790	597	205 500	22 943	792	213 100	Electrical eng/electronics
21	Bayer	D	20 247	914	171 000	20 663	853	164 200	Chemicals
22	Deutsche Telekom	D	19 783	611	212 217	22 883	229	255 000	Telecommunications
23	RWE	D	19 380	476	97 596	21 388	607	102 190	Energy
24	Total	F	18 537	572	46 024	20 497	833	49 365	Oil
25	British Telecommunication	UK	18 528	2 930	226 900	18 952	2 905	210 500	Telecommunications
26	ICI	UK	18 036	862	132 100	17 796	772	123 600	Chemicals
27	Thyssen	D	17 630	299	152 708	17 773	152	148 250	Metallurgy
28	ENEL	I	16 173	139	112 329	17 735	150		Energy
29	Générale des Eaux	F	16 014	321	173 105	19 348	230	255 000	Services
30	France Télécom	F	15 859	796	156 615	16 606	231	156 000	Telecommunications
31	Robert Bosch	D	15 507	273	179 636	16 359	241	177 123	Motor vehicles
32	British Aerospace	UK	14 730	363	129 100	15 051	-80	115 700	Aerospace
33	B.A.T. Industries	UK	14 705	569	217 373	15 903	587	212 316	Agro-alimentary
34	INI	E	14 366	81	146 251	15 297	-464	140 925	Conglomerate
35	Usinor Sacilor	F	13 892	457	97 000	13 907	-434	97 845	Metallurgy
36	British Gas	UK	13 368	1 293	81 805	15 625	1 372	84 540	Energy
37	BMW	D	13 214	336	70 948	14 541	367	74 385	Motor vehicles
38	STET	I	13 176	632	125 958	14 950	632	129 492	Telecommunications
39	Grand Metropolitan	UK	13 098	885	138 149	12 477	940	122 178	Agro-alimentary
40	Mannesmann	D	11 641	231	123 997	12 105	191	125 188	Mechanical engineering
41	Oiag	A	11 504	55	77 781	11 740	19	78 689	Conglomerate
42	Rhône-Poulenc	F	11 374	188	91 571	12 013	152	89 051	Chemicals
43	Ruhrkohle	D	11 170	55	119 457	12 026	32	122 469	Extraction
44	Ciba-Geigy	CH	11 157	585	94 141	11 879	721	91 665	Chemicals
45	Pechiney	F	11 094	709	70 460	10 667	118	70 749	Metal products
46	Volvo	S	11 034	-135	68 797	10 319	91	63 582	Motor vehicles
47	Ferruzzi Finanziaria	I	11 001	163	44 569	11 581	75	44 949	Agro-alimentary
48	Electrolux	S	10 935	98	150 892	10 560	50	130 300	Electrical eng/electronics
49	Repsól	E	10 922	522	21 571	13 164	546	20 848	Oil
50	Deutsche Postdienst	D	10 915	-728	300 019		11 946	385 040	Postal services
51	Thomson	F	10 880	-358	105 500	10 202	0	105 000	Electrical eng/electronics
52	SIP	I	10 797	265	87 370	12 687	317	89 745	Telecommunications
53	Petrofina	B	10 229	511	23 800	10 182	386	17 069	Oil
54	SNCF	F	10 209	38	230 221	10 471	-96	226 789	Transport
55	Lyonnaise des Eaux-Dumez	F	10 200	206	112 326	12 538	167	122 929	Services
56	Ford-Werke	D	10 091	130	50 121	10 896	69	48 171	Motor vehicles
57	La Poste	F	10 036	193	298 000	10 468		300 000	Postal services
58	Hanson	UK	9 973	1 354	80 000	10 969	1 476	70 000	Conglomerate
59	Saint-Gobain	F	9 969	530	104 987	10 758	403	104 653	Building materials
60	Enichem (ex Enimont)	I	9 897	-58	49 000	8 755	-484	37 017	Chemicals
61	Metallgesellschaft	D	9 660	91	32 224	10 296	9	38 173	Metallurgy
62	Neste	SF	9 589	193	11 278	10 785	73	13 426	Oil
63	Viag	D	9 443	142	55 848	11 501	153	74 122	Metallurgy
64	BTR	UK	9 422	773	105 594	9 607	789	104 950	Conglomerate

Rank	Name	Country	Turnover 1990	Profits 1990	Employees 1990	Turnover 1991	Profits 1991	Employees 1991	Sector
65	Preussag	D	9 279	152	72 268	12 373	243	71 654	Conglomerate
66	MAN	D	9 227	173	66 626	9 229	308	64 604	Mechanical engineering
67	Statoil	N	9 104	411	13 222	9 890	341	13 943	Oil
68	Michelin & Cie	F	9 054	-694	140 826	9 681	-100	140 000	Rubber products
69	General Electric Company	UK	8 511	707	118 529	8 205	713	104 995	Electrical eng/electronics
70	Stora Kopparbergs Bergsl.	S	8 273	168	69 691	8 969	68	66 813	Paper and paper products
71	Air France	F	8 221	-104	64 894	8 265	-98	64 973	Transport
72	Bouygues	F	7 812	90	69 609	8 969	91	69 615	Building/civil engineering
73	Norsk Hydro	N	7 657	422	33 042	7 656	-143	34 957	Chemicals
74	BSN	F	7 634	446	45 254	9 469	560	59 158	Agro-alimentary
75	Fried. Krupp	D	7 587	79	59 044	7 368	119	53 115	Mechanical engineering
76	Deutsche Bundesbahn	D	7 547	-2 409	235 975	10 332	-2 584	232 000	Transport
77	Akzo	NL	7 443	314	69 800	7 288	299	65 200	Chemicals
78	Schneider	F	7 199	133	83 604	8 443	40	101 000	Building/civil engineering
79	British Steel	UK	7 100	272	56 100	6 534	-48	49 100	Metallurgy
80	Bertelsmann	D	7 065	263	45 500	7 347	274	45 110	Printing and publishing
81	P & O	UK	7 038	258	75 034	6 979	219	70 628	Transport
82	Lufthansa	D	7 024	-46	57 567	7 839	-203	61 791	Transport
83	Sandoz	CH	7 003	548	52 640	7 577	628	53 400	Pharmaceuticals
84	British Airways	UK	6 954	134	54 427	7 423	362	50 409	Transport
85	Degussa	D	6 784	72	35 005	6 489	48	34 482	Metallurgy
86	Finmeccanica	I	6 766	68	55 000	5 822	-370	56 153	Electrical eng/electronics
87	Sucres et Denrées	F	6 762	-67	5 600				Agro-alimentary
88	Pirelli	I	6 692	92	68 703	6 525	475	64 854	Rubber products
89	Smithkline Beecham	UK	6 658	760	57 300	6 676	909	54 000	Pharmaceuticals
90	Nederlandse Gasunie	NL	6 641	35	1 984	8 183	35	2 006	Energy
91	Post Office	UK	6 616	43	207 438	7 345	217	201 937	Postal services
92	Dalgety Plc	UK	6 514	115	22 700	5 376	117	16 753	Agro-alimentary
93	AEG	D	6 393	25	76 949	6 822	-68	76 338	Electrical eng/electronics
94	Telefónica de España	E	6 183	584	75 350	8 161	811	75 499	Telecommunications
95	Allied-Lyons	UK	6 179	439	83 243	6 529	539	78 743	Agro-alimentary
96	National Power	UK	6 166	465	14 513	6 680	519	11 421	Energy
97	Hoesch	D	6 112	46	52 200	4 922	63	44 200	Mechanical engineering
98	PTT Nederland	NL	6 101	677	96 254	6 551	696	100 664	Postal services
99	Saatchi & Saatchi	UK	6 070	10	14 696	7 229	-123	13 323	Advertising
100	Ericsson (L.M.)	S	6 062	458	70 238	6 119	118	71 247	Electrical eng/electronics
101	Eridania Zuccherifici	I	6 049	88	15 807				Agro-alimentary
102	Gaz de France	F	6 046	-10	26 965	7 078	142	26 509	Energy
103	Solvay & Cie	B	6 003	394	45 671	6 031	232	45 585	Chemicals
104	Olivetti	I	5 964	40	53 679	5 602	-299	46 484	Office machinery/computers
105	Ruhrgas	D	5 941	323	9 235	7 448	385	10 105	Energy
106	Swiss PTT	CH	5 924	-55	63 654	6 504	-165		Postal services
107	Audi	D	5 895	66	37 035	7 224	180	38 326	Motor vehicles
108	Hillsdown Holdings	UK	5 891	191	47 504	6 636	176	48 652	Agro-alimentary
109	Henkel	D	5 843	189	38 803	6 289	194	41 475	Chemicals
110	Anova Holding	CH	5 720						Conglomerate
111	SGE	F	5 608	66	63 231	6 409	67	72 545	Building/civil engineering
112	British Coal	UK	5 537	109	74 300	5 886	116	79 100	Extraction
113	Roche Holding	CH	5 476	537	52 685	6 454	835	55 134	Pharmaceuticals
114	Beghin-Say	F	5 437	156	15 526				Agro-alimentary
115	RTZ	UK	5 404	709	73 612	5 062	439	73 495	Extraction
116	Thomson-CSF	F	5 343	314	46 900	5 045	337	44 500	Electrical eng/electronics
117	Ladbroke Group	UK	5 311	320	52 039	5 395	219	53 429	Amusement and recreation
118	Tractebel	B	5 251	184	1 461	5 575	210	32 827	Energy
119	Rolls Royce	UK	5 129	187	65 900	5 009	34	57 100	Aerospace
120	Aerospatiale	F	5 096	-57	37 691	7 760	14	43 287	Aerospace
121	Tarmac	UK	5 040	172	34 876	4 596	18	31 734	Building/civil engineering
122	Machines Bull	F	4 991	-981	44 476	4 819	-472	39 878	Office machinery/computers
123	BICC	UK	4 968	154	44 379	4 919	41	41 874	Building/civil engineering
124	Arbed	L	4 912	125	29 000	4 684	102	52 920	Metallurgy
125	PMU	F	4 892	238	2512				Recreational services
126	Procordia	S	4 851	56	45 193	5 085	402	38 144	Agro-alimentary
127	Cockerill Sambre	B	4 777	293	28 979	4 101	86	29 000	Metallurgy
128	Total Raffinage Distribution	F	4 758	116	7 713	7 883	273		Oil
129	Skanska	S	4 720	206	31 746	4 316	92	31 077	Building/civil engineering
130	Tate & Lyle	UK	4 712	183	16 670	4 594	208	16 159	Agro-alimentary
131	Lafarge Coppée	F	4 697	316	34 711	4 529	177	30 830	Building materials
132	Feldmühle Nobel	D	4 574	95	32 044	4 491	110	32 998	Paper and paper products
133	Nokia	SF	4 550	62	37 336	3 090	37	29 167	Electrical eng/electronics

Rank	Name	Country	Turnover 1990	Profits 1990	Employees 1990	Turnover 1991	Profits 1991	Employees 1991	Sector
134	OMV	A	4 542	56	13 017				Oil
135	Cadbury Schweppes	UK	4 397	251	35 653	4 606	290	35 372	Agro-alimentary
136	DSM	NL	4 386	350	24 850	4 042	215	25 170	Chemicals
137	L'Oréal	F	4 381	244	29 286	4 786	308	29 877	Chemicals
138	Endesa	E	4 349	614	15 661	5 191		16 567	Energy
139	Hachette	F	4 336	71	31 210	4 359	-277	28 460	Printing and publishing
140	British Railways Board	UK	4 313	-15	136 277	4 495	-206	138 001	Transport
141	Electrabel	B	4 306	548	17 773	4 504	533	18 335	Energy
142	CEA Industries	F	4 297	242	37 779	5 567	186	37 300	Uranium
143	Trafalgar House	UK	4 246	155	28 928	4 567	113	32 133	Building/civil engineering
144	L'Air Liquide	F	4 173	284	4 749	4 560	305		Chemicals
145	Continental	D	4 158	27	51 064	4 565	-63	49 877	Rubber products
146	Svenska Cellulosa	S	4 128	173	30 139	4 377	124	32 199	Paper and paper products
147	Glaxo Holdings	UK	4 012	1 115	31 327	4 846	1 301	35 640	Pharmaceuticals
148	Auxiliaire d'entreprises	F	3 883	36	26 371				Building/civil engineering
149	Thyssen Industrie	D	3 852	65	48 581	4 062	22	46 129	Mechanical engineering
150	Saab-Scania	S	3 851	265	29 388	3 916	187	31 656	Motor vehicles
151	Philipp Holzmann	D	3 841	-4	36 810	3 855	32	40 410	Building/civil engineering
152	Krupp Stahl	D	3 828	43	25 147	3 773	35	25 651	Metallurgy
153	Powergen	UK	3 734	280	8 840	4 276	344	7 771	Energy
154	Pilkington	UK	3 732	91	56 100	3 710	13	43 700	Building materials
155	BET	UK	3 713	221	124 118	3 332	11	104 019	Conglomerate
156	BOC Group	UK	3 686	337	40 008	3 877	276	39 661	Chemicals
157	SKF	S	3 683	117	53 995	3 636	-149	47 939	Mechanical engineering
158	Cable and Wireless	UK	3 652	471	39 426	4 513	460	38 835	Telecommunications
159	Alitalia	I	3 624	-65	29 641	3 820	-23	28 917	Transport
160	RMC Group	UK	3 619	152	25 100	3 987	100	26 031	Building materials
161	Alusuisse-Lonza Holding	CH	3 587	152	25 399	3 569	57	24 907	Metallurgy
162	Hoogovens	NL	3 528	128	26 435	3 501	8	26 248	Metallurgy
163	Gebruder Sulzer	CH	3 527	79	33 521	3 666	61	32 767	Mechanical engineering
164	CMB Packaging	F	3 524	148	33 948	3 655	122	31 661	Metal products
165	Matra	F	3 514	87	19 614	3 253	36	21 334	Electrical eng/electronics
166	Guinness	UK	3 512	785	18 873	4 192	906	24 788	Agro-alimentary
167	Nobel Industries	S	3 502	156	26 654	3 303	-674	22 922	Chemicals
168	BP France	F	3 440	136	6 907	3 339	102	6 449	Oil
169	Havas	F	3 415	159	11 904	3 800	144	12 462	Advertising
170	United Biscuits	UK	3 394	183	40 565	3 791	204	40 226	Agro-alimentary
171	Trelleborg	S	3 345	227	19 924	2 869	-20	19 510	Extraction
172	Spie-Batignolles	F	3 336	36	36 261	3 096	-137	33 940	Building/civil engineering
173	Unigate	UK	3 323	73	29 618	2 691	90	27 698	Agro-alimentary
174	Fasa Renault	E	3 315	8	19 403	3 413	27	15 876	Motor vehicles
175	Esso Francaise	F	3 274	76	3 154	3 387	122	3 120	Oil
176	Co Española de Petróleos	E	3 251	55	7 101				Oil
177	Beazer	UK	3 241	95	22 307	2 750	40	22 953	Building/civil engineering
178	Ver Elektrizität Westfalen	D	3 162	55	8 005	3 349	21	7 956	Energy
179	Lucas Industries	UK	3 124	204	57 399	3 374	72	53 102	Motor vehicles
180	Tabacalera	E	3 107	103	11 249	3 431	113	11 261	Agro-alimentary
181	AMEC	UK	3 100	59	30 396	3 332	-14	30 056	Building/civil engineering
182	Nordstjernan	S	3 072	102	23 178				Building/civil engineering
183	Heineken	NL	3 061	158	28 908	3 262	177	27 502	Agro-alimentary
184	GTM-Entrepose	F	3 044	22	37 472	3 857	33	39 600	Building/civil engineering
185	Hawker Siddeley Group	UK	3 044	113	44 600				Electrical eng/electronics
186	Stahlwerke Peine-Salzgitter	D	3 024	168	14 116	2 962	66	14 355	Metallurgy
187	Holderbank Fin. Glaris	CH	2 971	106	29 557	3 358	98	32 161	Building materials
188	Hidroelectrica Española	E	2 965	145	8 304				Energy
189	Linde	D	2 951	112	27 676	3 368	117	28 535	Mechanical engineering
190	Racal Electronics	UK	2 936	153	38 461	2 572	120	35 384	Electrical eng/electronics
191	Valeo	F	2 913	87	29 300	2 844	78	27 000	Motor vehicles
192	Nedlloyd Groep	NL	2 896	-61	25 000	2 918	2	23 170	Transport
193	Schering	D	2 880	126	26 695	3 099	134	26 339	Pharmaceuticals
194	LVMH	F	2 862	487	14 272	3 153	535	14 650	Agro-alimentary
195	GKN	UK	2 851	130	33 904	2 744	52	31 372	Motor vehicles
196	Klockner-Werke	D	2 848	34	25 585	3 477	1	31 772	Metallurgy
197	ACEC-Union Miniere	B	2 835	86	16 713	2 712	-119	14 730	Metallurgy
198	AGIV	D	2 828	51	31 633	3 957	62	37 051	Mechanical engineering
199	Deutsche Babcock	D	2 827	-41	29 661	3 632	13	35 549	Metal products
200	KLM	NL	2 823	-152	28 660	3 372	53	29 075	Transport

Source: DABLE

Table 19: Europe's largest distribution companies (million ECU)

Rank	Name	Country	Turnover 1990	Employees 1990	Turnover 1988	Employees 1988
1	Tengelman	D	20 571	167 000	16 872	145 000
2	Metro International	CH	18 159	85 000	16 761	86 100
3	Spar International	NL	16 252	173 000	14 382	158 000
4	Marc-Rich	CH	15 889	1 500	16 664	1 200
5	Leclerc	F	14 463	47 000	10 517	38 900
6	Rewe	D	14 345	120 000	12 377	107 000
7	Intermarche	F	13 928	61 000	9 948	45 000
8	J Sainsbury	UK	11 005	108 987	8 656	88 283
9	Carrefour	F	10 946	51 300	9 214	42 900
10	Tesco	UK	8 902	87 692	7 194	75 658
11	Promodes	F	8 439	36 587	6 565	32 124
12	Marks and Spencer	UK	8 134	74 528	7 834	76 313
13	Stinnes	D	7 987	24 324	6 303	18 825
14	Otto-Versand	D	7 845	35 000	6 411	28 500
15	Edeka Zentrale	D	7 791	742	5 775	700
16	Migros	CH	7 765	70 493	6 875	63 999
17	KF Group	S	7 691	33 760	5 308	23 997
18	Haniel	D	7 383	27 598	6 139	20 990
19	Karstadt	D	7 309	70 990	5 965	67 174
20	Ahold	NL	7 302	87 978	6 269	80 284
21	SHV	NL	6 801	32 800	5 224	27 300
22	Maus Frères	CH	6 583	18 500	5 555	19 000
23	Casino Guichard Perrachon	F	6 476	40 727	5 043	39 686
24	Argyll Group	UK	6 333	67 609	5 355	63 264
25	Asda Group	UK	6 329	74 109	4 146	50 465
26	Kesko	SF	6 278	8 111	5 287	7 604
27	Delhaize Frères & Cie "Le Lion"	B	6 260	62 500	4 818	49 000
28	El Corte Ingles	E	6 227	50 000	4 225	27 397
29	Thyssen Handelsunion	D	6 226	24 322	5 315	12 481
30	Kaufhof Holding	D	6 177	46 726	4 871	42 570
31	Schickedanz	D	6 133	39 300	4 838	31 500
32	ICA	S	5 463	18 612	5 018	16 802
33	Coop Schweiz	CH	5 431	32 884	4 797	31 812
34	Asko Deutsche Kaufhaus	D	5 278	37 902	4 242	31 254
35	Andre	CH	5 107	500	4 722	450
36	Boots Company	UK	5 022	83 745	4 137	69 967
37	GIB	B	4 833	70 862	3 897	24 323
38	Kloeckner	D	4 794	8 274	5 731	9 923
39	Pinault	F	4 701	30 147	1 115	9 581
40	Systeme U	F	4 700	22 320	3 553	18 200
41	Vendex International	NL	4 641	56 900	4 363	55 000
42	Inchcape	UK	4 600	49 724	3 690	45 247
43	Au Printemps	F	4 379	28 413	3 733	30 248
44	Kingfisher	UK	4 367	61 497	4 031	57 173
45	Axel Johnson	S	4 261	17 908	4 542	17 699
46	Agache	F	4 196	21 768	1 298	8 641
47	Booker	UK	4 090	22 762	2 768	17 166
48	Raab Karcher	D	3 984	15 322	3 369	10 548
49	Docks de France	F	3 811	23 391	3 281	21 244
50	Rallye	F	3 722	21 992	2 018	13 200

Source: DABLE

The fastest growing company, France's Pinault at the 39th place, was not represented in the 1988's Top 100. In 1991 Pinault continued its advance.

Table 19 shows the 1990 Top 50 and their corresponding 1988 figures.

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Cross-border mergers and acquisitions in the EC

THE OVERALL PICTURE IN 1991

The rising trend of cross-border mergers and acquisitions (M&A) throughout the 1980s stalled in the first two years of the 1990s. KPMG, a firm of accountants and management consultants that monitors global M&A figures, calculates that the value of all cross-border M&A around the world in 1991 was less than half the value in 1990, which was itself down on 1989's figure: $130.6 billion in 1989; $117.8 billion in 1990; and a mere $51.9 billion in 1991.

The causes were not hard to find: the Gulf War turned most financial centres into ghost towns in the first quarter of 1991; and a severe economic recession made capital scarce and expensive in the two most active M&A markets - the UK and the USA. The recession in these countries, which started in 1990, was prolonged through 1991 partly by uncertainty over the elections due in both of them in 1992. Other factors, such as the tension at the Uruguay Round of trade talks carried out under the auspices of the GATT, plus the uncomfortably fluid state of what was once the Soviet Union, also played a part.

Historically, M&A activity has been closely linked with the ups and downs of the business cycle. Activity fell off in the recession of the mid-1970s, and again in the early 1980s. The unprecedented length of the continuous period of economic growth in the 1980s assured a build-up to unheard-of levels of M&A activity. It was inevitable that there would be a dramatic fall as soon as the boom years ended.

Activity in Europe declined in 1991 less than it did in North America. KPMG's figures show that cross-border sales of European companies in 1991 were 56% of the value of such sales in 1990. In North America, 1991 sales were only 37% of 1990's. For the first time for several years, the value of EC sales ($23.3 billion) exceeded the value of North American sales ($20.3 billion).

The EC was also a much more active cross-border acquirer than North America (acquiring $10 billion more than North America in 1990, and $21 billion more in 1991). Indeed, in 1990 both the UK and France individually spent more on cross-border acquisitions than did the United States. And in

Table 1: The top 20 cross-border European M&A deals in 1991

	Acquirer	Target	Industry	Price (million USD)	(million ECU)
1	Elf Aquitaine & Enterprise Oil (F/UK)	Occidental's North Sea assets	Oil and gas	1 480	1 195
2	Daimler-Benz(D)	34% of Sogeti (F)	Computer services	1 000	807
3	Carlsberg(DK)	Allied-Lyons jv(UK)	Brewing	908	733
4	Solvay and Laporte (B/UK)	Split up of Interox jv (NL)	Peroxide	890	718
5	Agnelli group (I)	Exor (F)	Water	880	710
6	Viag (D)	Continental Can Europe	Packaging	850	686
7	Elsevier (NL)	Pergamon Press (UK)	Journals	843	680
8	Cragnotti (L)	50% of Ja/Mont (Europe)	Tissue paper	827	667
9	Roche (CH)	Nicholas Labs (US)	Drugs	821	663
10	Suez (F)	10% of SGB (B)	Holding co.	767	619
11	Asko & Jacobs (D)	53% of Adia (CH)	Personnel	632	510
12	UAP (F)	45% of Sun Life (UK)	Insurance	625	504
13	Whirlpool(US)	47% of Philips jv (NL)	White goods	610	492
14	Fosters(Aus)	Grand Met units(UK)	Brewing	590	476
15	Uni Storebrand (N)	25% of Skandia (S)	Insurance	586	473
16	AGF (F)	23% of A&MB (D)	Insurance	580	468
17	Alcatel (F)	AEG Kabel (D)	Cables	500	404
18	E. Merck (D)	52% of Lipha (F)	Pharmaceuticals	500	404
19	Ass. Generali (I)	5% of BCH (E)	Banking	485	391
20	Van Leer (NL)	4P Group (D)	Packaging	477	385

Source: M&A Europe, Almanac 1992

Table 2: Five-years of M&A in the United Kingdom

Year	UK public co's acquired		Private co's acquired		Divestments		Total		UK acquisitions in continental Europe	
	No.	Value (million £)	No.	Value (million £)	No.	Value (million £)	No.	Value (million £)	No.	Value (million £)
1987	197	13 895	1 266	6 402	395	4 125	1 858	24 422	145	1 342
1988	158	19 076	475	5 293	608	13 254	2 241	37 623	258	2 788
1989	159	27 999	1 243	8 417	676	10 816	2 078	47 232	410	2 724
1990	119	10 664	793	6 793	612	10 221	1 524	27 678	298	4 699
1991	90	6 241	657	5 939	442	6 001	1 189	18 181	194	1 634

Source: Acquisitions Monthly/AMDATA III

1991 France spent $12.5 billion, considerably more than either the United States ($7.3 billion) or the UK ($6.3 billion).

Within the EC, French companies have been particularly conspicuous for the past four years both as cross-border acquirers and as cross-border targets. They have regularly come in second to the UK in rankings of European cross-border buyers and sellers. Of KPMG's ten biggest cross-border deals in the world during 1991, four involved French buyers and eight involved European Community buyers - the four French deals plus one German, one Dutch, one Anglo-Dutch, and one Spanish/American deal. France was a less popular target in 1991 than in earlier years, but the Swiss multinational Nestle's purchase of Perrier has given it a good start to 1992.

For the clearest indication of the extent of the decline in M&A activity in Europe in 1991 it is best to look at the UK. There, M&A statistics have been gathered more consistently and for longer than anywhere else. Table 2 shows that M&A in the UK in 1991 was lower than in any year for the past five years. UK acquisitions in continental Europe were only just above those in 1987, the last year before the EC's 1992 programme really grabbed the business world's imagination.

There were no outstandingly popular sectors in 1991, although there were one or two (like pharmaceuticals) which bucked the downward trend. Among KPMG's top ten deals for the year there were two in insurance: a French consortium's purchase of the American company Executive Life - at $3.75 billion the biggest cross-border deal of the year; and the French company Axa's purchase of a 49% stake in the American company Equitable Life. And there were two deals in the oil and gas sector: Royal Dutch Shell bought the Guangdong Petrochemical joint venture in China; and Elf Aquitaine bought (jointly with Enterprise Oil) the North Sea assets of Occidental Petroleum.

STATISTICAL INCONSISTENCIES

Unfortunately, KPMG's picture of cross-border deals during the year is not a unique picture. There are other databases from reliable producers that paint a very different picture, and there are a number of good reasons for the differences.

First of all there can be disagreements about quite simple things - such as the value of deals. Take the Elf Aquitaine/Occidental Petroleum deal. KPMG includes it as one of its ten biggest cross-border deals of the year - at a value of $891 million. Acquisitions Monthly's AMDATA data base records the deal at £796 million. For that to be the same as KPMG's dollar figure the exchange rate would have to be $1.12 to the pound - a rate that never existed throughout the whole of 1991. IDD Information Services record the Occidental deal at £860 million. M&A Europe, produced by IMC Business Communications in Geneva, considers it as a joint Elf Aquitaine/Enterprise Oil deal with a value of $1 480 million (see Table 1).

And this was a widely publicised deal. When it comes to smaller private deals - which are particularly significant in continental Europe - numbers are often simply not available, or if they are they are largely guesswork. As Coopers & Lybrand, a firm of accountants and management consultants, says in a recent report on M&A in Germany, "Very often figures that one sees are merely based on assumed purchase prices derived by using rule of thumb multiples of either sales or profits".

Then sometimes there are problems over how deals should be categorised. When in 1991 the British company ICL bought Nokia-Data, the loss-making computer division of Finland's Nokia group, some data gatherers categorised it as a UK/Finnish deal; others saw it as a Japanese purchase of an EC business, since Fujitsu owns 80% of ICL, and much of Nokia-Data's business is inside the Community. The categorisation was no easier when ICL subsequently bought half of the European computer-services subsidiary of America's Bell Atlantic.

Potential Community member Sweden creates some special problems. The busily expanding Asea Brown Boveri (ABB) can be considered to be either Swedish or Swiss; and when Tetra Pak paid over $2 billion for Alfa Laval nobody was sure whether it was a cross-border takeover or a purely domestic affair. Tetra Pak and Alfa Laval are Swedish, but Tetra Pak's headquarters are in Switzerland and its business is everywhere.

Confusion also arises over the dating of deals. Should they be dated at the time when the deal was first announced, or at the considerably later time when it became fully effective? The impact that this decision can have is clearly illustrated by the European car industry. M&A Europe says that M&A spending in the car industry in Europe was "slashed" in 1991 to "a meagre" $500 million, down from $12 billion over the previous two years. According to IMC the biggest cross-border deal in the European car industry in 1991 was worth only $131 million.

Then turn to another authoritative source - IDD's Mergers & Acquisitions Analysis - and it lists Volkswagen's £3.45 billion purchase of the Czech car company Skoda as the biggest cross-border European deal of all in 1991. IMC did not include the deal in its 1991 figures because it had already included it in its 1990 figures: the deal was first announced in August 1990, but did not come fully into effect until June 1991.

Such a huge deal can make a huge difference. Include it, and the car industry does not seem to have gone into such a deep dive into the doldrums in 1991. More especially since Fiat signed a letter of intent to purchase a majority of the Polish car-maker FSM in October 1991, a deal that was worth $2 billion when it was completed in 1992. But a letter of intent was not enough to include Fiat's Polish deal in either IMC or IDD's 1991 figures.

Moreover, if the Skoda deal is included in 1991, and so is the German insurance company Allianz's $3.1 billion purchase of America's Fireman's Fund (a deal that was announced in August 1990, but which came into effect on the second day of 1991), then the picture of acquiring and target nations for the year changes dramatically too.

Suddenly, Germany becomes one of the most acquisitive nations in 1991 (by value - see Table 3), and question marks are raised over the argument that Germany became obsessed with its reunification of East and West at the expense of wider interests. Also, on the basis of the Skoda deal alone, Czechoslovakia becomes the second most popular target nation in Europe in 1991 - after the UK.

In terms of totals too it makes a difference. IDD reports that there were 1 334 cross-border deals around the globe in 1991, down 22.3% from 1 716 in 1990. KPMG reports that there were 1 793 deals in 1991, down 34.2% from 2 725 in 1990. IDD's smaller number of deals were worth £40.8 billion (compared with KPMG's larger number of deals which were worth the smaller amount of $51.9 billion). The value of IDD's deals in 1991 was one-third less than the value in 1990; KPMG's was down by more than a half.

A number of consequences flow from these inconsistencies. For a start, not too much should be read into the upturn recorded by some gatherers of M&A data towards the end of 1991. Then, although there was undoubtedly a decline in activity in 1991, nobody can be sure how steep it was. What can be said with reasonable certainty is that the value of deals declined more than the number of deals - i.e. the big widely-publicised (and often hostile) deals fell away rapidly, while small friendly mergers continued at a not very significantly altered pace.

JOINT VENTURES

The decline in M&A activity was not entirely due to the changed economic environment. It was at least partly the result of a discernible shift in corporate philosophy. Companies have been increasingly eschewing the full merger, or the acquisition of control, in favour of less expensive, less ambitious joint ventures. This marks a turning away from the popular belief in conglomerates - in the idea that the only way to benefit from another company is to own it and to control it.

Joint ventures are also referred to as "corporate partnerships". They involve loose agreements between two or more companies designed to help them exploit jointly a market opportunity. Joint ventures have been particularly popular in the electronics industry where Japanese technology has often been combined with European market access to help reduce normally high development and marketing costs to the benefit of both partners.

According to KPMG, joint ventures and minority participations (stakes of less than 50% in another company, often held as part of a strategic alliance between the two companies) have withstood the recent poor economic climate better than mergers and acquisitions. In the first nine months of 1991, the number of cross-border joint ventures recorded by KPMG fell by only 20% on the first nine months of 1990, while the number of cross-border mergers and acquisitions fell by 37%. KPMG says that "acquisition is increasingly seen as only necessary when it relates to a core part of the business and it is essential to have outright control. Outright acquisition is very expensive and there are situations in which companies no longer see it as viable."

Joint ventures may indeed make increasingly sound strategic sense to a large number of companies looking to expand in Europe. Nevertheless, in some cases joint ventures may represent not just the better option in entering a particular market; they may represent the only option. For despite the efforts of the EC to create a level playing field for takeovers across the Community, there remain considerable barriers to entry for companies wishing to make cross-border contested takeovers. Those barriers apply particularly to takeovers of quoted companies, and they divide continental Europe from Anglo-Saxon financial markets.

BARRIERS TO TAKEOVERS

Many contested takeovers do not take place for the simple reason that nobody really believes that they can happen. Whatever its shortcomings, the unsuccessful hostile bid by Italy's Pirelli for Germany's Continental tyre company in 1991 will have confirmed the view that German companies are impregnable for as long as they have the support of the big German banks. On the other hand, the successful bid by Switzerland's Nestle for France's Perrier may have reinforced the impression that France's capital markets are fast becoming Anglo-Saxon. Nestle played the Perrier takeover very much by the Anglo-Saxon rules that it had honed in its takeover of Britain's Rowntree a few years earlier.

In its 1990 report on barriers to takeovers in the European Community, Coopers & Lybrand identified two types of barriers to takeovers of public companies: "structural" and "technical". The firm defines structural barriers as being impediments to contested bids that arise from the structure of the ownership of shares and "the broad culture of how each market operates".

In Italy, for example, only eight out of over 200 listed companies have issued more than 50% of their shares to the public. That means that they remain tightly controlled by small cabals of like-minded industrialists and financiers who are not minded to give up control. Coopers could only identify one contested bid as ever having taken place in Italy, and that was for a minority stake. (Credit Lyonnais' purchase of 48% of Credito Bergamasco in 1989.)

Technical barriers are specific measures which directly impede the passing of control by contested takeover. By their nature, they can be removed in a short space of time by regulatory or legislative action. Dutch companies are particularly adept at building technical barriers which restrict the voting rights of ordinary shareholders and concentrate power in shareholder groups that are friendly to management.

Coopers & Lybrand found structural barriers to be strong in France, Germany, Italy, and Switzerland; while technical barriers were strong in Germany, the Netherlands and Switzerland. The consultants found the UK to be "the one example of a market in which both structural and technical barriers are weak for the majority of listed companies."

Coopers then described clearly the fundamental difference in this respect between the UK and other EC countries:

"As a general observation we find that only in the UK have directors a clear duty to shareholders. In all other countries studied [the major European economies], we have observed a commitment of management to act in the interest of the continuity of the company - though in some countries stronger than others - thereby taking into account the interests of all stakeholders and not merely their shareholders.

"At the same time, we found that only in the UK the concept of 'hostile takeover' is perceived to be an integral part of the financial market, while the other countries are very much conducive towards 'agreed takeovers'.

"This finding confirms that a free market for takeovers can only exist when shareholders have the major say in the decision on the company's future ownership. Indeed our study reveals that in all countries studied, except for the UK, many barriers to takeovers have effectively made the position of the shareholder less dominant. Thus an environment of agreed bids has evolved where contested bids could hardly succeed."

This dilemma is Europe's dilemma: does it want to move further towards the shareholder-dominated model which even

Table 3: Cross-border acquisitions in the EC

AQUIRIING COUNTRY

Country	1990 No of deals	1990 Value (million £)	1990 Value (million ECU)	1991 No of deals	1991 Value (million £)	1991 Value (million ECU)
Belgique/België	53	308	431	20	101	144
Danmark	36	541	758	37	354	505
France	345	16 710	23 407	220	12 532	17 877
BR Deutschland	160	6 853	9 599	155	3 733	5 325
Hellas	0	0	0	0	0	0
Ireland	54	796	1 115	15	414	591
Italia	62	3 513	4 921	83	1 525	2 175
Luxembourg	2	25	35	7	479	683
Nederland	144	2 358	3 303	84	4 012	5 723
Portugal	1	2	165	235		
España	30	2 178	3 051	17	618	882
United Kingdom	562	20 560	28 800	285	6 295	8 980
EC consortia	2	0	0	18	215	307
EC	1 451	53 842	75 420	943	30 443	43 428
World	2 725	117 813	165 027	1 793	51 945	74 101

TARGET COUNTRY

Country	1990 No of deals	1990 Value (million £)	1990 Value (million ECU)	1991 No of deals	1991 Value (million £)	1991 Value (million ECU)
Belgique/België	77	722	1 011	43	1 104	1 575
Danmark	55	545	763	23	61	87
France	248	4 592	6 432	166	2 365	3 374
BR Deutschland	236	6 034	8 452	207	2 192	3 127
Hellas	8	100	140	6	290	414
Ireland	19	510	714	8	144	205
Italia	135	3 485	4 882	69	1 135	1 619
Luxembourg	3	0	0	3	1 169	1 668
Nederland	111	1 224	1 715	68	1 549	2 210
Portugal	36	279	391	14	99	141
España	131	3 736	5 233	76	3 135	4 472
United Kingdom	358	20 404	28 581	252	9 102	12 984
EC consortia	7	232	325	8	933	1 331
EC	1 424	41 863	58 640	943	23 278	33 207
World	2 725	117 813	165 027	1 793	51 945	74 101

Source: KPMG

its greatest proponent (the UK) is having doubts about after the corporate irresponsibility that it encouraged in the 1980s? Or does Europe want to move away from its fixation with the level playing field beloved by the British, inventors of the cricket pitch and the tennis lawn?

Barriers to the takeover of private companies are much more limited than those discouraging the takeover of public companies. Most of them relate to the relative ease (or otherwise) of finding out about potential targets, or to the unwillingness of private companies in some countries to be bought by any company (like a UK quoted company) that will have to reveal the purchase price to the public. The strength of the intangible barrier put up by an absence of information should not be underestimated.

COUNTRY BY COUNTRY

Combining both domestic and cross-border deals, the UK (as always) stands head and shoulders above the rest of Europe in the amount of M&A activity during 1991. IDD reckons that there were 1 178 deals completed in the UK in 1991 (domestic and cross-border) worth some £21 billion. Comparable figures for 1990 were 1 491 deals worth £27.6 billion.

AMDATA has slightly different figures for the UK. It reckons that there were 1 189 deals (both domestic and cross-border) in the UK in 1991, worth £18.2 billion - compared with 1 524 deals worth £27.7 billion in 1990. There were 341 acquisitions by UK companies of companies abroad (value £3.3 billion), and there were 264 foreign acquisitions of UK companies (value £6.5 billion), the favourite sector of acquirers in the UK being the oil and gas industry.

On the continent, IDD reckoned that the busiest nation in 1991 was Italy. Italian companies, it claims, made 288 purchases (domestic and cross-border) worth £1.24 billion - "well ahead of Spain, France and Germany by value and number". AMDATA also has Italy high up the list of cross-border acquirers and targets in 1991. As an acquirer only the UK and France beat it; as a target only the UK, France and Sweden.

From KPMG's data - which covers cross-border deals only - Italy is way down the list of European Community acquirers (see Table 4). First in 1991 was France with 220 deals worth $12.5 billion, followed by the UK with 285 deals worth $6.3 billion. Italy is also low down the list of EC target nations for the year.

Table 4 : All cross-border deals, worldwide
Ranking of European countries

TARGET NATIONS

	1990				1991		
	Country	Value (million £)	(million ECU)	No of deals	Country	Value (million £)	(million ECU)	No of deals
1	United Kingdom	12 144	17 011	311	United Kingdom	7 451	10 629	225
2	France	3 274	4 586	160	Czechoslovakia	3 452	4 924	6
3	BR Deutschland	3 080	4 314	128	Nederland	2 142	3 056	61
4	Switzerland	2 781	3 896	28	Italia	2 114	3 016	70
5	España	2 022	2 832	84	Sweden	1 988	2 836	61
6	Belgique/België	965	1 352	62	France	1 404	2 003	107
7	Nederland	783	1 097	93	España	1 265	1 805	51
8	Sweden	666	933	42	BR Deutschland	1 022	1 458	150
9	Italia	560	784	96	Belgique/België	349	498	23
10	Norway	443	621	29	Finland	298	425	26

ACQUIRING NATIONS

	1990				1991		
	Country	Value (million £)	(million ECU)	No of deals	Country	Value (million £)	(million ECU)	No of deals
1	United Kingdom	13 159	18 433	383	BR Deutschland	7 442	10 616	99
2	France	11 042	15 467	186	France	4 903	6 994	114
3	Sweden	4 551	6 375	104	United Kingdom	3 869	5 519	194
4	Switzerland	1 947	2 727	38	Switzerland	2 228	3 178	33
5	BR Deutschland	1 481	2 075	105	Nederland	1 620	2 311	85
6	Nederland	1 021	1 430	109	Italia	1 181	1 685	44
7	Italia	860	1 205	58	Sweden	563	803	72
8	Norway	757	1 060	32	Norway	405	578	29
9	Luxembourg	446	625	10	España	365	521	21
10	Finland	345	483	32	Belgique/België	305	435	16

Source: IDD Information Services

Notwithstanding the equivocal data on Italy, 1991 was a year when M&A interest was particularly sharply focused on Germany and Spain. Coopers & Lybrand reckoned that there were a record 2 895 deals involving German companies in 1991, most of them inside Germany where the Treuhandanstalt continued with its task of privatising the former "Kombinat" in the eastern part of the country. By the end of the year almost 50% (some 5 200 companies) had been privatised.

Foreign companies accounted for only 10% of the privatisations in eastern Germany, with France, the United States and the UK the busiest buyers - in that order. Foreigners were particularly active in the construction and building materials sector. Almost half the European cross-border deals in the sector recorded by M&A Europe for 1991 were purchases in either the former East Germany or in Czechoslovakia.

Interest in Spain was sparked by general international excitement about the 1992 Barcelona Olympics, the Seville Expo, and the 500th anniversary of Christopher Columbus's departure for the New World. However, far more significant to deals in the longer-term than these grand events was a new law introduced in 1990. It required Spanish companies with more than 50 employees to file annual audited accounts. As such they become a matter of public record, available for examination by any hopeful suitor. Together with the removal of protectionism at the end of Spain's transitional period of entry into the EC at the end of 1992, this should be enough to keep the country in the forefront of EC M&A activity.

INDUSTRY BY INDUSTRY

Pharmaceuticals was one industry in Europe that remained reasonably immune to recession in 1991. Cross-border deals in the sector increased, buoyed up by the fact that - recession or no recession - European populations get remorselessly older and more health-conscious.

The oil and gas industry was also noticeably active, thanks to the almost single-handed efforts of France's Elf Aquitaine which featured as a buyer in six of the seven biggest cross-border deals in the sector. The biggest deal by far was Elf's joint purchase with Enterprise Oil of Occidental Petroleum's North Sea assets.

Despite an almost halving in the value of deals between 1990 and 1991, the food, beverages and tobacco sector was still the busiest in cross-border M&A in Europe. Apart from some rationalisation of the UK brewing industry, there were no particularly big deals in the sector. But many big names (Unilever, PepsiCo, Nestle) were busily further consolidating their positions in Europe with a number of relatively small deals. The seemingly insatiable French giant BSN was again particularly active, cementing deals during the year in Czechoslovakia, eastern Germany, Greece, Ireland, Italy and Spain.

The media sector was also busy with the dissolution of the Maxwell empire at the end of the year accounting for much of the interest. And as usual there was plenty of activity in the banking and financial services sector. Much of the interest there was focused on Spain, where a restructuring of the banking industry led to the divestment by the big banks of non-core businesses (of which they had more than a few), and to a number of strategic stakes being taken in the biggest Spanish banks by banks from other member countries.

CONCLUSION

Future M&A activity is highly dependent on the levels of economic growth in the major economies of the world. There are, of course, certain special situations and opportunities that apply only in recession, and that can be sure to keep corporate financiers occupied whatever the economic climate. For example, in recession some buyers are tempted to go looking

for irresistible bargains; others buy defensively in the hope of improving their own profitability; and yet others (often groups of managers) buy bits and pieces spun off by big corporations as they rationalise and digest the excesses of earlier booms.

There are other more positive forces that apply in both good times and bad. Companies continue to put strategies into effect that reposition them competitively to take account of the changing corporate environment. Coopers & Lybrand identify three areas where this applies:

"Highly regulated sectors such as pharmaceuticals, media and transportation, will continue to rationalise throughout the world as regulatory barriers are removed. In Europe, companies in capital-intensive industries, such as chemicals and steel, will have to consolidate in an effort to reduce fixed costs. There will also be pressure on businesses in labour-intensive industries to relocate to lower-cost areas, such as southern and eastern Europe."

Anything beyond this is in the hands of the pilots of the western world's major economies.

Written by: Tim Hindle

Inward and outward foreign direct investment in Western Europe

INTRODUCTION

Foreign direct investment (FDI) and the activities of multinational corporations (MNCs) are playing an increasingly important role in the international integration of the world economy, even though this integration affects different parts of the world to a different extent and in different ways.

Three important developments can be discerned in the development of FDI over the last two decades - trends which are likely to persist for some time:

Growth: Worldwide FDI is growing faster than other economic indicators like production or international trade.

Regional shifts: FDI is becoming more and more concentrated in developed countries, especially in the USA and Europe. Simultaneously, MNCs from Japan as well as from several European countries have been growing faster than those from the USA and the UK, who have traditionally dominated FDI.

Growth patterns: External growth, i.e. through acquisitions of already existing companies, is becoming the dominant mode of MNCs' expansion strategies, in contrast to internal growth, i.e. through the setting up or extension of subsidiaries.

DEFINITIONS AND STATISTICAL PROBLEMS

FDI can be defined as cross-border transfer of capital through which an investing enterprise creates a new foreign company, (partly) gains control of an already existing foreign company, or develops the business of an already affiliated foreign company. The affiliation of the foreign company, i.e. some kind of managerial relationship, is important since this is the criterion which distinguishes FDI from international portfolio investment. Thus, FDI is closely related to the activities of MNCs.

This general definition allows for a great variety of detailed statistical definitions. The benchmark definition of the OECD includes the following transactions: the purchase of shares or other original capital, reinvested earnings, the net increase of loans and credits, minus disinvestments. The affiliation of a foreign company is usually assumed if the investing company holds 10% or more of the voting power.

However, most countries use their own definitions, which deviate more or less from each other, as well as their own methods of collecting data. The statistics of some countries do not include reinvested earnings. This is the case for instance in the Netherlands and France, to name only the most important. Some countries do not define a minimum threshold, like the Netherlands, or use a 20% ownership threshold as the criterion, like Germany and France. The different treatment of investment in real estate or of short term loans poses further problems. Finally, some countries like Greece and Ireland do not produce FDI statistics at all.

A further important problem is that of indirect FDI e.g. through intermediary holding companies and special financial institutions. Intermediary holding companies which belong to a foreign company and own other foreign companies at the same time play an important role in the UK, the Netherlands,

Table 1: Outward FDI stocks

(in billion ECU)	Total	EC	Europe	USA	Japan	Other LDCs
BR Deutschland (1990)	113.5	51.6	10.9	26.2	2.1	9.0
France (1989)	63.1	34.0	N/A	15.5	0.3	N/A
Italia (1990)	41.2	22.9	4.8	3.9	N/A	N/A
Nederland (1989)	73.2	30.2	N/A	24.5	0.7	8.5
Sweden (1988)	21.1	10.6	5.1	3.9	N/A	1.1
Switzerland (1990)	48.9	23.5	2.7	11.1 (1)	N/A	N/A
United Kingdom (1989)	170.4	45.8	5.6	71.4	1.9	24.1
USA (1990)	309.2	126.9	22.9	-	15.4	77.5

(1) North America
Source: Deutsche Bundesbank; Banque de France; Banca d'Italia; De Nederlandsche Bank; Sveriges Riksbank; Schweizerische Nationalbank; Central Statistical Office; Bureau of Economic Analysis of the U.S. Department of Commerce

Table 2: Employment at foreign owned manufacturing affiliates

(thousands)	All affiliates	Majority owned	US affiliates All	US affiliates Majority	Japanese affiliates All	Japanese affiliates Majority	Total employment (in millions)
BR Deutschland	1 349	N/A	428	382	31	20	8.2
France	717	636	251	194	24	20	4.4
Italia	504	343	141	118	6	4	4.1
United Kingdom	N/A	724	529	458	110	67	5.2
España	500	450	120	93	29	23	2.4
EC	4 500	3 700	1 718	1 463	219	150	28.3
Western Europe	4 800	4 000	1 785	1 505	222	152	31.6

Notes and sources:
Data on US affiliates is for 1989, taken from Bureau of Economic Analysis
Data on Japanese affiliates is for 1990, calculated from JETRO data
Data on total employment is for 1990, taken from OECD
Data on Germany is for 1990, taken from Deutsche Bundesbank
Data on France is for 1989, taken from Service des Statistiques Industrielles
Data on Italy is for 1989, taken from R.Cominotti and S.Mariotti: Italia multinazionale 1990, Milano 1991
Data on United Kingdom is for 1989, taken from Central Statistical Office
Data for Spain is for 1990, estimates based on a current research project
Data for EC and total Western Europe are estimates for 1990, based on the figures presented here plus additional national sources

Luxembourg and Switzerland, and their treatment in national statistics varies greatly. Finance companies or so-called special financial institutions through which MNCs finance international as well as domestic operations are frequently found in the Netherlands, where they are completely excluded from FDI statistics.

Eurostat has tried to tackle the problem and started to harmonise data available from national statistics of the twelve EC countries. This is obviously a very difficult task. A comparison of "harmonised" bilateral FDI data as given for the investing country and the targeted country show tremendous differences or asymmetries. FDI outflows and inflows often are a multiple of the respective other.

All data presented here have to be interpreted with caution. For this reason, this report will refrain from calculating and presenting exact percentage figures on sectoral or regional FDI distribution as well as, e.g., on growth rates.

Outward investment stock

Since statistics on FDI *flows* are difficult to interpret, we will present some other data first. The above definition of FDI refers to flows, i.e. annual values of capital transferred across borders as reported in the balance of payments. Another method of measuring FDI is to assess FDI stock or FDI position at a certain point of time, i.e. the (book) value of the assets owned by the investing company in its foreign affiliates. Data on FDI stock also poses severe statistical problems, but national definitions are nevertheless more homogeneous.

Data on outward FDI stock is available for the seven most important European investing countries (cf. Table 1). The by far most important investor is the United Kingdom, followed by Germany, the Netherlands, France, Switzerland, Italy and finally Sweden. There are significant differences in the regional distribution of the countries' foreign investment. The United Kingdom is the only country where the USA (40%) has attracted more FDI than Europe (30%); it is also the country with the highest share of FDI in developing countries (14%). For all other European countries, perhaps with the exception of the Netherlands where data on FDI stock in European non-EC countries is lacking, Europe has attracted over half of the FDI stock. The EC alone has attracted more or less half of FDI stock of most European countries, but only little more than one quarter of that from the United Kingdom.

This data shows the distinctive orientation of MNCs from the United Kingdom, which, following a long tradition, are much more globally oriented. MNCs from other European countries, on the other hand, are still, despite high growth rates in the USA for most countries, heavily oriented towards Europe.

Data on industry structure of FDI stocks is only available very selectively and on different bases. To give an example - data sometimes refers to the industry of the investing company and sometimes to the industry of the foreign affiliates. Consequently, data will not be presented here in detail. But some general remarks can be made. The share of investment in manufacturing affiliates is considerably higher in overseas investment than in investment in European countries, where commercial affiliates are much more important. For the UK and also for the Netherlands, oil companies which usually act on a more global basis account for a major share of FDI. Finally, it seems that a considerable share of the UK's FDI is being undertaken by trusts and other conglomerates which manage their subsidiaries at arm's length. This means that foreign affiliates of these companies are much less integrated into a unique company strategy, hence on an operative level UK companies are less internationalised than statistical data would indicate.

Employment at foreign owned manufacturing affiliates

For inward FDI, probably the best indicator for the level of internationalisation can be derived from employment figures. Head count leaves much less space for varying definitions. Table 2 shows data for the manufacturing industry of the most important European countries, along with an estimate for the EC and total Western Europe. Germany is the country with the most employees at foreign owned companies, followed by the UK, France, Spain and Italy. In Western Europe, there are about 4 million persons employed at majority owned manufacturing foreign affiliates, 3.7 million of them in the EC. About half of these employees are working at non-European companies, especially American but also Japanese and Canadian but also others. Foreign penetration of the manu-

Table 3: FDI flows of the EC, the USA and Japan

(billion ECU)		1985	1986	1987	1988	1989
EC	Outward	15.1	21.9	30.6	31.6	32.9
	Inward	5.7	7.1	12.2	16.1	27.6
USA	Outward	-1.2	8.8	8.6	2.0	8.5
	Inward	26.7	37.0	39.4	43.9	65.7
Japan	Outward	8.5	14.7	16.9	28.9	40.1
	Inward	0.8	0.2	1.0	-0.4	-1.0
Intra-EC		6.0	10.5	12.2	22.0	33.2

Note: negative values indicate a net disinvestment
Source: Eurostat

Table 4: FDI flows of the USA 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	16 674	17 991	25 103	15 113	27 381	26 787	21·898
EC	8 922	4 017	8 028	7 184	15 767	7 415	11 397
EFTA	1 000	439	1 769	-554	584	3 518	1 855
Japan	436	349	1 005	899	206	656	82
Inward	26 851	36 726	51 532	49 532	62 637	36 208	10 184
EC	13 777	22 985	36 652	26 243	32 402	19 227	6 793
EFTA	3 934	2 658	3 404	645	6 737	741	-131
Japan	4 414	7 144	7 628	14 550	16 930	13 629	4 183

(1) Balance of payments data, including reinvested earnings; totals are country totals, excluding current cost adjustment
Source: Bureau of Economic Analysis of the U.S. Department of Commerce

facturing sector is especially high in Spain, and also in several smaller countries like Ireland, Austria or Belgium. It is low, for instance, in Italy.

Global developments

Over the last decades, world-wide FDI has grown much faster than world production or international trade. This has been especially true for the period between 1983 and 1989, when - according to UNCTC calculations - worldwide FDI outflows grew by 29% annually. In 1990 and 1991, this growth slowed down again.

During the 1950s and 1960s, FDI was dominated by MNCs from the United States and the United Kingdom. The 1970s and 1980s, on the other hand, have witnessed a tremendous growth of FDI by corporations from other European countries and from Japan. Table 3 shows "harmonised" Eurostat data for inward and outward FDI flows of the three regions of the Triad, and reflects the tremendous growth between 1985 and 1989. EC(12) has doubled outward FDI, and inward FDI has even grown fivefold; in 1989 both reached about the same level. Japan's outward FDI has grown almost fivefold, while inward FDI has remained negligible. Contrary to this, US inward FDI has more than doubled, while outward FDI remained at a low level. The situation of the US looks somewhat different if one includes reinvested earnings (cf. Table 4). Recent data for Japan also show that the extremely high growth rates of the 80s did not persist in 1990 and 1991; nevertheless, Japan remains a large net foreign investor (cf. Table 5).

Table 5: FDI flows of Japan 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	8 455	14 713	16 908	28 931	40 054	37 712	24 796
EC	2 010	2 792	3 113	4 899	8 846	8 659	6 435
EFTA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
USA	3 351	8 101	8 351	16 042	19 277	20 091	12 277
Inward	841	230	1 009	-410	-957	1 377	1 104
EC	71	55	102	85	297	869	508
EFTA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
USA	674	202	540	-507	-1 389	470	-72

(1) Balance of payments data, not including reinvested earnings
Source: Bank of Japan

Table 6: Outward FDI flows 1985-1991

(million ECU)	1985	1986	1987	1988	1989	1990	1991
BLEU	165	1 552	2 346	3 065	5 564	5 201	5 795
Danmark	339	664	532	659	2 033	1 270	1 654
BR Deutschland	6 352	9 814	7 899	9 677	13 200	18 035	17 426
España	339	487	708	1 595	2 150	3 515	5 269
France	2 952	5 336	7 552	10 816	16 408	21 340	16 606
Hellas	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	2 395	2 714	2 018	4 614	1 819	5 552	5 398
Nederland	3 743	3 212	6 149	3 480	10 222	9 915	9 238
Portugal	31	22	32	44	89	160	421
United Kingdom	14 644	17 568	27 192	31 345	32 006	12 480	13 987
Finland	465	731	738	1 605	2 709	2 996	1 699
Norway	N/A	1 745	833	816	1 233	1 148	1 489
Austria	87	248	338	158	645	1 260	783
Sweden	1 633	3 010	2 678	4 514	6 654	9 642	5 312
Switzerland	6 055	1 492	1 105	7 362	7 134	5 002	3 641
Japan	8 455	14 713	16 908	28 931	40 054	37 712	24 796
USA	16 674	17 991	25 103	15 113	27 381	26 787	21 898

Source and notes: see country tables

The high growth of FDI in the second half of the 1980s is primarily a result of the boom in international M&A activity. The fact that MNCs today are primarily expanding through external growth, i.e. acquisitions, and only to a very small extent through internal growth, i.e. green field investments or expansions, also has an impact on MNCs' internal structures. MNCs' structures are becoming more polycentric. This is due to the fact that acquired companies have strong points and potentials of their own, such as access to markets, management abilities, technology, or R&D capacities - sometimes, they are even MNCs in their own right. This development towards more polycentric company structures is supported by the "philosophy" of many companies to develop a triad structure and to become an insider in the three most important regions of the world economy, North America, Europe and Japan, i.e. to develop the ability to behave like a national company in each of the three regions.

For most European MNCs, except those from the UK and the Netherlands, Europe has always been at the core of their internationalisation strategies. Due to a boom of M&A activities, FDI flows between EC countries have grown enormously in the second half of the 1980s (cf. Table 3). This growth has slowed down in 1990 and 1991 (cf. country data as presented below). European MNCs are restructuring their European activities and developing a more unique approach including European intra-company divisions of labour. They achieve this by utilising the different locational advantages for different kinds of activities and production in different

Table 7: Inward FDI flows 1985-1991

(million ECU)	1985	1986	1987	1988	1989	1990	1991
BLEU	1 267	642	2 029	4 226	6 124	6 430	7 069
Danmark	164	164	76	426	984	947	1 177
BR Deutschland	776	1 215	1 650	1 019	6 355	1 821	2 362
España	1 863	2 292	3 801	4 695	6 902	11 596	13 946
France	-307	2 818	4 021	6 082	8 677	7 127	9 674
Hellas	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	1 323	-16	3 521	5 791	2 297	4 973	2 056
Nederland	849	1 900	2 002	3 462	5 775	6 411	3 481
Portugal	286	169	318	585	1 431	2 327	2 642
United Kingdom	6 415	7 189	11 376	14 733	24 320	26 660	17 072
Finland	145	327	84	235	278	751	26
Norway	N/A	1 120	169	215	1 300	733	-284
Austria	218	165	326	342	470	438	166
Sweden	354	812	291	791	1 040	1 528	5 117
Switzerland	1 391	1 816	1 774	35	2 048	3 514	1 615
Japan	841	230	1 009	-410	957	1 377	1 104
USA	26 851	36 726	51 532	49 532	62 637	36 208	10 184

Source and notes cf. country tables

Table 8: FDI flows of BLEU 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	165	1 552	2 346	3 065	5 564	5 201	5 795
EC	351	934	1 609	1 033	3 562	4 574	5 638
EFTA	44	73	554	344	811	-968	-1 460
USA	-65	341	-28	500	328	446	-92
Japan	8	-100	5	20	26	56	79
Inward	1 267	642	2 029	4 226	6 124	6 430	7 069
EC	722	538	1 342	2 997	4 477	4 994	5 463
EFTA	97	141	344	387	450	409	721
USA	296	-38	249	544	102	419	1 192
Japan	90	93	33	88	1 080	255	182

(1) Balance of payments data, not including reinvested earnings and excluding transactions of holding companies in Luxembourg
Source: Banque de Belgique

parts of Europe and the EC. In this respect, they are following a strategy MNCs from the USA have pursued for a long time. One third of the turn-over of US manufacturing affiliates in Europe are exports to other European countries.

The opening of Eastern Europe poses completely new challenges to MNCs. Selected data available on FDI outflows to Eastern European countries displays high growth rates, especially since 1989. Hungary and the Czech Federation of the CSFR are receiving the largest shares of FDI inflows, particularly when their relatively small size is taken into account. Among the investing countries, Germany and the USA hold the leading positions.

FDI flows of European countries since 1985

Data on FDI outflows and inflows as given in the balance of payments are presented in Tables 6 and 7. For many European countries, annual figures fluctuate enormously. FDI is a long-term phenomenon, though FDI figures for one or two years might only reflect a small number of large take-overs that just fell into that period. Similarly, low FDI figures for a year or two might reflect the absence of large take-overs and perhaps even the sale of parts of the companies that had been acquired in the previous period.

FDI flows should not be mixed up with foreign affiliates' investments in fixed assets. Since FDI is only one way of financing foreign activities of a company, besides e.g. taking up loans on the local market, FDI is strongly influenced by changes in interest rates or exchange rates. This means that changes in FDI flows during the last one or two years generally should not be interpreted as indicators of a general and long term shift in the structure of FDI flows, even if these changes are immense, such as in the UK in 1990 and 1991.

Comparing the three-year periods 1985-87 and 1989-91 in Tables 6 and 7, FDI outflows have increased significantly for most European countries, the notable exceptions being the United Kingdom, Switzerland and Norway, where data for the last years shows no clear tendency. FDI inflows of EC countries have also grown in this period, most significantly of its new members Spain and Portugal. Among the EFTA countries, only Sweden shows a clear increase of FDI inflows. For most European countries, FDI outflows are more or less constantly higher than FDI inflows, with some important exceptions: In 1990 and 1991, the UK became a net importer of FDI while Austria only recently became a net exporter. Spain and Portugal (and probably also Greece and Ireland, where no data is available) have always been net importers of FDI.

EC countries

BLEU

The BLEU, receives slightly more FDI than it invests abroad. Both inward and outward FDI have been growing strongly since the mid 1980s. It should be noted that banks and other financial institutions located in Luxembourg, and which are

Table 9: FDI flows of Denmark 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	339	664	532	659	2 033	1 270	1 654
EC	172	270	303	379	1 582	857	820
EFTA	40	102	39	54	210	211	366
USA	76	245	80	153	83	89	55
Japan	1	9	6	22	4	24	19
Inward	164	164	76	426	984	947	1 177
EC	-10	1	-78	81	377	789	542
EFTA	114	320	279	246	534	492	570
USA	59	-173	-144	163	33	44	43
Japan	-1	2	4	12	25	4	10

(1) Balance of payments data, not including reinvested earnings and intra-group loans
Source: Danmarks Nationalbank

Table 10: FDI flows of Germany 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	6 352	9 814	7 899	9 677	13 200	18 035	17 426
EC	1 642	3 684	2 160	3 416	7 881	12 242	9 717
EFTA	409	531	498	889	768	1 750	1 473
USA	3 421	5 064	4 041	4 644	3 020	2 634	1 372
Japan	60	119	82	129	172	307	186
Inward	776	1 215	1 650	1 019	6 355	1 821	2 362
EC	567	1 305	391	1 487	3 549	663	876
EFTA	209	204	520	404	682	64	-93
USA	-401	-318	519	-1 744	1 280	74	-1 010
Japan	232	155	323	312	724	417	487

(1) Balance of payments data, including reinvested earnings
Source: Deutsche Bundesbank

large recipients of FDI, are not included in the data presented in Table 8.

Denmark

Outward FDI has been higher than inward FDI during the whole period since 1985, and both have been growing in the longer run. The EFTA countries have traditionally been the most important foreign direct investors into Denmark. But in 1991, the share of the EC had risen such that the Community accounted for about half of FDI outflows as well as FDI inflows. Outward and inward FDI in manufacturing have also been growing, accounting for less than a quarter of outward and over one third of inward FDI in 1990 and 1991 (Table 9).

Germany

FDI outflows have been growing tremendously over the last years, while FDI inflows have more or less stagnated since 1985 (Table 10). While until 1988 the USA received about half of Germany's FDI outflows due to a wave of acquisitions, outflows have concentrated on EC countries since 1989. The privatisation of East German enterprises, so far, has not led to a higher penetration of the German economy by foreign MNCs. The share of investment or employment guaranteed by foreign investors to the privatisation agency Treuhandgesellschaft is less than 10% of total guarantees.

Spain

FDI flows of Spain show a continuous and high growth (Table 11). Inward FDI has grown more than sevenfold between 1985 and 1991, and outward FDI has grown even seventeen fold over this period. Spain has been an important importer of FDI since the end of the 1950s, while the internationalisation of Spanish companies is a new phenomenon. Spain is the biggest European net importer of FDI, with net inflows amounting to over 8 billion ECU in 1990 and almost 9 billion ECU in 1991. Spain's most important FDI partners for inward as well as for outward FDI are the other EC countries.

France

French outward FDI has increased enormously in the second half of the 1980s, and in 1990 French outward FDI was higher than that of any other European country (Table 12). 1991 outflows showed a decrease. In manufacturing, the chemical and food industry showed the highest growth rates. Inward FDI has been growing too, but has not reached the level of outward FDI. More than half of inward as well as outward FDI were connected with other EC countries.

Greece

Data on outward FDI is not available for Greece. Data on inward investment refers to "entrepreneurial capital" which includes foreign capital inflow either for direct investment or for working capital approved under the foreign investment

Table 11: FDI flows of Spain 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	339	487	708	1 595	2 150	3 515	5 269
EC	80	152	361	765	1 238	1 886	3 276
EFTA	9	21	34	68	225	120	117
USA	43	96	44	386	196	151	223
Japan	0	1	0	3	0	30	1
Inward	1 863	2 292	3 801	4 695	6 902	11 596	13 946
EC	876	1 478	2 512	3 374	4 964	9 658	11 746
EFTA	207	193	544	479	1 015	261	386
USA	483	233	282	245	390	345	540
Japan	109	72	234	96	180	279	370

(1) Authorized or verified investments; indirect investments, published as investments from Spain, have been excluded from inward investment
Source: Ministerio de Economía y Hacienda

Table 12: FDI flows of France 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	2 952	5 336	7 552	10 816	16 408	21 340	16 606
EC	570	1 802	4 070	6 858	10 203	14 487	8 804
EFTA							
USA	1 256	2 277	2 357	2 492	3 609	4 595	4 303
Japan	25	19	15	1	26	24	23
Inward	-307	2 818	4 021	6 082	8 677	7 127	9 674
EC	1 369	1 428	1 961	4 266	6 573	3 887	4 672
EFTA							
USA	439	436	993	342	372	922	801
Japan	-11	133	143	242	557	853	444

(1) Balance of payments data, not including reinvested earnings
Source: Banque de France

Table 13: FDI flows of Ireland 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Inward	260	256	270	203	175	159	290
EC	86	104	102	72	43	50	57
EFTA	11	10	10	12	5	1	19
USA	144	122	115	99	107	90	162
Japan	3	10	20	9	9	10	13

(1) Only grant-aided foreign investment
Source: Industrial Development Authority; own calculations

law. Capital inflows of this kind have more than doubled since 1986, reaching 727 million ECU in 1990. A regional breakdown is not available.

Ireland

Unfortunately, Ireland does not provide data on FDI, even though the Irish manufacturing industry is highly dependent on foreign companies, and Ireland's Industrial Development Authority subsidises these investments. About half of grant-aided foreign investment is coming from the USA. The very high FDI outflows to Ireland the statistics of several European countries are showing in the beginning of the 1990s are primarily going to the newly established Free Banking Zone in Dublin (Table 13).

Italy

Annual values of Italian FDI outflows as well as inflows vary considerably (Table 14). In the medium term perspective, outflows and inflows seem to be balanced. In 1991, outflows stayed at a relatively high level while inflows dropped by more than half. The concentration of FDI to and from EC countries is higher than for most other European countries.

Netherlands

Both inward and outward FDI have grown since the mid 1980s, the level of outward FDI being considerably higher than that of inward FDI (Table 15). Neighbouring BLEU as well as the UK where some Dutch MNCs have a second headquarters (like Royal Dutch Shell and Unilever) are the most important

Table 14: FDI flows of Italy 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	2 395	2 714	2 018	4 614	1 819	5 552	5 398
EC	990	1 239	-315	1 747	2 291	4 541	N/A
EFTA	-64	112	-13	28	350	177	N/A
USA	425	377	-359	293	-1 269	232	N/A
Japan	38	3	-33	-1	234	160	N/A
Inward	1 323	-16	3 521	5 791	2 297	4 973	2 056
EC	1 352	-786	1 735	2 436	1 711	2 024	N/A
EFTA	-401	25	697	2 171	-245	2 649	N/A
USA	262	410	679	787	549	34	N/A
Japan	-40	16	39	70	225	184	N/A

(1) Balance of payments data, not including reinvested earnings
Source: Banca d'Italia

Table 15: FDI flows of the Netherlands 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	3 743	3 212	6 149	3 480	10 222	9 915	9 238
EC	1 340	2 182	2 541	722	5 029	5 787	6 225
EFTA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
USA	1 388	632	2 902	1 323	3 069	2 356	898
Japan	73	-22	14	52	24	130	153
Inward	849	1 900	2 002	3 462	5 775	6 411	3 481
EC	342	962	1 338	2 572	3 141	3 938	1 055
EFTA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
USA	-684	-257	-69	-204	892	777	1 190
Japan	24	57	30	294	225	224	354

(1) Balance of payments data, not including reinvested earnings and excluding transactions of special financial institutions
Source: De Nederlandsche Bank

FDI partners. Outward FDI to EC countries grew slightly above average, accounting for more than half in 1990 and 1991. Inward FDI from EC countries dropped considerably in 1991, leading to an overall decrease in total inflows for the first time since the mid 1980s.

Portugal

Outward FDI of Portugal, especially in the manufacturing sector, is still negligible. Inward FDI, since the end of the 1980s, has seen a real boom (Table 16). Even though FDI inflows in manufacturing have grown much slower than total inflows, accounting for about one fifth in 1991, the data illustrates that Portugal has become an interesting location for export manufacturing not only for low skill and labour intensive industries, which had been important for many years, but also for capital intensive industries, the joint venture of Ford and Volkswagen being the most prominent example.

United Kingdom

Until the end of the 1980s, outward FDI of the UK had been considerably higher than inward FDI, and both had been growing continuously since 1985 (Table 17). The imbalance was due to high FDI outflows to the USA, while net outflows to EC countries were much smaller, and the EFTA region, due to high FDI inflows from Switzerland and Sweden, even was a net investor. In 1989, the latest year for which data is available, manufacturing accounted for over half of outward FDI and around two fifth of inward FDI, which are considerably higher shares than those of other countries. In 1990, net outward FDI to the USA stopped completely, and, for the first time, the UK became a net importer of FDI. In 1991, inward FDI decreased while outward FDI stayed at about the same level.

EFTA countries

Finland

The strong growth of Finnish outward FDI, of which manufacturing accounts for about half, reflects the enormous internationalisation of a small number of Finnish MNCs. EC countries have become the main destination, while neighbouring Sweden is still the most important single country (Table 18).

Norway

Inward and outward FDI flows of Norway do not show a clear tendency (Table 19), reflecting the variability of investments in the oil industry. Negative inward FDI flows in 1991 are basically the result of some disinvestments by British oil companies.

Austria

Starting from a low level, outward FDI flows of Austria have grown considerably since the mid 1980s, indicating the beginning of an internationalisation process of a small group of Austrian companies. Inward FDI flows have remained notably low, even though many MNCs - especially from Germany and the USA - operate in Austria.

Table 16: FDI flows of Portugal 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	31	22	32	44	89	160	421
EC	5	4	13	30	55	106	328
other Europe	9	2	4	4	4	26	19
USA	9	2	4	4	3	22	7
Japan	0	0	0	0	0	1	0
Inward	286	169	318	585	1 431	2 327	2 642
EC	162	129	209	404	1 043	1 655	1 834
other Europe	20	17	33	65	140	262	208
USA	77	15	45	69	64	76	224
Japan	0	1	7	5	11	54	27

(1) Balance of payments data, including reinvested earnings only if transferred to the affiliates' own capital
Source: Banco de Portugal

Table 17: FDI flows of the United Kingdom 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	14 644	17 568	27 192	31 345	32 006	12 480	13 987
EC	4 036	3 298	3 100	8 040	8 403	7 298	N/A
EFTA	691	-1 013	859	20	273	828	N/A
USA	5 484	11 256	17 870	15 672	17 413	-742	N/A
Japan	81	177	-34	154	330	354	N/A
Inward	6 415	7 189	11 376	14 733	24 320	26 660	17 072
EC	2 258	3 635	4 200	6 874	6 288	8 086	N/A
EFTA	779	1 434	163	3 373	4 018	2 998	N/A
USA	2 871	1 878	1 756	644	8 463	7 116	N/A
Japan	211	64	1 133	1 317	1 775	2 388	N/A

(1) Balance of payments data, including reinvested earnings
Source: Central Statistical Office

Table 18: FDI flows of Finland 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	465	731	738	1 605	2 709	2 996	1 699
EC	N/A	266	407	699	1 019	1 371	935
EFTA	N/A	346	141	532	677	766	340
USA	N/A	51	97	257	567	445	N/A
Japan	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inward	145	327	84	235	278	751	26
EC	N/A	20	28	80	142	169	179
EFTA	N/A	291	42	139	164	528	-134
USA	N/A	17	17	9	21	50	N/A
Japan	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Balance of payments data, not including reinvested earnings
Source: Suomen Panki

Sweden

Sweden's outward FDI has been growing enormously since the mid-1980s; but it dropped in 1991, due to a decrease of FDI outflows to EC countries, which attract the major part of Sweden's FDI (Table 20). Inward FDI has always been much lower than outward FDI, but in 1991 inward FDI from EC countries grew considerably. The shift of FDI flows from and to EC countries can possibly be linked to the changed macroeconomic paradigms of the Swedish economy.

Switzerland

Data on outward and inward FDI flows of Switzerland do not display a clear trend. Usually, outflows are higher than inflows (Table 21). In 1990 and 1991, over half of Switzerland's FDI outflows went to EC countries. In 1990, the USA

Table 19: FDI flows of Norway 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	N/A	1 745	833	816	1 233	1 148	1 489
EC	N/A	613	487	183	865	646	511
Nordic Countries	N/A	395	73	779	1 184	994	1 407
USA	N/A	130	-213	215	89	296	234
Japan	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inward	N/A	1 120	169	215	1 300	733	-284
EC	N/A	527	204	316	338	319	-849
Nordic Countries	N/A	224	302	181	966	481	500
USA	N/A	406	-345	-140	-37	-364	-122
Japan	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Balance of payments data, not including reinvested earnings
Source: Norges Bank

Table 20: FDI flows of Sweden 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	1 633	3 010	2 678	4 514	6 654	9 642	5 312
EC	487	882	1 374	3 203	4 292	8 247	3 844
EFTA	156	389	618	887	1 063	293	411
USA	607	1 545	535	309	997	423	652
Japan	9	19	13	11	1	0	9
Inward	354	812	291	791	1 040	1 528	5 117
EC	172	153	49	164	151	898	4 510
EFTA	400	488	147	508	599	333	650
USA	-227	137	4	48	105	118	-290
Japan	0	2	1	-1	2	0	7

(1) Balance of payments data; reinvested earnings have been excluded because no regional break down is available
Source: Sveriges Riksbank

Table 21: FDI flows of Switzerland 1985-1991 (1)

(million ECU)	1985	1986	1987	1988	1989	1990	1991
Outward	6 055	1 492	1 105	7 362	7 134	5 002	3 641
EC	N/A	584	1 377	5 043	1 534	2 566	1 894
EFTA	N/A	10	70	224	682	-155	637
USA	N/A	136	-247	710	3 288	83	-107
Japan	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inward	1 391	1 816	1 774	35	2 048	3 514	1 615
EC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EFTA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
USA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Japan	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Balance of payments data, including reinvested earnings
Source: Schweizerische Nationalbank / Banque Nationale Suisse

accounted for half of FDI inflows; in 1991, over half of FDI inflows came from European countries.

Written by: FAST e.V.

The Single Market after 1993

The date of 1st January 1993 marked a further historic landmark in the development of the European Community. It heralded the start of an EC market without internal border controls, with wide-ranging benefits and changes for citizens and for businesses operating in the Community.

Whilst a few decisions remain to be taken notably in the company law and direct taxation field, the basic legal framework for the Single Market based on the Commission's 1985 White Paper programme has been agreed, thus respecting the deadline embodied in the Single European Act of 1987 which obliged Member States to create "an area without internal borders in which goods, persons, services and capital can freely circulate". Future work will focus on ensuring the efficient and proper functioning of the Single Market. This will involve the close cooperation of Member States' authorities, the Commission and other Community institutions, business and citizens in exchanging information and experience through mechanisms and procedures already established or which are being set up. The Commission will play an important role in smoothing out difficulties which may arise.

The Treaty establishing the European Economic Area will shortly enter into force. This Treaty extends to the EFTA states except Switzerland the relevant Community legislation concerning the free movement of goods, capital, services and people, thus creating a free trade area covering some 375 million consumers. In many areas, Community legislation (e.g. public procurement and financial services) will apply throughout the EEA from the date of its entry into force. The EEA will cover most of the "acquis communautaire" including most internal market measures except those dealing with the abolition of border controls. EFTA countries will apply EEC rules on state aid, transport, competition, consumer and environmental protection, statistics, public procurement and company law. The EEA will not bind EFTA states to participate in the Common Agricultural Policy. There are special arrangements for certain sectors, such as food, fish, energy, coal and steel and some countries have derogations to delay implementing obligations. A special EFTA Surveillance Authority will ensure that the EFTA countries abide by the rules and that the same competition rules as applicable within the EC are also applied by the EFTA side. Cooperation will be intensified in the flanking policies like research and development, environment and social policy.

SINGLE MARKET DECISIONS

As at 31st December 1992, decisions had been taken on 95% of the Single Market measures foreseen in the Commission's 1985 White Paper programme.

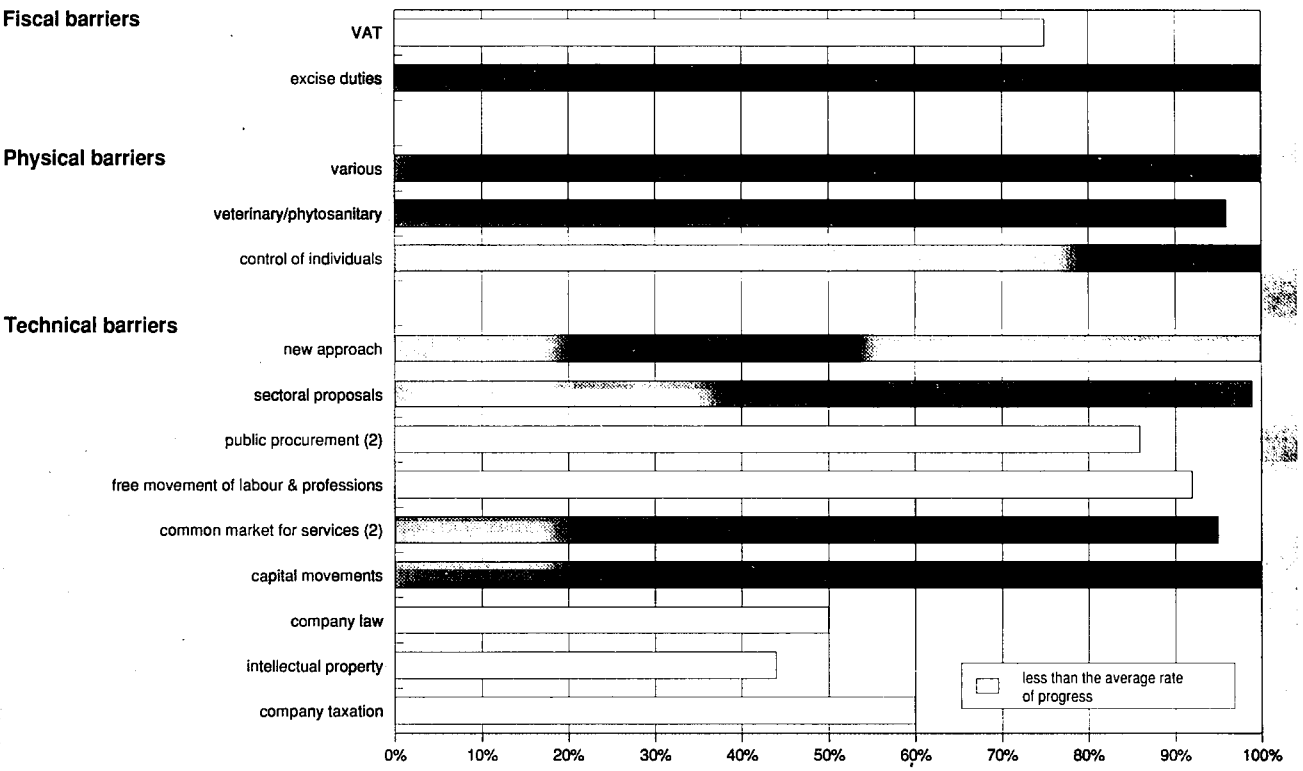
All the decisions to enable the free movement of capital have been taken. In the veterinary and phytosanitary field, all the decisions have been taken to harmonise the conditions for placing animal and plant products on the market and for displacing the necessary health controls away from the internal borders to inspection points on the territory. In the area of free movement of goods, new VAT and excise duty regimes have been introduced. These replace controls at the internal borders by, for example, in the case of VAT, a system based on cooperation between national tax authorities; customs documentation has been abolished on goods circulating in the Community or put in free circulation in a Member State; all the technical harmonisation measures foreseen in the White Paper have been agreed, and so has the legislation for opening up competition in the field of public procurement. In the services sector, all the decisions foreseen in the financial services sector and the transport services sector (with the exception of the definitive cabotage regime for the road transportation of goods) have been taken, though certain measures will not enter into force immediately (e.g. third non-life insurance and life assurance directives enter into force on 1st July 1994; similarly in the fields of, for example, maritime and road cabotage (of passengers), transitional measures have been agreed to enable certain Member States to adapt to a system of open competition).

In the area of intellectual property, it is expected that the remaining decisions will be taken early in 1993 to enable the Community trade mark to be introduced; similarly that all Member States will ratify the Convention on the Community Patent to enable its entry into force. It is regrettable that certain decisions have not been taken in the area of company law - notably the setting up of a European company statute and the harmonisation of laws relating to take-over bids, and on direct taxation designed to eliminate the imposition of double taxation in cross-border dealings. Nevertheless, if one or two pieces remain to be agreed to complete the legislative programme, the framework is largely in place and awaits only the finishing touches.

In relation to the free movement of persons, all Community citizens will have the right of residence in a Member State other than their own, and will be able to freely circulate in the Community. Restrictions on cross-border purchases of duty paid goods have been removed, although a traveller may be subject to a control on the territory, and asked to justify that the excess spirits and cigarettes above certain stipulated indicative limits (at which level trade in such goods might be suspected) are for personal use (e.g. for a family wedding). Whilst sales of duty free purchases will be permitted until 1st July 1999 in respect of intra-Community travel, controls to administer such sales will be carried out at the point of purchase and not by customs at the internal border. Measures for the mutual recognition of professional qualifications have entered into force and comparative tables published of national vocational training qualifications in a wide range of non-regulated professional sectors.

The legislative programme necessary for the abolition of border controls on goods was first set out in the Commission's Communication of December 1991 (see COM(91)549), and in subsequent Communications of May and June 1992 (SEC(92)877; SEC(92)1085). By and large all decisions en-

Figure 1: State of Council decisions taken on the Single Market, 31 December 1992 (1)



(1) The table shows the percentage of decisions taken by the Council based on the 1985 White Paper Programme: 264 decisions of the 282 proposals (261 final adoptions, 3 common positions), 18 decision remaining of which 5 are being given high priority for adoption.
(2) Common positions: capital adequacy, investment services, public procurement excluded sectors
Source: Commission of the European Communities

abling the removal of internal border controls on goods have been taken, though certain accompanying measures at Community level relating to particularly sensitive goods and issues (strategic goods, cultural goods, animals accompanying travellers) need to be finalised. Checks at land and sea borders on persons circulating in the Community are being abolished between the Member States party to the Schengen Agreements, but checks will still be made by certain Member States at the internal borders for the purpose of controlling illegal immigration, given their geographical situation and where the immediate introduction of new controls on the territory would be more cumbersome for citizens than the minimum checks necessary at the internal border. Internal border checks on persons at airports are to be removed by 1 December 1993 in the Schengen area.

FUTURE PRIORITIES

The priority is now to ensure that the Single Market works properly and efficiently. This requires, first, that the Member States' authorities transpose all the directives currently in force and enforce them uniformly.

With respect to this first point, the transposition situation by Member State as at 31 December 1992 is as follows: 233 directives have entered into force of which 194 require national transposition measures. The rate of transposition has risen to 75%.

A second requirement is that remaining or additional legislative measures to complete the framework are adopted by the Council and implemented: notably in the fields of company law, direct taxation and energy.

A third requirement is that the necessary European standards for the full implementation of the "new approach" directives and public procurement directives are developed by the Community standards bodies as soon as possible.

The fourth requirement is the uniform policing of the Community's external border, close cooperation between, for example, national tax authorities, and an efficient and effective system for removing from the Community market either dangerous goods or those which do not comply with Community legislation. Measures involving the exchange of officials particularly in the taxation and customs fields have been set up to foster mutual confidence, and telematic networks introduced or improved (e.g. VIES, SHIFT) to enable the storage of data and rapid exchange of information between Member States' authorities and with the Commission. In addition, "contact points" in Member States are being designated to deal with problems relating to the coordinated removal of dangerous goods. In order for the benefits of the Single Market to be fully achieved, it is necessary to develop fully integrated trans-European networks in the transport, energy distribution and vocational fields as well as those in the data transmission field. Work is continuing on the basis of a programme of priority networks established by the Commission in consultation with interested parties.

Programmes and policies articulated in the 1985 White Paper have resulted in fresh strategic perspectives that have radically transformed the business environment by imparting a pan-European dimension rooted in market transparency, a viable legal framework and a new dynamism born of deregulation:

In the wake of harmonisation and the removal of cross-frontier controls, the Single Europe affords the corporate sector access to a marketplace of 340 million consumers - a marketplace which is characterised by an unprecedented level of compatibility in terms of both goods and services. New possibilities have emerged with respect to cooperation between individual

Table 1: State of Impementation of the White Paper Measures
Breakdown of situtation by Member State at 31/12/92 (1)

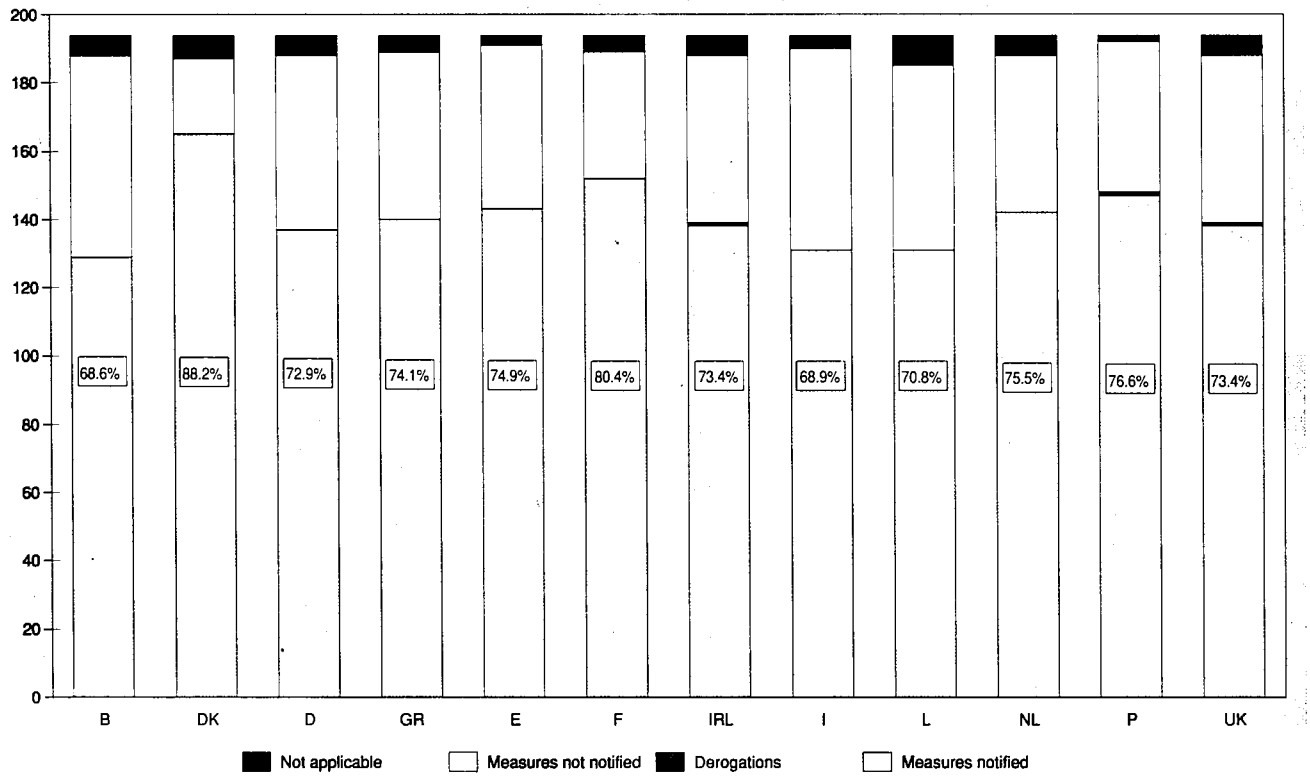
	Measures notified	Derogations	Measures not notified	Not applicable
B	129	0	59	6
DK	165	0	22	7
D	137	0	51	6
GR	140	0	49	5
E	143	0	48	3
F	152	0	37	5
IRL	138	1	49	6
I	131	0	59	4
L	131	0	54	9
NL	142	0	46	6
P	147	1	44	2
UK	138	1	49	6

(1) There are 233 measures in force of which 194 require national implementing measures
Source: Commission of the European Communities

firms and recourse to services provided by operators in other EC Member States, whereby the sole competitive yardsticks are price and quality. The impact of this new economic area has already been demonstrated both at the corporate level, where intra-EC trade has grown from 50% in 1981 to 60% in 1992, and in terms of intensified cooperation between EC firms.

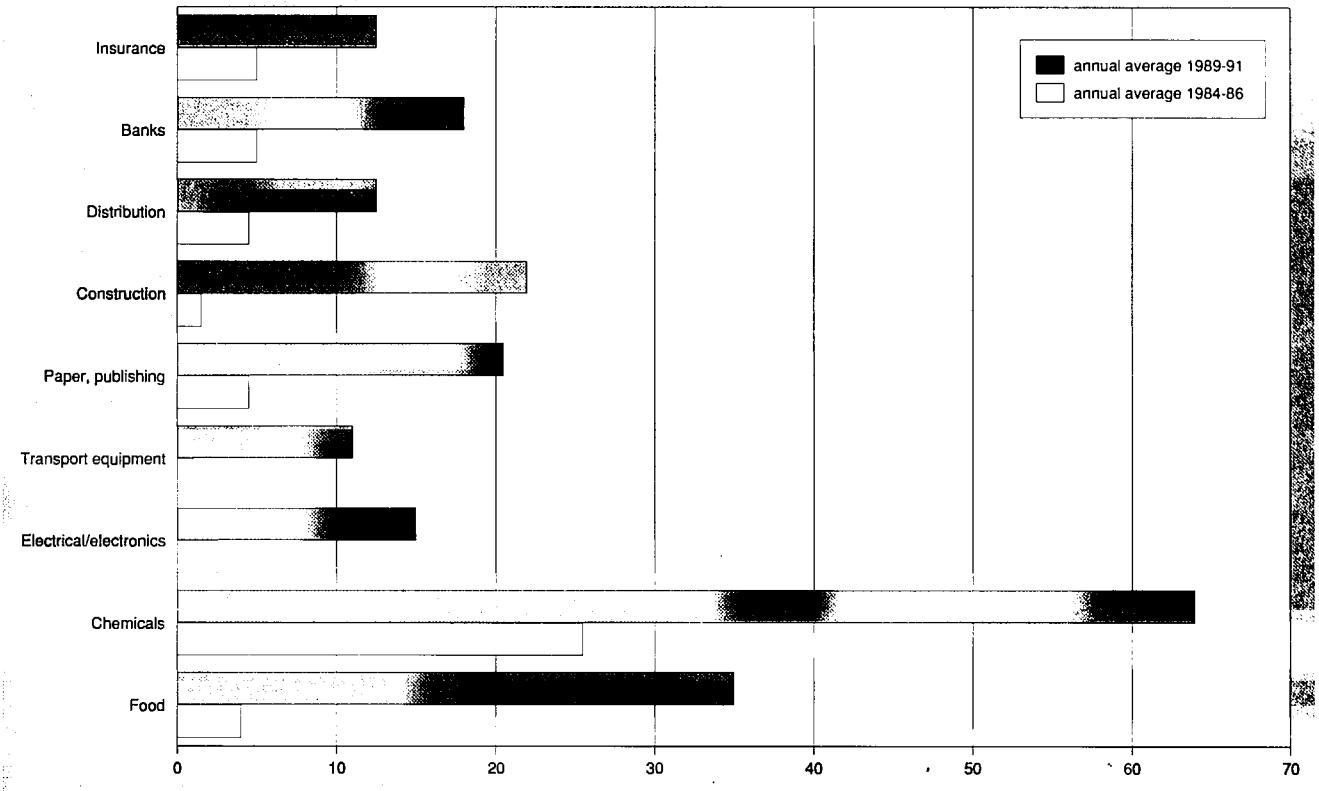
The Single Market affords companies the possibility of operating within a stable and established legal framework which largely eliminates distortions to trade. Transposition and implementation of EC rules into Member State law has resulted in private sector firms and public sector operators acquiring rights and obligations which are enforceable, in the first instance, at the level of national tribunals. Artificial barriers rooted in national law have also been largely eliminated, the most notable change being undoubtedly in respect of public procurement. At the consumer level, there is a new confidence that pan-European harmonisation of regulations, test methods and certification standards will ensure that goods and services comply with health and safety requirements. Meanwhile, new provisions on external EC relations and fair trade guarantee that European companies are shielded against unacceptable commercial practices.

Figure 2: Breakdown of situation by Member State at 31/12/92 (1)



(1) Measures notified as a share of total is displayed
Source: Commission of the European Communities

Figure 3: Intra-EC mergers and acquisitions of majority holdings by sector



Source: Commission of the European Communities, Annual Reports on Competition Policy

Finally, the Single Market promotes and protects private initiative and boosts innovation. Community rules have abolished frontier controls and eliminated attendant formalities, rendering superfluous some 90 million customs declarations every year. Customs and transit documents issued by one EC Member State are now recognised by the other eleven Member States. Even more important, however, is the fact that the removal of border controls obliges each Member State to take account of its Community partners when implementing new rules at national level so as to preclude distortion of intra-EC trade.

These aspects of the Single Market have already had an impact on corporate strategy and on the policies adopted by the public sector in the Member States, not least in fiscal matters. On the other hand, progress in this area only serves to highlight significant shortcomings at the social level.

The 1st January 1993 was considered a deadline by business and citizens, inside and outside the Community. The challenge was to put in place the legal framework for the Single Market, removing the physical, technical and fiscal barriers to the four freedoms of movement. This deadline has largely been respected. Many measures have been in force for some time, the remainder will enter into force in due course. The challenge in the immediate future is to make the Single Market work smoothly through effective implementation and enforcement. The open, competitive environment will present challenges for each sector of industry and for each business. 1992 is behind us; the real challenge of the Single Market is just beginning.

Written by: Commission of the European Communities, DGIII

The use of modern electronics in urban transport

Developments in advanced telematics and information equipment

THE TRANSPORT SECTOR CHALLENGE

The rapidly growing European economy has brought with it an even more explosive growth in mobility.

Europeans spend more than 500 billion ECU on road transport products and services every year. More than 10% of the average family budget is devoted to transport. Car ownership has been increasing steadily by 4% a year. and there are now some 120 million cars in Europe. International traffic increases by 5% a year, whilst on main motor ways freight traffic increased by more than 10% in 1990 alone. It has been estimated that a 1% growth of the GNP generates 1.5% growth in passenger transportation and up to 3% growth in the transportation of goods.

Economic growth in the European Community has recently been about 2.5% per annum. Coupled with the freedom of movement of persons and goods in 1993, this implies that much higher increases in transport flows can be expected.

In certain cities, traffic demand can no longer be satisfied. In Paris the average speed has dropped to about 10 km/h and in London to about 18 km/h. Once the journey has been completed, finding a parking space is often no easy task: In Paris there are only 720 000 legal parking places for 4.2 million cars, so it is difficult to find even prohibited parking space. Quite a significant proportion of downtown traffic is due to people merely looking for a parking place. In large cities and city centres, traffic needs to be managed, and more attention should be paid to public transport as the most promising alternative to guarantee an acceptable level of mobility.

On the 2nd of December, the Commission adopted the white paper, "the future development of the common transport policy". The new global approach identifies the transport challenges of the future and the eventual responses of the Communities for coping with them.

At this crucial period when developing the competitiveness of Europe is at the top of the agenda, the transport system faces major deficiencies: traffic congestion, accidents and environmental problems are worsening. The social problems are accumulating. Waiting in traffic jams for instance costs a German driver 65 hours a year. The cost of congestion delays in Europe is estimated to be around 15% of total transport costs - at around 500 billion ECU per annum. Finally, in the EC countries alone, approximately 55 000 have been killed, 1 700 000 injured and 150 000 permanently handicapped through road accidents on average in each of the years of the 1980's. Apart from the human suffering, the financial cost of all this lies around 50 billion ECU per year.

Therefore, important efforts to increase the performance of the road network are urgently required. There are, however, severe obstacles to the expansion of traditional infrastructure, such as the scarcity of space (especially in the urban environment) and resources as well as environmental reasons. Existing approaches to solving road traffic problems such as current traffic management schemes, civil engineering improvements, engine management technology and Community Directives on vehicle standards are important, but have limited effect in the face of rapidly increasing traffic.

The major challenge in the future in the short term but also in the medium and long terms, is the substantial improvement in the utilisation and operation of transport networks through the application of information technology and telecommunications. Investment in this "new" approach, called Advanced Road Transport Telematics (ATT), is required and has potential of substantial benefit.

EXPECTED BENEFITS OF ATT SYSTEMS

ATT systems are expected to be beneficial to different groups in the community:

To road users:

- Increased road safety
- Reduced travel time
- Availability of better information and other services
- Improved travel comfort

To road operators and administrations:

- Improved traffic control and monitoring
- Assessment of new strategies & policies

To industry:

- Creation of a new important market
- Stronger European competitiveness

To society:

- Reduced pollution
- Reduced number of accidents
- Reduced congestion

To Europe:

- Facilitate the single European market 1993
- Strengthen the European competitiveness
- Further European social cohesion

THE NEED FOR EUROPEAN COLLABORATION

In view of the forecast increase in international traffic, these systems will have to be introduced all over Europe in a co-ordinated way.

Transport patterns on road infrastructures are changing rapidly, and do not take into account national borders. This makes the operation of on-vehicle equipment installed with minimum common functionality a high priority in all regions and cities in Europe.

The telematics and automobile industries are already well aware of these aspects, but this awareness is only a first step and much more effort is required to arrive at an approach where compatible solutions acceptable to European citizens and industry are found.

However, the rapid technological changes and differences in user requirements represent a major challenge to achieve a satisfactory level of European compatibility and interoperability. The collaboration in the development of common functional specifications and European standards is essential for the development of a compatible network for all services in an "open" system. This requires appropriate flexibility in the integration of existing and new developments in the stages of testing and implementation at different national and regional environments. The different situations and problems at both the technical and institutional level must be taken into account allowing sector actors - and in particular local, regional and national authorities responsible for the infrastructure - to decide their investment and strategies. A common conceptual framework and agreement on basic principles at European level is a prerequisite for meeting user requirements, fair competition and the management of risks of the considerable investments required.

This European approach will benefit both the users and industry.

EC R&D INITIATIVE

Following favourable opinions from the Economic & Social Committee, from the European Parliament and from the Council of Ministers, DRIVE was formally adopted as a Community research programme in June 1988, for a period of three years (1989 - 1991). Within the budget of 64 million ECU, 72 projects were retained for a total amount of over 1000 Man-years.

Following the successful operation of this programme, a new initiative extending it to a new phase (DRIVE II), shifting the accent from "exploring options" to "preparing for the implementation", has been launched for a new period of three years (1992 - 1994). With a budget of 120 million ECU, 56 projects including a large number of "demonstration projects" are actually working for a total amount of over 2000 man-years.

The main objectives for the use of ATT is threefold:

- improving the safety in road transport;
- maximising road transport efficiency;
- reducing the environmental impact of road transport.

The EC envisages a common European Integrated Road Transport Environment (IRTE) in which drivers are better informed and "intelligent" vehicles communicate and co-operate with the road infrastructure itself. The aim is to come to the overall design of traffic management and safety systems which will represent a significant advance over those currently available.

DRIVE is not a stand alone initiative: It works in close co-operation with PROMETHEUS, CARMINAT and other programmes under the EUREKA initiative and with several national development programmes.

ECMT RESOLUTIONS

In May 1990 the council of ministers of transport of ECMT (European Conference of Ministers of Transport) passed a resolution on transport, computers and telecommunications. Here the ministers recognised that the problems of transport on European roads are becoming worse and that it is not possible to address these problems simply by building more roads. The conference took into consideration how important efficient transport is to the economics of the Member States, the impetus already given to the exploitation of Information technology and Telecommunications in programmes such as DRIVE an PROMETHEUS and resolved:

- to monitor on an on-going basis the developments with respect to computer and telecommunications applications to the transport sector;
- to promote studies on the legal and administrative problems arising with respect to these applications, especially where the question of safety is concerned;
- to carry out comparative studies on public and private funding mechanisms, both national and international, whereby the infrastructure and services associated with these applications can be developed;
- to engage initial analyses of scenarios for introducing computer and telecommunications applications in the transport sector.

In May 1991, The Council of Ministers of ECMT acknowledged the valuable work carried out on the subject of harmonising traffic messages and their transmission in close co-operation with EC within the DRIVE project RDS-ALERT. The council recommended that the draft pre-standard for traffic messages and their communication should be followed in all European field trials and that wide circulation should be given to the corresponding resolution so that the proposed pre-standard can be brought into the public domain and can be freely used in the implementation of trials and in the development of equipment.

In November 1991, the Council of ministers of ECMT considered its response to DRIVE II and recommended that:

- national policy-making authorities give full support to pilot experiments conducted under the DRIVE II programme;
- officials from central government play an active role in designing and conducting DRIVE II experiments in order to promote and assist in preparing, performing and assessing such experiments, and to establish a practical system of co-ordination with other public authorities involved, notably at local or regional level.

In June 1992 at the Athens meeting, all ECMT ministers, after having spent substantial time to a special demonstration concerning the major action lines of DRIVE, expressed their satisfaction with the progress of the work carried out in the different DRIVE projects.

LOCAL INITIATIVES WITH TRANSPORT AUTHORITIES - POLIS AND CORRIDOR

The involvement of local authorities, infrastructure providers and the participation of the real final users is a must in setting up integrated pilot projects. With this in mind, two "bottom up" initiatives were launched in order to incite awareness of local, regional and national authorities on the ATT capabilities and to help in the exchange of ideas and the development of common future plans. They are:

POLIS (Promoting Operational Links with Integrated Services through road traffic informatics between European cities) which is a network for urban area pilot projects administered by the cities themselves. More than forty (40) European cities are involved in the POLIS network, either under the "participant" mode (for cities that committed themselves to set up and fund the major part of an R&D pilot project) or the "follower" mode (for cities that are interested in following closely the pilot projects of other cities without wanting to take the lead themselves in the setting up of an R&D pilot project).

CORRIDOR is a collaboration network for all actors (national and regional road administration, motor way companies, IT&T industry, service providers and operators) involved in the process towards the implementation of new ATT services on European motor ways. The infrastructure owners, in most cases national or regional road administrations, will play a crucial role as investors in road-side infrastructure. The initiative provides a framework for the exchange of experience in planning and conducting inter-urban pilot projects containing cross border traffic flow and/or cross border traffic information flow. 13 European regions and representatives from all national administrations and EFTA countries participate in this framework. In this way CORRIDOR is contributing to the realisation of the Single European Market.

THE IMPLEMENTATION - ERTICO

The Commission of the European Communities has promoted the creation of a private-public organisation, open to all interested European organisations, with the objective of contributing to the co-ordination of on-going ATT projects in Europe and to provide support and guide-lines for implementation.

On November 13, 1991, an international non-profit making organisation in the form of a Belgian Société Cooperative was incorporated in Brussels, for which the name ERTICO SC was chosen (European Road Transport Telematics Implementation Co-ordination Organisation)

The objective of ERTICO is to encourage, promote and assist with the co-ordination of ATT implementation in European transport infrastructures, assuring a smooth transition from pre-competitive R&D to market driven investments.

The main tasks of ERTICO are to:

- conduct strategic planning;
- analyse needs and markets for ATT;
- conduct ATT systems engineering resulting in Common Functional Specifications;
- follow and assess continued research results;
- follow and assess field trials;
- promote common specifications, standards, laws and regulations;
- initiate and participate in implementation projects.

SYSTEMS ENVISAGED

Driver information increases safety and travel comfort

A first area where advanced telematics can offer a great help is the information of the driver.

Many accidents and a lot of time lost in traffic jams can be avoided by informing the driver accurately and in good time so that he can take this information into account and adapt his way of driving or decide on an alternative route.

- Well organised data transmission systems between meteorological institutes and information providers can greatly enhance the accuracy of the information on local weather conditions.
- Artificial intelligence based systems will be able to quickly and accurately detect road accidents, incidents and congestion. Telematic systems can bring that important information to the drivers with the shortest delay by means of in-car displays or warning systems or using variable message signs along the road.
- Information about actual traffic flow will be available in the relevant traffic control centres. Advanced telematic systems can also make this information available to the road users in such a way that it can be easily utilised by individual drivers.
- Advanced telematic systems make it possible to connect information centres of different modes of transport together in order to make all this information (travel times, schedules, fares, park & ride facilities, ...) available to the candidate traveller at home or in the office and at public places in order to allow him to better plan his trip and to choose the most suitable mode of transport.

Enhanced traffic control increases efficiency

A second area for improvement is within traffic control centres.

Signalised intersections are one of the most important components of any urban traffic control system because, to a great extent, overall traffic efficiency, safety, cost of operation, capacity, and environmental impacts depend on their design and operation.

Delay is the parameter which defines the level of service of signalised intersections. It is also a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

Traffic signal optimisation is a complicated process that determines cycle time, green split, phase sequence, and offsets between the signals (in the case of signals co-ordination). It is obvious that traffic signal optimisation can lead directly to reduction of delay. Two approaches are mainly used to reduce delay and fuel consumption. They are optimisation of cycle time and green split for isolated intersections, and co-ordination of signalised intersections within a network or along an arterial.

ATT systems can play an important role in automatic traffic data collection as the input for traffic control systems in which sophisticated algorithms and strategies allow immediate adaptation of the traffic control system for an individual intersection as well as for a whole urban network to the real demand.

Freight management systems enhance efficiency

One of the most important sectors of road use is the commercial vehicle fleet. Efficient routing of commercial vehicles produces very significant economic benefits.

Telematics and neural networks can significantly contribute to a pan-European freight management system which will establish unprecedented levels of information availability on vehicle and load locations with direct data communication to drivers for delivery and pick-up instructions and creation of customs documents. This would lead to an opportunity for making significant improvements in the efficiency of goods transport by road.

Hazardous goods monitoring enhances safety

One area of transport safety lies in the movement of dangerous loads. ATT systems such as automatic identification combined with automatic location and continuous tracking have great potential in providing accurate logging of movements of loads and identification of their nature. Similar considerations apply to the security of both dangerous loads and valuable cargo.

Public transport: the most promising alternative

As stated earlier, certain cities have such serious and wide spread congestion problems that traffic demand can no longer be satisfied. If nothing is done, this will inevitably result in a lower quality of life in the city as mobility decreases. This congestion is mainly due to the use of private cars for home-office travel taking a large amount of road space for only one or two persons. Use of private cars for this purpose needs to be reduced. This can be achieved by attracting people naturally to another mode of transport. On the other hand, city authorities might need to practice demand management strategies strictly to reduce car traffic in certain areas. In these cases, in order to guarantee the same level of mobility to individual citizens, the only alternative is to make sure that an attractive public transport system offering sufficient capacity is available before the application of measures restricting demand. An attractive public transport system must offer sufficient capacity with modern comfort, should be more reliable (enhanced real time control), easy to use (better information for passengers), with reduced travel times (less loss of time at stops due to the use of electronic payment systems, better interchange facilities between different transport modes) and adapted to the needs of the traveller (by increased efficiency, comfort and flexibility using non-fixed itineraries providing a demand responsive service and avoiding congestion.

ATT can be applied to an integrated Public Transport overall management system based on a V.S.C.S. (Vehicle Scheduling and Control System, in French S.A.E.: Système d'Aide à l'Exploitation) where all the buses have an on-board micro-processor which determines their exact location. The control centre interrogates all the buses in turn which then respond with their location, load, mechanical status, information on fare collection, etc. The central computer compares the real position of each vehicle with the theoretical situation as foreseen in the timetable, and calculates (here expert systems in real time can be applied) possible measures in order to restore the service to normal in case of delays or incidents. The operator can then send instructions in digital form to the vehicles concerned which are then displayed to the concerned drivers. The central computer registers all the operational data to be used for statistical purposes. These statistics can then be used as input for the refinement of future timetables.

Telematics and informatics will play a major role in the following functions concerning the general management of Public Transport undertakings:

- Strategic planning: demand analysis, network improvement, operations improvement.
- Management information: information on bus operation, information to the managers on the day-to-day variations in demand and their causes.
- Maintenance: development of a data base in order to gain the necessary know how for improvement of vehicle reliability, improved Artificial Intelligence base maintenance planning and diagnostics.
- Fare collection: smart cards can be used as the basis for a more user friendly fare collection system, easier to use by the traveller and allowing for the operator a much more detailed information gathering about origin and destination of users.
- Passenger information: psychological studies reveal that waiting for a bus for 3 minutes not knowing when it will arrive gives much more stress than waiting for 10 minutes knowing in advance that it will arrive in 10 minutes. This is the foundation of passenger information: To put the user at ease, it is essential to give him maximum information 1) before the trip starts to help the passenger in organising his trip, and 2) during the trip information about the actual bus journey: bay assignment, actual waiting times, route identification, destination (outside and inside the vehicles), interchange facilities, disturbances, etc. The information about current actual operation is available in the V.S.C.S. centre and can thus be made accessible to the users by means of interactive displays at bus stops, stations, at home and also inside the vehicles. At bus stops the actual waiting time can be displayed. The major difficulty to overcome here is the development of new cost effective displays to permit the generalisation of such displays to practically every stop without overloading the operator's budget.
- Operations management: all the major operations management tasks such as scheduling (establishment of timetables, assigning vehicles, drivers and rostering drivers) and management of crew and vehicles can largely be assisted by informatic tools with the possible use of Artificial Intelligence.

At strategic level it is of the utmost importance that urban traffic control systems take into account the needs of public transport. Telematic systems can interconnect and integrate both systems and give public transport a certain priority within the general traffic strategy adopted by a city.

In general, the application of integrated computer based bus operations management systems will have the following direct and indirect effects:

Commercial effects: Service improvement resulting in turnover increase and improvements in:

- running speed
- regularity - punctuality
- user information
- supply adequacy
- demand responsiveness
- multimodal and multiservicing facilities
- fare facilities (smart cards)
- increase in operation efficiency
- revenue/expense coverage improvement
- resource saving:
- staff due to productivity increase
- buses due to more hours/bus (less breakdowns and down time)

Profitability of routes:

- patronage knowledge
- fare collection
- strategic planning

Energy savings:

- higher speed (running and operating)
- depot management
- better safety: due to better maintenance and on-line diagnostics
- better security: due to continuous surveillance and alarm systems
- whole management efficiency
- common language flexibility simulation

External effects:

- contribution to economy
- industrial and software suppliers
- better service - mobility
- urban development

- energy saved

Environmental impact (indirect):

- air pollution
- noise pollution

Safety and security are also at stake as on the one hand maintenance methods and on-line diagnosis will lower the incidence of accidents for buses which are already much safer than private cars (in France 18 fewer accidents with equivalent kilometrage). In this case, any traffic substitution in favour of public transport saves human lives.

On the other hand, rapid communication and "silent alarm" possibilities and close contact with police and emergency services will reduce criminal acts drastically. This is an important fact since "small criminality" seems to have found its playground around public transport facilities at stops and in the vehicles.

MAJOR BUILDING BLOCKS FOR THE IRTE

Radio data systems (RDS)

The development of in-vehicle information systems in recent years has been based almost entirely upon broadcast radio. Broadcasting of radio information about road or traffic conditions has been common practice for several decades. However, several drawbacks need to be overcome:

- the listener is not only obliged to accept messages which have nothing to do with his trip, but is also forced to hear them repeatedly;
- he needs to capture "his message" amongst a variety of non-interesting messages;
- he is obliged to listen to the programme broadcasting this type of information;
- he needs to understand the local language.

A special system (ARI) has been developed in Germany making use of identification signals for broadcast messages to motorists. This system was introduced in Germany, Switzerland, Austria and Luxembourg, but didn't succeed to spread all over Europe.

On the other hand, the RDS (Radio Data System) is already standardised by the broadcasting organisations co-operating at European level within the EBU all over Europe and fitted in many car radios. It is used to broadcast on a side band data together with frequency modulated radio programmes. Its main application is the automatic tuning of receivers. The driver sets the radio station of his choice and from then on there is no need for tuning his radio again when entering another broadcasting zone during his trip.

A promising application of this system is the RDS-TMC (Radio Data System - Traffic Message Channel) that allows the transmission of signals identical with the identification signals in the ARI system but that also presents other interesting functions that can solve the drawbacks of voice broadcasting mentioned above: traffic messages are no longer broadcast in the form of sound, but digitally according to a so-called TMC computer code. The messages are reconstructed in the vehicle using a special RDS-TMC receiver unit that contains a micro-computer, a database for the standardised international data set, the respective national location sets and an integrated circuit producing synthesised speech from decoded digital data. The system can restore the information in the form of short speech synthesis messages or as printed messages on a display.

In such way the system is language independent and can be presented directly to the driver or even integrated into an autonomous navigation aid system which can be improved using RDS location coding.

The system is, however, limited in its transmission capacity (some 130 bits/s). In the future, Digital Audio Broadcast (DAB) systems will allow to broadcast much more information. Approximately 8 kbit has been reserved on each stereo program which could be used for services like RDS-TMC and extra services such as paging, and other information such as weather forecast, water levels, stock market, etc.

Groupe spécial mobile (GSM)

Due to the growth of analogue mobile radio throughout Europe, the CEPT (Conférence Européenne des Postes et Télécommunications) set up GSM to define a second generation system. The result is the pan-European digital cellular mobile radio system commonly referred to as GSM (Groupe Spécial Mobile).

The infrastructure necessary for the GSM cellular radio system is presently being installed and will assure full coverage for mobile telephony purposes all over Europe by 1993 - 1994.

The advantages of GSM as a communication medium between moving cars and a traffic control centre are:

- The ready availability of a radio channel implies that the driver can be in contact with the traffic centre in any place at all times. Many important applications such as emergency calls can only be realised by means of a radio link.
- GSM is a digital system providing several types of data services which could be used as building blocks for a dynamic route guidance system. The maximum user data rate available is 9600 bits/s.
- GSM defines a pan-European standard.

GSM is already operational in many European countries and is expected to cover the whole territory by 1994.

This infrastructure can also be used in order to achieve two-way communication between vehicles and control centres, but with an important difference from conventional cellular telephony where calls are made on a one-to-one, or point-to-point, basis. Only one channel for each cell (representing less than 1% of the total GSM capacity) is needed to broadcast information to all equipped vehicles in the cell, while the uplink with data from the vehicles uses a multiple access protocol to distinguish individual vehicles.

The system will be compatible with UMTS, the future generation of pan-European cellular radio.

Due to the nature of its concept, with "cells" covering a diameter varying approximately from 5 km to 35 km, GSM can also be used for rough location of vehicles.

Navigation systems - route guidance

The task of the driver in a moving vehicle consists not only of operating the mechanics of the machine, but also the even important task of "navigation" which can be quite complicated especially in an unfamiliar environment: the driver needs determine the car's position, the itinerary, read the map, take the initiative to detour in case of road works or traffic jam,... This gives an extra burden to the driver which can endanger the safety of driving.

Positioning systems

Recent developments in communication techniques have lead to the implementation of services directly accessible to private users. Remote telephone communications and vehicle positioning are the most promising. Several systems are actually available:

LOCSTAR is a satellite based combined radio positioning and (data) communication system in the EUREKA programme.

DATATRAK and TRACKER are commercial positioning systems developed in the UK.

- LORAN-C and DECCA are commercial exclusive radio positioning systems, widely used for maritime navigation purposes.
- DATATRAK, LORAN-C and DECCA are available at the moment but do not fully cover the European territory.
- GPS (Global Positioning System) is a satellite based system developed for the United States for military purposes. It is also available for civil applications, however, with a lower degree of accuracy (but still within one hundred meters).
- GPS is already used for vehicle location purposes in fleet management applications. However, full coverage in urban areas, where buildings may cause transmission loss and interference with reflected beams can occur, remains problematic.

Autonomous navigation systems

Autonomous systems are able to give navigation advice to the driver based on the knowledge of the vehicle's position and of the road network. TRAVELPILOT developed by BOSCH and CARIN developed by PHILIPS, both rely on a combination of dead reckoning and map matching in order to maintain the vehicle's position.

Dead reckoning uses the electronic compass and the wheel sensors to respectively determine direction and distance travelled. Since slight inaccuracies of these sensors add up over long distances, the position becomes increasingly inaccurate and therefore is periodically corrected by using an additional procedure called map matching: the in-car computer seeks to match the route determined by the sensors with a possible route on the digital map. If the car is found to be slightly off the road, its position is updated by "electronically relocating" it back onto the street network.

The driver inputs his destination and the in-car computer matches this information with the digital map available on CD-ROM. The system then computes the shortest route between the current position and the destination, and this information is conveyed to the driver in the form of turning advice at each intersection, either by voice output or by means of a simple pictogram on a small display.

Autonomous navigation systems can:

- provide an easy way to find a destination in an unfamiliar environment;
- replan a route following a missed or wrong manoeuvre;
- allow for different route choice criteria (shortest, most scenic, etc.);

These systems go some way to alleviating traffic problems since shorter routes should result in "less time on the roads", thereby reducing environmental pollution. The most important feature, however, is the help provided to the driver in facilitating his task and therefore improving safety.

Dynamic navigation and route guidance systems

By design, the routing provided by autonomous navigation systems is based on static information and does not take the prevailing traffic situation into account. Consequently, these systems can be made more powerful when supplemented with "up to the minute" traffic data. Generally, traffic information is only available for a few important streets in a city, i.e., those covered by sensors. Comprehensive traffic information must therefore come from a different source such as the cars themselves. With its on-board sensors, each car will monitor its own progress as it traverses the links which constitute the planned route and anonymously send its "floating car messages" to the traffic control centre. These messages are very short and contain journey times as well as data concerning stop-and-go traffic and turning manoeuvres. This, however, implies a two-way communication link between the vehicles and the control centre through which cars receive information about current and predicted travelling times for the important links of the road network, and other data concerning availability of parking spaces, park & ride schemes, etc.. On the other hand, the same cars transmit to the control centre their own "floating car messages", acting as a traffic sensor and contributing this way to give the control centre an overall picture of the traffic in the whole city. Different technologies can be used for the link between the car and the control centre. EURO SCOUT uses infra, red beacons installed all over the city. Micro-wave beacons could fulfil the same function, both provide only intermittent and short range communication with the mobile, thus requiring high data rates. Another approach is taken by SOCRATES, using GSM allowing for continuous communication authorising much lower data rates.

The information available this way in a dynamic route guidance system enables the in-car computer to improve on the performance of an autonomous navigation system by supplanting the shortest route by the fastest.

Dynamic route guidance systems affect also the task of the traffic manager, who gains rapid access to a substantial amount of information about prevailing traffic jams and incidents. This knowledge enables him to improve his traffic control strategies by optimising the traffic control system.

THE MARKET: COSTS AND BENEFITS

The total financial investment for the implementation of the global ATT services will have to take into account:

- the cost of the preparation of infrastructure, where public investment will comprise the major part;
- the cost of the proper ATT infrastructure itself, where public and private investment will be shared depending on the implementation strategies adopted by the national governments of the member states;
- the cost of the in-car equipment, where private investment will form the major part.

For each Member State, the ratio of public to private investment will depend on the State's policy and strategy. Some countries would not want to go beyond the basic infrastructure equipment level, while others clearly accept that the public investment can reach a higher level, for example in the services operators domain. Most countries have not yet formulated their policies for some or all of the ATT services.

The infrastructure investment

It is clear that private investment will depend both on the prior provision of the necessary public investment (in the preparation of the infrastructure) and on the existence of a potential market demand for services to users. As it is difficult for all of the European countries to have a precise idea of their own investment on ATT implementation, the following figures are based on some data available in countries which have been used to produce a forecast scenario in terms of systems which could be implemented on major urban areas and inter-urban motor way networks. Some figures concerning freight & fleet applications have been included in the figures for the inter-urban area.

ATT applications which have been clearly identified for short and medium term implementation in medium and large cities are:

- Adaptive traffic control
- Public transport management
- Parking management
- Route guidance
- Tunnel control

Table 1: Cost of implementing the ATT systems in large cities

Country	Number of inhabitants (millions)	Number of cities by size (inhabitants) 0.3 million	0.3 to 1 million	1 to 5 million	5 million	Cost estimate (million ECU)
Belgique/België	10	4	1			70
Danmark	5	1		1		40
BR Deutschland	75	10	8	6		330
Hellas	10		1	1		40
España	38	5	4	2		140
France	55		3	1	1	200
Ireland	3.7	1	1			20
Italia	57	4	7	3		190
Luxembourg	0.37		1			10
Nederland	14	1	3			40
Portugal	10	1		1		30
United Kingdom	57	5		6	1	360
EC						1 470
EFTA		5	7	2		170
Europe						~1 700

Source: IRIS Report, CEC DG XIII

- Integration of ATT systems

and, possibly:

- Road pricing

Cost estimates

The figures in Table 1 are taken from the CEC DG XIII C4 IRIS report. The average cost estimates for cities have been calculated mainly from estimates from the UK, and vary depending on the size of the city (7 million ECU per site for cities of 0.3 million inhabitants and over to 140 million ECU per site for cities of more than 5 million inhabitants). For each country, the number of towns or cities of the above sizes have been estimated. Using these numbers cost estimates of the total cost of implementing ATT systems in each country excluding Road Pricing have been prepared. These cost estimates do not include the costs of the ATT systems which may be installed in smaller towns.

On road pricing equipment, it is the Netherlands which has produced the most detailed studies and estimates of this type of application. It is estimated that the total cost of providing road infrastructure for the Randstad (a highly populated area consisting of several cities with a total amount of about 5.10^6 inhabitants) would be 150 million ECU, i.e. 30 million ECU per million inhabitants. For the whole of the EC, the cost estimate using a similar method of calculation would be around ECU 1.83 billion.

Since the same vehicle will generally be used to circulate within the urban environment as well as for inter-urban trips, Tables 2 and 3 consider both urban and inter-urban motorways.

ATT applications which have been clearly identified for short and medium term implementation on motor ways are:

- Basic infrastructure
- Traffic data collection
- Weather and environment monitoring
- Automatic incident detection
- Traffic control
- Driver information (variable message signs and video terminals)

Referring to the list of ATT applications, the average unit costs which have been suggested for dual carriageway motor ways are indicated in Table 2. To make a rough estimate of the unit cost per km of ATT equipment, a set of assumptions has been made, which are summarised in Table 3. Based on these hypotheses, the estimated cost for the implementation of ATT equipment on interurban motor ways is of approximately 0.4 million ECU/km.

Table 2: Average unit costs for dual carriage motorways

Basic infrastructure (cable, trench & emergency telephone)	80 kECU/km
Traffic data collection	30 kECU/km
Weather station monitoring	100 kECU/site
Automatic Incident Detection	200 kECU/km
Variable Message Signs	300 kECU/site
Automatic Toll Collection	50 kECU/site/lane
Traffic Control Centre	1000 kECU/site

Source: IRIS Report, CEC DG XIII

Table 3: Assumptions for the road infrastructure network

Length of European motor way network	20 000 km
Length of toll motor way network (EC & EFTA)	15 600 km
Weather monitoring station	every 50 km
Automatic incident detectors	every 500 m
Variable message signs	every 10 km
Automatic toll collection for 6 lanes	every 20 km
Traffic control centre	every 200 km

Source: IRIS Report, CEC DG XIII

If, however, it were accepted that Automatic Incident Detection is only necessary on half the motor ways and Variable Message Signs are only required every 20 km, the average cost becomes 0.25 million ECU/km. Taking the above estimates into account, one can conclude that the total investment required to provide ATT systems on the European motor way system is likely to be between 5 and 8 billion ECU.

In-vehicle investment

In Europe, the development of ATT which is already under way in conventional automotive functions for cars, and on

Table 4: Estimated market size for in-car equipment in France in 2000

Equipment	(million ECU)
Radiotelephone	2 200
DRS-TMC	2 000
Paging	430
Satellite receiver	86
Beacons receiver	15
Toll collection	30
Total	5 000

Source: French Ministry of Transport

the interdependent developments in component miniaturisation, fixed network telecommunications, and mobile telecommunications services, will be the key enabling elements of ATT.

As the number of vehicles increases, it will be reasonable to assume more interaction within the systems and consequently more benefits. In this context, there might be the possibility that sales of ATT services will be much higher than sales of ATT systems. In fact, the demand for inter-active driver information, navigation and safety systems might lead in 20 years time to 90% of the vehicles being equipped with processors, communications and interface devices. The number of vehicles in Europe is estimated to reach the number of 190 million by the year 2010.

A recent report for the French Ministry of Transport has made some estimates of the European market for in-car equipment by the year 2000, that are reported in Table 4.

If we consider that the market penetration of these devices by the year 2000 is about 10% of the final market, which could be 90% of the 190 million cars over 20 years, then the final market for in-vehicle equipment can be estimated to be more than 50 billion ECU. The above mentioned cost estimates for cities, motor ways and in-car equipment can be combined to give overall estimates for the whole European market (Table 5).

Cost/benefit analysis

A comprehensive cost/benefit is difficult in this domain, especially because the implementation approach of ATT systems is based on average need at European level and not on a detailed country per country approach where the implementation strategy has to be matched to the real problems of traffic safety or traffic efficiency. However, it has been possible to provide some figures for the return on investment and to estimate other benefits due to efficiency improvements (e.g. in term of reduced time delay or saving of human lives).

Revenues from the market of services

Estimates of revenues from the marketing of services were given in the above mentioned study for the French Ministry of Transport, and are reproduced in Table 6.

Table 5: Estimated infrastructure investment costs

Infrastructure investment and in-car investment cost	(million ECU)
Cities	4 000
Motor ways	5 000 to 8 000
Total	9 000 to 12 000
In-car investment	
Horizon 2000	5 000
Horizon 2010	50 000

Source: IRIS Report, CEC DG XIII

Table 6: Estimated revenue from the marketing of services in France

Service	Revenues (million ECU)
Radiotelephone	26 000
RDS-TMC	1 000
Paging	3 000
Satellites	43
Beacons	8
Example: city road pricing system	
Number of inhabitants	1 million
Number of vehicles/transaction per day	200 000
Average cost per transaction	1,5 ECU
Annual amount per vehicle (220 days/year)	330 ECU
Total annual receipts/city	660 million ECU
Necessary investment	10 million ECU

Source: French Ministry of Transport

Non commercial benefits: efficiency, safety, environment

One of the major aims of the Advanced road Transport Telematics systems is to increase the efficiency of road transport and road safety by the implementation of RTI systems where critical traffic problems cannot be resolved by more classical solutions.

Studies have been carried out by the European Road Transport Community to either measure or estimate the benefits of applying ATT solutions to these problems. Although it is very difficult to give precise figures, typical estimates of percentage reductions in time delay or accident savings, derived from these studies are supplied in Table 7.

Some of these figures will be verified by different pilot projects in DRIVE II. Unfortunately, pilot projects are in general devoted to only one system, making it impossible to conclude on the combined effect of several systems.

ATT and environment

ATT systems can result in potential benefits to the environment. A combination of ATT systems is, however, necessary, some aiming at improving efficiency, others aiming at reducing traffic demand.

It is also important to include these technological measures in a broader package of measures including also regulatory and policy measures to meet the requirements regarding the environment.

Although it is very difficult to get relevant information on the benefits of ATT on the environment, Table 8 gives a rough impression of the potential benefits of some ATT applications on the global (emission of greenhouse gases and depletion

Table 7: Benefits of implemetation of ATT system

	Traffic efficiency	Safety
Urban areas:		
Traffic information & VMS	10 %	N/A
Adaptive traffic control	10 - 20 %	N/A
Dynamic route guidance	10 %	5 - 7 %
Road pricing	5 - 15 %	N/A
Motor ways:		
Automatic incident detection	5 %	10 - 15 %
Traffic info (RDS-TMC or VMS)	5 %	10 - 15 %
Ramp metering	5 %	N/A
Variable direction signs	5 %	N/A

Source: IRIS Report, CEC, DG XIII

Table 8: Impact of ATT applications on the environment

	Global	Local
Urban areas		
Adaptive traffic control	+	++
Dynamic route guidance	+	++
Road pricing	+	++
Traffic information & VMS	+	++
Public transport	+	++ (1)
Motor ways		
Automatic incident detection	+	++
Traffic information (RDS-TMC) - VMS	+	++
Ramp metering	+	++
Variable direction signs	+	++
Public transport	+	++

" + : positive; ++ : substantial "
(1) positive although some increase in SOx emissions
Source: IRIS Report, CEC DG XIII

of stratospheric ozone - global warming) and local (emission of a range of pollutants with localised environmental impacts) environment.

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Defence-related industries in the EC

INTRODUCTION

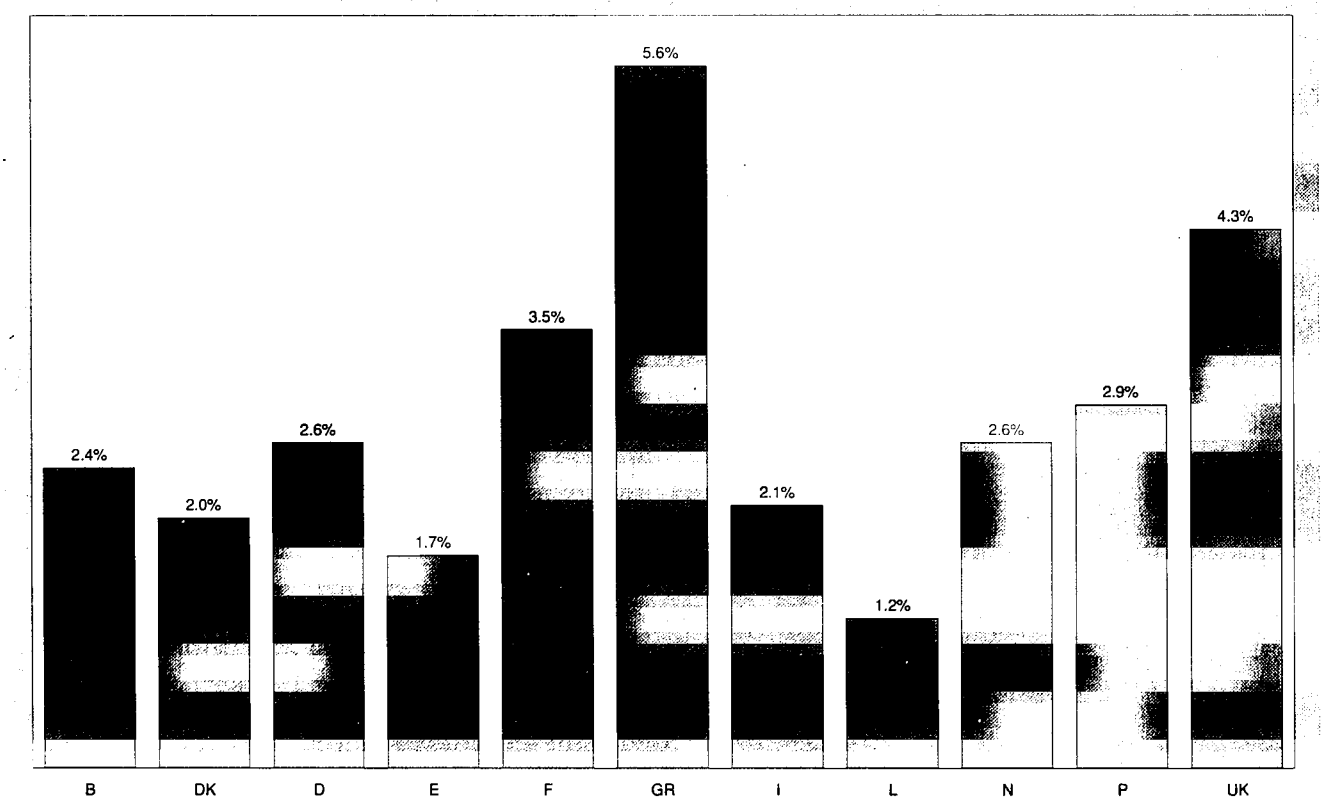
With an estimated production of 50 billion ECU and a workforce of about 800 000 people, the EC defence industry would easily rank among the top 20 EC manufacturing sectors. However, any such comparison is hypothetical because virtually all defence-related industries are already represented in the statistics of other, civilian, sectors.

In 1991, the EC defence industry consolidated on the adjustments and changes of 1989-1990. A series of mergers, acquisitions, internal restructuring and redundancies significantly altered the industry. Within the EC, defence procurement continued to fall in real terms and was on average 12% lower than in 1989 for major weapons. Reductions in defence spending hit hardest in heavy equipment for land forces and shipbuilding. But even technologically advanced armament development projects (upon which new military strategies focus) were at stake when EC governments reconsidered their budgetary priorities. Most EC defence contractors were actively expanding their civilian operations in order to be prepared for a much smaller defence market.

INDUSTRY PROFILE

The European defence industry has many ties with the civilian sector. The overlapping between the two areas in Europe are so numerous that it is often preferable to use the term "defence-related" industries. In this chapter, civilian industries related to the most significant production activities of military equipment are discussed. In Europe, this broadly includes five major

Figure 1: The EC defence industry
EC defence spending as a % of GNP, 1991



Source: NATO 1991

Table 1: Major weapon procurement expenditure by Member State at current prices

(million ECU)	1987	1988	1989	1990	1991
Belgique/België	473	416	349	289	297
Danmark	277	283	260	311	336
BR Deutschland	5 953	5 735	5 799	5 897	5 357
España	1 481	1 257	1 292	906	1 089
France	8 074	8 039	8 552	8 402	8 575
Hellas	433	669	616	651	720
Ireland	17	18	9	13	21
Italia	3 278	3 546	3 711	3 220	3 341
Luxembourg	2	2	3	2	4
Nederland	1 011	1 162	1 023	1 046	955
Portugal	99	120	157	152	131
United Kingdom	6 732	7 381	7 027	6 101	6 817
EC	27 830	28 628	28 798	26 990	27 643

Source: SIPRI Yearbook 1992, ERA calculations

groups of activity: aerospace, electronics, shipbuilding, land vehicles, and weapons and ammunition.

Precise production figures for 1991 are difficult to obtain, due to the fact that few European defence-related manufacturers publish the defence share of their total sales. In 1989 the total defence turnover of these industries was estimated at 55 billion ECU. With defence sales steadily decreasing, the 1991 figure was probably close to 50 billion ECU.

Estimates of the total EC workforce more or less dependent on defence sales vary between 1 and 1.5 million. Recent studies which focus only on employment directly generated by defence contracts quote some 850 000. During 1990 and 1991, a series of restructuring measures was announced in most major defence-related companies, totalling a workforce reduction of some 50 000.

Total military expenditure by EC Member States was 144 billion ECU in 1991, of which almost half went to personnel. Spending on major weapon systems amounted to 28 billion ECU, or less than 20%. Total EC exports of major defence systems by the six main exporting EC member states amounted to 3.4 billion ECU in 1991 according to a SIPRI estimate. This was down 15% from 4 billion ECU in 1990.

Real expenditure on defence equipment rose significantly in the EC from 1980 to 1987, but started to decline in 1988. The decline was particularly strong in 1990, the year after the fall of the Berlin wall and the effective end of the Cold War.

This development added to the declining situation on the world export markets. These were affected by a winding down of Cold War conflicts and arms races on Third World territory. On the supply side, EC exports have been hit by growing competition from US suppliers and emerging defence producers such as China, Brazil and Israel led to lower European sales in crucial markets in Asia and the Middle East. The Gulf war in 1991 provided a slight one-off boost for producers of ammunition, missiles and spare-parts. Nevertheless, the overall effect was negative. Significant exports to Iraq were cancelled. After the war, some Arab countries such as Saudi Arabia and Dubai rearmed at a significant scale but often rewarded US rather than EC contractors.

INTERNATIONAL COMPETITION

European industries see decreasing export markets directly affecting the budgets for new product development. European industries therefore, are increasingly pooling R&D resources and developing new products jointly. For most defence contractors, however, the situation in the US is not much better. In 1992 the Bush administration announced that, in five consecutive years, the defence budget would be reduced by 10 billion dollars. Major production and development programmes were already cancelled in the 1988-1991 period. US defence employment was estimated at 3.5 million in 1991. Industry analysts calculated that, given budget reductions, 500 000 to 1 million jobs would be lost up to 1997. Big US defence manufacturers like McDonnell Douglas and Lockheed will probably keep their lead in the world defence markets but will also face significant production overcapacity.

Japanese industries are gradually moving as suppliers of some of the core technologies used in Western armament systems. High speed integrated circuits, for instance, can be produced cost effectively by a few factories only, and most of them are Japanese. Japan has developed a significant defence pro-

Table 2: The 6 leading EC exporters of major conventional weapons

(million ECU)	1987	1988	1989	1990	1991	Total 1987-91
France	2 772	2 012	2 596	1 532	648	9 560
United Kingdom	1 862	1 432	2 415	1 237	805	7 751
BR Deutschland	672	1 109	708	963	1 624	5 076
Italia	514	620	204	117	139	1 594
Nederland	272	535	417	112	168	1 504
España	145	196	546	63	38	988
Total EC 6	6 237	5 904	6 886	4 024	3 421	26 473

Source: SIPRI Yearbook 1992, ERA calculations

duction capability without building a defence industry. More than in Europe, Japanese defence-related industries have their main strengths and profit earners in the civilian markets.

World trade in defence products declined as a result of overall reductions in defence spending. World trade statistics on defence are collected by two institutions, the US Arms Control and Disarmament Agency (ACDA) and the Stockholm International Peace Research Institute (SIPRI). According to 1992 SIPRI statistics, the total volume of world defence trade more than halved from 1987 to 1991. From 1990 to 1991 the trade volume decreased by 31%. Particularly depressed were Third World markets which, in 1991, imported almost one-third of what they absorbed in 1987.

This directly affected EC export sales as intra-EC trade has never been a sizeable proportion of European defence exports. Between 1987 and 1990, intra-EC trade never accounted for more than 700 million ECU and sometimes even less than 300 million ECU. Total EC defence exports ranged between 4 and 7 billion ECU annually over the period 1987-1991. The main EC export markets are the Middle East and South East Asia.

According to SIPRI statistics, defence trade from the six major EC exporting countries went down considerably from 6.2 billion ECU in 1987 to 3.4 billion ECU in 1991. The volume of French exports decreased most, and UK sales showed a similar pattern. Contrary to the trend, German trade went up from 1990 to 1991 as a result of the reunification. In 1991 much of the old East-German armaments stocks were sold on the second-hand market. In 1992, there were no prospects for a quick recovery of the defence export markets.

DEMAND

Market developments in 1991 continued to be dominated by the decrease in defence budgets. In many respects this trend was even accelerated. By the end of 1990 and the beginning of 1991 the virtual end of the Cold War had encouraged most EC governments to consider taking a "peace dividend" from the defence budget to allocate funds to more acute public expenditure needs. Growth of the defence budgets came to a standstill and some countries implemented reductions of a few percent in real terms.

The new security environment will have multiple effects on the pattern of defence equipment expenditure. Main armament systems (combat aircraft, warships) will be kept in service for longer periods. Funds initially foreseen for the development and production of new systems will increasingly be devoted to maintenance and upgrading of system components.

The changing strategic missions of NATO will have a devastating effect on the equipment budgets of land forces. Large numbers of tanks and other heavy land-based equipment were useful as a barrier to a large scale Soviet attack. There is hardly a place for them in the 'new world order' where the emphasis is on fast and mobile crisis containment.

Military personnel lay-offs are costly and come at the expense of equipment expenditure. Social security payment schemes for the large numbers of lay-offs in the EC armed forces will in the first couple of years enlarge rather than reduce the proportional size of personnel expenditure. Certain equipment expenditure will be postponed or cancelled altogether.

Military R&D is likely to be cut less than overall defence budget cuts. Although some major development programmes were cancelled, indications are that the major EC member states (France, UK) want to give military R&D a higher priority than in the past. However, big development programmes such as the European Fighter Aircraft which require huge R&D investments will be more difficult to defend politically.

Governments will also become more cost conscious. Despite a long history of protected national defence markets, many governments have already implemented competitive procurement procedures. Recent studies on public defence procurement show that an increasing number of EC governments use competitive tendering methods to award defence equipment contracts. As US suppliers have often been cheaper in the past, this could have consequences for the competitive position of European suppliers.

SUPPLY

The European defence industry is gradually moving to a higher degree of integration and concentration. The traditional inclination of individual member states to sustain a self-sufficient defence production capability is no longer attainable. R&D and unit costs of the principle armament systems have become so high that efficient cooperation and risk-sharing is the only way for defence manufacturers in Europe to stay in the front line of technological and product development. This risk-sharing includes not only the joint development of key technologies but often also implies building up financial buffers through share swapping or other methods.

Most major defence contractors now cooperate on a large scale in order to spread risks and secure markets. For instance, Aérospatiale announced that in 1992 it would generate more than three-quarters of its total sales in cooperation with the German DASA, both in civilian Airbus and in a range of defence projects. Cooperative projects will increasingly involve real work sharing, whereby each participant takes on

Table 3: Military expenditure by Member State at current prices

(million ECU)	1987	1988	1989	1990	1991
Belgique/België	3 611	3 469	3 525	3 658	3 859
Danmark	1 858	1 964	1 983	2 087	2 115
BR Deutschland	29 617	29 714	30 519	33 314	32 165
España	5 997	6 071	7 058	7 136	7 308
France	30 241	30 566	32 031	33 609	34 298
Hellas	2 516	2 816	2 813	3 040	3 158
Ireland	365	385	390	436	474
Italia	15 302	16 613	18 102	18 402	19 088
Luxembourg	63	72	69	76	85
Nederland	5 678	5 696	5 811	5 844	5 860
Portugal	980	1 141	1 323	1 476	1 621
United Kingdom	27 140	29 256	30 815	30 331	34 149
EC	123 368	127 763	134 439	139 409	144 180

Source: SIPRI Yearbook 1992, ERA calculations

Table 4: Top ten defence-related companies, 1991

(million ECU)	Country	Total turnover	% defence sales in 1991	% defence sales in 1989	Total employees
British Aerospace	UK	15 037	40	42	116 000
Thomson CSF	F	5 096	75 (1)	78	33 800 (1)
Daimler DASA	D	6 051	40 (1)	48	61 000 (1)
GEC	UK	13 499	23	28	40 000 (1)
Alenia (2)	I	2 406	40	64	30 000 (1)
Aerospatiale	F	7 037	30	44	43 287
Dassault	F	2 304	75 (1)	78	15 714
Rolls Royce	UK	2 468	27	32	57 100
GIAT Industries	F	1 666	80 (1)	85	18 000
Matra	F	3 290	62	65	21 300

(1) Estimates
(2) 1989 based on combined Selenia and Aeritalia figures
Source: Annual reports, DABLE and ERA

only a part of the production process, and specialises accordingly. This may contrast with the principle of juste-retour which has been the hallmark of defence cooperation in the past two decades. It implied that each national industry had a right to a share of the workload equivalent to its government's contribution. Although such arrangements will remain as a guiding principle they will often be too costly. Even among the major EC member states it has become clear that it is impossible to sustain a full range defence industrial capability on a purely national basis.

However, some of the more ambitious European cooperation projects are threatened by participating governments which are reconsidering their commitments. As it appeared end-1992, the European Fighter Aircraft programme could be seriously pruned. Other projects, such as the UK-Italian helicopter EH 101, could be more successful in particular because its function complies with new military strategies.

In addition to increasing concentration and cooperation, another striking pattern on the production side is the growing importance of specialised subcontractors. Most of the added value of today's weapons system is found in state-of-the-art electronic, precision-mechanic and other components. These specialised suppliers are at the leading edge of technological developments and are often able to combine military with civilian production. As a consequence, their profit margins grow and the dependency relationship with the main contractor is modified. In turn, the main system manufacturer is gradually transformed into an overall project manager and assembler. His profit margins decrease and he is less able to individually bear the financial burden of major weapon systems development and production.

In terms of technology, it is worth bearing in mind that military manufacturing increasingly involves technologies, production processes and components available in the civilian domain. In order to avoid unnecessary production costs most defence manufacturers are making use of what the civilian market has to offer.

INDUSTRY STRUCTURE

The profile of the European defence-related industry is still largely shaped along national lines. The three major EC member states, the United Kingdom, France and Germany have large supplier industries. The size of these markets is such that they host technologically advanced manufacturers in most sectors. British Aerospace, Thomson-CSF, GEC, DASA and Aérospatiale are the dominant players in Europe with considerable shares in export markets in the rest of the world.

Somewhat smaller are the industry groups of Italy and Spain, which have achieved significant market positions at home and sometimes even abroad. Alenia and Agusta in Italy and CASA in Spain have carved themselves niches in European markets for attack helicopters and transport aircraft. Nevertheless, these companies are of below-critical size to continue product development on their own. They need cooperation with other European partners to stay abreast in the defence field.

Indigenous industries in smaller EC member states such as Belgium and the Netherlands managed until recently to be competitive in very specialised product areas. FN in Belgium was a well known small arms producer supplying US forces, and HSA in the Netherlands was on the leading edge in naval anti-missile electronics. However, these and other comparable companies had to give up their independent position and join with big competitors. Other EC member states such as Greece and Portugal import most of their defence equipment or have local assemblers producing US equipment under licence.

Anticipating decreasing defence markets from 1989 onwards, the European defence-related manufacturers have regrouped by a series of mergers and acquisitions. In addition to the scale aspect mentioned in the previous section, another major reason for rising concentration was external growth. In the still nationally secluded European defence markets, the obvious way to expand (or not to decrease) is by buying the market share of competitors. These moves centred around industrial conglomerates in the four major EC member states. After two frantic years in 1989 and 1990, the mergers and acquisitions activity continued in 1991, though at a slower pace. There were continuing talks on cooperation projects but the persisting decline in defence sales left few manufacturers with enough cash to buy in new production capability. Instead, the year 1991 was marked by internal restructuring and workforce reductions.

In France, Thomson-CSF in missiles and defence electronics and GIAT Industries in land-based equipment were most active in acquiring smaller defence contractors in Belgium, the Netherlands and France itself. Thomson-CSF's attempt to buy a major share of Texas-based LTV's missile division failed in 1992 after strong political opposition to the proposed takeover in the USA. The strategy of these French defence contractors is to become market leaders in specialised defence niches. Other French defence contractors such as Dassault, Aérospatiale and Matra tried similar strategies but had less solid market positions in defence, in particular through their heavy reliance on export sales to the Middle East. Future prospects for these companies seem best in civilian markets, Dassault in its business jets, Aérospatiale in Airbus and Matra in its thriving space and transport activities.

In Germany, the Daimler-DASA grouping of MBB, Dornier, MTU and TST is at the centre of defence restructuring. The German government's preoccupation with the costly unifica-

tion and its determination to save significantly on defence spending has left the country's defence industry few illusions about future contracts. Mid-1992, the German government announced its intention to cancel participation in the production phase of the multi-billion European Fighter Aircraft project. By end of the year it appeared that the project will continue but will be seriously pruned. DASA's strategy is largely aiming at reducing, as quickly as possible, its defence exposure. Besides its major participation in the Airbus consortium it aims strongly at the emerging market for regional airliners. Plans on the joint development of a new regional aircraft were made with Alenia and Aérospatiale. Daimler is also close to acquire a controlling stake in Fokker, the Dutch regional airline manufacturer.

In the United Kingdom, the dominant players British Aerospace in aerospace and GEC in defence electronics restructured mainly internally. There was some movement pending in 1991 when GEC was considering to launch a takeover bid for British Aerospace. In-house, GEC cut more than 11 000 jobs in its electronics and shipbuilding production. In 1991, British Aerospace completely regrouped its missiles, electronics and aerospace divisions and reduced its workforce by some 12 000. In 1991, all British Aerospace defence divisions were merged into one operating unit. Other UK defence producers went through similar changes. VSEL and other shipyards shed several hundreds of jobs.

In Italy, Selenia and Aeritalia were regrouped in 1990 in the Alenia concern, all part of the IRI industry group. The new group ranked fifth in size among European defence contractors but it remained unclear whether the group would keep its present reliance on defence sales.

In other EC member states, such as Belgium and the Netherlands, smaller and specialised defence contractors were sold, significantly reduced their workforce, converted drastically to civilian production or closed down altogether. The latter applied in particular to smaller ammunition manufacturers, but also to land vehicle and heavy equipment producers.

REGIONAL DISTRIBUTION

The production of defence equipment is strongly concentrated in the four main EC member states, in particular in France and the United Kingdom. Among the EC top 40 defence producers, which generated some 40 billion ECU of total defence sales in 1989, 40% originated in the United Kingdom, 33% in France, 14% in Germany and 10% in Italy. Companies from these four member states added up to 97% of the EC total defence sales.

Within EC member states, several regions have built up a high degree of reliance on defence sales. Some combine such activities with advanced civilian aerospace and electronics production. Such is the case with most parts of the Southeast of England, the French concentration of aerospace industries around Toulouse and the province of Bavaria in Germany. These regions seem apt to modify their focus without too much trouble. In the coming years there will also be more job losses among the technologically advanced industries but these will continue to be the main contractors of future defence equipment.

Other regions are more linked to civilian sectors which are themselves in decline, such as shipbuilding. These regions include parts of the North of the United Kingdom, the French province of Brittany and the German area around Bremen. These will have greater difficulties in finding new outlets for their industrial activity.

OUTLOOK

The present outlook for the European defence-related industries up to the year 2000 is that trends which started in 1989-1990 are likely to continue. Defence spending by national governments seem to become more and more subordinate to other budgetary priorities. Major development and production programmes will probably be scaled down and export markets may continue to decrease. The ability of European defence industries to cope with such loss of business will depend on a successful reduction of their defence exposure. But not all alternative civilian markets will offer enough opportunities.

Major alternative civilian outlets include the aircraft and aeroengine markets which are still expected to grow at 5% annually. It also includes, to a lesser extend, the spacecraft and satellite markets.

The defence-related sectors which will continue to loose more markets and jobs are the traditional sectors which used to be geared towards the Cold War-scenario requirements. These include heavy land vehicles, ammunition, construction works and shipbuilding. The pace of decline will be faster in these sectors and could imply production reductions of 10% and more annually.

Some specific defence related markets have good prospects under the present circumstances. These include in particular all types of simulation equipment which allows superior training levels at low operating costs. There will also be a growing need for equipment used by the flexible (air)mobile intervention units which seem to become the cornerstone of a future European defence strategy. Such equipment would include various helicopters, transport planes, battlefield reconnaissance systems and anti-missile defence systems.

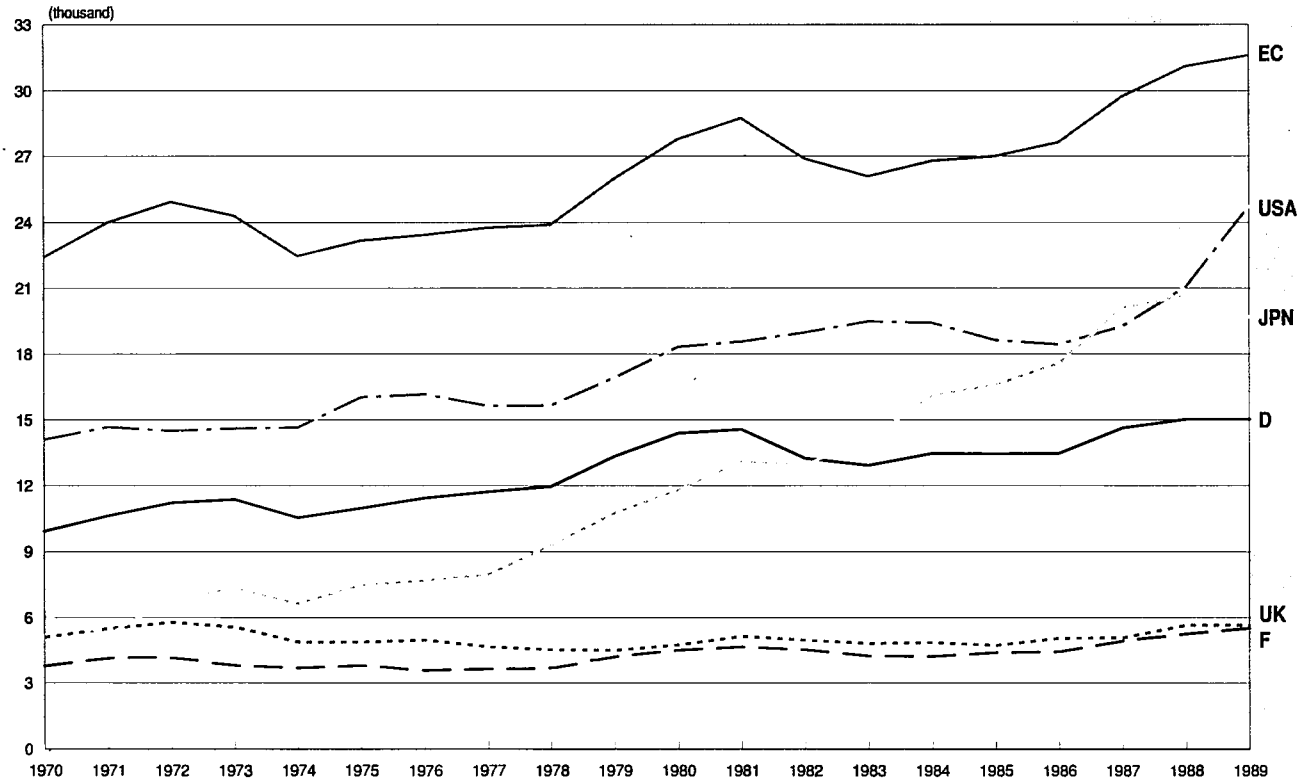
Written by: ERA, reviewed by DG III

EC performance in patented technologies

INTRODUCTION

The study focuses on the performance of the European Community in the race for innovations. The competitive position in new technologies is measured by the number of inventions of a certain quality applied for patent. The number of inventions applied for patent is a widely used R&D output indicator. It is of economic relevance because the right to produce and to market is claimed with the patent application. In the next section the data base and the methods used are explained. The third section deals with the EC performance in all fields of technology, and with the EC specialisation by area of R&D compared with the American and Japanese industry. In this context, the share of the different EC countries in the production of new technologies will be discussed, and the most ingenious EC companies will be identified. The EC performance will then be analysed in more detail, by focusing on fields of technology believed to be especially promising for the future. Following the well known "hit list" of sunrise industries, the following fields of technology were selected: biotechnology, new materials, information and communication technologies, and environmental protection. Within these broader areas, the analyses will be differentiated by subfield of technology and by strongly rising and strongly declining technologies. The last section summarises the findings.

Figure 1: All fields of technology
Inventions (1) by country of origin



(1) With patent applications in at least two countries
Source: EPIDOS/INPADOC, Ifo Patent Statistics (Update 10.1.1992)

MEASUREMENT APPROACH AND DATA BASE

The innovation process takes place in different phases: (i) perception of a problem and/or a scientific breakthrough, (ii) research and development of new solutions, (iii) securing marketing rights for the new products or processes, (iv) preparation of the production and market introduction, and (v) start of the production of new products or of existing products with the new production process. This implies that the position of the EC in the race for innovations can be measured at different stages and in different ways. If only market success is of interest, one measurement approach would be to identify new products or processes and to measure their production or degree of application by country. It is, however, both difficult and expensive to obtain reliable statistical information on the implementation of new technologies in this way. Official production and trade statistics normally give precise information only in a relatively late phase of the diffusion process of new products and processes, because adjustments in the statistical nomenclatures are only made from time to time. New products and processes are taken into account only if they have already achieved a significant economic importance. Often the impact of new solutions can, therefore, only be measured by their effect on the growth of larger product groups which are statistically covered.

A widely applied method of determining a country's position in the competition for new technologies relies on the use of indicators of R&D input (amount spent for R&D, number of active researchers). Existing R&D statistics are, however, not differentiated enough to allow a closer look into the positions in individual technologies. This is especially true for private R&D activities.

In this study, innovation activity will thus be measured by the number of inventions of a certain quality for which patents are applied. The indicator measures innovation activity by counting R&D results expected to pass the tests of patent offices for technical novelty and degree of innovativeness. Because patents secure an exclusive right for production and marketing, this indicator thus measures inventions that are expected to be economically relevant. A breakdown by country of origin or company of origin can then give an indication of the future position of competing industries. Data derived from patent documents are a widely used source because they allow statistical measurement of R&D output and its distribution by owner of the rights in an internationally comparable way.

For the analysis, ifo patent statistics were used. The information is drawn from patent documents published by the Vienna office of the European Patent Office. The ifo patent statistics provide, for each invention, the year of first application, the classification(s) of the invention by the patent offices according to the International Patent Classification (IPC), the countries for which a patent is claimed, the country of origin of the invention and the name of the company (or owner) applying for the patent. In the analysis below, inventions are only counted if the inventor or the owning company applies for a patent in at least two countries. This restriction is necessary to secure a similar "degree of innovativeness" and a similar expected economic importance of the invention. It also eliminates most of the distortions in international patent data which are due to differences in national patent systems. In particular, the inflationary effect of the Japanese patent system is suppressed: Japanese inventions are only taken into account if the applying companies expect the invention to pass US and/or European standards with respect to novelty and degree of technical change.

In Europe and Japan, inventions applied for patent are published 18 months after the date of application. The US patent office publishes them only after the patent is accepted. This implies that the most recent year for analysing invention activity is 1989, if the inventions are ordered according to the year of patent application.

Table 1: All fields of technology
Inventions by country/region of origin (1)

Country of origin	Number of inventions 1975-79	1980-84	1985-89	Share of inventions in % 1975-79	1980-84	1985-89
EC	120 259	136 315	147 097	42.6	39.6	37.8
EFTA	24 182	26 548	24 016	8.6	7.7	6.2
North America	82 497	97 089	104 870	29.2	28.2	27.0
Japan	43 155	68 073	94 669	15.3	19.8	24.4
Asian NICs	90	429	1 880	0.0	0.1	0.5
AUS+NZ	2 868	4 274	4 982	1.0	1.2	1.3
Other	9 387	11 677	11 175	3.3	3.4	2.9
World	282 438	344 405	388 689	100.0	100.0	100.0
Belgique/België	1 907	1 765	1 761	1.6	1.3	1.2
Danmark	1 061	1 760	1 766	0.9	1.3	1.2
BR Deutschland	59 440	68 615	71 614	49.4	50.3	48.7
Hellas	112	71	108	0.1	0.1	0.1
España	1 214	1 284	1 656	1.0	0.9	1.1
France	18 919	22 100	24 480	15.7	16.2	16.6
Ireland	257	361	693	0.2	0.3	0.5
Italia	7 995	9 302	11 967	6.6	6.8	8.1
Luxembourg	855	758	628	0.7	0.6	0.4
Nederland	4 983	5 804	6 269	4.1	4.3	4.3
Portugal	45	41	59	0.0	0.0	0.0
United Kingdom	23 471	24 454	26 096	19.5	17.9	17.7
EC	120 259	136 315	147 097	100.0	100.0	100.0

(1)With patent applications in at least two countries
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.1.1992).

Table 2: EC invention activity by industry/field of technology

Field of technology/industry	Inventions (1) share in %	EC specialisation (2) EC	USA	JP N	Special. on EC (3) USA	JPN	Change (4) of EC share in EC	USA	JPN
Agricultural machinery	58.1	162	94	57	49	24	6.7	3.7	3.1
M.f.food ind. packaging	51.7	134	141	113	79	48	4.7	0.4	2.0
Handling, lifting	50.7	134	129	101	58	54	5.4	2.1	2.0
Woodworking machinery	49.1	131	127	101	63	37	2.9	0.7	1.2
Air & space	48.4	124	147	94	111	52	2.2	-0.2	1.2
M.f.steel, al. industries	47.6	121	143	130	48	94	1.6	3.4	-0.5
Textile machinery	47.5	116	135	144	65	74	3.4	-2.4	1.6
Machine tools	46.2	119	128	112	66	85	5.1	0.8	0.9
Construction machinery	45.7	118	103	92	52	85	-1.5	-0.1	0.0
Motor vehicles	44.5	119	124	116	61	128	0.0	-0.5	-0.7
Paper, printing machinery	44.5	112	132	150	71	59	4.5	1.2	2.5
Gears, transmission equip.	44.0	116	141	122	69	115	1.3	0.3	0.7
M.f.mining	44.0	108	134	74	61	13	-4.1	6.7	6.7
M.f.rubber,plastic ind.	42.7	110	107	128	91	101	1.0	-1.4	1.0
Foundries	42.4	111	123	121	78	94	3.9	2.0	-0.7
Iron and steel	41.4	107	120	113	64	114	3.8	2.7	-0.3
Pumps, compressors	41.1	108	124	102	86	94	2.4	1.1	-0.5
El.power generation,transf.	41.0	111	110	94	80	109	3.5	0.2	-0.2
Robotics	38.8	102	121	116	54	156	3.1	1.2	0.9
Electrical lamps	38.2	99	117	129	103	100	-1.9	-4.4	-1.8
Chemicals (4)	36.0	92	90	137	128	100	1.0	-0.2	0.8
Measuring, control instruments	35.4	91	108	105	114	105	1.1	0.5	0.2
Pharmaceuticals	35.3	88	89	142	152	71	0.5	0.6	0.2
Production of plastics	34.5	89	84	130	126	118	2.4	-0.5	2.8
Medico-surgical equipment	34.1	88	106	95	144	58	1.4	0.6	1.2
Telecommunication equip.	30.0	83	87	85	110	143	-2.1	-3.1	-2.9
Optics	29.9	85	114	103	106	141	-1.5	-1.5	-2.3
Consumer electronics	26.1	74	84	93	77	206	0.6	-0.2	-0.3
Office machines, EDP-eq.	16.7	48	53	62	112	219	-0.7	-0.5	-1.5
All technologies	37.6	100	100	100	100	100	0.0	0.0	0.0

(1) Applied for patent in at least two countries in the period 1987-89
(2) EC share of industry specific inventions applied for patent in the region/country in relation to the corresponding share for all technologies (= 100)
(3) Share of USA/JPN in the industry-specific inventions applied for patent in EC countries in relation to the corresponding share for all technologies (= 100)
(4) Change in the EC share in the inventions applied for patent in the region/country in the period 1987-89 compared with 1984-86 in percentage points, adjusted for the gain/loss in all technologies
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.1.1992)

EC POSITION IN ALL FIELDS OF TECHNOLOGY

Long-term trends and R&D output by country of origin

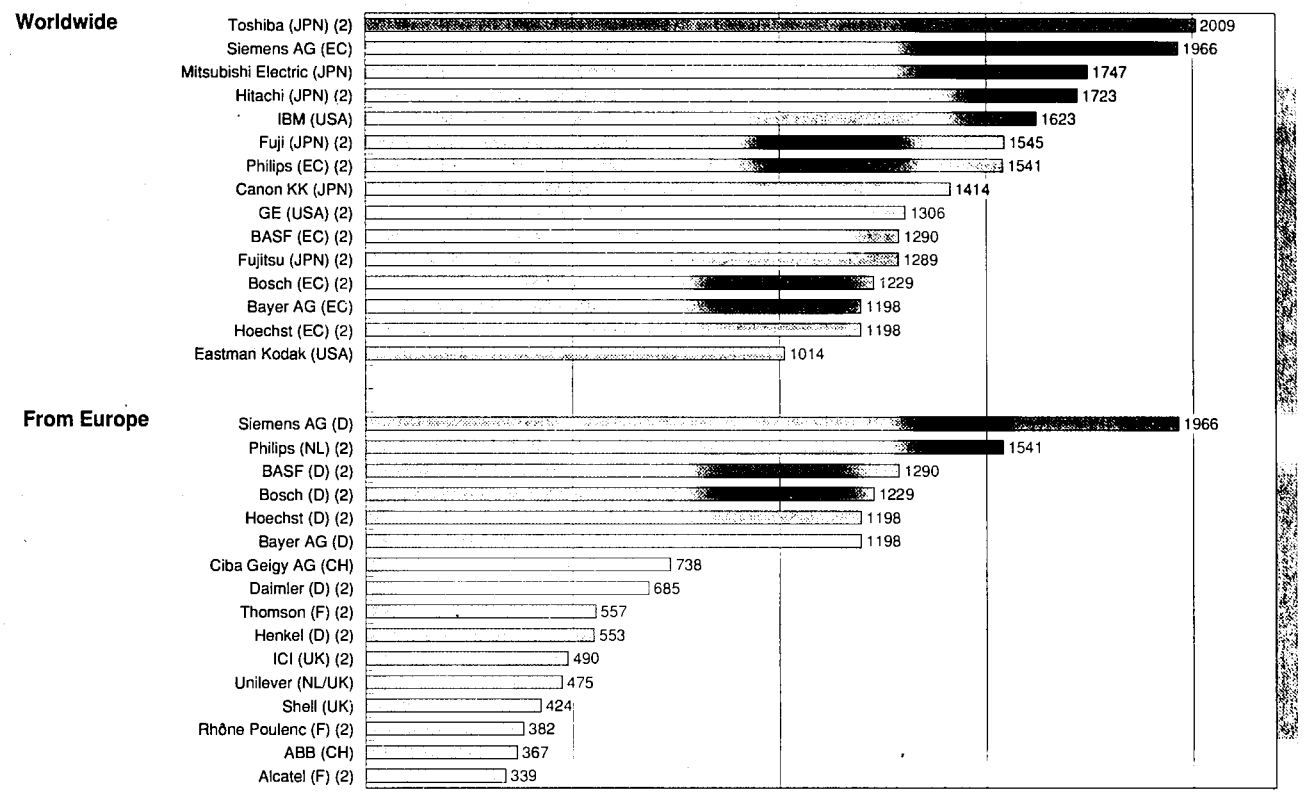
Measured by the number of inventions of supranational importance, Europe was the most important producer of new technologies in the past two decades. Taken together, the countries of the EC account for more innovations than either the USA or Japan (Figure 1). Although the invention activity of the EC has followed a rising trend in the long run, it is Japan which recorded the fastest growth of inventions.

In all countries/regions, invention activity is influenced by the business cycle. A rising business trend creates better opportunities for R&D and for bearing the costs of patent application. In a downswing, research activity has to be partly cut back due to financial constraints. Invention activity thus usually follows the business cycle, with a one year delay. The impact on EC invention activity of the upswings in Europe in the early seventies, in the second half of the seventies and in the second half of the eighties is visible in Figure 1. In the USA, Japan and the EFTA countries, the number of invention also shows a cyclical pattern.

Due to the stronger rise in invention activity in Japan and in the East Asian NICs, the EC has nevertheless lost shares in worldwide inventions during the last fifteen years (Table 1). The East Asian NICs started to secure their own competitive position in terms of the development of new technologies in the second half of the eighties. Whereas North America has fallen back in the race for new technologies, its loss in the share of worldwide inventions was not as pronounced as that of the EC during the eighties. Especially in the first half of the eighties, the "Reagan Boom" accounted for a better US-performance.

Within the EC, nearly half of the inventions originate in Germany. This is a far greater share than Germany's share of EC GDP (roughly one quarter) or than its share of industrial production in the EC. This confirms the pronounced specialisation of German industry on R&D or know how intensive industries. The United Kingdom and France rank next in the list of R&D output for which patent application is considered worthwhile, though at a considerable distance. Between these countries and Italy another big gap emerges.

Figure 2: Most ingenious companies
Number of inventions (1) in 1988/89



(1) With patent applications in at least two countries
(2) Including subsidiaries
Source: EPIDOS/INPADOC, Ifo Patent Statistics (Update 10.1.1992)

Technological specialisation of EC industry

A breakdown of EC inventions by sector allows for an analysis of the technological specialisation of R&D activity in the European Community. The science-and-engineering-based industries shown in Table 2 cover more than 80% of all inventions worldwide. The table does not only show the EC position in the race for new or improved products within the EC internal market but also the EC position on the Japanese and US markets. In addition, the Japanese and the US performances on the EC market are shown. Two indicators are used. The specialisation indices compare the EC share of invention activity by sector with the EC share of inventions in all fields of technology. Values significantly above one hundred show strong points, values well below one hundred weak points for the EC in the race for innovation. The changes in the EC's share of innovation in the various world regions show if the EC's position has improved or not. Because the Japanese gains over time might be underestimated and losses exaggerated in the raw figures, the changes by sector have been standardised by relating them to the overall change in the corresponding shares in all inventions.

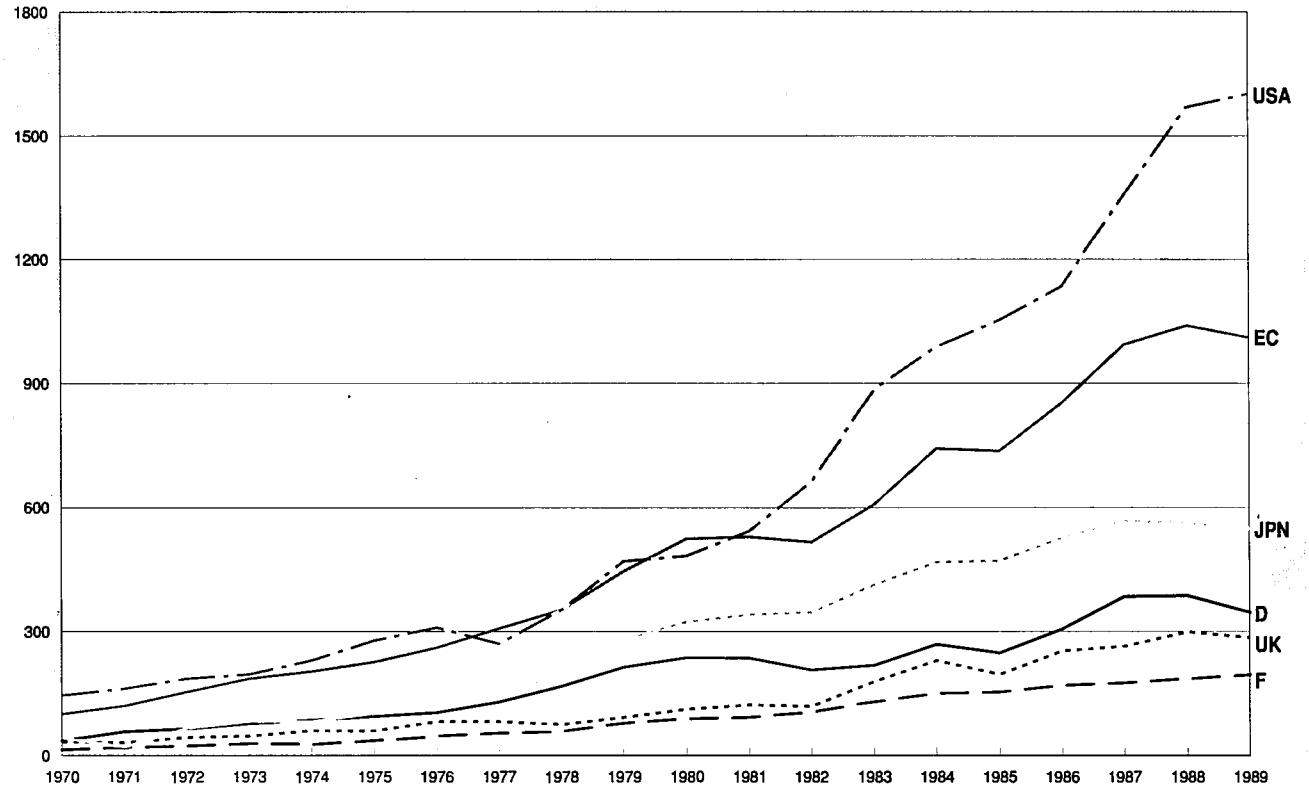
Measured by the share of EC-based inventions, Europe has a strong position in some areas of mechanical engineering such as agricultural machinery, machinery for food, processing and packaging, and woodworking machinery. Another strong point for the EC is the aerospace industry. The potential technological edge in subsectors of mechanical engineering is, however, unlikely result in pronounced job increases in the Community because some of the customers of these machinery producers belong to declining sectors. This is true for textiles and steel, and to a large extent for agri-food businesses.

In most industries with European technological edge, the technological position is strong on all markets of the Triad as indicated by the values of the specialisation index for the EC, the USA and Japan (Table 2). Only in agricultural machinery does the strong overall position reflect only a dominant position for the EC market. The lower propensity of the aerospace industry to apply for patents in Japan may reflect that the main competitors in this industry come from the USA. This is confirmed by the rate of concentration of US inventions in the aerospace for which the USA has applied for patent in the EC. In terms of the change over time, the European industries with a strong technological edge managed to improve their position in the most recent period. Measured by the adjusted change in the share of the inventions applied for patent for the different markets, this was often true for all three markets of the Triad.

In a second group of industries - extending from machine tools to electric power generation and transmission facilities - the EC still has a fairly strong technological position. These industries, however, have to cope with more intense competition from outside the Community. In motor vehicles, in gears and transmission equipment, in the steel industry and in technologies for the production and transmission of electricity, Japan is a powerful competitor in the race for innovations. Japanese, US and Scandinavian companies are in fact the main challengers to the EC companies in the field of engineering.

The next group consists of sectors with a below-average share of EC inventions. These industries have to fight either against a single dominant competitor like Japan (for instance in robotics and consumer electronics) or the USA (both in phar-

Figure 3: Biotechnology and genetic engineering
Inventions (1) by country of origin



(1) With patent applications in at least two countries
Source: EPIDOS/INPADOC, Ifo Patent Statistics (Update 10.1.1992)

maceuticals and in medico-surgical equipment), or are confronted with an intense technological competition from both the USA and Japan (as in measuring and control instruments, office machines and EDP equipment). In fact, in electronic based industries, the EC has lost shares in all regions. Thus, in the telecommunication equipment sector, where deregulation and privatisation of telecom services have occurred worldwide, the technological competition from other regions has considerably increased.

Table 3: Biotechnology
Share of inventions (1) worldwide by country (%) (2)

Sector	D		F		UK		EC		USA		Japan		Rest of world	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Appliances and devices for enzymology and microbiology	15.8	13.7	6.2	5.0	10.5	7.9	36.6	29.9	34.3	39.9	15.6	18.7	13.4	11.4
Microorganism, enzymes, cells	9.7	9.3	5.2	4.5	9.5	8.6	29.2	27.7	44.8	48.8	18.2	16.1	7.1	7.5
Fermentation	10.4	11.3	6.5	5.0	10.0	8.5	32.4	30.3	40.8	43.4	20.3	19.4	6.5	6.9
Measuring and test methods as assisted by enzymes or microorganism	13.1	10.0	4.9	5.1	8.2	7.7	29.3	26.6	49.4	56.2	14.9	9.3	6.4	7.8
Analysis of substances by testing for chemical or physical properties	12.7	13.0	6.0	6.5	7.1	7.7	29.8	31.3	45.6	45.7	15.2	14.1	9.3	8.9
Total (3)	11.6	10.6	5.8	5.5	8.7	8.5	31.0	29.7	41.8	45.9	18.4	16.1	8.8	8.3

(1) With applications in at least two countries
(2) Period I = 1986 and 1987, period II = 1988 and 1989
(3) Double counting excluded
Source: EPIDOS/INPADOC, Ifo Patent Statistics

Table 4: Biotechnology
Ranking of firms and institutes by number of patent applications, 1988/89

		Country of origin	Number of patent applications
Worldwide			
1	Boehringer Mannh. GmbH	D	113
2	Merck & Co Inc.	USA	87
3	Hoechst AG	D	86
4	Eastman Kodak Co	USA	81
5	Abbott Laboratory	USA	71
6	DuPont	USA	70
7	Takeda Chemical Ind.Ltd.	JPN	69
8	Behringwerke AG	D	63
9	Eli Lilly Co	USA	56
10	Hoffmann La Roche	CH	55
EC			
1	Boehringer Mannheim GmbH	D	113
2	Hoechst AG	D	86
3	Behringwerke AG	D	63
4	Novonordisk AS	DK	54
5	ICI plc	UK	50
6	Pasteur Inst.	F	43
7	Akzo NV	NL	41
8	BASF AG	D	35
9	Gist Brocades NV	NL	31
10	Ges. für biotechn. Forschung mbH	D	24

Source: EPIDOS/INPADOC, ifo Patent Statistics

Most ingenious companies

It is difficult to identify the most ingenious companies at the global level. The most important problem results from the different ways in which R&D and patenting are organised from company to company. In centralised organisations, all inventions realised in the different establishments and subsidiaries of the company worldwide are applied for patent at the company's headquarters. Other companies prefer to allow daughter companies to apply for patent. In order to secure comparability, it is therefore necessary to "consolidate" the invention activity of companies with a decentralised organisation of R&D or patent application. The consolidation was realised as far as relationships with other appliers for patents were recognisable, or where such information was known from other sources. A full comparability could, however, only be achieved at the level of combines.

The 15 most ingenious companies worldwide account for more than 500 inventions of supranational importance per year. As Figure 2 shows, six Japanese companies and six European companies rank among the current top 15, alongside only three American companies. The differences in the number of inventions that each company accounts for are, however, not very pronounced, such that the ranking can change over time. Companies active in the electronic and electrical engineering sectors occupy the first 9 ranks. Chemical companies follow, at a distance.

The list of the most ingenious European companies is also dominated by electronics/electrical engineering companies, and chemical companies. Bosch and Daimler Benz (including their subsidiaries in the electronic industry and aerospace) are the only outsiders representing the car industry. Among the top ten, many are of German origin. This is consistent with the high share of Germany (West) in all inventions of European origin (Table 1). A significant share of the inventions applied for patent by Philips, ABB and Alcatel also originates in Germany.

EC POSITION IN SELECTED FUTURE ORIENTED FIELDS OF TECHNOLOGY

Biotechnology

Definition of the R&D field

The sector of biotechnology, which includes genetic engineering, is a high-tech sector the development of which is just starting. At the same time it is a very controversial field, at least in some countries. The public presentation by mass media focused from the very beginning on special possibilities (sometimes impossibilities) of genetic engineering, allegedly aimed at creating monsters or chimeras, deadly micro-organisms or cloned humans. One of the consequences was and still is that in some countries almost no field tests have been performed (Germany, Denmark), whereas in other countries numerous tests have taken place (USA, Canada, Belgium, France, and the United Kingdom).

In fact, there is a small part of genetic engineering which is hazardous and requires high attention and precaution when used in biotechnic processes and applications. Most of biotechnic processes and genetic engineering are without any risks, however.

One can distinguish between classical biotechnology, comprising fermentation and preservation processes used in the production of beer, wine, cheese, bread, vinegar etc., and modern biotechnology, which is mainly characterised by the utilisation of genetic engineering. The sub-sectors are either products (micro-organism, cells, enzymes, proteins) or processes (fermentation, analyses, separation technics) or fields of application (pharmacy, agriculture, diagnosis, environmental protection, decontamination).

Compared to other high-tech fields like microelectronics, advanced materials, information and communication technology, the field of biotechnology has a limited radius of activities

Table 5: Advanced materials
Number of inventions (1) worldwide and changes (%) from 1986/87 to 1988/89 (2)

Sector	World		among which: D		F		UK		EC		USA		Japan	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Fine ceramics	961	1 162.0	174	244.0	53	79.0	41	62.0	300	430.0	286	363.0	273	268.0
(%)		20.9		40.2		49.1		51.2		43.3		26.9		-1.8
Metals, light and special materials	1 656	1 902.0	299	354.0	63	84.0	78	96.0	495	588.0	469	544.0	599	639.0
%		14.9		18.4		33.3		23.1		18.8		16.0		6.7
Polymers	613	756.0	142	189.0	29	34.0	28	22.0	222	276.0	134	181.0	226	278.0
		23.3		33.1		17.2	-	21.4		24.3		35.1		23.0
Semi-conductors	1 329	1 244.0	100	85.0	75	61.0	50	36.0	254	226.0	410	373.0	626	597.0
		-6.4		-15.0		-18.7		-28.0		-11.0		-9.0		-4.6
Composites	1 140	1 335.0	287	473.0	51	55.0	67	60.0	448	624.0	339	360.0	291	284.0
		17.1		64.8		7.8		-10.4		39.3		6.2		-2.4
Carbon materials	61	40.0	9	5.0	4	2.0	3	2.0	16	9.0	18	9.0	27	20.0
		-34.4		-44.4		-50.0		-33.3		-44.7		-50.0		-25.9
Glass and optical materials	1 510	1 672.0	288	305.0	99	115.0	160	165.0	603	636.0	422	528.0	421	417.0
		10.7		5.9		16.2		3.1		5.5		25.1		-1.0
Powder metallurgy	591	621.0	83	103.0	29	23.0	36	27.0	159	166.0	184	187.0	179	193.0
		5.1		24.1		-20.7		-25.0		4.4		1.6		7.8
Total (3)	7 335	8 187.0	1275	1 612.0	387	432.0	431	444.0	2337	2 749.0	2128	2 360.0	2424	2 566.0
		11.6		26.4		11.6		3.0		17.6		10.9		5.9

(1) With applications in at least two countries
(2) Period I = 1986 and 1987, period II = 1988 and 1989
(3) Double counting excluded
Source: EPIDOS/INPADOC, Ifo Patent Statistics.

and applications, though it can be considered to be a key technology in these applications as well.

Long-term trends and recent changes in the focus of worldwide R&D

There was a steady upward trend in innovations in this sector until the early eighties, with the USA and the EC (12) practically on the same level in terms of the number of patents applied for in at least two countries (Figure 3). In 1982, however, American inventors took off compared to the EC, reaching a more than fifty percent higher level in 1989. Japan distinctly trailed behind during the whole period of observation (1970-1989). Within the EC, Germany was in the lead (Figure 3), with the United Kingdom in second place, and France in third.

The development in the recent past followed the same pattern. Between 1986/87 and 1988/89, the USA expanded its invention activities significantly above average, increasing its leading position. The two fields of biotechnology and genetic engineering which were most dynamic, both in the USA and worldwide, were the "production" of micro-organisms and enzymes and micro-organism or enzyme based measuring and test methods.

Position of the EC as a location for R&D

The above developments brought about a change in countries' shares (Table 3). The general development in biotechnology was not to the advantage of the EC countries: the EC share of about 30% in 1988/89 was only slightly lower than in the previous period, but the gap between the USA and the EC increased from 10.8% to 16.2%. The importance of the EC among the five sub-sectors is remarkably balanced (between 26.6% and 31.3% share worldwide). In one sector, (analysis of substances by testing for chemical or physical properties), the EC was more dynamic than the USA.

The ranking of the EC members (Germany, the United Kingdom, and France) is also provided in Table 3. The German lead is significant in the "hardware" sectors, appliances and devices etc., analysis of substances etc., measuring and test methods, but not very distinct in the perhaps most important sector of micro-organisms and enzymes.

The breakdown in Table 3 does not allow a judgement to be made on the development by application fields. From other investigations we know that pharmaceuticals, medical diagnosis, cleaning and decontamination, and agriculture are sectors of remarkable size. Agriculture includes plant and pest control, genetically changed breeds of plants and animals, special fertilisers and special feed. The EC's importance is lower than average in the sectors of pharmaceuticals, medical diagnosis, mutations and genetic engineering, a little above average in the fields of plant control and feed. In the sectors cleaning and decontamination, the EC plays a leading role among the Triad thanks to Germany's efforts in these fields.

The other EC countries, the Netherlands, Italy, Belgium, etc. only have a limited importance in biotechnology research. Together, their share is a little over 5% of the world total and in some sectors it is significantly below. The other world countries (Switzerland, Sweden, Canada, Australia, etc.) together have a share of less than 10% (Table 4), below Germany's share. The minor importance of those other countries, however, does not mean that no important inventions have been made there.

Position of EC companies in the race for innovations

The analysis of patent applications also allows to rank enterprises (or institutes) according to the number of inventions. The patent applications in these rankings are registered with legal entities, which means for instance that Bayer AG, Germany, and Miles Inc., USA, are registered separately.

Among the fifty enterprises or institutes with the highest number of applications, 26 are from the USA (including Merck

Table 6: Advanced materials
Share of inventions (1) worldwide by country (2)

Sector	World		among which: D		F		UK		EC		USA		Japan	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Fine ceramics	18.1	21.0	5.5	6.8	4.3	5.3	31.2	37.0	29.8	31.2	28.4	23.1	10.6	8.7
Metals, light and special materials	18.1	18.6	3.8	4.4	4.7	5.0	29.9	30.9	28.3	28.6	36.2	33.6	5.6	6.9
Polymers	23.2	25.0	4.7	4.5	4.6	2.9	36.2	36.5	21.9	23.9	36.9	36.8	5.1	2.8
Semi-conductors	7.5	6.8	5.6	4.9	3.8	2.9	19.1	18.2	30.9	30.0	47.1	48.0	2.9	3.9
Composites	25.2	35.4	4.5	4.1	5.9	4.5	39.3	46.7	29.7	27.0	25.5	21.3	5.4	5.0
Carbon materials	14.8	12.5	6.6	5.0	4.9	5.0	26.2	22.5	29.5	22.5	44.0	50.0	-	5.0
Glass and optical material	19.1	18.2	6.6	6.9	10.6	9.9	39.9	38.0	27.9	31.6	27.9	24.9	4.2	5.4
Powder metallurgy	14.0	16.6	4.9	3.7	6.1	4.3	26.9	26.7	31.1	30.1	30.3	31.1	11.7	12.1
Total (3)	17.4	19.7	5.3	5.3	5.9	5.4	31.9	33.6	29.0	28.8	33.0	31.3	6.1	6.3

(1) With applications in at least two countries
(2) Period I = 1986 and 1987, period II = 1988 and 1989
(3) Double counting excluded
Source: EPIDOS/INPADOC, Ifo Patent Statistics.

& Co. Inc.), 15 from the EC, 7 from Japan, and 2 from Switzerland (Table 4).

The two lists in Table 4 show that firms which are producing pharmaceuticals or other chemicals are leading. The number ten in the EC ranking is an exception because the Gesellschaft für biotechnische Forschung is a research institute.

Advanced materials

Definition of the R&D field

R&D related to advanced materials covers a broad spectrum of high performance materials, some of them with sophisticated properties. These materials belong to a variety of sectors, like ceramics, metals, plastics, semiconductors, supraconductors, and composites. Examples are high-temperature resistant plastics, conducting plastics, high-temperature supraconducting ceramics, III-V semiconductors, special kinds of steel, carbon-fibre-reinforced carbon or plastic, aramide-fibre-reinforced plastic, metal-fibre- or ceramic-fibre-reinforced ceramic or aluminium, rapid solidified metals, aluminium, lithium, or titanium alloys.

The fields of application are varied. In a recent assessment, it was pointed out that almost all new technical fields require information and communication technologies or advanced materials or both (US Department of Commerce, Emerging Technologies, Washington 1992).

In the road vehicles, air- and space-craft sectors, light and at the same time physically very stable materials are required. Other properties might be necessary in addition, such as heat resistance, chemical resistance, electric conducting and non-conducting, magnetism. The same applies to material for all kinds of engines.

The electronic, optronic, and sensoric sectors need semiconductors, supra-conductors, special polymers with different properties, ceramics, special glass.

In the field of medical implants, ceramic materials, metal alloys, and polymeric material for diaphragms or constructive elements are used. In medical diagnosis and therapy, polymeric optical fibres and laser technique fibres have become state of the art; in imaging diagnosis techniques supra-conductors are necessary.

Long-term trends and recent changes in the focus of worldwide R&D

A striking feature in the long-term development of worldwide inventions was the rising trend for Japan from 1978 onward. In 1977, Japanese inventors were at the same level as Germany (West) measured by the number of patents applied for in at least two countries. In 1989 they had reached the level of the USA and the EC. The positive development of EC inventive activities derived mainly from German efforts, whereas France and the United Kingdom showed little movement.

Looking at recent changes, i.e. the years 1986 to 1989, the development was different. Comparing the two two-year periods 1986/87 and 1988/89, a worldwide increase by more than eleven percent was registered. Germany was far above average as was the EC, whereas the United Kingdom and Japan were distinctly below average (Table 5). These results are based on a selection of patent codes which is different from the one used for long-term series, for which no useful breakdown exists.

The search for very dynamic or heavily contracting sub-sectors (more detailed than the breakdown of Table 5) had the following result: in the sector of high-performance ceramics, patent applications for materials for prostheses or for coating them grew by 42% between 1986/87 and 1988/89. In the field of polymers, liquid crystal polymers (+19%) and optical elements (+ 24%) showed a remarkable increase. Among semiconductors, compounds of gallium, indium, or thallium (+ 51%) expanded strongly. The same applied to (composite) articles or shaped materials containing macromolecular substances (+ 19%) and the chemical after-treatment of carbon filaments (+ 18%). In the glass sector declines had to be registered, and the powder metallurgy sector showed increases and decreases as well. Finally in the crystalline field the production of polycrystalline material seems to be a promising sub-sector.

Position of the EC as a location for R&D

On average, the EC has a leading position world-wide as far as inventive activities in the field of advanced materials are concerned (Table 6). In detail, there are strong exemptions where Japan is in first place: carbon materials, semiconductors, metals, and powder metallurgy. Composites, fine ceramics, and glass are domains of the EC. The ranking shows that Japan does not play the leading role in fine ceramics, contrary to what as it is often stated in public.

Table 7: Advanced materials
Ranking of firms and institutes by patent applications, 1988/89

		Country of origin	Number of patent applications
Worldwide			
1	Bayer AG	D	225
2	Amer.Telephon & Telegraph	USA	161
3	Sumitomo Electric Ind.	JPN	146
4	Siemens AG	D	142
5	Hoechst AG	D	120
6	BASF AG	D	112
7	Du Pont	USA	99
8	Fujitsu Ltd.	JPN	99
9	Tokyo Shibaura Electric Co.	JPN	99
10	General Electric	USA	96
EC			
1	Bayer AG	D	225
2	Siemens AG	D	142
3	Hoechst AG	D	120
4	BASF AG	D	112
5	Philips NV	NL	84
6	British Telecom	UK	53
7	Philips Patentverwaltung	D	50
8	Leybold AG	D	45
9	Rhône Poulenc Chimie	F	35
10	ICI Plc	UK	33

Source: ifo Institut

In fact, Germany, number one among the EC countries in all sub-sectors, almost comes up to Japan in ceramics research. The United Kingdom has a relatively good position among the EC countries in the glass sector, whereas France is comparatively strong in glass and ceramics R&D.

Materials for prostheses had a particularly strong increase in the USA (+ 61%), less in the EC (+47%), and least in Japan (+30%). The liquid crystal polymer sector went up in EC countries by 41%, but went down in the USA by 4%. Compounds of gallium etc. increased especially in the USA (+130%) and Japan (+62%). Composites, an EC domain, showed a strong upswing in the EC (+38%), only minor increases in the USA (+10%), and Japan (+3%).

Position of EC companies in the race for innovations

Ifo Patent Statistics allow a ranking of enterprises (or institutes) showing their importance as inventors (more precisely, as applicants for patents) on the basis of the numbers of patents applied for.

Among the first fifty enterprises or institutes (according to the number of patent applications) 18 were from Japan, 17 from EC countries, 13 from the USA, and two from Switzerland.

The rankings demonstrate the dominance of producers from the chemical and electrical/electronic sectors in the R&D field of advanced materials. In addition to polymers, most of the raw material for fine ceramics, carbon material, or composites also come from chemical producers. The electric/electronic industry likewise is engaged in material R&D as part of their microelectronics, optronic, and sensoric development attempts.

Information and communication technologies

Definition of the R&D field

As indicated by the ranking of the most ingenious companies, one of the most important fields of current technical progress is the area of microelectronics and information and communication technologies (ICT). The area of ICT covers all technologies relevant for electronic information processing, information storage, retrieval and display as well as for communication via cable and cableless communication. All technologies necessary to change the media for information storage (i.e., electronic media to paper) are also summarised in this group of technologies. The core area of ICT products consists of semiconductors. Therefore, microelectronics technologies must also be considered. These technologies are located at the borderline between chemistry and engineering. In terms of the International Patent Classification, the information and communication technologies are summarised in Section G. Technologies relevant for semiconductors are classified in H01L and in C30B of the IPC.

Long-term trends and recent changes in the focus of worldwide R&D

Measured by the number of inventions with patent applications in at least two countries, the innovation activity has increased considerably both in ICT and in technologies for improving semiconductors during the last 20 years. Whereas inventions in ICT-oriented fields of technology accounted for 11% of all worldwide inventions in the early seventies, this ratio increased to 18% at the end of the eighties. The corresponding share for semiconductor technologies increased by 2 percentage points in the same period. Microelectronics and ICT are, therefore, one of major driving forces of worldwide innovations.

ICT oriented invention activity increased strongly in all parts of the Triad. Japan, however, developed these fields of technology far more intensively than Europe or the USA. The rise of Japanese industry to a leading-edge, high-tech industry was largely achieved by the application of microelectronics. In the race for new or improved products for electronic information processing, storage and communication, Japan has overtaken both the American and European industry, measured by the number of inventions of supranational importance. This was true both for the semiconductor-oriented technologies

Table 8: All fields of application of ICT
Distribution of R&D output by region, 1988/89

(%)

Japan	46.8
USA	29.8
EC	18.5
Other	4.9

Source: ifo Institut

and for ICT. A closer inspection shows that the ascent of Japan as a semiconductor innovator was achieved in the shadow of successes in the area of technologies for improving information and communication equipment. In the early seventies, consumer electronic equipment pulled chip-oriented invention activity. In the second half of the seventies, EDP equipment improvements took over as stimulus. As in all regions of the Triad, communication-oriented invention activities gained momentum, also in Japan, during the eighties.

In the area of office machinery and electronic data processing (EDP) equipment, R&D activity in the triad concentrated especially on the improvement of input/output operation in most recent years. Technologies for individual cableless telecommunication and complementary technologies like devices for suppression of noise and interference and error prevention were in the centre of interest among the technologies relevant for telecommunication equipment. The opening of (hardware) possibilities for individual uses of broadcast services was also a central research topic in the field of technology relevant for consumer electronics. Another important recent area is stereoscopic colour TV. In the other fields of application of microelectronics, the big themes of R&D centred around aircraft control and identification.

Position of the EC as a location for R&D

Measured by the distribution of inventions applied for patents in at least two countries, the technological position of the European Community on present and future markets for products based on ICT tends to be weak (Table 8). Less than one fifth of the inventions in the most recent years originate from EC countries, compared to one half or so of Japanese origin. The United States also has a higher share than the EC. In the technologies relevant for semiconductors, the EC position is even weaker than in the ICT equipment-oriented technologies. Taking into account that EC inventions are also counted if they are applied for patent only for two or more countries within Western Europe but not for third countries, the European position might even be over-estimated. Since the EC market has a similar dimension as the USA market, these inventions could be viewed as having a similar quality as the US inventions applied only domestically. Therefore, only inventions might be strictly comparable which are applied for patent in regions outside the home region (US inventions outside North America, Japanese inventions outside East Asia, EC inventions outside Western Europe).

By field of ICT applications, the EC position is weakest in office and data processing equipment (Table 9). In consumer electronics, the EC share is also still below average. The best EC position, relatively, is in telecommunications equipment. Measured by the number of worldwide inventions, however, the latter is at present technologically less important than the data processing technologies. As the next twenty years are viewed as the decades of integration of the islands of information processing and storage via communication networks, the importance of these communication technologies might increase considerably in the future. This would offer a chance for European ICT industry to improve its competitive position.

Within the EC, Germany is the biggest producer of improvements in semiconductor technologies and ICT. The specialisation index indicates, however, a far less strong position in these areas than in all fields of technology. French and British R&D activity is more oriented towards ICT technologies than German R&D. In fact, in France and the United Kingdom, a specialisation as a location for telecommunication-oriented R&D is emerging.

An inquiry into the reasons for the weak European technological position produced strong evidence for the inhibiting impact of the past fragmentation of European ICT markets. Fragmented markets imply higher risks of regaining the high R&D expenditures and, even more important, less competition between the suppliers. Competitive pressure is, however, a crucial factor for innovation activity of companies. Therefore,

Table 9: Invention activity in fields of application of microelectronics

Industry/ field of technology	World		D		F		UK		EC		USA		Japan	
	86-87	88-89	86-87	88-89	86-87	88-89	86-87	88-89	86-87	88-89	86-87	88-89	86-87	88-89
Number of inventions (1) by country/region of origin														
Semiconductors	6 781	7 444	611	650	293	338	267	225	1 405	1 445	1 912	2 094	3 221	3 592
EDP equipment (1)	16 156	17 785	1 249	1 264	512	583	522	602	2 770	2 966	4 002	5 233	8 860	8 956
Telecommunication eq.	8 272	9 869	1 219	1 302	509	682	559	636	2 641	2 960	2 083	2 885	3 110	3 381
Consumer electronics	8 313	9 171	965	1 040	377	520	388	450	2 153	2 437	1 509	1 794	4 315	4 404
ICTechnologies	25 853	29 330	2 858	3 031	1 118	1 438	1 252	1 431	6 197	6 893	6 219	8 256	12 263	12 655
Share of inventions (1) worldwide in %														
Semiconductors	100.0	100.0	9.0	8.7	4.3	4.5	3.9	3.0	20.7	19.4	28.2	28.1	47.5	48.3
EDP equipment (1)	100.0	100.0	7.7	7.1	3.2	3.3	3.2	3.4	17.1	16.7	24.8	29.4	54.8	50.4
Telecommunication eq.	100.0	100.0	14.7	13.2	6.2	6.9	6.8	6.4	31.9	30.0	25.2	29.2	37.6	34.3
Consumer electronics	100.0	100.0	11.6	11.3	4.5	5.7	4.7	4.9	25.9	26.6	18.2	19.6	51.9	48.0
ICTechnologies	100.0	100.0	11.1	10.3	4.3	4.9	4.8	4.9	24.0	23.5	24.1	28.1	47.4	43.1
Activity index (share of the country in all fields of technology = 100)														
Semiconductors			48	49	69	71	58	45	54	52	112	103	189	200
EDP equipment (1)			41	40	51	51	48	50	45	45	99	107	218	209
Telecommunication eq.			79	73	99	108	100	96	84	80	100	107	150	142
Consumer electronics			62	63	73	88	69	73	68	71	72	71	207	199
ICTechnologies			59	58	69	76	72	73	63	63	96	103	189	179

(1) Inventions with patent application in at least two countries
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.1.1992)

Table 10: Most ingenious companies in information and communication technologies

Rank	Company All Companies	Country of origin	Number of inventions (1) in 1988/89 ICT (2)	EDP	TCO	CEL	CHIPS
1	IBM	USA	1 176	1 038	255	164	261
2	Toshiba *	JPN	1 042	740	212	300	515
3	Canon KK	JPN	989	770	244	214	195
4	Philips *	EC	888	362	290	539	198
5	Siemens *	EC	798	303	424	94	243
6	Hitachi *	JPN	787	577	144	308	236
7	Sony Corp	JPN	673	458	131	530	60
8	Mitsubishi Electric *	JPN	636	430	160	227	356
9	Matsushita *	JPN	630	346	140	415	113
10	Fujitsu *	JPN	628	347	234	82	255
11	NEC *	JPN	618	334	265	92	163
12	Thomson *	EC	571	202	175	363	204
13	ATT *	USA	527	184	390	16	165
14	Sharp KK	JPN	493	350	97	186	89
15	Eastman Kodak *	USA	412	305	104	126	47
	European Companies						
1	Philips *	NL	888	362	290	539	198
2	Siemens *	D	798	303	424	94	243
3	Thomson *	F	571	202	175	363	204
4	Alcatel *	F	333	46	295	52	22
5	Bosch *	D	241	53	164	88	34
6	Daimler Benz *	D	157	26	103	46	34
7	British Telecomm	UK	107	11	95	11	11
8	Merck Patent Gmbh	D	104	5	6	5	6
9	BASF AG	D	101	90	8	67	20
10	France Etat	F	100	22	65	42	23
11	Hoechst *	D	99	44	25	18	51
12	Bull *	F	95	88	9	6	7
13	Nokia *	SF	85	8	56	38	0
14	GPT *	UK	79	13	62	13	22
15	Marconi *	UK	73	6	43	28	5

** = including subsidiaries*
ICT = Information and communication technologies (EDP+TCO+CEL)
EDP = Technologies relevant for office machinery, EDP equipment
TCO = Technologies relevant for telecommunication
CEL = Technologies relevant for consumer electronics (audio, tv etc.)
CHIPS = Technologies relevant for semiconductors
(1) With patent application 1988/89 in at least two countries.
(2) Double counting excluded
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.1.1992).

an improvement of competitiveness of European industry on the ICT markets calls mainly for an abolition of inner-European barriers to market entry and for more competition. The completion of the internal EC market by 1993 is without doubt a step in the right direction.

Position of EC companies in the race for innovations

The ranking of companies shows that the weak European position as a location for R&D corresponds to a weak position of EC companies (Table 10). Unlike the case for all fields of technology, in the application of microelectronics there are far fewer EC companies present in the ranks of the most ingenious companies. As far as possible, the table compares again consolidated inventions by company.

The ranking of the most ingenious companies in semiconductor technologies differs from the ranking in the technologies relevant for ICT equipment. Most inventions in semiconductors originate from Toshiba and Mitsubishi Electric, followed by IBM and Siemens in the period 1988/89. The strong technological position of IBM in ICT equipment is owed to its still excellent position in electronic data processing equipment.

In this field of technology, Philips is the only EC firm which ranks among the top ten. Siemens (including Nixdorf) only ranks 13. In consumer electronics, although Japanese companies dominate technological improvements, the most ingenious single company is Philips. Thomson ranks fourth. In fact, European companies perform best in the area of telecommunication technologies. With Siemens, Alcatel and Philips, three European companies rank among the top five in this area of technology. Thomson, Bosch and Daimler Benz follow with ranks between 10 and 17.

The correspondence between the differences in technological position of the EC as a location for R&D by field of ICT and the differences in the ranking of EC companies by field of ICT indicate that the weak competitive position of European ICT industries reflects a lack of companies big enough to meet the challenges of the internationalised ICT markets. With the completion of the internal market, the ICT newcomers like Alcatel, Bosch, Daimler, Mannesmann should have a chance of growing into such a position. The inclusion of the EFTA countries could also bring companies like Nokia and Ericsson in a position to perform better in the race for new applications of microelectronics.

Table 11: Environmental protection technologies
Number of inventions (1) worldwide and by countries of origin and changes (%) from 1986/87 to 1988/89 (2)

Sector	World		D		F		UK		EC		USA		Japan	
period (2)	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Total (3)	4 875	5 408	1 468	1 588	283	335	243	298	2 262	2 569	1 121	1 245	609	676
(%)		10.9		8.2		18.4		22.6		13.6		11.1		11.0
Breakdown by environmental area														
Waste management	1 145	1 164	488	447	70	63	45	44	664	652	215	221	77	95
(%)		1.7		-8.4		-10.0		-2.2		-1.8		2.8		23.4
Waste water treatment	1 727	1 970	484	564	105	119	97	117	782	926	373	458	182	208
(%)		14.1		16.5		13.3		20.6		18.4		22.8		14.3
Clean air measures	2 000	2 129	629	587	79	125	91	109	884	922	542	540	311	348
(%)		6.5		-6.7		58.2		19.8		4.3		-0.4		11.9

(1) With patent application in at least two countries
(2) Period I = 1986 and 1987; period II = 1988 and 1989, based on the year of first application"
(3) Double counting excluded
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.01.1992)

Technologies for environmental protection

Definition of the R&D field

Environmental problems arise both from the harmful production techniques of various industries and also from individual life-styles (e.g., heating, private transportation). In the past, measures adopted (laws, standards) for the protection of the environment primarily involved the employment of technologies to reduce emissions. Preventive environmental protection, i.e., the prevention of emissions by changing production techniques and the behaviour of all concerned has, however, now been recognised as a better way to address the problems.

In this report, the development of technologies relevant to environmental protection has been made on the basis of patent applications in three areas: waste management, waste water treatment and clean air measures. For the technological field "waste management", the IPC category "chemical means for combating harmful chemical agents; processes for making harmful chemical agents harmless" was included as well as inventions in the area of disposal of solid waste (dumping or destroying of waste or its transformation into something useful or harmless). Statistics in the area of "waste water treatment" include, for example, the biological or multistage treatment of waste water, sewage or sludge and recycling procedures such as the regeneration of pulp liquors in the production of cellulose or paper. "Clean air measures" include, among others, technologies to reduce air pollution. This includes inventions for flue gas desulphurisation (SO_2) as well as circulating fluidised bed combustion and the field of inventions for reducing NO_x emissions.

Because of the methodological approach, however, overlapping in fields of technology is not always excluded, such as in the case of waste removal by thermal procedures, since this also affects the area of "air". In the overall profile of environmental techniques, however, double counting has been avoided. Areas such as energy conservation and noise abatement, which could not be demarcated clearly enough on the basis of the IPC, were not taken into account.

Long-term trends and recent changes in the focus of worldwide R&D

The development in the number of patent applications in at least two countries in the area of environmental technology as a whole shows strong innovation efforts in the USA, West Germany and Japan at the beginning of the 1970s. The awareness of the necessity of implementing measures to protect the environment led, for example, already in 1967 in Japan to the "Basic Law for Environmental Pollution Control" (with a revision in 1970) and set clear framework conditions for technological solutions to the problem. Japan made most of its patent applications in 1975, a level which has subsequently not been reached. For the USA, a stagnation can be seen from 1971 to 1988, with a strong increase occurring in 1989.

West Germany made a major contribution to the rising trend for R&D efforts in the EC. The hotly debated environmental discussion with new laws for clean air and other measures

Table 12: Environmental protection technologies
Share of inventions (1) by country of origin (in %)

Sector	World		of which: D		F		UK		EC		USA		Japan	
period (2)	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Total (3)	100.0	100.0	30.1	29.4	5.8	6.2	5.0	5.5	46.4	47.5	23.0	23.0	12.5	12.5
Breakdown by environmental area														
Waste management	100.0	100.0	42.6	38.4	6.1	5.4	3.9	3.8	58.0	56.0	18.8	19.0	6.7	8.2
Waste water treatment	100.0	100.0	28.0	28.6	6.1	6.0	5.6	5.9	45.3	47.0	21.6	23.2	10.5	10.6
Clean air measures	100.0	100.0	31.5	27.6	4.0	5.9	4.6	5.1	44.2	43.3	27.1	25.4	15.6	16.3

(1) With patent application in at least two countries
(2) Period I = 1986 and 1987; period II = 1988 and 1989, based on the year of first application"
(3) Double counting excluded
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.01.1992)

Table 13: Environmental protection technologies
Activity of invention (1) (2) (in %)

Sector	World		of which: D		F		UK		EC		USA		Japan	
period (4)	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Environmental protection as total (3)														
invention activity (1)	3.2	3.2	5.2	5.3	3.0	3.1	2.4	2.6	3.9	4.1	3.0	2.7	1.6	1.7
Activity index (2)	100	100	161	164	93	97	74	82	121	127	92	84	50	52
Breakdown by environmental area														
Waste management														
Invention activity (1)	0.8	0.7	1.7	1.5	0.7	0.6	0.4	0.4	1.2	1.0	0.6	0.5	0.2	0.2
Activity index (2)	100	100	228	214	98	84	58	56	152	150	75	69	27	34
Waste water treatment														
Invention activity (1)	1.1	1.2	1.7	1.9	1.1	1.1	1.0	1.0	1.4	1.5	1.0	1.0	0.5	0.5
Activity index (2)	100	100	150	159	98	94	83	88	119	125	86	85	42	44
Clean air measures														
Invention activity (1)	1.3	1.3	2.2	2.0	0.8	1.2	0.9	1.0	1.5	1.5	1.4	1.2	0.8	0.9
Activity index (2)	100	100	168	154	63	91	68	76	116	116	108	93	62	68

(1) Number of inventions of the selected technical field in relation to all technical fields, based on the patent application in at least two countries
(2) Relation of the invention activity of the region to the invention activity as total (average = 100).
(3) Double counting excluded
(4) Period I = 1986 and 1987; period II = 1988 and 1989, based on the year of first application
Source: EPIDOS/INPADOC, Ifo Patent Statistics (update 10.01.1992)

Table 14: Environmental technologies
Ranking of firms and institutes worldwide and in the EC

Worldwide

1	Bayer AG	45	D
2	Henkel KGAA	44	D
3	Metallgesellschaft AG	41	D
4	Degussa	40	D
5	Hoechst AG	38	D
6	Dow Chemical Co	36	USA
7	Westingshouse Electric Corp	29	USA
8	BASF AG	28	D
9	Linde AG	27	D
10	Inst. Francais du Pétrol	26	F

EC

1	Bayer AG	45	D
2	Henkel KGAA	44	D
3	Metallgesellschaft AG	41	D
4	Degussa	40	D
5	Hoechst AG	38	D
6	Linde AG	27	D
7	Inst. Francais du Pétrol	26	F
8	Air Liquide	22	F
9	Air Prod & Chem	22	F
10	Daimler Benz AG	19	D

Source: ifo Institut

gave a boost to innovations. The number of market-relevant patent applications exceeded those of the USA in 1985. Thus, West Germany accounted for 30% of world patent applications for environmental technology and 62% of those in the EC (Tables 11 and 12).

A comparison of the two two-year periods 1986/87 with 1988/89 shows a slightly below-average growth rate for West Germany. Of note are increased technological activity in the United Kingdom (+22.6%) and France (+18.4%). Differentiated according to environmental areas, research in France was stepped up primarily in clean air measures (+58.2%), and in the United Kingdom in waste water treatment. The latter area has also been assigned greater importance in the USA, whereas inventions in Japan indicate intensified research in waste management.

But it must not be overlooked that - in terms of the total R&D output in the world for all areas of technology with patent applications - the number of patent applications for environmental technologies must be regarded as low and in addition has declined slightly. In 1980 the world share of patents for environmental technologies in total registered patents was still at 3.5% and since 1986 has stagnated at ca. 3.2%. The downward trend is even stronger in the USA and Japan, where the share of environmental patents in total patents in 1988/89 was 2.7% and 1.7% respectively, compared to 3.4% and 2.2% in 1980 (Table 13). These countries have evidently concentrated their marketing claims in other areas of technology. France and the United Kingdom also did not reach the shares they recorded in 1980. Only Germany showed an above-average specialisation, with a share that reached nearly 5.4% in the late eighties.

Position of the EC as a location for R&D

Table 12 shows for Germany a dominating share in innovation related to waste management with more than 38% of the world patents in this area in the world and nearly 70% of the EC patents. However, the development for Germany shows that research is now focusing on the problem of waste water treatment (+16.5%). It is not surprising that at the same time the number of patent applications in the area of clean air measures has declined since policies on preventing air pollution in Germany have brought out a major improvement by the reduction of emissions of dust (filters) and NO_x (catalyzers). In the process, many technical solutions have been patented and implemented.

In comparing technological competitiveness it is helpful to provide a normalised listing of patent applications, i.e. to equate the average activity in a field of technology for a country or region with 100. This comparison shows above-average values for the EC in environmental technologies which - as mentioned above - are attributed to the German contribution.

Although the problem of waste management is in urgent need of a solution, only 0.7% of all patent applications worldwide are in this area. Although the figures for the EC are above

Table 15: Environmental technologies
Number of patent applications by country of origin

Waste management (1)	
BR Deutschland	83
USA	30
Japan	10
Finland	8
Italia	5
Switzerland	2
United Kingdom	1
Waste water treatment (2)	
BR Deutschland	152
USA	105
France	31
Japan	22
Switzerland	21
United Kingdom	21
Finland	12
Australia	7
Italia	6
Austria	5
Nederland	5
Sweden	3
Clean air measures (3)	
BR Deutschland	246
USA	186
Japan	132
France	50
United Kingdom	26
Sweden	13
Switzerland	12
Finland	11
Austria	10
Danmark	5
Canada	5
Nederland	1
Rest of world	2

(1) Number of companies: 20
(2) Number of companies: 45
(3) Number of companies: 72
Source: ifo Institut

average, countries such as France and the United Kingdom are clearly below. For the USA, applications show stagnation at a below-average level of activity. For Japan, despite an increase in patent applications of 23.4% for period II/I, the activity index at only 34 points is still extremely below average.

Position of EC companies in the race for innovations

The ranking in Table 14 indicates those firms which have made most patent applications worldwide for inventions in the area of environmental technology in 1988/89. Most of these firms, due to their size, are also strongly represented in sub-areas of technology.

In this list of the first ten, none are Japanese firms. The following Japanese companies ranked 18, 20 and 22 worldwide: Mitsubishi Heavy Ind. Ltd, Nippon Catalytic Chem. Ind. and Ebara Corp.

The ranking of sub-areas for 1988/89 at a minimum of 5 inventions (per firm) with patent applications in at least two countries is indicated in Table 15.

SUMMARY

Today's competitiveness in R&D output is tomorrow's competitiveness in turnover. One widely used method for measuring R&D output is the analysis of inventions applied for patent which allows a very differentiated breakdown of worldwide R&D activity on a comparable basis. The use of information from patent applications gives a more up-to-date picture than from granted patents.

This approach shows that the technological position of the EC is very strong in many R&D fields. In all fields of technology, the EC has a clear lead when inventions with supranational importance are considered. But there are sectors in which the USA (biotechnology) or Japan (microelectronics) are leading, or where a head-on competition can be registered (advanced materials). Generally, it can be said that the EC position is less strong in science-based fields, and stronger in engineering-based activities.

Within the EC, Germany, France, and the United Kingdom are the leading inventors. The analyses of some future-oriented fields of technology showed that in the R&D field of biotechnology, despite the leading position of the USA, nearly 30% of inventions come from EC countries, with Germany and the United Kingdom in first and second place. The sector of advanced materials is equally shared by the EC and Japan (over 30% each), with the USA somewhat behind. In the fields of microelectronics applications between 40% and 50% of inventions are from Japan, except in the telecommunication sector where Japan also is leading but closely followed by the EC and the USA. The relatively strong technological position of telecommunications offers Europe a chance to catch up in ICT applications because the importance of telecommunications will increase in the emerging era of networking the islands of information processing facilities and of individual communication. The fourth future-oriented field of technology, environmental protection technologies, is a domain of the EC, mainly of Germany.

A worldwide breakdown of invention activities by companies sees Toshiba and Siemens on top of the list, followed by Japanese, American, Dutch, and German companies. In both the world ranking and the EC ranking the dominance of the chemical and the electric/electronic industry is obvious.

In summary, although the EC position in the international race for inventions is satisfactory, strong efforts are nevertheless necessary to maintain or improve this position.

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Cooperation between small enterprises within the EC

THE EMERGENCE OF COOPERATION

There are many considerations which together lend overwhelming support to the concept of cooperation among small enterprises. Cooperation enables small enterprises to overcome disadvantages arising from the small scale of operations (high fixed costs), a limited scope of production (exclusion from many lucrative markets), a low market power as buyers and as sellers (exploitation by strong suppliers and strong clients) and structural financial weakness (inability to adjust and to modernise). In fact, for small enterprises, cooperation is the means to match in several respects the advantages of large enterprises without a loss in independence.

Therefore, it is somewhat surprising that cooperation among small enterprises is the exception rather than the rule throughout the various industry and service branches. Only in the retail trade and, to some extent, in urban taxi services, is cooperation a frequent phenomenon.

Two fundamental reasons can explain why cooperation among small enterprises is not as universal as its general advantages might suggest:

- 1) While there are opportunities for beneficial cooperation across a wide range of economic activities, there is relatively little real need for it, i.e. the survival of the SME in the market does not normally depend on it.
- 2) Cooperation neither emerges automatically out of an opportunity nor is it gratuitous. To establish it constitutes an investment that costs. And it takes a tremendous effort to overcome the many "natural" obstacles which are rooted among others in the individualistic resistance against collective discipline. Often there is nobody who will take it upon himself to organise cooperation and is capable of doing so.

These two general observations make it plausible that cooperation between small businesses is the exception rather than the rule. But, in order to explain why in some countries small enterprises cooperate much more frequently than in others, we have to consider the following factors:

- opportunities and needs
- organisation
- attitudes
- legislation and policy.

Opportunities and needs

The importance of cooperation for small enterprises is closely linked to the wider issue of these enterprises' place in the modern industrial and service economy. Historically, cooperation between small enterprises was often linked to the defence of a whole way of life and a social order which had their roots in a pre-industrial mode of production.

Today, the battle against the impoverishing effects of industrialisation has been fought successfully on fronts other than SME cooperation. It has resulted in the economic emancipation of the working class. The status of a salaried employee conveys several privileges the independent entrepreneur does not have. Thus, from a normative point of view, the case for the defence of small enterprises at any price is much less convincing. And, in fact, in many areas SMEs have had to give way to larger enterprises, capable of organising production more efficiently and of innovating more systematically.

But there are many economic activities for which smaller enterprises are better suited than large ones. And, while it is true that large enterprises have not stopped invading former niches of small enterprises, it is also true that new niches arise continuously. In fact, large enterprises themselves constitute one of the most important markets for small suppliers of goods and services. The constitution of new large firms typically gives rise to new business opportunities for many small firms as well. Even within the same sector there are patterns of symbiosis between large and small firms.

For those SMEs whose place in the market is based on "natural" advantages linked to small size, cooperation is not vital, although it might be advantageous. For the others, the attempt to match via cooperation the advantages of their big competitors can easily resemble swimming against the current - a brave effort but ultimately in vain. At any given point in time, to start cooperation is really appealing for only three specific segments of SMEs:

- (a) Those which have just started to feel or which foresee in the not-too-distant future the pressure of large-scale competition. But, even for them, cooperation is normally just one strategic option. Another frequently more readily accessible one is the shift into different market segments. Still another and in many ways simpler one is to join the large-scale competitors through franchising arrangements.
- (b) Those who are confronted with new needs for which there is no adequate supply in the market yet, e.g. specialised data processing or specialised waste disposal facilities. Both type-a and type-b cooperation are facilitated by the homogeneity of the partners' businesses with regard to size, product and kind of clientele.
- (c) Those who are confronted with attractive market chances, which are foreclosed, however, to the individual SME and require extended supply facilities. This kind of cooperation presupposes complementarity among the partners (with regard to product profile and/or clientele) rather

than homogeneity. Mutual competition is to be avoided at any rate.

The extent to which these three conducive conditions are present differs from sector to sector. Obviously, it is time-bound, i.e. it changes in accordance with technological and regulatory developments favouring larger or smaller businesses. Particularly factors (a) and (b) point to specific moments in the development of an economic sector rather than to permanent characteristics. They refer to transitory opportunities, which must be seized in time. For several problems which SMEs face the cooperative solution is just one alternative. Once another solution is established the case for cooperation is rather weak. Such an alternative solution can be developed, for example, by the market in the form of attractive commercial supply. To set collective self-supply against it has always proved to be very difficult, even if this would offer additional advantages in the longer run.

Whether opportunities and needs for cooperation present themselves more or less frequently in a country obviously depends on its economic structure. In our sample of seven EC countries this factor singles out Italy as the country where SME cooperation should be expected to appear most frequently, because the market share of small businesses is generally highest there (as a consequence of a complex political blockade to the development of the corporate sector). At the other end of the scale we have Ireland and Britain. In Ireland, the scope for SME cooperation is rather limited, because the late industrialising open Irish economy has allowed only those small businesses which fit into typical SME market segments and thus are able to survive well on their own to develop. The very base for SME cooperation outside the primary sector always has been particularly narrow there. In Britain, the concentration of production has progressed further than elsewhere and has narrowed the scope for SME cooperation in the process, even though this trend has reversed somewhat over the last decade.

Organisation

In order to form a cooperative or another legal form of institutionalised cooperation (a "quasi-cooperative") somebody has to take the initiative and promote the idea among potential partners. Once a collective decision to cooperate has been taken, the common enterprise has to be set up, and the behaviour of the partners has to be coordinated. All that requires time and dedication. In addition, it requires either expertise or additional time and money to acquire.

The initiative can emerge out of the dynamics of an already existing and interacting group. But even if cooperation is desirable, it is normally a big step from general interest in an idea to its active implementation. Normally it requires a leader who pushes ahead on his/her own or who offers him/herself to the group as the agent to set up the cooperative venture. Again, persons who are (a) motivated enough to take on this leadership function and (b) endowed with sufficient competence, authority, time and maybe even money, are not readily available whenever there is an economic opportunity or need for cooperation.

Moreover, the leadership function does not only consist of agency services. In addition, it has to induce the led ones to conform with collective decisions and to abstain from disruptive behaviour which imperils the collective cause -particularly in the face of tempting offers by competing suppliers who try to keep their clientele from cooperating.

All these considerations point to the fact that a non-cooperative solution to a problem of economic coordination, be it a market solution based on demand and supply, be it an in-house solution based on power and authority, is in many respects easier than a cooperative one. It is more likely to succeed.

Altogether, the incidents where cooperative ventures during the past decades have been promoted and set up by individual leaders or have emerged out of a collective initiative are scattered. Examples for the prominent role of individual leadership are:

- DATEV, the German fiscal advisors' giant data processing cooperative, whose launching at a particularly conducive point in the development of the profession's market must be attributed largely to the initiative of one representative of a regional professional chamber;
- the French transport cooperative "la Flêche cavaillonaise", which is the product of one particular "founding father" and partner.

Most instances where individual initiative without organisational mandate was of decisive importance are found when the promoter perceives special opportunities for his own business. In this respect one can consider the promotion of a cooperative venture as an extension of private entrepreneurship. In the case of DATEV, however, there was also a clear preference for a collective solution to the problem at issue which implied a decision against private market solutions. In fact, it was the quick determined seizing of the opportunity on behalf of a cooperative solution which prevented private suppliers from occupying the emerging market. In all other countries the same field has been left to commercial suppliers. In France, for example, a large data-processing centre for tax advisors is being run by a group of big banks, a software house and others.

The emergence of a cooperative venture out of a collective initiative cannot always be neatly distinguished from the preceding pattern, since in the formation of a collective decision key individuals often play an important role. But there are instances where group dynamics clearly dominate the decision-making process. Among others, this was the case with:

- the cooperative of the German "alternative" insurance traders, whose group cohesion was reinforced by their explicit deviation from ordinary professional standards and their consequent separation from established institutions providing auxiliary services;
- the cooperative solution of tanners in Valdarno Inferiore (Italy) to the newly arising problem of having to recondition the water contaminated during the first phase of hide processing - a solution facilitated by continuous physical and social proximity and, of course, by the country's "cooperative culture";
- the French cooperation of leather product manufacturers IFCO, which arose out of a network of already existing informal contacts.

There are certainly more examples. The essential message here refers to their isolated and specific character. The alternative to the unsystematic emergence of cooperation out of highly specific and, by definition, exceptional circumstances is the systematic promotion by an institution explicitly dedicated to this task and funded for it. Such institutional promotion can be done by professional and business associations, by the cooperative movement, or by government bodies. However, our investigation has rendered only few examples where such organised promotion has had relatively good success. The following cases can be listed here.

Italy: The big Italian cooperative federations - on national, regional and provincial level - promote the formation of new cooperative ventures in varying legal forms: they look for eligible partners, they help with all the legal and administrative work connected with the founding process, and they offer advice and direct help in managerial and financial issues. In doing this the cooperative federations can draw upon substantial resources as regards manpower and finance, on favourable legislation and general political support, and on

long-standing "cooperative culture", which makes for a favourable disposition on the side of the SME. This way, they have created many hundreds of new cooperative ventures in the past years, a success all the more notable because of the already large stock of existing cooperatives and cooperative-like companies.

Catalonia: The Federation of Service Cooperatives of Catalonia has contributed decisively to the foundation of more than 100 new SME cooperatives in all kinds of economic sectors since 1987. It has taken the initiative to promote cooperation in the form of countless seminars, conferences, written exposes, and personal talks with representatives of small business, crafts, and independent professions. It has also assisted the actual founding processes with its legal and administrative expertise and with its manifold good connections. It seems that a good deal of this organisational achievement must be attributed to the personal involvement of the federation's long-time president, which underlines again the importance of the "leadership" factor even within established organisational settings. Like in Italy, the federation was helped in its promotional activity by a strong cooperative tradition in Catalonia and a favourable official attitude.

France: A similar case on a much smaller scale is the creation of 27 transport cooperatives by the French sectoral cooperative federation UNICOOPTRANS. Here, too, the personal role of the manager of UNICOOPTRANS has been of overwhelming importance.

The French Confederation of Crafts Cooperatives and Groupings (CGCGA) and its sectoral branch FNACB (construction) helped to create more than 350 new cooperatives of independent crafts businesses after 1983. Of decisive importance for this record was (a) the explicit statutory commitment of CGCGA to the creation of new cooperatives; (b) the cooperative law of 1983, which offered an especially well suited legal form to crafts cooperations and endowed it, on top, with fiscal privileges; (c) government funding for CGCGA's promotion campaigns. But again, the case of CGCGA also points to the difficulties of overcoming SMEs' resistance to cooperation: CGCGA members' turnover represents only 1% of the turnover of French crafts businesses.

Spain: The Spanish government Institute of Small and Medium-sized Industrial Enterprise (IMPI) has in the course of the past 10 years or so promoted more than 100 cooperative ventures among small businesses of many different sectors. Apart from general brokerage services, a decisive element for this success has been IMPI's participation with temporary risk capital in the newly established "companies of collective action", something which proved attractive to many businesses. However, the case of IMPI also highlights two important difficulties encountered by institutional promoters of cooperation: budget limits and distrust by SME of official agents.

United Kingdom: The National Cooperative Development Agency in the UK helped in the few years of its existence to create several dozen cooperative ventures among SMEs. This case highlights most clearly the importance of government funding. Cooperative expansion stopped in the UK as soon as NCDA funding was discontinued. Apart from the commitment of the NCDA promoters and the agency services they were able to offer to the new cooperative ventures, their success can be explained to some extent by the low level of cooperation they started from.

Other attempts at organised promotion of SME cooperation were considerably less successful. The difference between success and failure seems to be attributable mostly to differences in the human and financial resources available for promotion. None of the less successful agencies were predominantly or even exclusively devoted to the creation of new cooperative ventures. This was a relatively marginal task compared to several others. Another condition of promotional success is the access the promoting institution can establish with its target group, the small businessmen. In this regard it is of extremely high value that the cooperative cause has been adopted by the professional organisations. That this was not the case marked a serious limitation of most of the above listed campaigns, if compared, for instance, with the pervasive success of cooperativism in Italy, among several German crafts, and in retail trade.

Still, our findings lend overwhelming support to the notion that explicitly pursued and well-funded promotion is of supreme importance for the actual emergence of SME cooperation. All cases where we have a creation of new SME cooperatives or similar entities in large numbers can be attributed to this factor.

Attitudes

Systematic promotion seems to be the key to SME cooperation on a large scale. But the disposition of small businesses to respond positively to such promotion still differs from country to country. Besides, the question must be raised: what makes for systematic promotion? This directs the attention to the factor "attitudes".

To some extent this factor is sector-specific. A condition which seems to increase the disposition to cooperate - in spite of the notorious individualism of small independent business everywhere and throughout all branches - is a relatively high level of professional education and a certain professional tradition or "culture", as we find it, e.g. with crafts but not with newly independent lorry drivers. But there are also significant country-specific differences. We might refer to them as the "ideological environment". This factor has at least three dimensions:

- the prevalence of individualism versus an inclination to cooperate within the business world, and the society in general;
- historical experience and familiarity of the business world with institutionalised cooperation;
- the prevalence of economic pragmatism versus the prevalence of "Social Economy" ideals within the cooperative movement;
- government attitude towards SME cooperation.

A positive ideological environment can reflect the historical strength of cooperativism in a country or a region (prime example: Italy). It can also originate in a relatively recent social movement to which certain groups adhere. On the other hand, the association of cooperation or certain forms of it with a social movement and its ideology can become a negative factor, turning off those who are more oriented towards economic advantage than meta-economic values. With a note of caution, we can characterise the ideological environment in the various countries of our investigation as follows:

Belgium: Strong association of cooperativism with the ideals of a non-capitalist "Social Economy", which proves a handicap for the formation of SME cooperatives; slightly positive government attitude.

UK: The idea of SME cooperation is largely absent from the economic "culture"; moreover, strong association of cooperativism with the ideals of a non-capitalist alternative economic order, which reinforces business distrust, while the cooperative movement itself remains sceptical about SME cooperation; government attitude during the 1980s mostly hostile.

France: On the one hand, strong association of cooperativism with the ideals of a non-capitalist "Social Economy"; on the other hand, pragmatic outlook of those organisations which represent service cooperatives, tendencies which compensate each other to some extent; positive government attitude throughout most of the 80s.

Germany: Strong historical roots of cooperativism (also in East Germany), associated almost exclusively with the form of SME cooperatives but also with agriculture and crafts, which makes for a somewhat pre-industrial tint; main-stream cooperative ideology emphasising economic pragmatism with an explicit anti-Social-Economy accent; general acceptance of the idea of SME cooperation in forms other than cooperatives; neutral government attitude.

Ireland: Idea of SME cooperation outside the primary sector largely absent from the economic "culture"; neither positive nor negative ideological connotations; neutral till slightly positive government attitude.

Italy: Strong historical roots of cooperativism; pragmatic outlook of the cooperative movement; SME cooperation widely accepted part of the economic "culture"; strongly positive government attitude.

Spain: Strong association of the main-stream cooperative movement with the ideals of a non-capitalist "Social Economy" and with the form of worker cooperatives; therefore a certain neglect of SME cooperatives; at the same time pragmatic outlook oriented at economic success; wide-spread distrust among SMEs of any cooperation and in particular of government initiatives; strongly positive government attitude.

Relating the factor "attitudes" or "ideology" to the other explanatory factors, its highest importance seems to be its influence on systematic promotion. This can be seen clearest where a positive government attitude leads to the establishment and funding of a promotional agency. This has been the case in Spain and - paradoxically - for some time in anti-cooperative Britain. In Italy, but to some extent also in Spain and France, we have the case that the mobilisation of resources for the promotion of pragmatically oriented SME cooperation is ultimately rooted in the ideological vigour (and the economic and political strength) of the wider cooperative movement. In the context of such considerations it strikes the attention that the equally strong cooperative movement of Germany exhibits much less promotional zeal.

Legislation and policy

Favourable legislation and government policies have contributed to the emergence of new SME cooperatives in various ways. The most direct and important, of course, has been the funding of promotional efforts, which we found in Spain, France and - temporarily - in Britain.

Another aspect which apparently has mattered in the past is adequate legal provisions for cooperative enterprises. In France, there was a surge of such new enterprises in the wake of a law in 1983 which established the cooperative of craft shops as an own enterprise type with specific rights and obligations oriented at the needs and the limitations of such cooperations. However, it is not clear how much of that surge can be attributed to the newly established enterprise type, because the same political initiative which brought about the favourable legislation also provided for the subsidies to CGCGA which helped funding its large-scale promotion activities.

State regulations - endowed with legal sanctions or not - also affect the opportunities for advantageous cooperation. Tax privileges and other subsidies can add to the economic advantage to be gained through uniting certain business functions. Even though we find such privileges in France and Spain they are not of such a magnitude that they would by themselves define an economic advantage of cooperation as compared with non-cooperation. Most of all, they discriminate in favour of the legal form of a cooperative, compensating somewhat its inherent disadvantages. In part they also have the function of an investment subsidy, which facilitates the seizure of an economic opportunity.

Trade policy is another example which illustrates the effect of state regulations on SME cooperation. When former trade barriers are removed, the need for cooperation between hitherto protected SMEs can increase. It also opens up new market opportunities which are accessible for SMEs only if they cooperate. European integration and the fear of increasing competition derived from it seems to have induced some new cooperation in Spain, where this topic has been used as a stimulus by promoting agents.

Finally, regulation also restricts the scope for SME cooperation, as is the case in Italy and Belgium, where practitioners of certain liberal professions are prevented from it by law, or in Britain, where the government's competition policy keeps bus companies from cooperating for common business.

THE DEVELOPMENT OF EXISTING COOPERATIVE VENTURES

Once they have been set up, cooperatives and "quasi-cooperatives" of small businesses are susceptible to two types of forces, internal and external. Internally they are exposed to centrifugal as well as to centralising tendencies. The former are embodied in the member SMEs, whose primary preoccupation is their own economic success and who exhibit a latent tendency towards short-term considerations. Centralising tendencies are embodied in the managers of the cooperative enterprise, who are entrusted with the well-being of the group as a whole and insofar bound towards a longer-term perspective, but who are also interested in the success of the common enterprise as such, regardless of the members' preferences. Externally, changing market conditions pose challenges and present opportunities. Both the success of the cooperative enterprise and that of the member SMEs depend on the appropriate response. The ultimate sanction for response is disappearance from the market. But success has its price too. It might be profound transformation.

Concentrating on performance (rather than structure) as our primary criterion of cooperative development we should distinguish from the outset three main purposes of cooperation:

A) survival in the competition with larger companies (need, focusing on costs);

B) rationalisation for better economic results (option, focusing on costs);

C) fitness for extended business (option, focusing on the scope of production).

Cooperation for the purpose of survival

Such cooperation involves small businesses which do not operate in a niche market for which small size is appropriate, but in a market segment in which smallness has become a "natural" disadvantage. Through cooperation they try to defy the pressure of the market for structural change. The one trade where cooperation is most clearly dominated by the survival motive is retail trade. To a minor extent it applies to craft bakers, who are confronted with the competition of industrial bakers.

Here the main challenge for existing cooperatives and "quasi-cooperatives" has been and continues to be the increase in competitive pressure on the member SMEs. Initial ways of cooperation have again and again proved insufficient to match the ever-increasing advantages of large-scale competitors. This fundamental challenge is the background to various development patterns.

First, as far as success in achieving the basic purpose is concerned, cooperation has not been able to prevent the advance of concentration in retail trade. Everywhere a very large number of small retail shops have had to close down. However, cooperation can slow the process and build up a new defence line. For the overwhelming majority of their members, the retail cooperatives are today a necessary condition of survival as independent firms. However, it is mostly the larger ones

among SMEs which have the greatest chance of survival with the help of cooperation. Most of the still really small shops are unanimously said to be doomed, unless they are placed in a protected market niche (defined e.g. by a special location or a range of merchandise which is not subject to price competition).

Second, the necessity to match the increasing economies of scale reached by the large supermarket chains, department stores, etc., has profoundly affected the relationship between the cooperative enterprise and its members. For the latter this has meant an increasing loss of independence. The ongoing trend in cooperation ranges from the common purchase of merchandise to the common and more tightly coordinated and supervised marketing concepts and product range strategies, which in turn are the precondition for the achievement of ever higher scales in purchasing.

Third, also dictated by the need to reach ever-increasing economies of scale has been a centralisation process within the cooperative structure, that is, a shift of decision-making away from the individual cooperative to the cooperative central at national level. It has gone hand in hand with a move towards fewer and ever larger cooperative enterprises. The single national cooperative has become the dominant pattern in retail.

Four, the indispensable quest for larger scale has triggered initiatives by the cooperative organisations to actively expand business beyond the members' current capacities or needs. One way to do this has been the active search for new members. Another has been the creation of branch shops directly administered by the cooperative enterprise and thus separate from the members' business. With the German food retail cooperative REWE, for example, such directly administered branches have by now come to account for more than 40% of the group's overall turnover. Often the members of the cooperatives do not endorse these initiatives, which they consider as unrelated to their own interests or even as competing with them.

Five, the increasing importance of common marketing strategies, based on common product ranges, common brand names and a common image has reinforced selectivity with regard to the admittance of members to the cooperative group. Welcome are only relatively strong and well-managed enterprises for the success of the strategy depends on reliable and competent implementation throughout the group.

Finally, in order to reconcile the need for a certain homogeneity with the need for large scale and with the principle of solidarity, retail cooperatives have introduced separate strategies, sometimes associated with different names, for different types of member SMEs.

Altogether, cooperative ventures formed for the purpose of survival closely follow the dictates of the market. These dictates favour the inherent centralisation of the cooperatives' management. This doesn't leave much leeway for the quite visible centrifugal tendencies of independence-minded members and little room for ideologically inspired variations. Management incompetence carries the immediate threat of bankruptcy. There is no indication that support from outside, be it from the state or from the broader cooperative movement, has played a significant role.

Optional cooperation for the sake of better economic results

This category applies to small businesses which operate in more or less protected market segments, not contested by large competitors. Such businesses include craftsmen oriented towards local markets, practitioners of liberal professions, or taxi drivers. If they cooperate, they do it in order to rationalise their purchase of inputs and to achieve bargaining power vis-a-vis their suppliers. Depending on the market situation, the costs saved this way boost their profits or allow them to offer cheaper goods or services to their clients. But enterprises of this category also cooperate in order to supply each other with services and sometimes even goods which are not readily available in the market at the same quality and/or price. Mostly this refers to branch-specific consulting services on technical and economic issues. Such services are mostly offered by the central organisations of cooperatives whose principal function is common purchase. However, in some cases the collective self-supply of services is the central purpose of the cooperative enterprise. This is the case, for instance, with taxi drivers' cooperatives which run booking centres for their members or with the German fiscal accountants' data processing cooperative.

Since cooperation is not vital in this category there is no need to adjust it to the dictates of large-firm competition. The challenge cooperative enterprises face here is another one: it is they who have to compete with the commercial suppliers of their members in order to stay in business. It is a typical pattern in the relationship between the cooperative enterprise and its member SME that cooperation is put in jeopardy by the availability of attractive supply alternatives for the members paired with low commitment on the members' side to the cooperative cause. Sometimes this turns into a vicious circle: low commitment of members prevents the cooperative from achieving sufficient scales of operation and hence from being attractive in its offers.

In many cases where the market has come to question the necessity of cooperation the managers of the cooperative enterprise took on the challenge. They accepted that they cannot count on the unconditional loyalty of their member SMEs, but that they have to strive continuously for a competitive edge over alternative suppliers. The means to achieve it have been basically the same as with any other enterprise: continuous modernisation, rationalisation, centralisation where it mattered, emphasis on marketing, etc. Doing business with non-members in order to achieve more advantageous scales of operation has been part of it. This approach has secured for many cooperative enterprises the position of a preferred supplier with their member SMEs. However, it has also implied that the relationship between the two sides came to resemble more that of a market partnership: each partner has his own self-interest and one cooperates to the extent that these interests meet. The self-interest of the cooperative's management in commercial success superseded in a subtle way the original task of serving the member SMEs.

Things are different with some cooperative ventures that have emerged out of the need or the desire to fill a supply gap of the market. They could maintain something like a monopoly position, either because the market does not readily support more than one supplier (e.g. booking service for taxis) or because the advantage of the first one to occupy a certain market niche is difficult to match for a late-comer. The latter has been the case, for instance, with the German fiscal advisors' data processing cooperative DATEV. Where outside competition does not question the cooperation, the cooperative spirit, oriented towards the collective purpose of the common undertaking, tends to be stronger.

Cooperation for extended business

We find this type of cooperation in a large variety of manufacturing and service industries. Its essence is that the member enterprises pool their capacities in order to take on production tasks or offer service jobs which none of the partners would be able to do alone. This pooling of capacities can take various forms:

- It can consist simply of the quantitative adding up of several similar production capacities so that orders of a larger volume, e.g. the transport orders of a larger enterprise or a big industrial cleaning job, can be accepted. In this case the cooperative enterprise functions as a booking and co-

ordinating office for the individual jobs, which are carried out separately by the member SMEs.

- It can consist of the pooling of complementary specialisations so that the group as a whole can offer - under one single brand name - a greater variety of products (e.g. different types of leather, transport services to different locations, legal advice on different subject areas) than each member SME. The cooperative enterprise does the marketing, the production job goes to a single member SME according to the nature of the client's order.
- Several SMEs of different specialisations can join in the common, centrally coordinated production of a good or a service. For example, different craft enterprises can form a cooperative construction company. Or a number of firms of various branches produce shoes according to a common design.
- Several SMEs of the same branch can join in acquiring or renting equipment (including real estate) which extends their production possibilities but which would not make economic sense, or be feasible, for any one of them alone.
- SMEs can join in a common effort to market their individual products, reaching this way market segments which are beyond the reach of the single enterprise (examples: travel agency of bus owners, export communities).

For this type of cooperation membership is exclusive - with regard to the number of participating SMEs and with regard to their qualification. Like in retail cooperations with a common marketing concept, member SMEs must not compete with each other in the same product market or for the same clientele. Often this means only one enterprise per local or regional market.

SMEs who get together to coordinate their entrepreneurial core functions producing and selling have - almost by definition - a high initial commitment to their common undertaking. However, the dependency of this type of cooperation on permanent close coordination and discipline also makes it especially vulnerable. If only a few partners do not live up to their obligations within the common production and marketing concept, the whole cooperation can be put in danger. Over and over such cooperations have broken down, because the individual interests of some partners began to interfere with the group's common interest. Also the distribution of costs and benefits is often a more sensitive matter here than in cooperations restricted to common purchase.

Altogether, the high demands on commitment, discipline and coordination are reflected by the relative scarcity of this sort of cooperation and by an elevated level of difficulties, conflicts and fluctuations where it has been attempted. This seems to confirm the suspicion that coordination based on solidarity is more vulnerable than one which is based on the interplay of supply and demand or on authority.

COOPERATIVES AND OTHER FORMS OF SME COOPERATION

Much of the institutionalised long-term cooperation between small businesses in the EC takes place in forms other than cooperatives ("quasi-cooperatives", as we call them here). Whether the cooperative form or another form is chosen depends most of all on economic and practical convenience, but beyond that also on factors which belong to the sphere of ideology.

In Britain, the cooperative has never been legally instituted as a separate enterprise type. There, all de-facto cooperatives must adopt one of the existing legal forms, preferentially a joint-stock corporation. Elsewhere, cooperating SMEs have the choice. Many consider the cooperative enterprise form as less convenient because of:

- the relative slowness of decision-making and therefore a lower degree of flexibility vis-a-vis changing market conditions (because of the dispersion of responsibility);
- the lack of individual property rights in the capital of the cooperative enterprise, which reduces the flexibility with regard to enterprise structures, participations, etc., and makes the raising of finances difficult.

It seems that these inconveniences are more important the more the cooperation aims at the pooling of the member SMEs' capacities and the coordination of their activities, i.e. the more the entrepreneurial core functions of production and marketing are affected. Thus, cooperations of our type C are predominantly organised as joint-stock, limited-liability or other conventional forms of enterprises. But it is also in this field where we often find relatively loose, sometimes temporary forms of cooperation (e.g. in the construction trade). On the other hand, the classical cooperative form seems to be especially appropriate where the task is to supply a certain auxiliary service to a large number of small businesses. Where the development of originally service-centred cooperatives has led to an increasing emphasis on coordination, notably in retail trade, we observe the emergence of conventionally structured subsidiaries of the cooperatives.

A factor which touches upon convenience and ideology at the same time is custom and tradition. Several trades have developed their specific forms of cooperation aside from the cooperative movement. These forms are adjusted to their needs, but they are also important for their identity. Perhaps most noteworthy in this regard are the formalised partnerships of practitioners of liberal professions. From a functional point of view they constitute enterprise forms between a service cooperative (independence of the partners with certain common functions) and a workers cooperative (one identity towards the client; to some degree common products, done in division of labour under one roof; in part common profit). However, from an image point of view, they are considered as an altogether separate form of organising business.

Generally, there is a tendency among small businesses not to consider cooperatives as a serious option. They are associated in a vague, unfocused way with a lack of business orientation, with amateurism or some sort of romanticism, with outdated pre-industrial economic structures, sometimes with socialist tendencies. This generalised image is often propagated by professional advisors, banks, etc., who are not familiar with cooperatives and simply dismiss them in recommendations to their clients.

Italy is certainly the country where this tendency is weakest. There cooperatives are most firmly entrenched as part of the country's business culture. At the other end of the spectrum we have Britain, in whose economic culture the concept of the cooperative is most conspicuously absent. In Britain, like in Ireland, small business cooperation itself is underdeveloped. In other countries we certainly find a general disposition to consider "quasi-cooperative" forms first when it comes to cooperation.

But there is also the second component to the ideology factor: the ideological orientation of the cooperative movement itself. It can be localised between business-like pragmatism and anti-capitalist value orientation on the one side and between self-conscious assertiveness (reflected in active promotion) and silent accommodation on the other. It seems that a combination of pragmatism and assertiveness can provide for a counterweight to latent prejudices within the small business sector. This view is supported by the experience of Italy and to some extent of France, Germany and Catalonia. On the other hand, to some small businesses it is precisely the notion of the cooperative as an alternative way of organising economic activity, an alternative where individual profit is not the supreme criterion, which makes it attractive. This has been the case

for example, in Germany, with the consumer-oriented insurance traders and bicycle shops. But certainly, only a small minority of cooperating small enterprises can be drawn to the particular form of a cooperative.

CROSS-BORDER COOPERATION

Our investigation has rendered three basic findings on the extension of small business cooperatives or "quasi-cooperatives" across nation borders:

1) The majority of respondents in all investigated countries and economic branches do not consider cross-border cooperation that would go beyond individual partnerships among two or three enterprises as important for small business, not even with the completion of the Single European Market. According to this dominant view, the additional advantages of scale which could be gained through an extension of cooperation are not significant enough to outweigh the substantial difficulties such an extension would have to overcome. At any rate, cross-border cooperation is not considered as the most indicated response to increasing competition in the wake of the Single Market. This argument refers basically to cost-oriented cooperation (types A and B). As far as cooperation for extended business is concerned (type C), its importance is diminished by the fact that small enterprises are overwhelmingly oriented towards local and regional markets.

2) Notwithstanding the dominant disinterest, we encountered a sufficient number of respondents who actually do consider cooperative activities across national borders as important or desirable.

3) But those who are interested also find cross-border cooperation extremely difficult to bring about. In fact, the general impression is one of complete helplessness, which stifles any serious attempt. The difficulty is underlined by the fact that the investigation encountered less than a handful of cases of a successful extension of cooperative activities across national borders.

The desirability of cross-border cooperation

An extension of cooperative activities across national borders is considered as desirable or has actually proved to be advantageous for all three types of cooperation.

Cost-oriented cooperation among small retail shops for the sake of survival in the competition with large enterprises obtains a new dimension through the fact that these large enterprises themselves have started not only to internationalise their sales outlets but also to pool their purchases internationally. They do see additional rationalisation possibilities in even larger scales of operations than they have reached already. In part, they themselves cooperate internationally.

With optional cost-oriented cooperation as it characterises most of the European crafts cooperatives (type B), an extension across national borders can offer an opportunity for further rationalisation and/or strengthening. An example is offered by a Catalonian restaurant cooperative which has members along the French Mediterranean Coast. Here it is a matter of disregarding, if possible, the political boundaries to a sensible radius of cooperation and substituting them by economically more meaningful bounding criteria, for example, geographical distance or regions of structural similarity. In this category, internationalisation seems to make sense predominantly as an extension of cooperation to the adjacent region in the neighbour country. But we also see some signs that the geographical radius of meaningful cooperation simply becomes larger while political borders simply lose importance.

The increasing internationalisation of many economic activities itself also creates new needs for coordinating services, to which the market often does not respond for a long time. Here cooperation could fill the gap with collective self-supply. An example is the need for something like a bourse service which connects in a rational way the demand for and the supply of international road hauls. Road hauliers cooperatives could take it in their hands to set up such a system.

Extending SME business to new markets, which either arise or get in reach with the general advance of internationalisation and in particular the Single European Market is a relatively strong motive behind the interest in cross-border cooperation. The transport market provides again an example: By cooperating across national borders, small transport firms could gear up to offer international transport services for which any individual one of them would lack the capacity. Another example is the consulting market, where the national expertise of individual consultant firms can be and are being pooled in order to meet the increasingly internationally oriented demand of clients (not to speak of the better access to international funding).

But it is not only the opportunity of new markets which can make extended-business-oriented cross-border cooperation (type C) desirable. Sometimes suitable partners for an advantageous cooperation can be found more easily across national borders, for instance, because the obstacle of mutual competition is less pronounced. This possibility is most likely to be encountered in branches with relatively few national suppliers in a single country, like, for example, in leather production.

Finally, we have the motive to strengthen colleagues abroad, thus strengthening the own professional group in the increasingly important international (and particularly EC) arena and/or promoting the cause to which the own professional activity may be dedicated.

As the various examples show, the extension of cooperative activities across national borders can take different forms:

- Existing cooperatives in various countries run something like a second, third, or higher degree cooperative on an international level (Intersport, BAKO Europa). As a step beyond this, they could even merge into one cooperative.
- SMEs in two or more countries form a cooperative venture, for which the European Economic Interest Grouping (E.E.I.G.) has come to provide a convenient legal form.
- SMEs in one country join a cooperative or "quasi-cooperative" of another country (French members of a Spanish restaurant cooperative; Austrian, Scandinavian and Belgian members of a German watch retail cooperative).

Obstacles to cross-border cooperation

As shown above, it takes a big effort in terms of initiative, time and organisational skill to bring about cooperation among small businesses. This is the reason why we do not find much more of it. That the frequency of cooperation goes beyond that of sporadic incidents presupposes one of three things:

- cooperation is necessary for SME survival in the market;
- cooperation is promoted systematically by an agency which is dedicated to this task and endowed with sufficient resources;
- there is a social movement, which triggers an exceptional dynamic of collective behaviour.

Of course, all these restrictions are valid for cross-border cooperation as well. And they explain as such already a good deal of its rare occurrence. But the fundamental obstacles are enhanced by the fact that:

- (a) the pre-cooperation density of communication is normally much lower than within a country; businessmen simply do not meet so frequently and often they do not master the other language;
- (b) the conditions for doing business are often very different from one country to another; this applies to consumer habits,

market structures, regulations and the business culture in general.

Significantly, legal barriers to cooperation across national borders seem to play hardly any role at all. This would correspond to the experience of so many transnational corporations, who all have found ways to arrange themselves with the diversity of different national laws.

Consequences

It is to be expected that cooperative and "quasi-cooperative" activities are extended beyond national borders more frequently in the foreseeable future as several of the obstacles which were in its way so far are somewhat relaxed:

1) The increasing internationalisation of business in general forces some small businesses to follow suit if they want to survive in their markets (retail trade). The completion of the Single European Market reinforces this trend.

2) The increasing internationalisation, again reinforced by the Single Market, makes for many new business opportunities, which require cooperation if small enterprises want to make use of them.

3) European unification reduces the regulative differences between EC countries.

4) European unification contributes to a general levelling down of differences in business cultures and even consumer habits within the Community.

However, all these developments will not do away with the basic impediment: the need for agency services which are not available immediately. If cross-border cooperation is to increase significantly, this would require deliberate, sustained efforts of promotion which are backed with sufficient resources.

Written by: ERA, reviewed by DG XXIII

Sectoral prospects

THE MACROECONOMIC ENVIRONMENT

After an early promise of recovery in 1992, the world economy has lost momentum. Declining production figures, sharp falls in new orders, overcapacities in the manufacturing sector, rising unemployment and further losses in consumer confidence now characterise nearly all the major world economies.

The slow growth of EC domestic demand is caused by a fallback of consumer and business confidence. In addition, exports to the United States are at a standstill, due to the weak economic climate there and the loss of competitiveness of European exports due to the depreciation of the US-$ against most European currencies; the loss of markets in Eastern Europe contributes as well to the depressed mood in the Community.

The most crucial factor contributing to the slow growth of the EC economy is, however, the policy of high interest rates of the German Bundesbank, which is putting enormous deflationary pressures on the other European countries. In addition, the "convergence" gaps between EC economies have led to the breakdown of the fixed exchange rate system built into the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS). The resulting exchange rates realignments on and about "Black September" have increased the uncertainties about the prospects for the European economies, as well as about the future of the Maastricht Agreement.

The combination of exchange rate turmoil, political uncertainties and poor economic indicators is leading all forecasting authorities to revise downwards their forecasts for 1993.

GDP growth in the EC as a whole is expected to reach 1.8% in 1993, compared to 1.0 percent in 1992. This is mainly a result of the nascent recovery in the United Kingdom, where GDP growth is now expected to be a little below 2% in 1993, up from a negative 0.9% in 1992. The increase in the overall GDP growth forecast for the UK appears to be principally a reflection of stronger projected growth in net exports. The outlook for production in the manufacturing sector, which is likely to benefit from increased competitiveness, has also improved.

Slow growth is also expected in Germany (1.4% in 1993), due to continued worries over public finances, the receding prospects for early significant cuts in interest rates and the deteriorating outlook for growth elsewhere in Europe. The increase of the VAT in January 1993 will cause the average inflation rate to remain high in 1993, which will induce the German Bundesbank to remain cautious regarding cuts in interest rates in the near future. Consequently, investment expenditure is expected to remain flat, also hampered by overcapacities in the manufacturing sector. Consumer expenditure is expected to remain weak, as disposable income is hit by expected contributions to health costs and by further indirect tax hikes (e.g. oil duties).

The French economy is expected to grow by 2.2% in 1993, compared to 2.1% in 1992, due to weak export growth; tighter fiscal policies in a number of countries and the devaluations in several of France's major export markets have done little to improve the outlook for export growth in 1993, which had been deteriorating in recent months.

Prospects for the Italian economy are not encouraging, in the face of high short-term interest rates and planned cuts in public spending and revenue increases totalling 93 trillion lire. These cuts in spending and revenue increases aim to hold budget deficit in 1993 down to 150 trillion lire, and are likely to dampen consumer expenditures. GDP growth is expected to reach 1.9% in 1993, compared to 1.5% in 1992.

In the medium term, it is expected that growth in all EC countries will recover, as reduced interest rates revive the economies. GDP growth for the EC as a whole is expected

Table 1: Macroeconomic prospects for the EC in the 1990s

(real annual % change)	1991	1992	1993	1994	1992-1996
Gross Domestic Product	1.1	1.0	1.8	2.7	2.4
Consumer spending	1.6	1.3	1.5	2.1	2.1
Gross fixed investment	0.1	0.1	1.8	4.2	3.5
Exports of goods	2.5	4.4	4.8	5.4	5.0
Imports of goods	5.2	4.8	4.1	5.0	4.7
Industrial production	-0.7	1.0	1.4	2.9	2.3
Consumer prices	4.5	4.0	4.1	4.2	3.9
Short-term interest rates (1)	7.8	6.5	6.0	6.0	6.2
Long-term interest rates (1)	8.4	7.8	7.7	7.7	7.8
Unemployment rates	9.0	9.6	10.2	10.5	10.2

(1) Nominal rates for OECD economies (period averages)
Source: BAK/OEF

to reach average annual growth rates of 2.7-2.8% from 1994 on. The assumption is that efforts to achieve convergence, in line with the Maastricht agreement, will resume after the turbulence of 1992, creating a favourable climate of confidence and stability.

THE SECTORAL OUTLOOK

The economic environment for EC industry has experienced far reaching changes during the last decade. Preparation for the advent of the single market has triggered important structural changes. The gradual disappearance of trade barriers has given rise to increased efforts by companies to reach the critical size, and to enhance their market shares. Another consequence of the break-down of trade barriers and the prospects of a large, unified, European market was increased competition from non-EC countries, in particular from Japan, the NICs and the United States, but also from non-EC companies establishing production facilities in the EC (e.g. Japanese transplants in the UK). The movement towards easier access to the EC markets for non-EC producers can be expected to gather even more strength in the future, as technical harmonisation takes hold in all of the EC countries. Another important change is the potential opening of the East European markets. The end of the cold war may have temporarily caused a loss of markets, as the transformation of centrally planned economies into market economies is accompanied by huge financial problems; in the medium term, however, once these economies revive, new market opportunities will be created for EC producers.

Developing markets in Asia, the region in the world with most growth potential, will also give added stimulus to demand growth; competition from the NICs and Japanese producers in these markets is, however, expected to be very stiff, as the latter benefit from traditional links and cultural advantages in these part of the world.

Environmental concerns are likely to provide EC industries with fresh impetus for the development of new products, but will also require costly adjustments from some industries, which may result in increases in production costs and some losses in competitiveness.

Intermediate goods

Intermediate goods producing sectors chiefly deliver inputs to downstream industries, in particular to the construction industry and to the investment goods sector. In many cases, intermediate goods industries suffer chronically from overcapacity problems. This gives rise to ruinous price competition and low profitability, even in times of strong demand. Most companies working in this area are also confronted with environmental problems, as their production processes or the use of their products are linked with damages to the environment.

Non-energy mining and quarrying industry

This sector, which includes the production of iron ore, non-ferrous metal ores and industrial products, is expected to grow at roughly 1% per year in the short-term, 2% in the medium-term.

Within the EC, the most important subsector is the industrial minerals sector, which accounts for 90% of the industry's output. The major consuming industry is the construction industry, which absorbs about 45% of all EC mined materials. Competition from abroad in the field of industrial minerals is restricted by the costs of transportation, which ensures that local materials are predominantly used. In the field of non-ferrous metal ores, however, price competition from overseas threatens the situation of EC producers.

Ferrous metals

The sector of ferrous metals includes the production of iron and steel, the manufacture of steel tubes, and the drawing, cold rolling and cold folding of steel. By far the largest component within the sector is the iron and steel industry, which accounts for 74% of the sector's output. The industry is a supplier of inputs to investment goods industries as well as to the construction industry. Production increased considerably in 1988 and 1989, in line with increased demand from the investment goods sector. From 1990 on, however, production of ferrous metals flagged. Competition from the NICs increased, thanks to their lower production costs. Exports, on the other hand, were hurt by the loss of markets in Eastern Europe and by reduced demand from China. In general, the ferrous metals industry suffers from world-wide overcapacity problems, and from intense price competition in export markets. In the short-term, the outlook for the industry in the EC is not encouraging. Demand from the consuming industries is expected to remain low. In the medium-term, both production and consumption are expected to increase, as the recovery of the world economy boosts demand for the industry's products.

Non-metallic mineral products

Demand for non-metallic mineral products depends heavily on the activity of the construction sector, as nearly 70% of production is used in construction. The bulk of glass and ceramic products, however, is used in a variety of other sectors; the EC is the leading world exporter of the latter kind of goods, but the share of international trade in the industry is fairly limited, due to high transport costs, as well as non-tariff trade barriers. The outlook for the industry in the nineties is quite favourable and production is expected to grow by an average of 2% per year in the period from 1992 to 1996.

Chemicals (incl. pharmaceuticals)

The EC chemical industry experienced a strong expansion over the last two decades, among others as a consequence of the replacement of traditional materials (steel, wood, paper, glass etc.) by new materials derived from chemical processes. At the beginning of the present decade, however, demand for basic chemicals has been weakened by the cyclical slowdown of the European economies, and by slower export growth, as a consequence of the recession in the United States. Demand in other sub-sectors, such as the pharmaceuticals sector, continued to grow rapidly.

The prospects for the industry as a whole are not encouraging in the short-term. Production is expected to increase by a moderate 2.4% in 1993. This figures covers flat production in most subsectors, while the production of pharmaceuticals and cosmetics/perfumes continues to grow rapidly as a consequence of rising demand for personal care products and growing concerns for health. In line with faster economic growth in the medium-term, the production growth of basic chemicals is expected to resume also.

Increased concern over the quality of the environment entails both opportunities and new markets for the chemicals industry, but also imposes new burdens on the industry, through the need to reduce noxious emissions, as well as through restrictions imposed on the consumption and the disposal of the industry's final products.

Investment goods

The investment goods industries in the EC were hard hit during the last two years. Declining investment growth worldwide, as well as strong competition from Japan and the United States, have battered the sector, particularly those industries suffering from excessive fragmentation. In order to meet these challenges, the industry is undergoing major structural changes, as well as revising its strategies. Consolidation through mergers and acquisitions, as well as increased R&D expenditures, should help the industry to reinforce its market position in the next years.

Table 2: Sectoral prospects for the EC in the 1990s

(real annual % change)	1993	1992-1996
Intermediate goods		
Non energy mining and quarrying	1.0	2.0
Ferrous metals	1.0	1.3
Non-metallic mineral products	1.2	1.8
Chemicals	2.4	3.1
Investment goods		
Mechanical engineering	2.3	3.1
Electronic engineering	3.8	3.9
Transport Equipment	1.2	2.6
Instrument Engineering	2.3	3.1
Consumer goods		
Food, beverage and tobacco	0.9	0.9
Textiles, clothing, leather and footwear	1.7	1.8
Wood processing	3.4	3.4
Pulp, paper, printing and publishing	3.5	4.2
Rubber products	1.0	1.9
Plastics processing	5.0	6.0

Source: Panorama of EC Industry

Mechanical engineering

The well known dependence of the mechanical engineering industry on cyclical fluctuations in investment activities is the main source of the sharp decline in production suffered during the last few years. Future prospects for the mechanical engineering industry, however, are quite good. The main factors for this improved outlook are: still ongoing microelectronisation of the machines, which will create demand for new machines (CAM, CIM); the modernisation drive brought about by the common EC market and the European Economic Area, and the opening of new markets in Eastern Europe. On the other hand, growing competition from abroad, particularly from the USA, Japan and the NICs, is likely to cause increased pressure for EC companies. Japan competes mainly in the area of high technology machines or components, while manufacturers from Taiwan and South Korea are making inroads with more basic products.

Electronic engineering

The electronic engineering industry in the EC has been faced with a number of challenges over the last few years. The most important ones are the reduction of product life cycles and the pressure on profit margins. As lead times for the development of new, more sophisticated, products for consumer and business markets becomes ever shorter, the life cycle of products has declined sharply. Fast productivity gains have also caused prices to decline rapidly. At the same time, competition from outside the Community has increased considerably, particularly from the United States and Japan, a consequence of slow demand growth on their home market. Competition from imports was also strengthened by the decline in the exchange rates of the USD and the Yen, which made companies from these countries more competitive in terms of prices. The answer of EC companies was to strengthen cooperation with other companies, particularly in the field of research and development (e.g. Siemens, IBM and Toshiba).

During the eighties, the EC electronics industry experienced high growth rates in both production and demand. In the last few years, however, general market conditions have worsened. The recession and the reduction of general income levels have hampered the development of the industry. Growth rates, however, remained positive and above those of the manufacturing sector in general. The only sector which has experienced a decline in production is the consumer electronics sub-sector. Future prospects for the industry are nevertheless quite good, as new product innovations are likely to stimulate demand. Examples for such innovations have been the notebooks, laptops, fax machines and camcorders. Structural changes in the field of home offices and the merger of computers and telecommunication are likely to give a new boost to demand. New demand can also be expected some time in the future from Eastern Europe.

To keep growing, however, the EC electronics industry needs to face up to competition from outside the Community through increased R&D efforts, and through additional mergers and acquisitions, in order to both strengthen their market position and gather the huge resources necessary to finance these same R&D expenditures.

Transport equipment

The transportation equipment industry as a whole experienced moderate growth in 1991, after a stagnant 1990. Considering the subsectors of the industry, output of the motor vehicles and the motor vehicle parts and accessories industry declined by more than 2.5%, due to weak demand at home and in export markets. In contrast, the aerospace industry has helped to counter the situation.

In general, production growth in the transport equipment sector is expected to average 2.6% per year up to 1996.

The motor vehicles industry, however, has to be aware of the important challenges to be faced during the nineties. Competition from Japanese companies, including transplants, will force companies to increase their production efficiency (lean production), if they are to maintain their market share. To profit from economies of scale, a strong movement towards international cooperation has been observed over the last years. This process can be expected to go on, not only between EC manufacturers, but also between US and Japanese manufacturers.

Another important challenge of the nineties will be the protection of the environment. Heavy energy users, one of which being the transport sector, are likely to be under attack over the course of this decade. This could lead to a modal shift in transport services the sector (e.g. from cars to rail).

Instrument engineering

The instrument engineering industry is an extremely diverse sector, with demand stemming both from industry and from households. In general, demand for products of the industry has increased in the eighties as a consequence of the healthy economic climate, with high spending in consumption and investment, but also as a consequence of the development of new technology, increasingly combined with microelectronics.

In line with the economic downturn in the last few years, production growth as well as consumption growth have declined markedly. Competition from outside the EC has increased considerably during these last years and the trend is still ongoing. The strategies of EC companies have to be to reduce costs and to increase production efficiency, as well as to increase R&D efforts. One important problem in this context, however, is the small to medium sized structure of the companies. Thus, restructuring is one of the main efforts which have to be undertaken.

The outlook for the industry is better in the medium-term than in the short-term. Production is expected to grow at an annual average rate of 3.1% during 1992 to 1996. Environmental concerns, the automation of industrial processes, and the development of new products are the main driving forces.

Consumer goods

Demand for consumer goods industries depends largely on the development of consumer expenditure. A fast changing fashion climate, combined with strong competition from

abroad, has forced the industry to undertake a remarkable concentration processes during the last years.

Food, drink and tobacco

Demand for food products is increasing moderately, even though population growth in the EC is close to zero. The share of food consumption in total expenditures has declined to about 20% in most countries. What little growth there is mainly reflects shifts in demand from fresh and/or artisanal products to easy-to-make products with a higher service content, which keep longer then fresh ones.

The EC food and drink market structure has also undergone a major concentration during these last years. This is not only in order to profit from economies of scale, but also in order to maintain and strengthen market position against competitors. Growth expectations in the EC for the next few years are better than in the recent past for both production and consumption. A continuation of the movement towards processed products, in particular towards high service content products, and faster population growth through immigration rather than through changes in birth rates, are the main factor underlying this improved outlook for growth.

Textiles, clothing and footwear

The growth of demand for textile, clothing and footwear, as measured by apparent consumption, has been significantly faster than production growth in the period 1982 to 1991. The gap is filled mainly by imports from East Asian countries who benefit from significant cost advantages, particularly in the production of mass-produced items. In the field of high quality products, on the other hand, EC producers are more competitive, and price elasticity there is lower. Efforts of EC companies to reduce costs have led to a shift from labour intensive production to more capital intensive production, with automation processes and highly efficient production systems (JIT). EC producers have also increased the speed at which they respond to changes in fashion and trends.

The outlook for the industry over the next few years is quite good. Production growth is expected to reach roughly 2% in 1992 to 1996. Consumption growth will remain higher, at 3.4% for the same period.

Competition from non-EC countries is expected to become even stiffer, as trade liberalisation in the context of the GATT negotiations are likely to phase out the Multi-Fibre Agreement (MFA) and the Lomé Convention. Liberalisation efforts, on the other hand, will also increase export possibilities in markets currently protected, such as the Japanese market. The ability of EC producers to respond quickly to market changes is an important asset. In the long-term, an important potential market is that of the East European countries, but EC producers will face substantial competition there from low-cost producers.

Wood processing

The woodworking industry has experienced a less favourable year in 1991, as its most important end-markets, the construction sector and the furniture industry, experienced only moderate growth, a consequence of slow income growth and high interest rates. Trade flows between Member States are more important than extra-EC trade, due to the importance of transport costs and technical barriers. The deficit in the EC trade balance is explained mainly by imports of tropical hardwood, plywood and hardboard from Asia, South America and Brazil, but also by imports from countries of Central and Eastern Europe at extremely low prices.

EC production is expected to grow at an annual rate of 3.4% in the years 1992 to 1996. Environmental regulations and the imposition of technical barriers to trade between Member States, however, may increase costs for the industry. Production processes need to be rationalised to improve production efficiency. In addition, European standardisation may lead to increased extra-EC imports.

Pulp, paper, printing and publishing

This sector, which includes activities such as the production of pulp, paper and board, the conversion of paper and board, as well as printing and publishing, is currently plagued by overcapacity problems, a consequence of large investments by the industry in the eighties. Consequently, prices have been put under downward pressure. Competition stems mainly from the EFTA countries, i.e. from Scandinavian competitors, and has caused the industry's concentration to increase. The outlook for the industry is quite good, as renewed economic growth is expected to spur demand in 1993.

One of the most important challenges for the industry in the coming decade will be its response to new EC and national environmental regulations, as some of them, like EC packaging legislation, could fundamentally alter the market for pulp and paper products. In printing and publishing, signs of maturity are obvious. New electronic media are not expected to replace, but rather to complement written media.

Rubber products and processing of plastics

The outlook for the rubber products and plastic processing industry differs considerably; while the rubber products sector is expected to grow at roughly 2% per year in the period 1992 to 1996, the outlook for the plastic processing industry is much more optimistic, at about 6% per year over the same period.

The explanation is the heavy dependence of the rubber industry on the transport equipment industry, mainly in the form of tyres, which account for roughly 60% of demand for rubber products in the EC. Taking tyres, tubes, and other products together, the automotive sector covers about 70% of the rubber products market. Given the weakness of the automotive industry in the short term, this explains the slower growth of the rubber industry. In the medium term, however, growing traffic, as a consequence of increasing intra-EC trade, will spur demand for tyres too. The optimistic outlook for the plastic processing industry is based on the fact that there exists extensive and diversified demand for plastic goods; consequently, the ability to compensate for slow demand growth in any single demand sector is much higher than in rubber products.

An important issue for the industry is the problem of waste. Both plastic and rubber products are a durable component in the waste stream. Tyres are used again by retreading, but this solves the problem only partly, since, in the end, every tyre ends as disposal waste. Chemical recycling is to expensive and generates air pollution.

Construction

The construction sector has been characterised by declining trends in nearly all EC countries these last years. Germany and Portugal are the only exceptions, thanks to a great backlog of demand in Portugal, and to the boost of reunification in Germany. Public expenditure for infrastructure work has been declining as a result of efforts to reduce public debt; this has affected mostly the areas of civil engineering and public sector building. High interest rates have also affected the sector of private commercial buildings. In the medium-term, the construction sector is expected to increase its activity, as the general economic climate improves and interest rates come down. This will affect the building of new homes, as well as modernisation and reparation activities of existing buildings. The subsector of civil engineering will benefit from investment in the protection of the environment, in revamping existing infrastructure facilities and in the area of trans-European networks. Germany will experience a particularly dynamic development, as the expansion and reconstruction of the public infrastructure in the eastern part of the country

will develop. Competition between EC firms is expected to increase, as the common market will provide the possibility for EC firms to compete on bids for works anywhere in the Community.

SERVICES

The services sector experienced high growth in the last decade. Even though these growth rates were well above those of the manufacturing sector, even higher growth had been previously expected. Liberalisation efforts in the EC and the advent of modern means of communication technology are likely to create new opportunities for the sector, but also to increase competition.

Tourism

The tourism industry experienced rapid growth during the last years, for the following reasons:

- a general rise in private income levels,
- a substantial increase in the availability of free time for vacationing.

These two factors contributed to the multiplication of second holidays and short-breaks, as well as to a greater incidence of holiday taking.

Another important factor was the increase in business related travel, which is probably the fastest growing segment of the travel market.

In 1991, the previously rapid growth of the tourism industry in Europe slowed substantially, as a result of a variety of factors, including the Gulf war, unrest in the Balkans and the recession in some of the major originator countries which affected mostly the lucrative long-haul market.

The outlook for the tourism industry in the nineties is quite good. In line with the economic recovery, international tourism expenditure will increase. Increases in short-break holidays will lead not only to increased tourism expenditure but also to a better utilisation of capacity. New tourists will come from Asia's NICs and from Eastern Europe. Most important is the product innovation, i.e. new programmes, responding to changes in demographics, social patterns and tastes which stimulate travel to less developed regions and encourages better off-season utilisation of facilities.

Transport and communications

The transport and communication sector is engaged in the conveyance of goods, passengers and information. As this industry is a necessary complement to economic activity and interaction, European integration will spur demand for this kind of products. Competition between EC Member States, however, is expected to increase, as common policies for transport and communication are introduced. This forces potential competitors to invest heavily in modern equipment.

Demand for transport and communication is also expected to be spurred by the opening of the Eastern European economies. This type of demand, however, is likely to develop only in the medium term.

Finance and insurance

The financial sector experienced a complete overhaul during the last decade. The traditional separation between activities - kept strictly partitioned by official regulations - has been progressively removed, a result of the trend toward deregulation, globalisation and the removal of barriers between services. The distinction between commercial banks, investment banks and brokerage houses has become more and more negligible. In addition, links between the banking and insurance sector have grown. The deregulation of the industry has led to an explosion of market activity and to a proliferation of new products. As a consequence, competition in terms of products has increased, particularly regarding household savings, with the advent of larger numbers of players among credit institutions, insurance companies and cooperative investment organisations. New technologies, based particularly on computers, have become a more and more indispensable factor. Consequently, the financial sector is now faced with major investments for retraining the workforce.

The outlook for the industry in the EC is quite good, but increased competition will endanger the profitability of companies. Continuing increases in efficiency and productivity are a must, as well as new product development to ensure survival in the market. The impact of the common market will probably not be too important, as financial services, savings and insurance are already operating globally, at least in major firms.

Electronic information services

The supply of electronic information covers a wide range of services: financial data, economic data, business data, professional data, industry specific data, and information newspapers, news, services, magazines, etc..

Despite the fact that growth in this sector did not fulfil expectations completely, this sector's growth rate has remained significantly higher than that of the economy in general. The crucial issues in this context are the cost of electronic information and the shortage in end-user training.

Prospects for the information services sector are quite good, as the infrastructure for these services (micro-computers and modems, videotex, telephone lines and fax) becomes more and more user-friendly, improving the ability of users to work with these services.

Written by: BAK

Commercial distribution

THE IMPORTANCE OF COMMERCIAL DISTRIBUTION

Commercial distribution is generally a misunderstood and undervalued sector of the economy. The simple fact, however, is that commercial distribution - the companies, processes and activities involved - affects us all in one way or another. As individuals we all shop and expect goods and services to be available when we require them. Similarly, for manufacturing, companies commercial distribution provides the means of access to end-users whether consumer or industrial purchasers. An understanding of commercial distribution, its functions, activities and behaviour is therefore essential not just to those involved in the sector itself but for those manufacturers who must use the sector to reach their final consumers, and those politicians determining employment policy.

The problem of recognition faced by the sector is partly due to differences in the perception of what constitutes 'commercial distribution' and in particular the scope of its activities. To some commercial distribution is simply a business process or function, whilst others identify it as a distinct sector of the economy in its own right. These perceptual problems are compounded by a lack of clarity in statistical data collection within the Community. This serves to reinforce the confusion over what commercial distribution involves. Data collection is commonly based upon a number of factors ranging from type of product involved; company size or form; establishment or selling technique; or the activities performed. Definitions also vary from country to country, further compounding the problems of comparability, and the construction of a uniform definition of the sector.

Despite the problems associated with statistical sources and definitions, estimates of the contribution of those companies involved in commercial distribution to the European economy can be derived. Estimates suggest that commercial distribution within the Community involves at least 4 million businesses, with 18.4 million people generating a turnover in excess of 1300 billion ECU (excluding VAT). The contribution to individual national economies varies from market to market, but averages 13% of GDP, and companies involved in the sector are now amongst the largest enterprises in many countries.

THE NATURE AND ROLE OF DISTRIBUTION CHANNELS

In simple terms commercial distribution involves the activities in the distribution channel by which goods and services move from the supplier to the end customer. Understanding the distribution channel and the processes that take place within it, requires the consideration of a number of dimensions which provide for complexity:

- channel members
- channel activities
- channel flows

Channel members have been traditionnally categorised as primary organisations or facilitating organisations. Primary organisations - such as suppliers of goods and services, wholesalers and retailers - usually take legal title to products and services as they flow through the channel. Facilitating organisations - agents and brokers, transporters, warehousemen, market researchers, advertising agencies, insurers and financial agents - provide special services to support the flow of goods and services.

Channel activities have traditionally included the sourcing and purchasing of product and services; storage, assembly, packaging; bulk-breaking, sorting and picking; physical distribution; and marketing and sales promotion.

As far as channel flows are concerned, the distribution process involves a number of flows - of products and service, information, finance and risk - which pass from organisation to organisation within the distribution channel.

The nature of the products and services themselves, plus consumer demand for products and services, influence these dimensions and contribute to differences in the size, type and structure, and behaviour of distribution channels.

The activities performed within distribution channels are commonly perceived as adding value (or destroying value if poorly performed) to the product or service concerned. Increasingly, owing to the information now available from new technology, channels are being driven or initiated by consumers through their choices and expectations of products, outlets, services and their time requirements. The activities undertaken to meet these requirements inevitably incur a cost and this, plus the changing demands of consumers, increasingly focuses attention upon distribution channel management as essential for most businesses.

As distribution channels involve a number of different organisations each with different business goals and performing a variety of tasks, relationships within the distribution channel become crucial to its efficient functioning and performance. Relationships are affected by:

- power or dependency, which determines the relative importance and roles of channel members;
- market structures and the nature of market competition, which determines the nature of tasks required and the relative importance of these tasks.

Commonly a 'leader' evolves in a channel to manage or control the process and activities, although the presence of a leader does not mean that benefits are equally distributed amongst channel members. Government intervention may take place to manipulate these factors if it is felt that one particular organisation is misusing power within the channel.

DEVELOPMENTS IN DISTRIBUTION CHANNELS

Distribution channels take many forms and have evolved over time. In conventional channels relationships are essentially determined by power, particularly coercive power (the belief that a more 'powerful' organisation can punish, or fail to reward, a less powerful organisation). Channel members are loosely aligned and their efforts and interests are closely linked to the 'next' member of the channel, for example manufacturers deal only with wholesalers and wholesalers deal only with retailers. Increasingly these conventional channels are regarded as inefficient, as the alignment and nature of relationships usually ensures that negotiations at each level in the channel are conflict driven with each channel member seeking to preserve his own position. This form of distribution channel almost inevitably leads to a duplication of functions and activities, and only allows limited access to others in the channel. Essentially roles are pre-determined and relatively inflexible.

Increasingly in Europe and elsewhere, channels are now being regarded more as integrated vertical marketing systems. In this type of distribution channel, organisations are vertically aligned, with the whole distribution channel managed as a single system. The view is that these forms of channel are more efficient as conflict is reduced, synergies arise, and every channel member works together for the total benefit of the channel, rather than for his own individual position. In many markets, especially food, the impetus for such vertical marketing systems has come from retailers. In in other product markets, such as clothing and electrical goods, manufacturers have taken a firm lead in developing this approach to channel management.

The move to vertical marketing systems has arisen as the more progressive channel members have recognised that the value added by channel activities does not only arise from the transformation of raw materials to finished product or the physical movement of goods and services, but from more intangible sources of value associated with a wider range of marketing activities. Historically, manufacturing has been the major contributor to the total added value of a product. The standardisation and mass production of many products, coupled with low cost capacity from countries outside the Community, has meant that the overall share of manufacturing to total added value has decreased in the EC. Increasing customer sophistication has made marketing a more important contributor of value added. The marketing value added component is derived from an improved understanding and recognition of consumer needs and desires, from an ability to design or enhance products and services to satisfy these needs and desires, and from the need to reduce the risk associated with distribution and retailing of the product. It is the commercial distribution sector which provides this 'new' added value for the end customer. The development of powerful brands within the commercial distribution sector is just one reflection of the importance of these marketing related activities.

ISSUES FOR COMMERCIAL DISTRIBUTION IN THE 1990S

Whilst these developments in commercial distribution and the distribution channel are uniformly observed, the pace at which they have occurred within Europe varies. In crude terms the evolution of the vertical marketing system approach to commercial distribution is more common in northern Europe than southern Europe, where traditional channels are still prevalent. Within these markets, however, many examples of vertical marketing systems can be found, just as examples of traditional channels persist in some product and service markets in the north.

Whilst national differences in the structure of commercial distribution persist in the Community and elsewhere, the internationalisation of activities and firms involved in the sector is undoubtedly increasing. The sourcing of products from foreign markets is common, both inside and outside the Community. The mutual recognition of national product standards in 1993, combined with the removal of border controls will provide a further impetus to this activity. As a number of major manufacturers have intensified their attempts to develop pan-European products and brands, pan-European buying groups of retailers have been formed in recent years. More commonly, channel members themselves have developed a presence beyond national boundaries. Retailers, wholesalers and transportation companies have internationalised their activities - examples of which are the French hypermarket chains in Spain, the pan-European activities of Metro/Makro, Christian Salvesen and NFC. These trends are likely to continue, and are not the preserve of the largest companies. Implementation strategies involving joint ventures, franchising and other forms of contractual coordination, plus the highly specialised nature of some commercial activities, allow smaller companies to pursue similar ventures.

On the broad theme of internationalisation, the recent events in Eastern Europe provide a variety of opportunities and raise issues for those involved in all aspects of commercial distribution. At a very simple level these markets are now open to Western providers of distribution services and a number of retailers and wholesalers have already moved into these states via joint ventures and acquisitions. In financial terms, most of this activity must be regarded as long term investment given the problems of adjustment to market-driven economic systems. A more fundamental issue in the East, before one contemplates the likely evolution of distribution channels and vertical marketing systems, is the development of an infrastructure to support the distribution process. Logistical issues in particular must be addressed. Transport infrastructures and storage facilities are inadequate and there is considerable scope for Western European companies to play a leading role in technology transfer. The development of such basic infrastructure is essential to the functioning of any form of market economy.

The benefits of vertical marketing systems have raised the awareness levels of the crucial importance of supply chain management in most businesses. The role of technology in providing and changing the available information in the distribution channel has been fundamental to the realignment of channel members, activities and relationships. A clarification of channel activity has taken place. For example, the identification of product movement in the channel has allowed for further efficiencies in how the channel performs functions and provided the scope to add more value via channel activities. Many of the mundane, regular procedures between channel members have been automated via electronic data interchange (EDI) technology, reducing the scope for human error, the costs of paperwork and speeding up the processes involved. Improved information systems have allowed channel leaders to view the whole channel as a single entity, and the role and importance of selected activities in adding value to products or services has also become clearer. This has led to a change in the activities performed by individual channel members. Often specialist activity suppliers such as brokers, specialist transportation companies or distribution centre managers have been contracted to perform activities previously undertaken by more generalist channel members. One tendency has been for formal, ownership based, vertical integration to give way to contractual forms of vertical integration.

Technology has also generated new information and allowed new forms of data analysis. Also it has allowed the ownership of information to change hands. For example, the consumer data now generated at the point of sale for consumer goods provides retailers with more specific data on consumer demands and preferences, and this information has allowed them to become channel leaders. Viewing the channel as an integrated marketing system has meant that this information has

been used to lead innovation in the channel. In many product markets, innovation and new product development are stimulated 'down stream' by retailers, who increasingly discuss product specifications with suppliers and others involved in the channel. Products and services are now developed to fulfil market demands, rather than markets being sought for existing products and services.

The benefits of managing the distribution channel as a vertical marketing system have allowed some channel members to develop very strong positions in relation to horizontal competitors (other retailers or wholesalers for example). For smaller or less powerful organisations this development has created a real need to consider some form of association to build the scale and combined competencies which the larger dominant organisations have developed. Again technology can play an important role in initiating and managing such associations. However, this raises issues concerning the adoption of information technology by small and medium sized companies. The costs of technology, plus human resource issues such as competencies and training, provide barriers which must be overcome. Alternatively these businesses may establish a unique form of added value which allows them to be differentiated from these market leaders, so that in effect they do not directly complete. Such dominant positions may also be perceived as providing a competitive threat to other members in the distribution channel, particularly if their position and power is used in a traditional, more coercive, way in the channel.

CONCLUSION

In summary, the importance of the commercial distribution sector to the European economy and employment should not be underestimated. Commercial distribution and the activities performed in the distribution channel are crucial to the success of any business. As a sector made up of a number of different organisations and requiring a range of skilled activities, the world of commercial distribution is complex and frequently changing. Undoubtedly, throughout Europe, approaches to the distribution channel are changing, with a move away from a traditional conflict based approach to one regarding the channel as an integrated entity and as a single vertical marketing system.

The role of technology in allowing these changes is important, and provided that such technology is available to all, the benefits of the vertical marketing channel approach are available to both large and small. As the single market comes into being, four broad trends would appear to be evident within the commercial distribution sector. First, a growing internationalisation of the activities and companies involved; second, the potential to play a leading role in developing distribution infrastructures in Eastern Europe; third, the increasing recognition of the importance of supply chain management and the changing role of members as distribution channels are managed as vertical marketing systems; fourth, the issues of horizontal and vertical competition as individual organisations reap the benefits of these changes.

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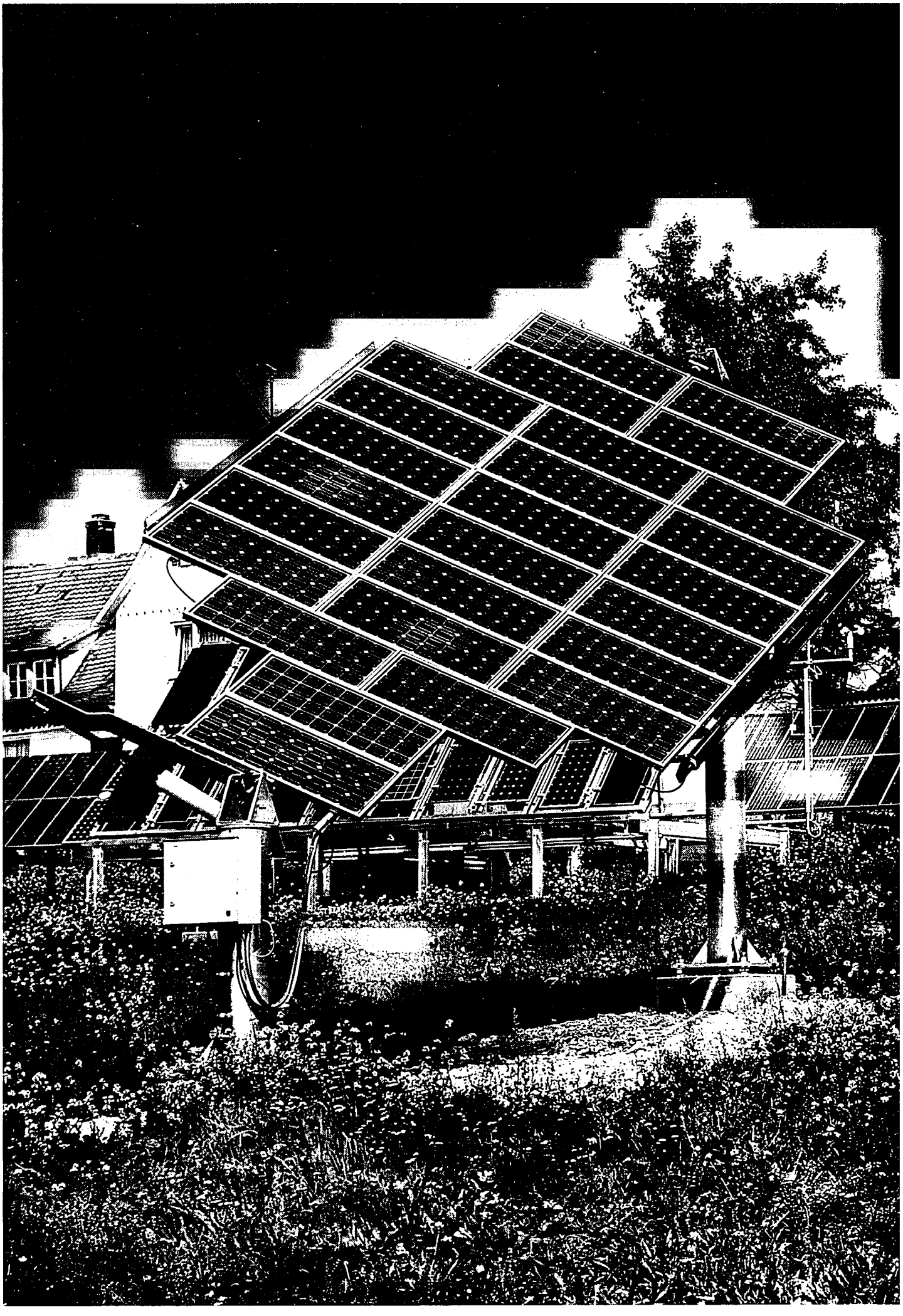
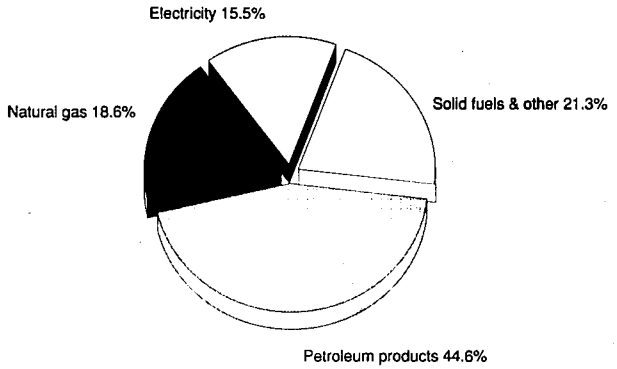
Reviews and Forecasts: Industrial Sectors



Energy
NACE 11, 12, 13, 14, 15, 16

In 1991, primary energy consumption in the EC was about 1 200 million toe, which corresponds to about 15% of total world consumption. At the same time, the EC contributes to about 8% of total world primary energy production. EC primary energy production is dominated by the United Kingdom which accounts for around 36% of the total. Consequently, the EC is a net importer of energy; in 1991 net imports amounted to 617 million toe.
The primary energy mix is dominated by oil, which accounts for about 45% of primary energy demand. Natural gas consumption is increasing fast. In the second half of the 1990s, it will become the second largest share in the fuel mix, replacing coal.

Figure 1: Energy
Fuel shares of primary energy demand, 1990



Source: Eurostat, DRI Europe

INDUSTRY PROFILE

Description of the sector

The energy industry is composed of the following subsectors: extraction and briqueting of solid fuels (NACE 11); coke ovens (NACE 12); extraction of petroleum and natural gas (NACE 13); oil refining (NACE 14); the nuclear industry (NACE 15); production and distribution of electricity, gas, steam and hot water (NACE 16).

In addition, a description of the renewable energy industry is given in this chapter (not defined by NACE). The inclusion of this industry, though it has a relatively tiny impact on energy supply, reflects the growing appreciation of the contribution that renewable energy can make to reducing carbon dioxide and other atmospheric emissions.

Although different forms of energy are physically very different (gasoline, coal, electricity etc.) they can be accounted for jointly. Their gross calorific value (the amount of heat that can be obtained from each form of energy) makes consolidation possible and all the energy forms can be converted into a common unit. The tonne of oil equivalent (toe) is most commonly used for this purpose.

Capability of substitution amongst forms of energy corresponds to this idea of energy compatibility. For example, heat production in an industrial boiler can be served by coal, oil products, natural gas or electricity. In such a case, one can talk in terms of: final energy consumption, which merely consists of the energy used by end consumers; and primary energy consumption, which takes account of losses along the whole energy chain (production, conversion, transport and distribution) as well as the consumption by concerns within the energy industry itself.

Energy intensity corresponds to the amount of energy consumed per unit of gross domestic product (GDP). Energy intensities vary from country to country depending on the economic background, national energy policies and sectoral and industrial structures.

Main indicators

Between 1985 and 1991, GDP has increased by 19.3%; an average annual increase of 2.8%. Over this period, gross inland consumption increased by 16.8%; an average annual increase of 2.6%. Primary production increased only 5.4% which has resulted in an increase in net imports of 35% between 1985 and 1991, principally from imports of oil and coal.

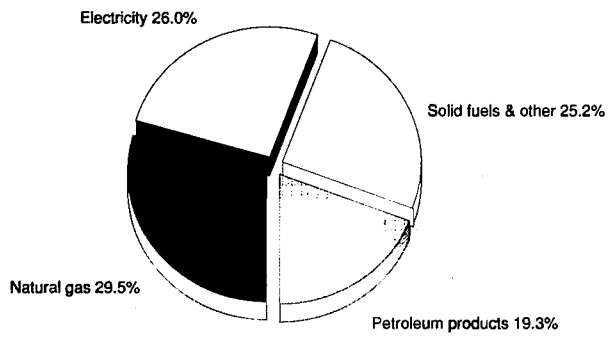
In the period 1973 to 1985 energy intensity decreased by more than 20%. The EC objective was to reduce energy intensity by a further 20% by 1995. In 1990, the energy intensity of the EC was 7% below the 1985 level, considerably less than half way towards the target. This is partly due to the fall in oil prices in 1985/6, however energy intensity had already begun to flatten out as consumers learnt to live with higher energy prices.

International comparison

The EC is a relatively large consumer of energy. Primary energy consumption in the EC in 1990 was around 1 200 million toe (see Table 7); over 14% of total world primary energy consumption. The USA, the largest energy consumer in the world, accounts for over 24% of total world primary energy consumption. The only country, other than the USA, to consume more energy than the EC is the former USSR with nearly 17% of total world consumption.

In demographic terms, the EC consumes roughly 3.5 toe per head of the population. This corresponds to that of Japan,

Figure 2: Energy
Fuel shares of final industrial energy demand, 1990



Source: Eurostat, DRI Europe

Table 1: Energy
Main indicators (1)

(million toe)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Final energy consumption	693	663	645	642	656	676	689	703	707	713	724	776
Gross inland consumption	1 037	1 003	980	965	991	1 029	1 044	1 063	1 077	1 099	1 115	1 202
Net exports	-592	-509	-476	-435	-458	-457	-480	-490	-511	-552	-573	-617
Primary production	479	504	514	538	534	589	601	601	591	576	573	621
Employment (thousands)	2 017	2 055	2 026	2 015	1 967	1 915	1 870	1 797	1 756	1 725	N/A	N/A

(1) Excluding Portugal; employment figures are for energy and water; 1991 figures include former East Germany
Source: Eurostat

Table 2: Energy
Primary production by fuel type (1)

(thousand toe)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Hard coal	156 922	148 584	107 639	133 597	139 496	133 908	129 460	125 839	118 828	116 760
Lignite	36 241	36 089	37 618	35 634	33 854	32 582	32 440	34 303	34 077	65 865
Crude and semi-refined oil	115 892	130 607	141 680	144 765	145 697	144 082	136 319	113 260	113 899	112 234
Petroleum products	3 755	4 737	5 546	5 860	6 239	5 725	4 591	4 213	2 059	3 536
Natural gas	115 984	119 940	119 952	127 117	124 565	129 101	120 203	125 296	129 791	143 838
Other fuels	1 593	1 833	1 562	1 664	1 660	2 169	2 622	2 456	2 593	4 190
Nuclear/geothermal heat	68 280	80 934	104 443	125 711	132 888	138 583	148 768	158 883	159 170	161 000
Electrical energy	14 905	14 772	15 042	14 581	14 246	15 189	16 532	11 336	12 484	13 877

(1) 1991 figures include former East Germany
Source: Eurostat

Table 3: Energy
External trade

(thousand toe)	1980	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC imports	819	724	766	764	774	805	842	887
Extra-EC exports	227	267	287	274	262	253	269	270
Net exports	-592	-457	-479	-490	-512	-553	-573	-617

(1) Estimated
Source: DRI Europe

Table 4: Energy
Evolution of the energy intensity (1)

(1985=100)	1985	1986	1987	1988	1989	1990
EC	100	99	98	96	94	93
Belgique/België	100	102	101	98	95	93
Danmark	100	97	99	93	87	87
BR Deutschland	100	97	96	94	90	88
Hellas	100	97	103	106	113	113
España	100	98	96	99	98	97
France	100	100	100	96	97	95
Ireland	100	103	103	100	94	93
Italia	100	99	107	99	100	99
Luxembourg	100	95	90	89	91	91
Nederland	100	102	104	100	97	96
Portugal	100	104	103	108	119	118
United Kingdom	100	98	94	90	89	88

(1) Energy intensity is equal to gross inland energy consumption divided by GDP
Source: Eurostat

Table 5: Energy
Final energy consumption by sector

(million toe)	1980	(%)	1983	(%)	1986	(%)	1988	(%)	1989	(%)	1990	(%)
Industry	245.8	32.2	206.3	29.1	209.7	27.6	219.0	28.0	223.0	28.3	223.0	28.0
Transport	170.4	22.4	173.1	24.4	191.5	25.2	211.5	27.0	222.7	28.2	229.6	28.9
Commerce, administration, residential	276.6	36.3	263.0	37.1	288.0	38.0	276.9	35.4	267.0	33.9	271.0	34.0
Non-energy	69.6	9.1	66.6	9.4	69.5	9.2	75.1	9.6	75.6	9.6	72.5	9.1
Total	762.4	100.0	709.0	100.0	758.7	100.0	782.5	100.0	788.3	100.0	796.1	100.0

Source: Eurostat

where energy consumption is little over 5% of world consumption. The USA has the highest ratio at 7.9 toe per capita, the former USSR consumes around 4.7 toe per capita.

The oil dependency ratio of the EC in primary terms fell to 44.6% in 1990. In Japan, 56.2% of primary energy consumption is derived from oil. The proportion of oil consumed in the USA is slightly less than the EC at 39.5%.

Natural gas, currently undergoing rapid expansion in the EC, still occupies a relatively low proportion of EC primary energy consumption in an international perspective. Compared with the EC's 18.3%, natural gas consumption in the USA is 24.9%. The USSR, home to the largest proven gas reserves in the world, consumes a massive 42.2% of total primary energy consumption as natural gas. In Japan, natural gas takes a 10.3% share in primary energy consumption.

In the EC, coal consumption occupies a 20.5% share in the fuel mix in terms of primary energy. The former USSR consumes a similar percentage. The USA, however, has a coal share in primary energy consumption of 24.2%; reflecting the greater emphasis of coal in the power generating sector. Japan is less coal intensive, with coal accounting for 17.2% of total energy consumption. China, on the other hand, is extremely dependent on coal. Coal contributes a huge 76.7% to primary energy consumption, though inefficiency in combustion processes is a major factor contributing to this.

Hydroelectric power in the EC takes a relatively low share in the fuel mix. At 3.4% of total primary energy consumption, hydro electric power has lower share than the USA (3.6%), the former USSR (4.2%) and Japan (4.8%). The principal reason for this is tight environmental regulations which have curtailed many ambitious projects. These factors are being applied worldwide and suitable sites are becoming scarce.

The EC contributes 7.7% to total world primary energy production. The country contributing the largest share of production is the former USSR with 22.2%. The USA follows close behind with 19.4%. EC primary energy production is dominated by the United Kingdom which accounts for around 36% of the total.

In global terms, the EC is not a significant energy producer and has been in decline since 1987. It is, however, a significant consumer. This results in the EC being 50% dependent on imports for its energy supplies, 7% more than in 1985. Oil production, 78% of which comes from the United Kingdom, is modest in an international context. EC oil production is 27% that of the USA and only 4% of total world oil production.

The EC is a rather more significant producer of natural gas with over 7% of total world natural gas production (73% of which comes from the Netherlands and the United Kingdom). The former USSR is the world's largest producer of natural gas: Soviet natural gas production in 1989 came to over 5 times that of the EC.

Coal production in the EC (45% of which came from the former West Germany and the United Kingdom in 1989) was around 160 million toe: less than a third of the output of the world's largest coal producer, the USA (closely followed by China).

Primary electricity production in the EC accounts for 17% of the world total. The USA accounts for over 20% of world primary electricity production. This is 4.9% of total US energy production. Japan on the other hand, with very small indigenous reserves of fossil fuels, has 73.5% of its total energy production as primary electricity.

Foreign trade

The European Community shows a deficit in the energy trade balance. Net imports were 617 million toe in 1991, i.e. 51% of gross internal consumption which is 7% more than the share in 1985.

EC energy imports have increased since 1988. In the latter part of the 1980s this was due to a slight increase in energy prices and a renewed start up of economic activity. The Gulf War increased crude oil imports for EC refineries working close to capacity. This in turn led to an increase in exports

Table 6: Energy
Evolution of final industrial energy consumption by fuel type

(thousand toe)	1980	1983	1984	1985	1986	1987	1988	1989	1990
Hard coal and patent fuel	10 889	13 961	14 852	18 727	16 668	18 703	18 480	18 500	19 185
Coke	28 494	24 238	26 443	27 125	24 166	22 194	22 792	22 924	21 318
Lignite and derived products	1 695	2 028	2 156	2 236	1 903	1 898	1 936	2 303	2 787
Residual fuel oil	63 831	38 747	34 500	29 031	29 095	25 833	25 949	24 257	22 626
Other petroleum products	27 094	20 764	21 174	21 350	22 916	24 753	23 750	22 644	20 288
Natural gas	51 418	46 450	50 129	51 090	50 340	56 602	57 662	61 277	65 763
Derived gases	12 118	10 689	11 364	11 974	10 809	11 099	10 664	11 112	10 281
Derived heat	1 197	2 005	2 075	2 288	2 286	2 792	2 336	2 641	2 648
Electrical energy	47 885	46 248	48 375	49 542	50 452	52 924	55 417	57 467	58 028

Source: Eurostat

Table 7: Energy
Gross inland consumption by type of primary energy (1)

(thousand toe)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Hard coal and derivated products	197 217	192 388	180 636	200 662	195 754	198 086	192 997	195 560	199 393	203 183
Lignite and derived products	37 331	37 989	39 050	38 345	35 773	33 179	33 760	35 443	34 880	66 547
Crude oil and petroleum products	482 425	466 956	472 006	462 591	474 024	476 686	488 072	491 758	497 420	521 130
Natural gas	160 334	167 537	176 674	184 742	186 934	198 053	192 580	201 489	207 718	231 677
Other fuels	1 593	1 834	1 660	1 765	1 668	2 168	2 622	2 456	2 593	N/A
Nuclear/geothermal heat	68 280	80 703	10 422	125 346	134 036	138 123	148 768	158 883	159 170	N/A
Electrical energy	16 549	16 744	16 573	15 754	15 385	16 538	18 297	13 035	13 911	14 685

(1) 1991 figures include former East Germany
Source: Eurostat

of refined products which explain the upturn in exports which took place in 1990.

In 1991, around 38% of extra-EC crude oil imports came from the Near or Middle East. Since the Gulf War in 1990 when crude oil imports from Iraq and Kuwait ceased, Saudi Arabia has increase production to cover the difference. This meant that Saudi Arabia's share in extra-EC imports from OPEC countries has risen from 19.7% in 1989 to 31.8% in 1991. Overall, since the end of 1987, extra-EC crude oil imports from OPEC countries have been increasing by 3% per year. The percentage of extra-EC imports coming from the former USSR and eastern Europe has fallen by 4.2% between 1989 and 1991.

MARKET FORCES

Demand

Energy demand by sector

Conservation and structural changes in the 1970s had a great impact on the industrial sector, particularly in energy intensive industries. Industrial energy consumption (including non-energy use) declined 21% between 1973 and 1985. In the residential and commercial sector, despite improvements in the efficiency in end use equipment and in the use of insulation, by 1986 energy consumption in this sector had increased almost 10% on 1973 levels. Since then energy consumption has declined in the residential and commercial sector and in 1989 consumption was down to almost 1983 levels. In 1990, consumption increased slightly, though it remained at roughly the same share of final energy consumption. Energy use in the transport sector increased 24% between 1980 and 1988, an average annual increase of 2.7%, despite improvements in vehicle fuel efficiency. Since then, energy consumption in the transport sector has increased at a rate 1.5% above this, reflecting large increases in the vehicle parc.

As a result of these trends, the share of industry in EC final energy consumption declined from 32% in 1980 to 28% in 1988. Since then the share has remained fairly stable. The transport sector share in final energy consumption overtook industry, absorbing almost 29% in 1990. Over the decade, the transport sector has increased its share by 6.5%. The residential and commercial sector remains the largest with its 34% share.

Energy demand by fuel type

Oil is still the dominant fuel type in the EC, whose major part of demand comes from the transport sector. The share of oil in gross inland energy consumption has declined only slightly since 1985, at a little under 45% in 1990. The main shift away from oil took place in the early 1980s when the share of oil declined almost 9% between 1980 and 1985. The share of oil in the industrial energy mix has been declining more rapidly than that of the residential and commercial sector. In 1990, oil shares in primary energy consumption for these sectors were 34% and 33% respectively and the transport sector nearly completely dependant on oil.

The contribution of natural gas in gross inland consumption has been increasing slowly. Over the last decade it increased its share in the primary fuel mix by 2%, with almost 19% in 1990. The share of electricity has increased greatly over the decade from just over 6% in 1980 to 15.5% in 1990. The

Table 8: Energy
Major EC companies, 1991

Company	Country	Turnover (million ECU)	Employees (thousand)	Net profit (million ECU)
Royal Dutch Shell	NL/UK	82 777	133.0	3 424
British Petroleum	UK	46 474	155.2	591
ENI	I	33 125	130.7 (1)	1 336 (1)
Elf Aquitaine	F	28 761	86.9	1 404
Electricité de France	F	24 582	120.7 (1)	198
RWE	D	21 388	102.2	607
Total	F	20 497	49.4	833
ENEL (1)	I	16 173	122.3	139
British Gas	UK	15 625	81.8 (1)	1 372
Repsól	E	10 922	21.6	522
Petrofina	B	10 182	17.1	386

(1) 1990
Source: DABLE

growing role of electricity in meeting end-use energy requirements has been accompanied by an increasing penetration of nuclear power in the early 1980s, tailing off in the latter half of the decade. Nuclear energy and hydropower accounted for around 44% of electricity generation in 1990.

In the industrial sector, fuel consumption in the 1980s has been categorised by a marked increase in the share of natural gas. This has been accompanied by the decline in the use of oil products. Residual fuel oil consumption has declined by almost a third over the last decade. In 1980, the share of petroleum products and natural gas in industrial final energy consumption were 37% and 21% respectively. By 1985, the shares had evened up to roughly 24% each. In 1990, natural gas had gained the larger share with 30%, leaving oil products with just over 19%. Consumption of solid fuels has increased only slightly over the decade with a share of 18% in 1990. Electricity consumption has seen a high rate of growth, an average annual rate of increase over the decade of 1.8% (0.5% per year below the average annual growth of GDP).

Supply and competition

EC primary energy production has increased at a lower rate than consumption which has resulted in greater net imports. Production increased by just over 5% between 1985 and 1991 to reach a total of 621 million toe.

The EC coal industry, facing foreign competition with far lower costs, and tough environmental legislation increasing its own costs, has been in steady decline in recent years. Between 1985 and 1991, hard coal production declined by 12.6%. Solid fuels as a whole increased slightly, but that is due to the inclusion of the new Bundesländer in the statistics, pushing up lignite production which had declined by over 4% to 1990.

Oil production, principally from the UK North Sea oil fields, declined by 22.5% between 1985 and 1990. This meant that the share of oil in total primary energy production declined from 26% in 1985 to 19% in 1991. Natural gas production, principally from the United Kingdom and the Netherlands, has increased 13% over the same period. This has resulted in its share in primary energy production increasing slightly to 23% in 1991.

Primary electricity production, mainly due to the bringing on line of nuclear power stations, increased its share in primary production from 24% in 1985 to 28% in 1991.

INDUSTRY STRUCTURE

The EC energy industry is characterised by the existence of large companies, many of them being either de jure or de facto monopolies, especially in the electricity and gas distribution industries. Some have an international dimension (the major oil companies), while others are national, often state owned or with a large participation by the state.

REGIONAL DISTRIBUTION

In the EC as a whole, energy intensity has declined by 7% over the 1985-1990 period. Examination of the regional contributions to this reduction in energy intensity reveals marked differences between member states. Leading the way in energy intensity reductions are, the former West Germany, Denmark and the United Kingdom. In the Mediterranean countries, where there are less opportunities for efficiency gains in space heating (such as through improved insulation), energy efficiency gains have been less marked and intensities have, in some cases (Greece and Portugal), increased. What is apparent in all countries where improvements in energy intensity have been made, is the recent slowdown in the rate of decline.

Regional differences in the consumption of oil and solid fuels are apparent. The countries who are over 50% dependant on oil are: Greece, Spain, Italy, and Portugal. The countries least dependant on oil are the United Kingdom, the Netherlands, France, former West Germany and Belgium. These regional disparities in oil dependence are due to a number of factors: reliance on oil fired electricity generation, the size and age of the vehicle parc, the penetration of oil used for space and other heating requirements, and the associated efficiency. Industry has tended to switch away from heavy fuel oil for its heating requirements over the past decade, so that this factor is becoming less significant.

Regional differences in the consumption of solid fuels can almost exclusively be explained by the share of solid fuels in the power generation sector. As a result of this, Denmark, Greece, Ireland, Germany (including the new Bundesländer) and the United Kingdom, all have a significantly higher share of solid fuels in the fuel mix than the EC average. France, noticeably, has a very low coal dependence due to the small share of coal fired electricity generation in its nuclear dominated power sector. Italy, though it has no nuclear generation, relies more on natural gas and oil for power generation than solid fuels.

ENVIRONMENT

The issue of global warming has been in the forefront in the public debate and in the environmental activities of the Communities. As a first step in the preparation for the Rio de Janeiro conference on Global Warming the joint energy and environment Council decided in October 1990 to stabilise the Community's CO2 emissions in the year 2000 at the 1990 level. No specific measures for achieving this target were adopted by the Council.

Following this, the Commission outlined in October 1991 an EC strategy to limit CO2 emissions and to improve energy efficiency. The Commission considers, that a CO2 policy is needed and that such a policy would work out more efficiently if adopted on the EC level than adopted on the national level. A coordinated carbon tax policy is seen as been critical in order to avoid distortions in the internal market for energy as well as for trade within the Community. The Commission outlines three sets of measures to control CO2 emissions: first, specific measures, including R&D programmes, sector measures and other types of regulatory and voluntary measures; second, fiscal measures; and third, complementary national programmes.

The fiscal measures suggested by the Commission is a tax on energy use corresponding to $10/bbl. The carbon tax element of the total tax should not exceed 50%. The Commission was invited by the Council to present formal tax proposal. In this proposal (submitted to the Council in May 1992) the Commission foresees that the new energy and carbon taxes will be national taxes levied on the top of already existing energy taxes. The new tax policy should only be implemented if other members of the OECD adopt similar taxes or other measures having similar effects, following the principle of "conditionality". The proposal from the Commission foresees that energy intensive industries may obtain tax refunds, if they are confronted with serious difficulties because of competition from non-OECD countries not having imposed carbon taxes or equivalent measures.

REGULATIONS

In order to promote an integrated internal energy market, the Commission is pursuing two lines of action. On the one hand, the Commission is enforcing the existing Community legislation and treaty obligations and in particular the free trade

provisions of the EEC treaty as well as competition and state aid provisions.

The other strategy, which involves regulatory changes and new Community legislation, started being seriously envisaged in the June 1987 Council, when energy ministers asked the Commission to identify the remaining obstacles to the functioning of the internal market for energy and to make proposals for their progressive elimination before the end of 1992. The subsequent Commission report (COM(88)238) was followed by a first set of proposals which have been adopted by the Council and constitute what is referred to as Phase 1 of the creation of an internal market for energy. The measures concern only gas and electricity: June 1990: directive on price transparency for gas and electricity; October 1990: directive on transit of electricity; May 1991: directive on transit of natural gas.

The directive on price transparency provides for collection of information on electricity and natural gas prices for final consumers across the Member States. It is first of all a statistical instrument, which allows comparisons of price levels. The two transit directives give access to the electricity and natural gas transmission grids for transport across a Member State on certain conditions.

Early 1992, the Commission made another series of proposals for Phase 2 of the energy internal market. These proposals have not yet been adopted by the Council. They include three set of measures:

- the liberalisation of electricity generation and the freedom to construct transmission lines for both gas and electricity;
- the unbundling of production, transmission and distribution activities for vertically integrated gas and electricity companies. Unbundling is an accounting concept and does not require changes in the ownership structure;
- the introduction of limited third party access to the gas and electricity networks. Eligible customers will be industrial companies whose annual electricity or natural gas consumption exceeds a specified threshold (100 GWh for electricity and 25 million of m3 for gas). Distribution companies with a market share above a threshold (3% in the case of electricity and 1% in the case of gas) will also have third party access to transmission grids.

RESEARCH AND DEVELOPMENT

The historical improvement of energy efficiency in industry is characterised by several phases that are listed below.

Firstly, changes in the structure, technology and management of energy saving measures. Implementation took place with the advent of higher energy costs in the 1970s. These measures did not require large capital investments and can be termed a stage of rationalisation.

Secondly, investments instigated by improvements in energy performance through design changes. These were made by the energy intensive industries, mainly because market prospects in the 1980s, which were mediocre at the turn of the decade did not encourage them to make investments in capacity increases. Industry consolidated and centred on inward investment with a view to reducing costs.

Thirdly, investments in which improvements in energy efficiency come as one consideration in the decision making process; coupled with capacity increase, product quality improvements and the reduction of other operating costs.

Since the first of the oil crises in 1973, energy efficiency has been one of the principal elements of the EC's energy policy. The Community's commitment to energy efficiency has been evident in the many measures aimed at improving the rational use of energy adopted by energy ministers since 1974. Most notable examples are the Joule and Thermie programmes, still in existence. The effects of these policies, indicated by the decline in energy intensity, have been waning partly as a result of lower crude oil prices. The SAVE (Specific Actions on Vigorous Energy Efficiency) programme will soon be introduced to reignite enthusiasm in energy efficiency.

SAVE will consist of three elements:

- Legal and administrative measures aimed at creating a more positive environment for energy saving. The legal aspects take the form of a single directive encompassing those measures without bearing on the internal energy market. A large measure of freedom will be left for Member States to implement the directive with developments being monitored by the commission, as under the principles of subsidiarity.
- A support programme to assist in expanding or creating an energy saving infrastructure so as to best utilise member states' reserves of technical expertise.
- A network designed to disseminate information and coordinate activities on a community level concerning energy efficiency activities.

The Thermie programme, designed to promote new and innovative energy technology, was approved by the Council of Ministers in 1990 to run for 5 years with an estimated total budget of 700 million ECU. Thermie operates in four areas: the rational use of energy in industry, buildings, transport and the energy industry; renewable energy sources (solar, biomass, waste and wind); solid fuels (combustion and waste); and hydrocarbons (safety and environmental protection, exploration and production).

The EC has recently called for projects for the 1993 round of Thermie funding which will place particular emphasis on energy technologies having a benefit on the environment, especially those reducing emissions of CO_2.

OUTLOOK

In the EC as a whole, gross inland consumption will grow at a rate increasingly below that of GDP as a result of energy efficiency improvements. Total gross inland consumption will increase 19% between 1990 and 2005 on this basis. Energy intensity would decrease 20% on 1985 levels by 2005 on these predictions, though increased effort in conservation on a Member State level and the implementation of the SAVE programme may speed up this decline.

The future primary energy mix will be characterised by the continued dominance of oil, with its share remaining over 40% in 2005. This is predominantly as a result of increasing fuel demand from the transport sector. Moderate oil prices in the short term reduce the incentive for fuel switching away from oil. Demand for oil will be particularly strong in the lower income Member States as stronger economic growth feeds through into energy demand.

Natural gas consumption increases at the fastest rate of all fuels, at over 1.5% above the rate of growth of GDP in the short term to 1% above in the start of the next century. This results in natural gas occupying the second largest share in the fuel mix, replacing coal, in the second half of the 1990s. In 2005, natural gas will have a share of over 24%, 7% more than in 1990. This rapid increase reflects the growing attractiveness of this fuel in terms of environmental and economic considerations. Nuclear power units are coming on stream in France and the United Kingdom, leading to an expected increase in nuclear electricity production. Renewable energies are expected to triple their share though their contribution in absolute terms will remain modest.

In the light of increasing demand, prospects for Community energy production are less favourable. Production costs are

Table 9: Energy
Expected annual gross consumption growth rates (1)

(%)	1990-1995	1995-2000	2000-2005
Solid fuels	-1.1	0.2	0.0
Oil (2)	1.4	1.0	0.2
Natural gas	3.8	3.9	2.5
Nuclear fuels	1.0	0.7	0.2
Hydropower	5.4	0.6	0.3
Heat (3)	9.8	9.8	2.1
Renewables (4)	1.8	16.1	14.2
Total	1.3	1.5	0.8

(1) Including former East Germany
(2) Crude oil and finished oil products
(3) Geothermal energy
(4) Mainly biomass
Source: DG XVII, DRI Europe

relatively expensive compared to other regions of the world, especially with regard to hard coal. As a result, hard coal production levels will decline appreciably to a level which will be primarily determined by the availability of state aid and other policy measures. Oil and gas production from many existing fields may be depleted in 10 to 15 years time, but production from new fields should largely offset these losses. Consumption will still outpace production, however, and imports will increase as a result. Import dependency in 2005 is likely to increase by around 10% of 1990 levels.

In the industrial sector, final energy consumption is forecast to increase at an average annual growth rate of 0.4%. This is 0.8% per year below the annual growth rate of total final energy consumption in the EC. As a result of this, by 2005, the industrial share is reduced by 4%.

In the long term growth in industrial energy demand is forecast to virtually stagnate. This is as a result of structural changes within the sector as well as due to further efficiency gains: The industrial base is shifting away from the energy intensive industries towards less intensive industries such as electronics. Energy efficiency measures will occur both through price stimulated behavioural changes as well as through policy measures taken at a national and community level.

Written by: DRI Europe

Solid fuels
NACE 11

Solid fuels accounted for 22.5% of gross EC inland energy consumption and 29.7% of EC primary energy production in 1991. Back in 1980, the share held by solid fuels of primary energy production was about 40%. The decline since then has been wholly attributable to hard coal, while the contribution of lignite has been stable until 1991, when the addition of former Eastern Germany caused lignite output to increase by more than 90% and lead to an increase in total solid fuels output. Nevertheless, in terms of contribution to total EC thermal energy, lignite produces just about 39% of that produced by hard coal.

INDUSTRY PROFILE

Description of the sector

NACE 11 covers not only hard coal (NACE 111) but also brown coal or lignite (NACE 112). Solid fuels or "coals" are usually classified according to their rank in terms of their degree of maturity. This ranges from peat, the lowest rank, to lignite, bituminous coal and finally anthracite, the highest rank. Although reference will be made to the total contribution of solid fuels to the EC energy balance, the emphasis in the following pages will be on hard coal.

Main indicators

In 1991 indigenous production of hard coal satisfied 59.3% of EC hard coal consumption, well down from 80.5% a decade earlier. In 1991, about 260 000 people were employed in hard coal production in the EC, that is 57% less than in 1980.

Recent trends

Total EC output amounted to 193.4 million tonnes in 1991, 25.7% lower than the 260.3 million tonnes produced in 1980. The three largest coal-producing countries, the United Kingdom, Germany and Spain, together accounted for 93.4% of total output. Over the 1980s, capacity reductions left production declining in all of these countries except Spain.

International comparison

EC hard coal output has fallen faster than EC hard coal consumption, creating an ever growing need for extra-EC imports.

The EC ranks with Japan as one of the two foremost importers of hard coal. The drastic reduction in European production since the 1960s was due to competition from imported coal and, to a lesser extent, to competitive pressure from cheap hydrocarbons since 1986. Indeed, because of unfavourable geological conditions, which amongst other effects means that European coal is mostly produced from deep underground mines rather then open-cast mines, European coal is expensive to produce and, over the years, its competitive position has grown ever weaker. Less than 10% of European coal is extracted from surface mines, compared to 50% in Australia, 60% in the USA and 85% in Canada. German production costs are particularly high with hard coal deposits at an average depth of 900 m.

High production costs affect the competitive position of European coal against imports from abroad. This was exacerbated by the depreciation of the dollar compared to EC currencies in the late 1980s which rendered imported coal even cheaper in EC currencies.

The financial losses due to growing competition from imported coal and other sources of energy have forced the European coal industry to rationalise, closing the most uneconomic mines, reducing the work force and increasing productivity. The number of underground mines in the EC fell from 479 in 1980 to 265 in 1991.

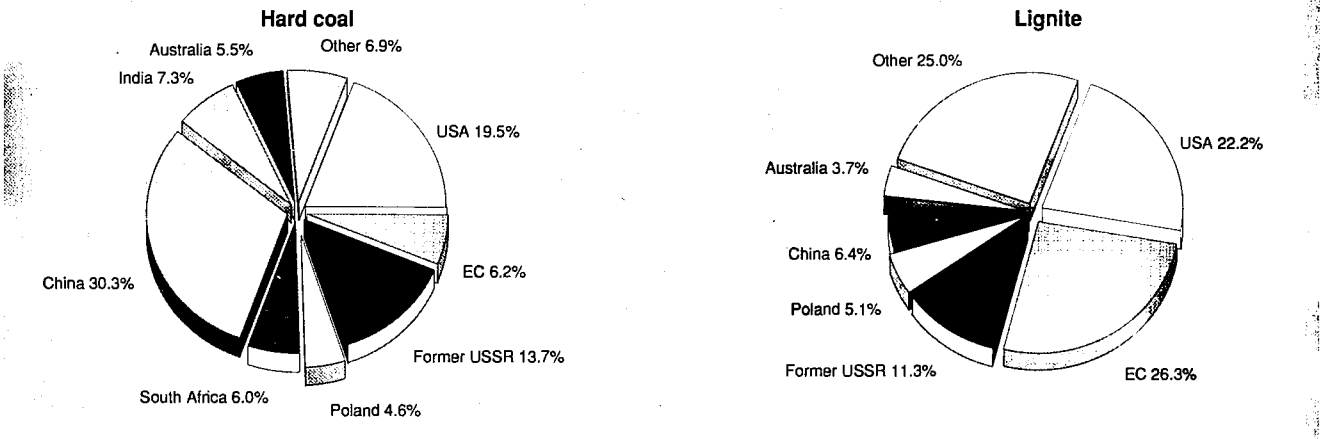
Foreign trade

In 1991, indigenous coal production accounted for 59.3% of gross coal consumption in 1991, with the remainder being covered by imports and stocks. Over the 1980s, intra-EC trade, fell sharply from 17.0 to 9.0 million tonnes, mainly due to the deterioration in the price competitiveness of EC coal versus coal originating from third countries.

Although complete freedom in the movement of coal between Member States is ensured by the ECSC Treaty provisions, trade policy measures in some countries remain an obstacle to free circulation. These include vertical agreements between national coal producers and consumers, which the Commission is currently examining within the context of the Single Market.

The USA supplies the greatest volume of foreign imports to the EC, providing 50.9 million tonnes, 38.8% of total extra-EC imports in 1991. Imports from South Africa and Australia accounted for 19.4% and 15.1% respectively. The remaining 26.7% was made up by largely of imports from Columbia, Poland, the USSR, Canada and China.

Figure 1: Solid fuels
Coal production, 1991



Source: BP, Eurostat

Table 1: Solid fuels
Main indicators - Hard coal

(million tonnes)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Gross inland consumption	330.9	323.6	326.6	316.1	285.6	322.1	319.7	323.9	311.7	315.4	320.9	326.1
Net exports	-80.8	-75.5	-78.0	-64.3	-85.8	-96.5	-92.5	-91.3	-93.4	-101.1	-114.8	-130.8
Production	260.3	260.6	256.8	244.9	172.9	217.4	227.9	221.7	214.7	208.7	197.2	193.4
Employment (thousands)	599.7	582.6	567.9	537.9	504.3	464.4	420.8	378.4	367.0	322.0	300.0	260.0
of which underground	387.1	381.7	369.8	356.4	331.4	311.4	285.0	255.3	230.0	211.0	187.5	174.3

(1) Including former East Germany
Source: Eurostat

Table 2: Solid fuels
Main indicators - Lignite

(million tonnes)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Gross inland consumption	179.4	189.0	188.4	191.9	196.0	194.4	186.6	179.6	183.1	190.9	188.9	N/A
Net exports	-2.2	-2.8	-2.8	-3.0	-3.3	-2.7	-2.9	-2.4	-2.1	-2.3	-2.2	N/A
Production	176.5	188.1	187.7	188.5	196.6	186.9	183.1	179.8	179.8	188.7	186.8	354.8

(1) Including former East Germany
Source: Eurostat

Table 3: Solid fuels
Share of solid fuels in gross inland energy consumption

(%)	1980	1985	1986	1987	1988	1989	1990	1991(1)
EC	23.1	23.2	22.2	21.8	21.1	21.0	21.0	22.5
Belgique/België	24.0	22.7	19.7	19.0	19.0	20.6	21.4	19.7
Danmark	30.6	39.6	38.5	39.2	38.5	33.2	35.7	42.4
BR Deutschland	29.7	31.0	29.5	28.1	27.6	28.1	27.6	33.2
Hellas	20.9	34.8	36.8	37.4	38.2	37.5	38.3	36.4
España	21.5	28.0	25.8	24.0	19.7	22.5	22.5	22.5
France	16.9	12.6	10.3	9.4	9.1	9.6	9.4	9.5
Ireland	20.7	29.5	30.8	38.1	39.1	38.1	34.9	35.4
Italia	8.6	11.4	10.6	10.5	9.7	9.2	9.7	8.3
Luxembourg	50.7	45.5	42.1	34.5	34.8	34.0	31.9	30.2
Nederland	6.3	10.8	10.2	10.5	12.7	12.6	13.7	12.0
Portugal	4.6	6.4	10.0	14.4	15.5	16.3	17.4	15.7
United Kingdom	35.0	30.8	31.8	33.0	31.7	30.7	30.4	30.2

(1) Including former East Germany
Source: Eurostat

Table 4: Solid fuels
Hard coal - Production, trade and consumption by sector

(million tonnes)	1980	1988	1989	1990	1991 (1
Production	260.3	214.7	208.7	197.2	193.4
Imports	97.7	104.6	111.5	126.1	140.0
Exports	16.9	11.2	10.4	11.3	9.2
Gross domestic consumption	330.9	311.7	315.4	320.9	326.1
Transformation, of which	293.3	270.5	273.5	280.2	284.2
Electric power stations	194.2	196.1	200.4	210.0	215.9
Coking plants	93.8	71.7	71.1	68.3	66.0
Final consumption, of which	36.1	42.1	41.4	40.1	41.8
Industrial	17.0	28.0	29.0	29.1	28.4
Domestic, Administration, Services, etc.	18.9	14.0	12.4	10.9	13.4

(1) Including former East Germany
Source: Eurostat

Table 5: Solid fuels
Hard coal - Production by country

(million tonnes)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
EC	260.3	260.6	256.8	244.9	172.9	217.4	227.9	221.7	214.6	208.7	197.2	193.4
Belgique/België	6.3	6.1	6.5	6.1	6.3	6.2	5.6	4.3	2.5	1.9	1.0	0.6
BR Deutschland	94.5	95.5	96.3	89.6	84.9	88.8	87.1	82.4	79.3	77.5	76.6	72.7
España	12.9	14.8	15.6	15.4	15.3	16.1	15.9	19.3	19.0	19.2	19.4	18.3
France	18.1	18.6	16.9	17.0	16.6	15.1	14.4	13.7	12.1	11.5	10.5	10.1
United Kingdom	128.2	125.3	121.4	116.4	49.5	90.8	104.6	101.6	101.4	98.3	89.3	91.3

(1) Including former East Germany
Source: Eurostat

MARKET FORCES

Demand

By far the greatest consumer of solid fuels is thermal power generation which, in 1991, accounted respectively for 62% (hard coal) and for 68% (lignite) of consumption. The second largest market for solid fuels is for the production of coke (90% of which is used by the steel industry) in coking plants. The third largest market is the industrial sector.

During the period 1980-1991, hard coal consumption by power stations increased in the EC of about 11% On the contrary, coking plants reduced their hard coal consumption of about 30% during the same period. In addition to declining steel production, development of electric arc furnace (EAF) based steelworks and technological improvements contributed to the reduction in coke consumption, and therefore in coal consumption in coke manufacturing. EAF based steelworks took a noticeable share of the European market of low-grade long products, recycling significant quantities of scrap. Estimates by the European Coal and Steel Community (ECSC) suggest that a third of the European gross steel production will come out from EAF based steelworks in 1992. This production method does not require coke. Technological improvements aimed at reducing production costs resulted in particular in a reduction in specific coke consumption per tonne of pig iron production in blast furnaces. The major technical change has been the wider use of pulverised coal injection (PCI) in blast furnaces, thereby reducing specific coke consumption: as a result of the PCI technology, there has been a partial substitution of coke by coal in the production of steel. The full potential for use of PCI in Europe has not yet been realised and there is, therefore, scope for further reduction in coke consumption.

The large share of total coal demand accounted for by the power generating sector ensures that this sector will play a critical role in the future of hard coal consumption. Coal's share in the power generation fuel mix is expected to gain between three and four percentage points, largely to make-up for output lost as heavy fuel oil falls increasingly out of favour and as nuclear construction programmes slow down.

The use of hard coal in the industrial sector (which excludes power stations and coking plants) increased steadily over the 1980s from 17.0 to 29.1 million tonnes. The industrial sector includes a many small and medium-sized consumers from various industries, such as cement, chemicals, food, engineering, and with varying energy requirements (for example motive power, high-temperature heat, low-temperature heat). Following the second oil crisis, which demonstrated the need of the EC to reduce its dependence on imported oil and gas as well as to diversify energy sources, there was an upturn in industrial coal consumption. To some extent, this upturn was prompted in by government incentives that were offered to companies to encourage them to switch from oil and gas to coal and also by programmes offered by European coal producers to encourage conversion to coal.

Nonetheless, growth in coal use by the industrial sector was relatively slow and limited to a few countries. An exception was the cement industry, where coal maintains a clear-cut price advantage over other energy sources even without government incentives. Given that coal installations carry a higher capital cost than oil or gas installations, industry will switch from oil and gas to coal only if it expects that the differential of the fuel prices will become sufficiently large. This criteria is reflected in the observation that since the oil price collapse of 1986, conversion from oil and gas to coal has virtually disappeared.

The remaining sector in which significant quantities of hard coal are consumed is the domestic sector which includes households, services and administrative bodies. Solid fuel consumed in this sector is used almost exclusively for space heating, and its consumption is decreasing. Throughout the EC, environmental concern is expected to leave solid fuels losing ground to natural gas. Having accounted for about 6% of the domestic sector fuel mix in 1990, solid fuels should account for only 4% in the year 2000.

As for lignite, because of its low calorific value, transport over long distances is uneconomic. Thus most lignite is mined and consumed on-site or nearby in power stations or briqueting plants. Between 85 and 90% of total lignite was burnt in power stations over the 1980s, whilst the remainder was used to manufacture briquettes and for the preparation of pulverised lignite for use in the industrial market.

Supply and competition

Coal is the most abundant fossil fuel in the world and in the EC. EC proven hard coal reserves are estimated to have stood at 33 billion tonnes at the end of 1989. At current rates of production, this means that hard coal reserves would last about 170 years.

At the end of 1989, EC reserves of sub-bituminous coal and lignite are believed to have stood at about 60 billion tonnes. Some 90% of these reserves were in Germany. The EC has 14% of world reserves of sub-bituminous coal and lignite. Most lignite mined in the EC is extracted by surface or "open cast" methods, which allow higher productivity than underground mining and yield a fuel that is competitive with other fuels used for electricity generation.

Although the EC is reasonably well-endowed with coal, the majority of remaining reserves are deep deposits that require working at very great depths, sometimes in excess of 1 000 metres with heavy-duty, sophisticated equipment, both for technical and safety reasons. This has led to high production costs and has undermined the financial situation of the coal production industry.

Table 6: Solid fuels
Hard coal - Output per man/hour underground

(kg per man/hour)	1988	1989	1990	1991 (1)
EC	578	603	628	680
Belgique/België	320	328	361	355
BR Deutschland	630	645	673	695
España	333	329	341	350
France	534	589	634	728
United Kingdom	633	680	704	794

(1) Including former East Germany
Source: Eurostat

Production process

Over the 1980s mine closures and general restructuring saw the number of workers employed in the extraction of hard coal to be reduced by more than half. Much of the decrease is accounted for the work force of British Coal which fell from 293 900 in 1980 to about 58 100 in 1991 (of which 44 600 are colliery employees). The same trend exists in the other producing countries: the ultimate example is provided by Belgium, where coal mining is due to cease at the end of 1992.

Generally, the marginally least productive mine is the mine that is closed. This has lead to a significant increase in productivity in the EC coal mining industry. During the 1985-1991 period, productivity increased substantially, posting a 52% in output per man-hour underground in the EC. Capital expenditure over the past decade has concentrated on developing and implementing the use of new coal mining technology, increasing the share of production held by surface mines, the exploitation of additional reserves, and the closing of uneconomic pits.

Research and development

Although several programmes on health and safety in mines have been successfully undertaken, the emphasis in this report is mainly on technical research in the two key areas of mining technology and product upgrading.

Research in mining technology is concerned with improvement of roadway support techniques (particularly in light of ever greater working depths), monitoring of ventilation, automatic steering of mining machines, and more efficient and safer transport systems for both personnel and materials. Research is also being made into remote control, data processing and modern communication systems, to examine whether and how they can contribute to increased safety, improved working conditions and more efficient mining operations.

Research into product upgrading concerns efficiency and environmental considerations of coal preparation, handling and coking. Both fundamental and applied research is being carried out by mining institutes, universities and laboratories, often on a jointly at an international level basis, and with ECSC financial support amounting to some 60% of total costs.

After the first oil crisis, in 1974, interest grew in the conversion of hard coal and lignite into other materials as a way of reducing dependence on imported hydrocarbons. As a result, several pilot and demonstration programmes were launched by the EC into:

- gasification and liquefaction of solid fuels (including underground gasification);
- substitution of hydrocarbons by solid fuels with fluidised bed combustion, coal-liquid mixtures and combined cycles as key areas of research;
- utilisation of solid fuels within the framework of the EC "JOULE" R&D programme into non-nuclear energy and rational use of energy (1989-92);
- energy production from fossil fuels based on advanced technologies, notably combined cycles, within the recent "Framework programme" (1990-94);
- new and improved clean combustion methods for solid fuels, underground coal gasification and use, treatment or enhancement of wastes arising as a result of the use of solid fuels, within the new demonstration "Thermie" Programme (European Technologies for Energy Management) which was proposed by the Commission to run from 1990-94 and has since been adopted.

INDUSTRY STRUCTURE

Companies

In Belgium, the only mining company, Kempense Steenkolenmijnen, is a public company in which the state has a majority holding. The central fuel buying agency for the Belgian electric utilities is the Pool des Calories.

Most coal imported by Denmark is consumed by the two Danish power companies, Elsam and Elkraft, which buy coal directly on international markets.

The bulk of French coal production is the responsibility of the nationalised company, Charbonnages de France (CdF). A few small mines are operated by Electricité de France or are privately held. The Technical Association for Coal Imports (ATIC) holds a monopoly over coal imports.

Ruhrkohle, the major shareholder in which is VEBA, is the largest of Germany's coal producers controlling the coal activities of the companies EBV, Sophia Jacoba and Auguste Victoria. The second largest company, Saarbegwerke, is owned 74% by the Federal state and 26% by the German Land of Saarland. The other (small) companies are completely privately owned.

The major producer of lignite in Greece is the publicly-owned Public Power Corporation (PPC). Additionally, there are some small privately-owned mine in northern Greece. Greek lignite is burned almost exclusively in PPC's power plants.

In Ireland, coal mined by the privately-held company Arigna Coelieris is burned in a 15 MW power station that is owned by the Electricity Supply Board.

Italy's modest lignite output is found in Tuscany and Umbria. There is also sub-bituminous coal production in Sardinia. Coal imports are the responsibility of ENEL, ENI and Finsider, the steel company.

Coal is produced in Portugal at only one mine. Most of this coal is burned in a power plant belonging to the state-owned power company, EDP.

Table 7: Solid fuels
Investment - Coal extraction and preparation

(million ECU)	1989	1990 (1)	1991 (2)
EC	1 213.6	1 038.2	938.0
Belgique/België	10.9	2.0	0.0
BR Deutschland	294.6	274.7	313.7
España	182.6	211.5	191.8
France	44.4	42.9	39.5
Italia	42.9	54.8	78.1
Portugal	0.9	0.7	0.6
United Kingdom	637.3	451.6	314.3

(1) Provisional
(2) Forecasts
Source: Commission Services (DG XVII)

Coal in Spain is produced by a plethora of companies, more than 200 in total. The leading company, Hunosa, is publicly owned whilst most of the rest are held privately. Sales of coal to power stations are made under the auspices of a contract between Carbunion, the association of coal producing companies, and UNESA, the association of electricity utilities.

Finally, in the United Kingdom the National Coal Board was renamed British Coal as part of the British government's preparations to privatise the coal industry. Most underground mines are owned and operated by British Coal. Open-cast mining is undertaken by private operators, mostly under contract to British coal.

Strategies

The strategies of companies in the EC solid fuels sector are largely shaped by the foreseen decline in EC output, caused by the EC drive for increased competitiveness within the context of the EC state aid policy. Producing companies that wish to continue to exist in the long term have to diversify and rationalise. British Coal, which the British government hopes has enough future to make its privatisation possible, continues to close pits and reduce staff. As a result of the recent Coal Round Table, German producers such as Ruhrkohle will have to make more job cuts and close pits. Charbonnages de France, which faces similar cuts, is liable by law for the livelihood of its mining employees, and thus is investing in developing alternative employment for them. The Spanish coal industry has accepted to implement a restructuring plan which will result in the closure of the uneconomic underground pits and hence in a further reduction of the underground workforce.

In order to cope with the employment effects of the restructuring process and in order to reinforce the reconversion process in the mining regions affected by pit closures, the European Commission established the Community initiative "RECHAR", which is additional to the other Community financial instruments.

REGIONAL DISTRIBUTION

Hard coal is currently mined in significant quantities in four EC members, Germany, Spain France and the United Kingdom. Small quantities are also produced in Portugal and Ireland.

Lignite is mined in the following six EC countries: Germany (280 million tonnes),Greece (50 million tonnes), Spain (15 million tonnes), Ireland (6 million tonnes), Italy (1.6 million tonnes) and France (0.3 million tonnes). The three biggest producers accounted for over 97% of total output in 1991. The greatest change was in Germany, where the addition of eastern German output to total figures for Germany from the start of 1991, lifted output by 160%. This increase was the cause of an increase in EC output of 94% from 1990 to 1991 to 353.0 million tonnes. This increase represents a dramatic change compared to the entire previous decade during which total EC output was fairly stable at between 180 and 190 million tonnes/year.

ENVIRONMENT

As with any fossil-fuel, the production, transformation and use of solid fuels have an impact on the environment. Hard coal and lignite are used mainly for power and heat generation, processes which attract environmental protection measures. In particular, major efforts have been undertaken since the mid-1970s to reduce particulate, SO_2, and NOx emissions from coal- and lignite-burning power plants, albeit at the expense of conversion efficiency and the relative cost of coal-generated electricity. As a result of the installation of flue gas desulphurisation (FDG) and NOx removal units, drastic reductions in the emissions of pollutants have already been achieved. Further improvements are expected over the balance of this decade with the development of a large number of pilot plants that employ advanced methods of clean coal utilisation.

Compared to other fossil fuels, solid fuels emit the highest amount of CO_2 per unit of energy. In order to ensure that the greenhouse gas emissions from coal use are minimised, it is important that, wherever possible, the efficiency of coal utilisation continues to improve. So far, this century, the efficiency of coal-fired power generation has doubled due to technological improvements. Further efficiency gains are expected as combined cycle systems are developed and widely deployed. CO_2 emissions from such plants are as much as 20% lower than from conventional plants. Furthermore, the emplacement of combined heat and power (CHP) plants offers potential CO_2 emissions reductions of more than over 50%.

REGULATIONS

The Treaty establishing the European Coal and Steel Community (ECSC) stipulates under Article 4(c) that national financial support to the coal industry is prohibited. Decision 2064/86 is the latest in a long series of decisions by which state aid is allowed under strict conditions, to be granted to the coal industry. this decision expires on 31 December 1993.

The Treaty also stipulates under Article 55 that the High Authority shall promote technical and economic research relating to the production and increased use of coal and to occupational safety in the coal industry. From 1959 onwards, the ECSC High Authority, and subsequently the European Commission, granted financial aid to that end.

The Treaty establishing the ECSC will expire in June 2002. The European institutions have started discussions on the fu-

Table 8: Solid fuels
Forecasts

(million tonnes)	1991	1995	2000
Hard coal			
Production	199	163	130
Consumption	333	355	408
Lignite			
Production	353	306	281
Consumption	355	305	280

Source: DRI Europe,

ture of the provisions of this Treaty, and their phasing-in to the EC Treaty.

OUTLOOK

Solid fuels face a declining share in both the domestic and industrial sectors, although, as oil and gas prices are expected to rise more quickly than coal prices, the competitive position of coal should improve. Other cleaner fuels are favoured for space heating, whilst the use of coal in industry is linked closely to the fortunes of the iron and steel industry. Coal does, however, have a future in power generation where its share of the fuel mix should rise into the next century, although lignite consumption in power generation is forecast to drop mainly in Eastern Germany for environmental reasons.

Competition from third countries and the general effort to lessen national subsidies means that, by the year 2000, 71% of consumption is forecast to be serviced by imports compared with about 40% in 1991. Meanwhile, coal production should fall between 65 and 75% by the year 2000. Although indigenous production avoids the risk of exchange rate movements and plays an important role in terms of security of supply, it is not competitive at present price levels on the world energy markets. This has become increasingly apparent over recent years. Indeed, the only countries that have significant coal industries now are those that protected them in the past.

Consequently, major developments are expected in the British, Spanish and German coal markets. British Coal faces a hard battle to maintain its contracts with the power generation industry in the United Kingdom which are due for renewal next year. In Germany, cuts in the subsidies to both steam coal and coking coal are being negotiated, which can be expected to lead to cuts in production. Meanwhile, in Spain, a major restructuring of the industry is in progress, along with some improvement of import facilities.

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Exploration and production of crude oil and natural gas
NACE 13

Total production of hydrocarbons in the EC stood at 254.9 million tonnes of oil equivalent in 1991. The United Kingdom and the Netherlands are the two leading hydrocarbon producers within the EC accounting for 52% and 26% of output respectively in 1991. The EC depends on imports for about two thirds (in volume) of its total hydrocarbons consumption.

INDUSTRY PROFILE

Description of the sector

NACE 13 comprises three main activities:

- the exploration of both crude oil and natural gas;
- the production of liquid hydrocarbons (i.e. crude oil), condensates and other liquids resulting from gas processing operations;
- the production of natural gas.

Main indicators

Crude oil production in the EC has been declining. In 1991, total output stood at 111.1 million tonnes, 4.1% down on 1990's level of 115.8 million tonnes. Total world production of crude oil was 3 151 million tonnes in 1990, 1.4% higher than in 1989. Output grew in spite of the Gulf crisis as other producers quickly moved to replace lost Kuwaiti and Iraqi output. Of this, the EC's contribution of 115.5 million tonnes represented 3.7% of total world output. Provisional data for 1991 point to a decrease in world output by 1.1% to 3 116 million tonnes. EC output is estimated to have fallen 2.6% in 1991 to 112.5 million tonnes, which left it producing 3.6% of total world output. Total proven world oil reserves have been declining since 1989. They are estimated to have stood at 133.9 billion tonnes at the start of 1992, compared to 135.0 billion tonnes a year earlier and 135.3 billion tonnes in 1990. The EC share of total proven world reserves, at the start of 1992, was 847.1 million tonnes, or 0.6% of the world total. At current rates of production and assuming that no further reserves are found, EC indigenous supplies would be exhausted within eight years.

As for natural gas, from 1990 to 1991, natural gas output in the EC rose 10.9% to 143.8 million toe (tonnes of oil equivalent). Total proven world gas reserves rose 3.8% to 124.1 trillion m^3 (124.1 billion toe) at the start of 1992. At the start of 1992, EC gas reserves accounted for just 2.7% of the world total.

Recent trends

The EC produces only 22% of the oil and about 60% of the natural gas it consumes, being therefore quite dependent on imports for its energy consumption.

During the 1980s, world consumption of natural gas increased by 34%, while during the same period EC consumption has only increased by 12%.

The 1986 oil price collapse led to cutbacks which saw employment in the sector contract by 30% to 35%. In 1989, overall employment within the sector was estimated at 95 000 people. During 1990 and 1991, employment in the sector rose but has since fallen back under the weight of economic slowdowns.

Foreign trade

Extra-EC imports of crude oil stood at a level of 479.9 million tonnes in 1991. In 1990, the crisis in the Gulf reduced imports from the Middle East: while in 1989, 10.9% of imports were from Iraq and Kuwait, in 1990 only 7.6% were from those two countries due to the cessation of Kuwaiti and Iraqi exports following the Iraqi invasion of Kuwait. Over 1991, imports from Kuwait began to recover, but, for the year, totalled just 8.0% of 1990's level. Prior to the conflict in the Gulf, the EC member with greatest reliance on Kuwaiti imports was the Netherlands, which accounted for 48% of EC imports from Kuwait in 1990.

Natural gas imports to the EC totalled 99.3 million toe in 1991. The greatest proportion of imports, 45%, were from the former Soviet Union, followed by Algeria and Norway with 29% and 26% respectively. Despite the upheaval in the former Soviet Union their share of total EC imports grew by 1% from 1990 to 1991. Germany accounted for the greatest proportion of gas imports into the EC in 1991, taking 30.0%, Italy and France were placed second and third, accounting for 25.8% and 24.4% respectively.

Intra-EC trade in the form of imports of gas from the Netherlands increased by 6% from 1989 to 1990 to 1.2 million TJ (terajoule); fully 55% of Dutch exports were to Germany. Germany also accounted for all of the 17.2 thousand TJ worth of Danish intra-EC exports.

MARKET FORCES

Demand

Crude oil and natural gas are used to generate power and/or heat, and are widely used in everyday's life by all industries, households and final consumers. The demand for crude oil and natural gas is characterised by a low price and income elasticity, given their nature of basic input for all industrial activities and for heating purposes. The more recent years have been characterised by the emergence of a substitution process favouring natural gas against crude oil, mainly because of environmental considerations.

Supply and competition

Nearly 90% of EC production originates from fields on the British continental shelf. The high expense of exploiting offshore fields is the main reason why the production cost of EC oil is higher than areas with onshore resources. In 1990, the average cost of producing a barrel of oil from the United Kingdom North Sea was USD 18 per barrel. This figure includes the costs of exploration, development, and operation over expected field lifetimes, and assumes a 10% real rate of return before taxes and royalties.

In 1990, the total number of wells drilled in the EC rose by more than 21% to 715, which represented just 1.2% of the world total of 58 900 wells drilled. In 1991, 236 exploration wells were drilled in the North Sea, 83 of which were appraisal wells.

Production process

The exploration and exploitation of oil and gas requires a highly skilled and experienced work force. The fact that much exploration in the EC takes place offshore only heightens these requirements. By the same token, the EC is in a position to export highly trained and skilled labour in this sector.

R&D activity in the industry has traditionally been significantly high. The nature of R&D programmes reflect the significant proportion of offshore operations undertaken in the upstream oil and gas sector. The high price of crude oil which was maintained during the first half of the 1980s, encouraged research into enhanced recovery methods as well as into improving the tools and operating efficiency of exploration and production, with a view to reducing costs. Most of these pro-

Table 1: Crude oil
EC production by country, 1991 (1)

	Million tonnes	% of total	1990/91 (%)
EC	111.1	100.0	-4.1
Belgique/België, Luxembourg	0.0	0.0	0.0
Danmark	7.1	6.4	18.3
BR Deutschland (2)	3.4	3.0	-5.6
Hellas	0.8	0.7	0.0
España	1.2	1.0	50.0
France	3.4	3.0	0.0
Ireland	0.0	0.0	0.0
Italia	4.3	3.9	-8.5
Nederland	3.7	3.3	-7.5
Portugal	0.0	0.0	0.0
United Kingdom	87.7	78.9	-5.2

(1) includes NGL
(2) includes former East Germany in 1991
Source: Eurostat

Table 2: Crude oil
World production, 1990

	Million tonnes	% of total	1989/90 (%)
North America	510.9	16.2	-2.8
Latin America	373.7	11.9	7.1
EC	115.8	3.7	0.6
Rest of Western Europe	89.3	2.8	8.5
USSR + Eastern Europe	584.9	18.6	-6.7
Asia	290.2	9.2	2.7
Africa	313.5	9.9	8.6
Middle East	843.3	26.8	3.8
Australia + New Zealand	30.5	1.0	15.1
World	3 152.1	100.0	1.4

Source: BP Statistical Review

Table 3: Natural gas
EC production by country, 1991

(million toe)	1991	% of total	1990/91 (%)
total EC	143.8	100.0	10.9
Nederland	61.6	43.0	12.8
United Kingdom	45.2	31.5	10.5
Italia	13.9	9.7	-0.7
BR Deutschland (1)	13.6	9.5	16.2
France	2.7	1.9	12.5
Danmark	3.2	2.2	18.5
Ireland	1.9	1.3	0.0
España	1.2	0.8	-7.7
Hellas	0.1	0.1	0.0

(1) Includes former East Germany in 1991
Source: Eurostat

Table 4: Crude oil
EC imports by country, 1991

(million tonnes)	Total imports
EC	479.9
Belgique/België	32.9
Danmark	5.5
BR Deutschland (1)	89.1
Hellas	14.1
España	53.2
France	77.6
Ireland	1.7
Italia	84.8
Luxembourg	N/A
Nederland	52.8
Portugal	10.3
United Kingdom	57.6

(1) Including former East Germany
Source: Eurostat

grammes produced excellent results and generated significant growth in terms of services and equipment installation within the EC. However, the 1986 crude price fall hampered much of this research as players in the industry re-evaluated their priorities. Even so, the depth of water and the sometimes harsh operational environment in the North Sea have forced EC companies involved in oil exploration and exploitation in the areas to acquired wealth of experience of offshore operations. Much of this expertise is unparalleled elsewhere in the world.

Since the late 1980s, the increased emphasis on development of smaller fields and deeper fields has led to further technological developments many of which streamline or increase the efficiency of exploitation. Some of the important technological advances made in the North Sea include: improved and streamlined platform designs; development of sophisticated floating production systems; improved platform safety systems such as interlocking fireproofing panels, multimedia on-platform safety monitoring systems, and offshore escape systems; the development of dynamically positioned drilling vessels, capable of operating at depths of 2 000 m; the completion of the first commercial horizontal drilling operation; the development of deep-diving techniques and submarine vessels for underwater activities; the development of sophisticated pigs such as high friction reversible safety pigs; better geophysical data acquisition systems such as real-time processing of short offset 3D data.

Table 5: Natural gas
Intra-EC trade, 1991

thousand TJ (GCV)	1991 From NL	1991 From DK
Belgique/België	140.0	-
BR Deutschland (1)	652.5	17.2
France	138.9	-
Italia	230.7	-
Luxembourg	199.0	-
EC	1182.0	17.2

(1) Including former East Germany
Source: Eurostat

INDUSTRY STRUCTURE

Companies

Over the 1980s, the participation of governments in the upstream oil and gas sector steadily decreased. This was largely a reflection of the political agenda of the government of the United Kingdom, the largest EC hydrocarbon producer which allowed the 1981 privatisation of the British National Oil Company (BNOC). Competition to obtain exploration licences grew over the 1980s, with increasingly smaller areas are being allocated to a growing number of companies, many of which were including small independent operators. Nonetheless, the majors did not relinquish their dominant position in exploration and production: this was not entirely due to their own efforts but was also in part due to the damage wrought on many small players by the 1986 price collapse which lead to a concentration of exploration and operating licences particularly in the North Sea. The largest operators in the EC include Shell, Exxon and BP, all three of which are very active in the North Sea (with Shell and Esso involved in many joint ventures on a 50/50 basis), NAM in the Netherlands, BEB in Germany, as well as national oil companies such as ELF, DSM, AGIP and Repsol, which are involved in operations both domestically and elsewhere in the EC.

REGIONAL DISTRIBUTION

The production of crude oil and natural gas is extremely polarised in the EC. The United Kingdom dominates EC crude oil output, accounting in 1991 for some 80% of total EC oil production. As far as natural gas is concerned, the Netherlands alone accounted for 43% of total EC gas production, followed by the United Kingdom with 31%.

Table 6: Natural gas
EC imports, 1991

thousand TJ (GCV)	USSR	Norway	Algeria	Libya	Total
Belgique/België	-	90.1	168.8	-	258.9
BR Deutschland (1)	909.0	339.0	-	-	1 248.0
España	-	-	149.5	73.9	223.4
France	406.8	226.2	380.8	-	1 013.8
Italia	554.6	-	517.4	-	1 072.0
Nederland	-	81.4	-	-	81.4
United Kingdom	-	259.2	-	-	259.2
EC	1 870.4	995.9	1 216.5	73.9	4 156.7
(%)	45.0	26.0	29.3	1.8	100.0

(1) Including former East Germany
Source: Eurostat

Table 7: Crude oil and natural gas
Number of wells drilled

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC	620	730	830	780	880	1 000	850	720	790	590	715
(%)	0.7	0.7	0.8	0.9	0.8	1.0	1.4	1.3	1.5	1.3	1.2
USA	64 800	80 600	79 500	67 100	83 600	69 700	39 400	34 500	33 700	31 252	42 090
(%)	76.0	81.7	79.6	76.6	78.0	72.2	65.6	60.4	63.8	66.8	71.5
World (1)	85 300	98 700	99 900	87 600	107 200	96 600	60 100	57 100	52 800	46 800	58 900

(1) USSR and Eastern Europe countries not included
Source: BEICIP, CPDP

ENVIRONMENT

Tight regulations are applied to all offshore operations in the EC, including regulations regarding oil spills, and oil mud and cuttings discharges. Work is also being pursued to define rules and standards for the abandonment of disused offshore installations and structures.

Safety regulations are also very strict, following several accidents which occurred in the North Sea at the end of the 1980s.

REGULATIONS

The process towards the achievement of the Single European market has highlighted some few obstacles to the free movement of goods and services in the EC. Most of barriers to trade which have been addressed by the Commission were various regulations which favoured State companies (i.e. compulsory government participation, reserved areas, local landing obligation) and obligations for local procurement of goods and services. On 11 May 1992, the Commission adopted a proposal for a Council Directive on the conditions for granting and using exploration and production licences.

OUTLOOK

EC crude oil production is expected to remain fairly flat until the middle of the decade as enhanced recovery techniques are applied and small fields are brought on line in the North Sea sector. Later in the decade and into the next century, crude oil production in the EC is forecast to decline steadily. This fall will represent for the most part a drop in United Kingdom output which, by the year 2000, should have slipped back to an annual 87 million tonnes from 95 million tonnes in 1995. Although higher prices should lead to an upturn in exploration activity over the next few years, new finds are considered most unlikely to arrest the long term declining trend in United Kingdom oil output.

The outlook for natural gas is rosier. By the year 2000, Dutch output is expected to have risen 15% from 1991 to 71 million toe, whilst United Kingdom output is expected to stay steady. During the decade after 2000, Dutch output is expected to rise a further 9% but United Kingdom output should start to decline.

Declining indigenous crude oil production is expected to lead to an increased reliance in the EC on natural gas and imports of foreign crude oil. A further complication is the expected drift in EC demand towards lighter, low sulphur products. In addition to prompting more upgrading capacity, this should also lead to a shift towards importing ever lighter and sweeter crudes.

Written by: DRI Europe

Nuclear fuels
NACE 15

The EC's annual nuclear fuel requirement is about 14 000 tonnes of natural uranium (tU), a figure which is expected to edge slightly higher over the next decade, despite a larger increase in the electro-nuclear capacity. The fact that total requirements are expected to increase at a slower rate than nuclear capacities reflects the employment of better fuel management, the use of plutonium recycling and the recycling of reprocessed uranium.
The EC itself has an annual uranium production of about 3 250 tU, with uranium produced by five Member States: France, Spain, Portugal, Germany and Belgium. France is by far the leading EC producer, with annual production of 2 850 tU in 1990, representing 88% of the total EC output. The EC's requirement for conversion is about the same as its need for natural uranium, with current requirement levels represent 67% of the EC's capacity. The EC energy objectives for 1995 take into account the importance of the nuclear industry to the EC's energy supplies and emphasises the need to ensure that all aspects of planning, construction and the operation of nuclear installations meet optimum safety standards.

INDUSTRY PROFILE

Description of the sector

NACE 15 covers all activities relating to the different stages of the nuclear fuel cycle, i.e. from ore extraction (NACE 151) to fuel element production and processing (NACE 152), according to the following sequence:

- Extraction of uranium and thorium ores;
- Chemical concentration of uranium and thorium ores;
- Refining of uranium and thorium;
- Enrichment of uranium in isotope 235;
- Production of plutonium and uranium 233 through spent fuel reprocessing;
- Preparation of nuclear fuels and fabrication of fuel elements.

MARKET FORCES

Supply and competition

Uranium production

The EC itself has an annual uranium production of about 3 250 tU, with the remainder of its requirements being imported. By-and-large electricity producing companies tend to diversify their sources of supply in order to guard against unexpected interruptions in supply. They have also built-up stockpiles which can vary from two to four years' worth of consumption. According to the latest data from the International Atomic Energy Agency (IAEA), in 1989 the EC paid about 69 ECU per kgU for uranium supplied on long term contracts, down 0.75 ECU per kgU from 1988 level. At 1989 prices, the value of uranium imported into the EC is about 745 million ECU. Within the EC, uranium is produced by five Member States: France, Spain, Portugal, Germany and Belgium.

In France there are four uranium production locations, the details of which are shown in Table 1. Two other sites at Vendée and Lozère were closed in 1989 and 1990 respectively. The remaining sites extract uranium ore from thirty or so mines. France is by far the leading EC producer, with annual production of 2 850 tU in 1990, representing 93% of its production capacity and 88% of the total EC output. It is estimated that the uranium resources that have already been discovered in France, with recoverable costs of up to 72 ECU per kgU, could still maintain production at their present rate for a period of 15 to 20 years. Currently, there are no projects aimed at increasing annual production, with the OECD's Nuclear Energy Agency, projecting a decline in output to around 1 350 tU in the first decade of the 21st century.

In 1990, Spain's annual production was about 215 tU. Almost all this uranium (90%) was produced in the Sealices el Chico mine works at Ciudad Rodrigo from ore extracted from the uranium deposits at Fe. The surplus was produced by the small Haba experimental mine situated at Don Benito (which has an annual output capacity of around 30 tU). The government organisation, Empresa Nacional de Uranio SA (ENUSA), owns and manages the uranium production centres. Deposits have been discovered in Spain, which, at a recovery cost of up to 72 ECU per kgU, amount to a total of 27 000 tU. There are plans to increase the production from Spain's current facilities to about 850 tU per annum by the second half of this decade.

In 1990, uranium production in Portugal was around 110 tU. This uranium was mined from Urgeiria and consists of ore extracted from several deposits in the Upper Beira region. Work has started on a new production centre at Nisa in the Upper Alentejo region, which will process ore from several deposits in the region. Responsibility for uranium production in Portugal lies with the public organisation Empresa Nacional de Uranio (ENU). In Portugal, discovered uranium resources, which can be recovered at a cost of 72 ECU per kgU or less, are sufficient to maintain output at about 370 tU per annum for at least the next twenty years. As Portugal does not have a nuclear power programme of its own it exports its uranium, some of which goés to other Member States. Portugal's uranium output is projected to increase over the course of the next decade, rising to around 150 tU as the new sites start to come on line.

About 30 tU were produced in Germany in 1990, from the underground mine at Ellweiler and from Menzenschwand and Grobschlopen, which are both open cast. Production capacity at Ellweiler is about 125 tU per annum, but limited ore supplies means that capacity is under utilised. There are no plans to increase uranium production in Germany, despite the fact that Grobschlopen deposits could supply a processing facility with 250 tU per annum of uranium ore. The discovered resources, with a recovery cost of up to 72 ECU per kgU, are about 2 500 tU, but the Nuclear Energy Agency believes that German production will be wound down over the next decade and stopped after the year 2000. In former East Germany, there is an estimated 100-500 tU reserves. Production was centred on the Erzgeberge, which straddle the border with Czechoslovakia in the south-eastern part of East Germany. Production was undertaken by SDAG Wismut Uranium Combine, which was reportedly once the third largest uranium producer in the world. All output went to the Soviet Union under an agreement dating back to the immediate post-war period, where the uranium was enriched and made into fuel. Since the beginning of 1991, SDAG has practically stopped mining, with the companies only output coming from slag.

Finally, about 40 tU per annum are produced in Belgium from imported phosphates. Belgium has no known uranium resources and is expected to maintain current rates of production over the foreseeable future.

Conversion of uranium

The EC's requirement for conversion is about the same as its need for natural uranium, which is about 14 000 tonnes per annum, a figure that is anticipated to increase by around 1% per annum over the course of the 1990s. Current requirement levels represent 67% of the EC's capacity, which is also characteristic of the world situation, where total require-

Table 1: Nuclear fuels
Uranium production centres in France

Name	Location	Annual capacity (tU/yr)	Owner
Bessines	Haute Vienne	1 500	SIMC
Bertholène	Aveyron	70	TCFM
Mailhac/Bernardan	Haute vienne	500	TCFM
St. Martin du Bosc	Hérault	1 000	SIMC

SIMC: Société industrielle des minerais de l'Ouest (subsidiary of COGEMA)
COGEMA: Compagnie Générale des Matières Nucléaires (owned by the Commissariat à l'énergie atomique)
TCFM: Total Compagnie Minière France (Total's mining operator in France)
Source: DG XVII

ments amount to less than 60% of total conversion capacity. However, despite strong competition, BNFL (UK) and Comurhex (F) have been able to obtain a significant proportion of the non-EC European countries' markets and have thus been able to ensure adequate utilisation of their facilities. The EC's conversion capacity is expected to increase to around 24 000 tU by the second half of the 1990s, due almost exclusively to expansion in the United Kingdom.

The average conversion cost is about 6.5 ECU per kgU and the turnover in the EC market is about 90 million ECU. The EC attaches more and more importance to the idea of converting reprocessed uranium. In France, Comurhex and Cogema have linked together to form the Urep marketing company with the aim of offering a range of services in this field; meanwhile, in the United Kingdom, BNFL has begun converting reprocessed uranium, recovered from Magnox fuel, at its existing installations.

Uranium enrichment

Uranium enrichment is an important stage, both because it requires advanced technology with a high level of specialised knowledge and because this operation accounts for about 27% of the total cost of the fuel cycle. Production in the EC is in the hands of two multinational groups, Eurodif and Urenco.

France joined forces with Belgium, Italy Spain and Iran in forming Eurodif and in deciding to construct a large enrichment plant at Tricastin (F) using a gaseous diffusion process. The decision to go for a large, high capacity plant was taken in order to obtain the maximum benefit from economies of scale, which are considerable in the case of the gaseous diffusion technique. This choice was also influenced by the optimistic climate towards nuclear energy which reigned after the first oil crisis in 1973.

The Tricastin plant, which began service in 1979, is one of the biggest in the world, with an annual capacity of 10,8 million separative work units (SWU, which is a measure of a plants enrichment potential). A pressurised water reactor (PWR) with a capacity of 1 GW, has an annual requirement of about 25 tonnes of enriched uranium (i.e. uranium containing approximately 3% U_{235}), which in turn requires about 150 tonnes of natural uranium and 95 000 SWUs. Products from the Tricastin plant presently satisfy about 40% of the world's requirements. After the plant reached full production capacity in 1982, it had to trim its rate of output to accommodate a reduction in demand.

Urenco Ltd (UK) was formed on the basis of an equal equity split between Uranit GmbH (D), British Nuclear Fuels Plc (UK) and Ultracentrifuge Nederland (NL). The company was established to develop and apply, on an industrial scale, the technique of enrichment by means of ultra-centrifugation. Urenco coordinates the groups production and marketing, whilst a related company, Centec, coordinates research and development programmes and the exchange of technical information amongst its parent companies.

The present output of the Urenco group of plants is around 2.5 million SWU per annum, although a number of projects are currently being undertaken to increase this output to 4.5 million SWU by the end of the decade. The centrifugation technique does not require the construction of large plants, consequently output can be increased by adding modules as and when necessary. The new units can be built relatively quickly, enabling investment to be planned in relation to contracts obtained, ensuring a high level of plant utilisation.

Production of the fuel elements

Within the EC, fuel production tends to occur on a national basis. Only the Netherlands has to import all its final fuel as it has no production facilities of its own. Of the other countries, Germany is the only one where production capacity is less than its fuel requirements. For the EC as a whole, fuel requirements in 1990 represented 56% of the EC's production capacity, with the United Kingdom having the largest amount of over-capacity (55%).

The largest producers within the EC are Siemens (D), which is capable of producing 400 tU of fuel per year; ANF (previously owned by Exxon) with 400 tU, Agip (I), with 200 tU; ENUSA (E), with 250 tU; BNFL (UK) owns a factory producing fuel for light water reactors (LWR), which has an output of 200 tU; finally FBFC factories (F/B) have an overall output of 1 550 tU in 1991.

Table 2: Nuclear fuels
Conversion capacities and requirements in the EC

(thousand tonnes U/year)	1990	1991	1995
Comurhex	14.0	14.0	14.0
BNFL	6.8	6.8	10.3
Total	20.8	20.8	24.3
Requirements	14.0	14.4	15.6

Source: NEA

Table 3: Nuclear fuels
Enrichment capacities and requirements in the EC

(tonnes SWU/year)	1990	1991	1995
Eurodif	10 800	10 800	10 800
Urenco	2 600	2 550	3 200
Total	13 400	12 350	14 000
Requirements	8 887	8 953	9 886

Source: NEA

The average cost of producing fuel elements is about 230 ECU per kg, which makes that the EC market turnover was about 680 million ECU in 1991. Because of the development of plutonium reprocessing and recycling, the production of plutonium fuel elements is becoming increasingly important. Special plants created in Germany, France and the United Kingdom deploy a total annual output of about 100 tU of mixed oxides.

Storage and reprocessing of discharged fuels

The majority of EC countries (France, United Kingdom, Germany, Belgium, Italy and the Netherlands) have adopted fuel reprocessing after an interim period of storing the spent fuel on the power station site, either in special dry storage facilities or in under-water storage tanks. Spain and a number of countries outside the EC have opted for a longer period of fuel storage (from 20 to 50 years), while it awaits either reprocessing or disposal in deep-lying geological formations. Only France and the United Kingdom have any reprocessing facilities at the moment, a situation that seems unlikely to change in the medium-term.

Fuel reprocessing and waste management represent a considerable proportion of the fuel cost, almost 20% if account is taken of the recovered fissile material value, and 30% if this is not taken into account.

Present experience in the field of reprocessing mainly stems from metallic fuels reprocessing from gas cooled reactors powered by natural uranium. This reactor type was initially adopted by France and the United Kingdom, but no stations of this type are being built at present. To date, more than 40 000 tonnes of uranium from spent fuel of this type have been processed, whilst uranium oxide fuel, reprocessed from LWR and AGR reactors, amounts to around 3 000 tU. Of this latter figure, 2 500 tonnes have been processed at the UP2-400 plant at La Hague in France, the only commercial plant at present in service. This plant's annual output was 400 tonnes in 1989, but a decision to enlarge the site, with the construction of UP3, has added a further 800 tU. Over the next few years there are plans for the UP2 plant's output to be increased to 800 tonnes per annum.

In the United Kingdom, BNFL is building Thorp at Sellafield which will be capable of reprocessing 600 tonnes of irradiated fuel per year and is due to come on line in the mid-1990s. Its output is aimed at covering national requirements as well serving other EC and non-EC countries, the latter including Japan, Switzerland and Sweden.

Meanwhile, Germany has abandoned its plans to build a nuclear reprocessing plant at Wackersdorf and instead has decided to step up its cooperation with France in the joint processing of spent uranium fuel. At the same time, Germany has also signed a reprocessing agreement with BNFL to have fuel reprocessed at Sellafield and closed its only reprocessing plant in 1990.

Production process

To a far greater extent than other energy sources, nuclear energy has to be backed up by a complex combination of industrial activities. These include mining natural uranium, the preparation of nuclear fuel and the construction of sophisticated power stations. These characteristics are reflected in the structure of electricity costs. Only 17% of total costs is expended on fuel: 7% on natural uranium and 10% on the various processing stages of the nuclear cycle. However, 70% of the total cost arises from amortisation of the investment in the power stations, with the remainder (13%) accounted for by the stations operating costs.

The conversion process produces an uranium compound (uranium-hexaflouride) which lends itself to subsequent processing (enrichment and fabrication) and which possesses the required chemical purity. Conversion represents a small part in the total cost of the fuel, about 3%. At present, two companies carry out conversion operations in the EC: BNFL in the United Kingdom and Comurhex in France. Outside the EC, Canada and the United States also have conversion facilities. The EC's conversion capacities are shown in Table 2.

Enrichment is the process in the fuel cycle whereby the fissile isotope content of the uranium is increased. This stage is necessary in the case of fuel destined for light water reactors (either pressurised or boiling) and for advanced gas cooled

Table 4: Nuclear fuels
Capacities and requirements for the fabrication of LWR fuel elements in the EC

(tonnes HM/year)	1990	1991	1995
FBFC	1 550	1 550	1 550
Siemens	400	400	400
AGIP	200	200	200
ENUSA	250	250	250
BNFL	200	200	200
Requirements	2 858	2 952	3 063

Source: NEA

Table 5: Nuclear fuels
Reprocessing capacities of uranium oxide in the EC

(tonnes HM/year)	1990	1991	1995
Cogema	1 200	1 200	1 600
BNFL-Thorp	0	0	400
Total	1 200	1 200	2 000

Source: NEA

reactors. These types of reactors using enriched uranium, represent over 90% of the installed nuclear capacity within the EC.

Fabrication of the fuel elements comprises the operations during which uranium fluoride, enriched or otherwise, is used to produce the final fuel elements to be introduced into the reactors. This stage represents about 11% of the total fuel cost.

Reprocessing is a complex operation performed on spent fuel discharged from nuclear power stations. This fuel is a mixture of reusable products (unconsummated uranium and plutonium created during the fuel irradiation in the power station's reactor) and fission products which are highly radioactive and are akin to the ashes from using fissile material. The reprocessing operation enables the various products to be separated. In the medium term, by recycling material recovered from thermal nuclear power stations in the reprocessing process, the amount of natural uranium needed by a nuclear power station is reduced. In the long term, there is the possibility that fast breeder reactors will almost totally eliminate the need for additional natural uranium within the confines of the existing industry structure.

ENVIRONMENT

Environmental considerations of the nuclear fuel cycle stem from the discharges of radioactive effluent from nuclear installations. In the attempt to limit these discharges, waste material has been concentrated into solid and solidified forms, which have the characteristics of concentrating radioactive matter and reducing the rate of decay of its radiological toxicity.

There are three main categories of waste:

- Low-level waste, which forms the vast bulk of waste material, amounting to several million cubic metres. The material is either held in surface or near surface installations where the composition of the waste is controlled over a maximum period of 300 years. Alternatively, the waste is stored in underground installations, where the need for verification and measurement of the waste is considered to be limited. Prior to 1982, some of the low-level waste was dumped in special containers at sea. However, following the adoption of the Convention on the Prevention of Marine Pollution from the Dumping of Waste and Other Matters the practice was curtailed.
- Intermediate waste, which can be divided into: a) material that has been contaminated by radionucides, which have a long half life but produce little heat because of their moderate concentration of radioactive elements; and b) material containing and emitters only but of intermediate level of radioactivity having an insignificant heat production.
- Highly active waste, i.e. irradiated fuel discharged from the nuclear reactor and highly active vitrified waste produced after reprocessing of the fuel.

Waste from the latter two categories has a very high radioactive toxicity, which can persist over thousands of years. Given the length of time that containment of such material will require, disposal systems have to be passive, with the long-term safety not dependent on human control or surveillance. Currently, investigations are being concentrated on the burial of the waste in deep stable geological formations, which offer adequate isolation capabilities. On-land sites are the only ones currently under investigation, although research is also being carried out into the possibility of burial in sub-seabed formations.

EURATOM

Another area of concern within the nuclear fuels cycle is to ensure that material is not being diverted for the development of nuclear weapons. Within Europe, the Euratom nuclear safeguards system was established in 1957, with its general objectives defined as ensuring that "nuclear material have not been diverted to purposes other than those for which they were intended".

The Euratom safeguards system is founded in European law, with strong sanctions for infringements. It applies to all civil nuclear materials from the moment they are mined on Community territory or are imported into the EC. Aside from ensuring that the material is not being diverted from peaceful uses, Euratom also checks to see that declarations of specific use are correct and that the suppliers obligations are being respected.

Because the nuclear installations are designed with security and health concerns in mind, the nuclear material is becoming increasingly inaccessible. As a result, Euratom is having to develop advanced measuring instruments and sophisticated computer surveillance systems, which record and react to events that may be of interest to the inspectors.

OUTLOOK

The EC's annual nuclear fuel requirement is expected to edge slightly higher over the next decade, from its current level of 14 000 tU. Uranium production is forecast to fall to around 2 400 tU by the turn of the century, a decline of 26% on 1990s level. Whilst Spanish and Portuguese output are anticipated to increase, a drop in French production of 43% is expected to be responsible for the overall decline.

At the same time, the EC's conversion requirement is anticipated to increase by around 1% per annum over the course of the 1990s and enrichment services should expand from 8.9 million SWU in 1991 to 9.9 million SWU in 1995 and on to over 10 million SWU in the next century. The EC's total fuel requirements is expected to peak in the mid-1990s and then to fall below 2 500 tonnes between the years 2000 and 2010. This should coincide with greater decline in fuel production capacities, such that overall utilisation rates increase towards 80%. Meanwhile, current expansion plans for reprocessing facilities are set to raise capacity to over 4 000 tonnes in the EC by the turn of the century.

It is forecast that the EC's requirements for enrichment services will increase gradually from 8.9 million SWU in 1991 to 9.9 million SWU in 1995 and to over 10 million SWU in the next century. Despite natural uranium requirements increasing only very slightly over the next decade, there should be a greater increase in enrichment requirements. In practice, technical progress on better utilisation of uranium in the reactors does not reduce the need for enrichment services as much as it reduces the need for natural uranium. In addition, recycling reprocessed uranium has no appreciable reduction on enrichment requirements.

A total output of over 200 tonnes of mixed oxides fuel will gradually become necessary during the 1990s in order to satisfy the requirements of the plutonium thermal recycling programmes. Increased output is expected to come from France and the United Kingdom over the next couple of decades, while total fuel requirements are forecast to peak in the mid-1990s, falling below 2 500 tonnes between the years 2000 and 2010. At the same time, production capacities are projected to fall to below 3 100 tonnes and as a result, the utilisation rates should move up towards 80% by the year 2010.

Current expansion plans for reprocessing facilities are set to raise capacity to over 4 000 tonnes by the turn of the century. This should leave about 60% of capacity to deal with the current year's spent fuel and 40% to get through the backlog of material that has been in storage. Taking account of quantities to be reprocessed from countries outside the EC, it is estimated that interim storage requirements could be about 20 000 tU from 1995 to 2000. The necessary storage capacity to cover these requirements is already in place.

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Refining and distribution of oil products
NACE 14

After spending much of the 1980s concerned about overcapacity, the EC refinery sector is now looking to reverse that trend, while at the same time expanding its upgrading capacity. EC oil demand having fallen over the first half of the 1980s, has since stabilised around 480 million tonnes per year. The displacement of oil has occurred in the industrial, domestic and power generating sectors, whereas road transport remains completely dependent on oil. Unleaded gasoline is now available in all European countries. Its share of the total EC gasoline market has increased from 10% in 1987 to an estimated 41% in 1991.

The number of automotive retail outlets has declined fast. In 1990, there were 127 000 outlets in the EC, which means one quarter less than in 1980. Although competition is stiff, the integrated oil companies, especially the major companies, are regaining ground in retailing because excess refining capacities have disappeared in some countries. Access to supplies is essential for maintaining and expanding a market position in retailing.

INDUSTRY PROFILE

Description of the sector

NACE 14 includes the activities of petroleum refining and the processing of petroleum derivatives, with the exception of petrochemicals. The main products of this activity are refinery gas, liquefied petroleum gas (LPG), aviation fuels, motor gasoline, light distillates, kerosene, diesel and residual fuel oils.

Strictly speaking, units engaged in distribution of oil products and transportation of crude oil are not included in this definition, but given the close relation between the two activities, they are also dealt with in this monograph.

Main indicators

Just over one fifth of crude oil supplies to the EC come from within the EC itself, and of that over 90% is from the North Sea. The remaining supplies are imported from third countries, the level of which continued to increase in 1990, rising by 4.6% over the previous year's level. A marginal increase in the EC crude oil and condensate production was achieved as a result of increases in Denmark, the Netherlands, Italy and the United Kingdom, which were sufficient to offset losses elsewhere. The United Kingdom's level of output rose slightly in 1990 from the previous year's level, increasing by 340 000 tonnes. This increase would have been greater but for the fact of maintenance work that was carried out on a number of the fields during the course of the year.

Table 1: Refining and distribution of oil products
Main indicators, 1990

(million tonnes)	1990	1989/90 (%)
Production of crude oil	113	0.9
Imports of crude oil and feedstocks	451	4.6
Net production of refineries	471	2.4
Total imports of refined products (1)	175	2.9
Total exports of refined products (1)	151	4.1
Foreign trade balance of refined products	458	0.9
Marine reserves	34	0.7

(1) Includes Intra-EC trade
Source: Eurostat

There was an increase in the EC imports of crude and feedstock, rising by 20.2 million tonnes to 451.5 million tonnes in 1990 from 1989. This reflected the growth in refinery runs in 1990. Total exports from EC countries increased in 1990 from 1989, by 6.7 million tonnes to 66.7 million tonnes. The increase was primarily due to an additional 5.3 million tonnes of exports from the United Kingdom. Of the total volume of exports, 46% was to Member States, while exports to third countries rose by 2.4 million tonnes to 27.3 million tonnes.

Finally, in 1990 the upgrade capacity for the whole of the EC increased by 8.1%, to represent 31.3% of the primary distillation capacity and is believed to have risen to just over 32% in 1991.

Recent trends

Refining

The reduction of the total primary distillation capacity in the EC over the past decade continued in 1990. The total EC capacity fell 9 million tonnes/year to a total capacity of 572 million tonnes/year. The entire reduction was concentrated in the Netherlands, where primary distillation capacity fell 13%. This was the result of the joint venture between BP and Texaco, which involved the combining of the 21.6 million tonnes/year BP refinery at Rotterdam, with the 10.2 million tonnes/year Texaco refinery at Pernis. Rationalisation of the two facilities left a total primary distillation capacity of 22.7 million tonnes/year under the control of the new company called the Netherlands Refining Company.

A couple of further capacity reductions are believed to have occurred in 1991 in Germany and the United Kingdom, though these are expected to be more than offset by increase in capacity in Greece, Italy and the Netherlands. The net increase to the EC primary distillation total is believed to be just under 500 000 tonnes/year in 1991.

Fuel retailing

The 1980s have been characterised by a marked decrease in the number of petrol retail outlets (down 26% during the period 1980-1990). Rationalisation of the retail network did not occur uniformly across countries; the most drastic reductions in number of outlets took place in the Netherlands (-36%), France (-35%) and Germany (-29%), whereas the networks have expanded in number in Greece (+16%) and Spain (+17%). The rationalisation process has increased the competitiveness of those outlets that remain, in part because of increased throughputs. There are still considerable variations in average monthly throughputs across countries; the highest are to be found in Spain, because of the small number of outlets, whereas the average throughputs are approximately five times smaller in Italy, Ireland and Greece, where the rationalisation process has been slower.

Of all the EC countries, Italy has the largest number of service stations (31 000 or 24.5% of the EC total) for only 15% of the EC automotive fuel consumption. Germany has only 14% of EC retail outlets, compared to a level of automotive fuel consumption equal to 23% of the EC total. Spain consumes 9% of the EC transport fuels, but has only 4% of the retail outlets.

Foreign trade

In 1990, imports of refined products into EC countries rose by 6.1 million tonnes. Extra-EC imports accounted for 53% of total imports into the EC. OPEC remained the major supplier of crude and feedstock supplies outside the EC. Provisional

Table 2: Refining and distribution of oil products
Capacities of primary distillation

(million tonnes/year)	1980	1988	1989	1990
EC	891	591	581	572
Belgique/België	54	35	35	35
Danmark	11	9	9	9
BR Deutschland	150	82	78	78
Hellas	20	18	18	18
España	70	62	62	62
France	168	91	85	85
Ireland	3	3	3	3
Italia	177	117	117	117
Nederland	90	69	69	60
Portugal	18	14	14	14
United Kingdom	130	91	91	91

Source: CPDP

Table 3: Refining and distribution of oil products
Trends in the number of petrol retail outlets

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC	166 760	161 170	153 945	150 543	144 115	142 763	138 275	134 079	130 289	126 942
Belgique/België	8 258	7 575	7 068	6 742	6 207	5 633	5 448	5 306	5 030	6 273
Danmark	4 208	3 985	3 631	3 733	3 622	3 515	3 364	3 253	3 154	3 031
BR Deutschland	24 864	23 219	21 049	19 288	18 448	20 320	19 501	18 658	18 271	17 807
Hellas	5 500	5 500	5 500	5 500	5 800	5 800	6 000	5 950	5 000	6 386
España	4 602	4 608	4 621	4 622	4 616	4 799	4 855	4 821	4 978	5 370
France	39 500	38 600	37 100	36 000	34 600	33 200	31 100	29 000	27 700	25 670
Ireland	3 874	3 828	3 702	3 544	3 428	3 375	3 300	3 250	3 150	3 100
Italia	38 255	37 672	36 716	38 500	35 800	35 300	34 700	34 300	33 900	31 000
Luxembourg	473	461	469	447	448	442	420	400	392	385
Nederland	10 366	9 554	8 982	8 492	8 106	7 858	7 560	7 355	7 109	6 600
Portugal	2 100	2 060	2 010	1 970	1 900	1 880	1 830	1 770	1 849	1 871
United Kingdom	24 760	24 108	23 097	21 705	21 140	20 641	20 197	20 016	19 756	19 449

Source: National Statistics, CPDP

Table 4: Refining and distribution of oil products
Imports and supplies of refined products in 1990

(million tonnes)	Total imports	1989/90 (%)	of which extra-EC	1989/90 (%)	of which intra-EC	1989/90 (%)	Total inland shipments	1989/90 (%)
EC	175.3	3.6	92.2	1.5	83.1	6.0	458.3	1.0
Belgique/België	11.9	0.0	2.0	-28.6	9.9	7.6	17.3	0.6
Danmark	3.9	-4.9	3.3	0.0	0.6	-25.0	8.1	-3.6
BR Deutschland	44.0	3.5	15.3	2.0	28.6	4.0	106.4	4.4
Hellas	5.5	48.6	5.0	61.3	0.4	-33.3	11.3	-0.9
España	6.4	-14.7	5.0	-16.7	1.4	-6.7	40.0	1.2
France	23.8	3.0	12.6	11.5	11.2	-5.1	79.5	-1.1
Ireland	3.4	25.9	0.2	100.0	3.1	19.2	4.2	13.5
Italia	22.4	3.7	15.9	-7.6	6.5	47.7	84.6	-1.1
Luxembourg	1.6	6.7	0.0	0.0	1.6	6.7	1.6	14.3
Nederland	39.4	3.4	28.7	5.1	10.7	-0.9	20.3	3.0
Portugal	3.1	-13.9	0.6	-25.0	2.5	-10.7	11.0	-2.7
United Kingdom	9.4	5.6	3.1	-22.5	6.2	26.5	73.2	1.0

Source : Eurostat

data for 1991 suggests that its share of extra-EC imports has edged up to almost 63%. Other major sources of suppliers were the former Soviet Union, which accounted for 11% of extra-EC imports in 1990, and Norway, whose share was also 11%. Within the OPEC group of countries, there was a dramatic reduction in imports from Kuwait, down over 5.8 million tonnes, and from Iraq, down 9.3 million tonnes. However, these declines were more than offset by increases from Libya (up 9.0 million tonnes), Iran (up 7.5 million tonnes) and Saudi Arabia (up 3.2 million tonnes). Imports of oil products from the USA have shown the greatest increases over the past few years, rising from 6.9 million tonnes in 1989 to 7.7 million tonnes in 1990 and an estimated 11.1 million tonnes in 1991. The share of total imports into EC countries accounted for by the US has risen from 4.1% in 1989 to 6.2% in 1991. Much of this increase has been associated with the growth of imports of gas oil, particularly in 1991.

In terms of the regional spread of imports into the EC, there has been virtually no change in the volume of material imported from the Middle East, while that from the African continent has increased markedly. Supplies from Africa accounted for 32% of extra-EC imports in 1990, compared to 29% in 1989. The Middle East's share has fall to 39% in 1990, from 41% in 1989.

Among the EC countries, the trade balance varies widely in terms of volume. In 1990, the United Kingdom was the only country to show a surplus, having exported 55.6 million tonnes against imports of 52.7 million tonnes. Most of the other countries have a broad deficit, with the notable exception of Denmark where exports of crude and feedstock amounted to 60% of total imports.

MARKET FORCES

Demand

Table 5 shows product consumption for each of the EC countries in 1990. These figures concern only inland deliveries, excluding bunkers and refineries' own consumption. EC oil demand fell by 21% between 1973 and 1985, increased slightly between 1985 and 1988 and has since then stabilised around 480 million tonnes per year. Oil has lost market share to the benefit of solid fuels, natural gas and nuclear power, with the share of oil in total primary energy demand declining from 60% to 44% over the period 1973 to 1989.

The displacement of oil has occurred in the industrial, domestic and power generating sectors whereas road transport remains completely dependent on oil: as a result, 53% of the oil is now consumed in the transport sector, compared to 30% in 1973. These developments in energy and oil use have had a dramatic effect on the structure of oil demand, which has become lighter. The share of heavy fuel oil in inland oil demand has declined from 31% in the mid 1970s, to 29% in 1980 and 16% in 1989, while that of light products (LPG, naphtha and gasoline) has increased from 25% in the mid 1970s to 26% in 1980 and 35% in 1989.

Consumption of middle distillates declined in the second half of the 1970s, but has remained virtually stable throughout the 1980s. The share of middle distillates in inland oil demand has changed less than for the other oil products, but has increased slightly since the mid 1980s to reach 40% in 1989, compared to 36% in the mid-1970s. The increase in the share of middle distillates is due to strong demand for jet fuel and automotive diesel, whereas consumption of heating oil has declined rapidly.

Supply and competition

Prices of crude oil and oil products displayed considerable volatility over the past few years. At the start of 1990, oil product prices were relatively depressed, as demand was relatively weak. The events of August 1990, with the dramatic increase in crude oil prices, were also reflected in the oil product markets, where prices increased sharply. As markets moved closer to the winter heating season, concern was expressed over the supplies of distillate. At the same time, there was concern that imports from the former Soviet Union would be reduced as more product was expected to be consumed in the USSR, leaving less for export.

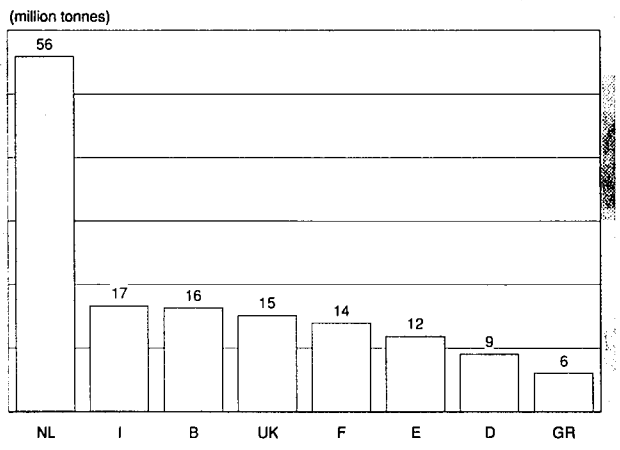
The confluence of these factors caused distillate prices to rise rapidly at the end of 1990 and into the start of 1991. This price movement was in the opposite direction to that of crude oil prices. This anticipated tightness of the distillate markets, and to some extent the heavy fuel oil markets, ensured that relative to crude oil, product prices rose in January and February, though their actual levels did show a decline. Over the second quarter of 1991, product markets moved towards their seasonal low point, burdened somewhat by relatively high stock levels. Winter demand had not been as strong as anticipated, and imports of distillate from the Soviet Union had not dried up as some traders had feared. Product prices fell both against crude oil prices and in absolute terms over the second quarter.

The economic recession on both sides of the Atlantic meant that demand remained weak over the remainder of 1991 and product prices fell to the start of the third quarter. Prices then rose on the seasonal upturn in demand over the third quarter, as well as from market expectation that economic recovery would add to relatively strong winter demand. Both these latter factors proved to have been overstated by the markets, with the result that oil product prices generally fell from November 1991 to the beginning of 1992.

Gross refinery margins, calculated as a function of quotation of products on the Rotterdam spot market and the spot price of crude oil, witnessed some large swings during the course of 1990 and 1991. Relatively low crude oil prices and high product prices, over the first half of 1990, led to a situation where upgrade and simple refineries were covering their variable costs, and complex refineries were more or less at break even with their total costs. However, the invasion of Kuwait by Iraq, led to a sharp increase in crude oil prices which far outpaced product price movements, with the result that refinery margins moved into the red.

Over the course of the winter of 1990/91, product prices surged ahead of crude prices, causing a sharp reversal in the margins, which rapid moved back into the black on to a peak in February 1991, at levels well in excess of the total cost of refining. Since that peak, margins have again fallen to the point where

Figure 1: Refining and distribution of oil products
Principal exporters of refined oil products, 1990



Source: Eurostat

Table 5: Refining and distribution of oil products
Shipments of petroleum products in the EC, 1990

(million tonnes)	All products	1989/90 (%)	Motor fuel	1989/90 (%)	Gas/ diesel oil	1989/90 (%)	Residual fuel oil	1989/90 (%)
EC	458.3	1.3	105.0	3.1	170.5	1.8	68.2	-3.5
Belgique/België	17.3	-7.5	2.7	-18.2	8.4	-5.6	1.8	-21.7
Danmark	8.1	0.0	1.6	6.7	4.2	0.0	0.9	-10.0
BR Deutschland	106.4	3.0	27.3	5.0	49.4	8.3	6.3	-6.0
Hellas	11.3	-0.9	2.4	4.3	4.4	-4.3	2.6	-10.3
España	40.9	3.3	8.0	1.3	14.1	-0.7	6.1	-14.1
France	79.5	-1.6	18.3	-1.1	34.5	3.0	6.6	-12.0
Ireland	4.2	13.5	0.9	0.0	1.7	13.3	1.0	42.9
Italia	84.6	-1.1	13.7	6.2	26.0	-3.7	26.9	-3.6
Nederland	20.3	10.9	4.0	17.6	5.7	1.8	0.3	-25.0
Portugal	11.0	8.9	1.4	7.7	2.5	0.0	3.8	-15.6
United Kingdom	73.2	0.3	24.3	1.7	18.7	-5.6	11.7	20.6

Source: Eurostat

simple refineries spent the last three quarters of 1991 oscillating around the zero mark. Complex refineries have tended to do better, remaining above zero and the variable cost line, but remaining below the level to meet total costs. This situation is encouraging the move towards more complex units. However, the current situation is still not favourable for an expansion of the refinery sector's total primary distillation capacity. The fact that the rationalisation process has been reversed over the past couple of years does not therefore reflect prevailing market conditions, but rather the medium to long-term outlook.

Consumer prices vary widely across Member States. The major determinant in the differences in consumer prices across the EC is the level of taxes applied to oil products. At the Ecofin Council meeting of 19 October 1992, the directive concerning the harmonisation of excise taxes was adopted. The following minima have been agreed and should be put in application as of 1 January 1993: leaded gasoline 337 ECU/thousand litres; unleaded gasoline 287 ECU/thousand litres; automotive diesel 245 ECU/thousand litres; heavy fuel oil 13 ECU/thousand kilos; and heating oil, 18 ECU/thousand litres. The Member States which, as of the first of January 1991, did not apply an excise tax on heating oil, are authorised to continue to apply a rate of zero on the condition that they pay a control tax of 5 ECU per thousand litres as of 1 January 1993. The minimum rate for LPG and methane used as transport fuel is fixed at 100 ECU per tonne and that on transport kerosene is fixed at 245 ECU per 1000 litres.

Only Luxembourg has a lower rate than the advised minimum on premium leaded gasoline. Two countries (Luxembourg and the Netherlands) have a lower excise tax for automotive diesel fuel. Concerning heavy fuel, Belgium applies a zero rate of tax. For the period from 1 January 1993 to 31 December 1994, Luxembourg can apply a minimum rate of excise of 292 ECU per 1000 litres for super leaded gasoline, 242 ECU per 1000 litres for unleaded gasoline and 195 ECU per 1000 litres for automotive diesel fuel. Greece will benefit from the same treatment for automotive diesel fuel. Because only minima have been set, the final agreement will have only a small effect on consumer prices of oil products in Member States, and therefore on the level and structure of oil consumption.

As regards value added taxes (VAT) harmonisation for the oil products, a transitional agreement has been formulated. Following the adoption of the proposal for directive on the harmonisation of value added tax (VAT) rates at the Ecofin Council meeting of 19 October 1992, petroleum products were submitted to the normal rate, that is, a minimum tax of 15%. Nevertheless, Member States which applied a lower rate on petroleum products as of 1 January 1991 are authorised to apply a minimum rate of 12% from 1 January 1993, to 31 December 1996. The United Kingdom which applies a zero rate on diesel oil for heating can maintain this rate until 31 December 1996.

Production process

Within the EC, each Member State has widely differing production structures. Germany, France and the United Kingdom are characterised by their low proportion of heavy fuel oil and by a relatively high proportion of gasoline output. At the other extreme, Greece, Portugal and Ireland have a refinery sector that is characterised by a high proportion of heavy

Table 6: Refining and distribution of oil products
Excise taxes on petroleum products, end September 1992 (1)

(ECU/1000litres)	B	DK	D	GR	E	FR	IR	I	L	NL	P	UK
Premium leaded	439	374	459	472	411	473	378	563	301	506	504	371
Unleaded	368	290	409	412	374	420	344	524	251	447	436	313
Automotive diesel	273	227 (2)	271	270	276	247	294	387	177	213	340	305
Heating diesel	-	227	40	238	74	63	49	387	-	71	-	18
Heavy fuel oil (ECU/tonne)	-	255 (3)	15	44	13	20	10	56	13	34	62	13

(1) Exchange rates at mid September: 1ECU = 41.3321BFR, 7.76371DKR, 2.00473DM, 252.136DR, 134.908PTA, 6.82154FF, 0.759758IRL, 1616.75LIT, 2.25816HFL, 176.549ESC, 0.748345UKL
(2) Excise tax of 250 ECU from 1 October 1992
(3) Excise tax can be recuperated by industrial consumers
Source : DGXVII

Table 7: Refining and distribution of oil products
Net production of EC refineries

(million tonnes)	1987	1988	1989	1990	1990(%)
LPG	14.1	14.8	14.6	14.7	3.1
Naphtha	14.7	16.2	17.1	15.5	3.3
Petrol	103.4	108.1	110.8	112.9	24.0
Kerosene	30.0	32.9	34.5	36.2	7.7
Derv	150.6	160.6	159.9	163.9	34.8
Residual fuel oil	95.1	91.6	91.2	94.9	20.2
Other products	29.1	32.3	31.8	32.5	6.9
Total	437.0	456.5	459.9	470.6	100.0

Source: Eurostat

fuel oil production and relatively low light-end output. Over the past few years the move towards increased upgrade capacity and product quality improvement has continued to shift the structure of refinery production away from heavy oil products in favour of the light ones.

Any assessment of the utilisation rates of primary distillation capacity poses a statistical problem due to the increase in the share of feedstocks in refinery throughputs. Some of these semi-finished products are redistilled while others go directly into secondary plants, the problem being that the division between the two categories is not recorded in a number of EC countries. This is why in its communication (Com (88) 491) to the Council on the oil market and the refining industry in the EC, the Commission presented a range consisting of a "maximum" (the relation of total input for transformation in the refineries to distillation capacity) and a "minimum" (calculated solely on processed crude oil).

The variations between these two points differs from country to country and from year to year, as refiners switch from crude oil to semi-finished products depending on their relative prices. These variations are related to the prevailing economic, seasonal and climatic conditions in each country, as well as turnarounds and the opportunities for exports of key products such as gasoline to the United States. European refineries went into turnarounds early in 1990, causing utilisation rates to fall to around 74% in February and March, before climbing to a summer peak. In 1991, turnarounds occurred later in the year, with the utilisation rate dropping to a low of 77% in April and May, before again moving to a summer peak. Overall, 1991 witnessed smaller variations in the monthly utilisation rate, as refineries responded to higher levels of demand and postponed their turnarounds until the start of 1992.

INDUSTRY STRUCTURE

Companies

Refining

After spending much of the 1980s concerned about the over-capacity in the refinery sector, Europe's refinery sector is now expanding its upgrading capacity. The Mobil refinery at Wilhelmshaven (D) has been bought back into operation. The refinery was acquired by Beta Refining & Marketing, a company jointly owned by the trading company Bulk Oil and the French trading firm Dreyfus.

The Schewdt refinery, the largest refinery in eastern Germany, was bought in 1991 by a consortium of Veba (37.5%), DEA (37.5%) and Agip/Elf/Total (25%). The Leuna and Zeitz refinery, were packaged with Minol and sold to a consortium of Elf Aquitaine, Thyssen and SB Kauf. Part of the deal requires that the new owners of the refinery provide the Leuna chemical plant with competitively priced feedstock and a pipeline link to the Baltic.

Prior to this, in the Netherlands, a new joint-venture company between BP (65%) and Texaco (35%) was created in November 1989 to link up BP's Europoort refinery with Texaco's Pernis refinery. Texaco allows BP to use it catalytic reforming process to boost octane levels, while BP lets Texaco use its catalytic cracker to produce more light-ends.

Table 8: Refining and distribution of oil products
Share of unleaded petrol in total motor fuel sales (1)

(%)	1987	1988	1989	1990	1991	1991 Sales (1000 t)
Belgique/België	0.2	0.5	15.3	24.5	30.2	814
Danmark	29.7	33.0	40.1	56.6	63.4	1 079
BR Deutschland (2)	25.7	44.5	57.5	67.8	77.0	24 367
Hellas	e	e	1.0	3.0	N/A	N/A
España	e	0.1	0.3	0.9	3.1	258
France	0.1	0.2	2.4	14.5	25.0	4 480
Ireland	e	e	6.4	18.8	24.5	222
Italia	0.2	0.7	2.1	5.1	6.8	1 003
Luxembourg	1.8	10.2	20.2	29.9	44.7	217
Nederland	20.4	26.0	32.3	42.2	52.6	2 059
Portugal	e	e	e	1.8	N/A	N/A
United Kingdom	0.1	1.1	19.4	34.0	40.8	9 811

(1) e = infinitesimal amount
(2) includes former East Germany in 1991
Source: Eurostat

The process of change in state monopolies has continued over the past few years. In Greece the refinery sector remains in the hands of the state, but a three phase plan has been developed to liberalise the markets, including a in the first stage the removal of counter cyclical tax and the lifting of controls on refinery base prices. The second phase will remove all remaining prices and margins regulations and the third phase will allow for the importation of oil products.

In Spain, the refinery and product distribution sectors are being liberalised, with Campsa being split up amongst the refineries that own the company. In late 1992, a new law was being discussed which would permit this opening of the market. At the same time, the number of operators in the parallel system has increased, despite the continued restrictions imposed by the government's quotas. All the product prices have been liberalised, although gasoline, gas oils and heavy fuel oil prices must remain below a state set maximum price which is reassessed every fifteen days.

In France, a reform bill was being discussed in late 1992 that would lift some of the restrictions relating to crude oil imports and change the system of securing stock reserves.

In Portugal, the oil product markets were liberalised at the start of 1991, including the system of market quotas. This has put Portugal's three refineries under pressure to modernise and expand their upgrade capacity to enable them to compete with imports. As part of the process, the Cabo Ruivo refinery no longer distils crude oil, but is being reconfigured to form a blending plant and distribution centre.

Fuel retailing

The major companies continue to have a dominant position, even during years of recession, as they have continued to invest large amounts to protect their market share. They now flag nearly 30% of the EC retail outlets. Shell (NL/UK) has the dominant market share, closely followed by BP (UK). Some of the traditionally national oil companies have now spread their presence throughout Europe: Total is present in eight countries for a market share of 4.4%. A newcomer to the European downstream business is Kuwait Oil, which introduced the Q8 brand in 1986 and now owns 4.5% of the EC retail outlets. Kuwait Oil is now the largest retailer in Denmark and is a major presence in Italy, the United Kingdom, Belgium and the Netherlands. Although competition is stiff, the integrated oil companies, especially the major ones, are regaining ground in retailing because excess refining capacities have disappeared in some countries. Access to supplies is essential for maintaining and expanding a market position in retailing.

Overall, in the countries where regulations permit, supermarkets have an important market share, but nowhere it is as large as in France where 33% of automotive fuels are sold by supermarkets (the market share is as high as 39% for gasoline alone). In the United Kingdom, their market share is 12% but is expected to increase to 20% by the mid 1990s. The other two countries where hypermarkets have a substantial market share are Belgium and Germany, where it is 10%, though this share is not expected to increase much more in the near future. During 1990, some supermarkets have sold their service stations to oil companies: this is the case of Casino (F) which sold to Shell and Agip (I).

In parallel with these developments, there has been a trend toward concentration. During 1990, Elf (F) was the most aggressive acquirer, with acquisitions in Spain and the United Kingdom. Shell, Agip and Norsk Hydro (N) also made acquisitions in the EC retail business.

ENVIRONMENT

An EC directive formulated in 1985 required that unleaded gasoline be marketed in all Member States from 1 October 1989. This date coincided with the date at which all large cars produced (2 litres) were to be equipped with catalytic converters. Unleaded gasoline is now widely available in all European countries. Moreover, all cars produced after 1 October 1990, whether they are equipped with catalytic converters or not, must be able to run on unleaded gasoline (Eurograde 95 RON). Although there have been some derogations for old-type engines, 90% of cars produced can run on Eurograde.

Amendments to the directive permit Member States to ban leaded regular grades, which Germany and Luxembourg have done, while Belgium is in the process of implementing a ban. The directive encourages Member States to introduce tax incentives in favour of unleaded gasoline in order to accelerate its penetration, which all countries have done. In addition, in order to allow a larger proportion of the existing car park to run on unleaded gasoline, most oil companies have introduced an unleaded fuel with a higher octane level, Super-premium unleaded (98 RON). Super-premium is marketed in most countries, with the exception of Greece, Portugal, Spain and Italy.

The introduction of tax incentives and of high octane grades of unleaded gasoline have led to a rapid penetration of unleaded in the gasoline market: its share increased from less than 10% in 1987 to an estimated 41% in 1991. Concurrently, sales of leaded regular have nearly disappeared in several countries even if they are not banned (United Kingdom, Denmark, Netherlands). Nevertheless, the rate of penetration of unleaded varies widely across countries, because of different tax incentives, government policies and the structure of the car park. The penetration is as high as 80% in Germany and still very small in Spain and Greece; it is accelerating in United Kingdom, Belgium and France.

From the beginning of 1993, all new gasoline-powered cars registered in the EC will have to be fitted with three-way catalytic converters, in order to meet exhaust emissions standards. This presages in favour of the universal use of unleaded gasoline, although the point at which this occurs will depend on the rate at which owners of pre-1993 cars opt for unleaded fuel and the rate at which old cars, able to use only leaded fuel, are scrapped. The effect will be relatively small in Germany, Denmark and the Netherlands, where the purchase of catalyst-equipped cars has been favoured for some time by tax incentives. However, in other countries, the new emission rules will give a significant push to sales of unleaded gasoline.

REGULATIONS

EC legislation relating to fuel quality addresses the content of lead, benzene and oxygenates of gasoline and the sulphur content of diesel and other gas oils (national standards specify other fuel properties). The European Standard Organisation (CEN) has developed European specifications for unleaded gasoline (EN228). CEN is working on specifications for automotive diesel and LPG, as well as on more comprehensive gasoline specifications.

- Lead content of gasoline: the maximum authorised lead level in leaded gasoline is 0.4g/litre, but EC countries are encouraged to use a maximum limit of 0.15 g/litre. All EC countries, except Portugal, have now adopted this lower limit.
- Benzene: the maximum benzene content of gasoline is set at 5% for both leaded and unleaded grades.
- Oxygenates: a directive requires that Member States permit fuel blends containing oxygenates and specifies the maximum content. If this maximum is exceeded, then the pumps must be clearly labelled. Most countries restrict limits below the maximum, with only four countries (Belgium, Denmark, Ireland, Luxembourg) permitting levels equal to, or exceeding, this level .

- EN228: CEN EN228 specifies the octane quality of Euro-grade unleaded (95 RON/85 MON), the benzene content (5% vol. max.) and the lead content (0.013g/litre). The sulphur content is currently set at 0.1% weight maximum, but will be reduced to 0.05% by 1995. Volatility and density specifications have also been agreed.
- Sulphur in gas oil: a 1987 directive specifies a maximum level of sulphur in gas oil of 0.3% weight, except for gas oil used in shipping for further processing; the directive allows Member States to reduce the sulphur content to 0.2% if necessary for environment or health reasons. Five EC countries have already reduced the sulphur content to 0.2%. A draft directive submitted in June 1991 calls for a reduction in the sulphur content of all gas oils to 0.2% by 1 October 1994. A further reduction is to be implemented by 1 October 1996 for the sulphur content of automotive diesel (to 0.05% by weight), as this is required to meet the exhaust emissions limits for diesel engines. The Council asked the Commission to propose a further reduction of the sulphur content of gas oil for industry, space heating and bunkers, and sulphur limits for aircraft kerosene. The amended draft directive also requires that the distributed automotive diesel of 0.05% sulphur be gradually available by 1 October 1995. The directive is in the process of being approved.

CONTROL OF RESERVE STOCKS

The reserve stocks consist of quantities of oil products which can be called upon at any time by a country to bridge a temporary shortage situation or difficulties in the sourcing of hydrocarbons. Directive 68/414 required the creation and maintenance of reserve stocks at EC level representing initially 65 days; this was then increased from 1 January 1975 to 90 days' consumption for three categories of product: petrol, jet propulsion fuel and diesel, and heating and heavy fuel oils. Since the directive merely imposed the obligation to achieve an end result, the EC members have over the years established systems quite different from one another and which can be divided into two categories depending on the existence or otherwise of a centralised stockpiling authority.

EC countries with a central reserves administration

Four countries have a central reserves administration: Denmark, Germany, France and the Netherlands.

Denmark has had legislation governing reserve stocks for over 30 years now; the reserves are administered by the Foreningen Danske Olieberedskabslager (FDO), a non-profit making foundation established in 1959 with voluntary membership. The FDO is financed by contributions from its members. The 1959 legislation related chiefly to fuels and was amended when Denmark joined the EC by the law of the 24 May 1972 which widened the stockpiling commitment to the three product categories specified in the EC directive. Currently, Denmark has 120 days' reserves of stocks.

In Germany, the lion's share of the stockpiling requirement of 80 days' consumption is administered by the Erdölbevorratungsverband (EBV), a national body with public corporation status financed by means of a special tax. Up to 90% of the reserves stocked by the EBV are its own property. The refineries themselves ensure an additional 15 days on their own initiative. In addition, the federal government has amassed stocks of crude oil equivalent to 30 days' supply.

France long ago established legislation requiring the stockpiling of oil reserves (the commitments to create and maintain safety reserves can be traced back to the law of the 10 January 1925). More recently (1988) France established a central reserve administration, the Société Anonyme de Gestion des Stocks de Sécurité (SAGESS). This is a private limited company with a special fiscal and legal status. Its shareholders must be all those companies (refiners and independents) who hold a special licence to import and market oil products; its operating costs are defrayed by the contributions paid by the shareholders. SAGESS is responsible for half the total legal stockpiling requirements, i.e. 45 days, twelve of which it actually owns and the balance being covered by allocations; the remaining 45 days are the responsibility of special licensees.

In the Netherlands the collective administration of stocks is entrusted since 1986 to the Central Organ Vorraadsvorming Ardolie-produkten (COVA), a public body which maintains 70 days of reserves of the light and medium distillation fractions. COVA is financed out of a levy on oil products additional to excise tax. The refineries are required to maintain a 50 day stockpile and sixteen and two-thirds days are maintained by the independents. The stockpiling of heavy fuel oils has been administered since the 1 January 1987 by the Union of electricity generators (SEP).

EC countries with no central reserves administration

In Belgium compulsory stockpiling represents one quarter of domestic supplies made during the previous calendar year; the responsibility is assumed by refineries and importers who are both required to maintain 90 days.

In Greece the distributors are principally required to maintain 90 days' reserve stocks, however this obligation may be assumed by the local refineries which supply the distributors. Distributors only commit themselves to the products which they actually import.

In Spain the requirement to hold 90 days of oil reserves is spread evenly between the refinery companies and Campsa, a distribution company created by state monopoly.

In Ireland stockpiling is ensured by importers by means of coverage contracts signed with the state refinery company located at Whitegate.

In Italy the compulsory 90 day reserves are administered by various different bodies: the refiners, importers, ENEL the national electricity generating company as well as the government itself whose strategic stocks are handled by ENI.

The Portuguese oil reserves are administered by import licence holders (refineries, importer-distributors) and represent 120 days of consumption although part of these may be provided by the state corporation Petrogal.

The target of 90 days of oil reserves is cut by 15% in the United Kingdom, owing to its status as an oil producer. Two groups of operators are required to maintain reserves: first the refineries (76.5 days); second, importers, distributors and consumers importing more than 50 000 tonnes per annum for their own account are required to maintain 66 days reserves.

OUTLOOK

In the wake of the dramatic changes that have occurred within the oil sector over the past few years and reflecting the uncertainty over future developments, oil prices are forecast to remain subject to a high degree of volatility over the short-term. Excess supplies and weak demand are expected to lead to relatively low crude and product prices in the near future, although in the longer term real oil prices are forecast to increase towards their 1990 peak by the middle of the decade.

The structure of oil product demand is expected to shift in favour of middle distillates. The previous move to lighter products is now almost stabilised, while the trend away from heavy-end products is set to continue. By 1995, the share of unleaded gasoline in the EC is expected to exceed 75%. Although there will continue to be wide variations from country to country in the market share, the difference between countries is expected to be far less than in 1990. Overall though, the

share of oil in EC primary energy demand is forecast to decline further over the next decade, giving way to natural gas.

The refinery sector is expected to see a very modest expansion of primary distillation capacity. However, the upgrade capacity within the EC is expected to increase at a faster rate, reflecting the move towards higher quality products and the shift in oil product demand away from the heavy-end. The retailing market is expected to move into a more sophisticated and increased product specification era, with the emphasis on product quality and performance, as well as on brand differentiation. The trend towards diversification, automation and increased size of sites is also expected to continue.

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Electricity generation and distribution

NACE 161

Electricity consumption in the EC grew by 30% in the 1980-1990 period, while the electricity intensity of GDP has been generally stable from the second half of the 1980s.
Nuclear contribution to the electricity sector has risen considerably over the past two decades, but generating capacity is expected to peak in the latter part of the 1990s and then decline at the start of the 21st century. Electricity production from renewable sources remains very isolated, limited by high investment costs and increasing concerns over siting. Constraints on these primary energy sources will mean that increases in demand over the next decade or so will have to be met by increases in conventional thermal capacity.
On the distribution side of the industry, the Commission is pursuing its plans to develop an internal electricity market, with the proposal for a further two stages to be added to the directives on transit and price transparency. The new proposals include the introduction of third party access on a limited scale.

INDUSTRY PROFILE

Description of the sector

NACE 161 includes generation of electric power destined for public use from thermal energy (161.1), hydro-electric energy (161.2) and nuclear energy (161.3), distribution of electricity (161.4) and generation of electricity for its own consumption (161.5 to 161.7).

Main indicators

Three countries account for two thirds of the total EC electricity production: Germany (27%), France (23%) and the United Kingdom (16%). If we add Italy (11.5%) and Spain (8%) to the other three, then their combined electricity production accounts for over 85% of the total. Over the course of the 1980s, France has dramatically increased its share of total EC electricity production, up from just over 18% in 1980. This increase reflects the French policy aimed at reducing its dependence on imported oil and promoting increased electricity use in conjunction with the development of nuclear power plants. The other countries where there has been a noticeable increase in electricity production over the course of the 1980s, have been Greece and Portugal.

Electricity consumption increased by 30% from 1980 to 1990, an average yearly growth rate of 2.5%, which represents a slow down compared with the correspondent rate of 3.7% from 1970 to 1980. However, the rate of growth of consumption has been greater over the second half of the 1980s than over the first half, and in recent years has grown at a faster rate than in the 1970s.

Recent trends

The electricity intensity of GDP, having increased between 1970 and 1985, has been relatively stable over the second half of the 1980s, although across countries the trend has varied widely.

Several factors explain why electricity intensity in the EC stopped increasing after 1986:

- the oil price collapse and the general decline in fossil fuel prices, while electricity prices remained much more stable, which resulted in electricity becoming less competitive;
- the saturation effects in some applications and some countries. This is most evident in the northern EC Member States, while there is scope left for increased penetration of electrical appliances in the Mediterranean area;
- the development of more efficient appliances and processes in general.

Most of these factors will continue to have an impact on electricity consumption in the future, though the catch-up effect of increased electrical appliance utilisation in southern Europe, coupled with some fuel switching to electricity in the industrial sector, should ensure that electricity intensity remains stable over the next few years. However, saturation effects will progressively become more widespread, with the result that the electricity intensity of GDP should start to decline over the second half of the 1990s.

Electricity has increased its penetration of total energy consumption, rising from 14.7% in 1980 to 18.2% in 1990. Electricity's share of final energy consumption varies substantially across countries, reflecting the structure of industry, the level of automation in industry, the use of electricity for space heating and the level of appliance ownership in the domestic sector, amongst other factors.

Within the EC, Spain and France have the highest level of electricity penetration, while Luxembourg, the Netherlands and Ireland have the lowest. In France, there is a high level of electricity for space heating, whilst in Luxembourg, the low share of electricity reflects the dominance of coal use in the important iron and steel sector.

Foreign trade

Electricity trade between EC and non-EC countries remains very low, while the supply of electricity between Member States has noticeably increased over the past fifteen years. In 1990, the trade in electricity by the Member States increased to 215.5 TWh, compared to 200.5 TWh in 1989 and 58 TWh in 1973. The amount of electricity traded has risen faster than the rate of increase of consumption, such that in 1990 it accounted for 12% of gross inland consumption, up 2% from 1987.

France is the major net exporter of electricity within the EC; Belgium, Denmark and Spain have also recorded small net exports in 1990. France's net exports amount to about 12% of the country's gross inland consumption, a situation that resulted from the development of excess nuclear power capacity in France. The major export markets for France are the United Kingdom, Italy, Germany and Switzerland.

MARKET FORCES

Supply and competition

Electricity production from renewable sources remains very isolated, despite efforts at the EC and national government level to promote and subsidise their development. So far only geothermal and wind power have made inroads into the energy sector, though across the EC there are wide variations in the use of renewable sources. Of these two energy forms, Denmark has the highest share of wind power, 1% of total generation, while Italy has the highest EC level of geothermal power, 1.5% of total generation. The principal limitations to the development of renewable sources are given by high investment costs, though siting is becoming an increasing concern in a number of countries.

No new orders for construction of nuclear power plants have been placed in Europe from 1987 onwards. The completion of capacity currently under construction and firmly committed capacity will lead to a peak in nuclear generation capacity and production in Western Europe in the late 1990s. At the same time, no new plants are expected to be commissioned in the late 1990s. Orders for new plants in France and the

Table 1: Electricity generation and distribution
Main indicators (1)

(billion kWh)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Apparent consumption	1418	1424	1422	1460	1518	1585	1626	1677	1727	1774	1814	1955
Net production (2)	1209	1206	1203	1230	1420	1486	1524	1568	1611	1656	1698	1831
Electricity consumption as % of final energy consumption	14.7	15.3	15.7	16.2	16.6	16.7	16.8	17.1	17.5	18.0	18.2	N/A

(1) Electricity delivered to market (excluding electricity consumed and losses within power stations);" 1991 figures include former East Germany
(2) 1980-83 EC10
Source: Eurostat

Table 2: Electricity generation and distribution
Net electricity production by country

(billion kWh)	1980	1990	1991
Belgique/België	51	67	68
Danmark	26	24	34
BR Deutschland (1)	347	417	495
Hellas	21	32	32
España	105	143	148
France	247	400	427
Ireland	10	14	14
Italia	177	206	211
Luxembourg	1	1	1
Nederland	62	69	72
Portugal	15	27	28
United Kingdom	266	298	300

(1) includes former East Germany in 1991
Source: Eurostat

Table 3: Electricity generation and distribution
Share of electricity in total final energy consumption, by sector and by country

	1980				1989			
(%)	Total	Industry	House-holds(1)	Transport	Total	Industry	House-holds(1)	Transport
EC	14.7	20.0	18.1	1.5	18.0	25.7	25.3	1.4
Belgique/België	11.7	15.9	12.1	1.4	15.7	22.7	18.3	1.4
Danmark	12.9	16.0	16.6	0.4	18.8	30.3	25.9	0.4
BR Deutschland	15.2	20.7	17.3	2.3	18.4	25.6	23.9	1.9
Hellas	16.2	22.8	30.0	0.1	18.0	26.1	34.1	0.1
España	17.8	24.8	28.6	1.1	20.5	30.3	41.1	1.4
France	14.2	18.8	17.9	1.9	20.3	26.7	30.6	1.9
Ireland	12.9	17.0	19.5	0.0	14.3	20.1	19.6	0.1
Italia	14.2	21.2	15.6	1.6	16.8	26.2	21.0	1.4
Luxembourg	9.1	9.3	15.5	0.8	10.9	12.8	20.4	0.5
Nederland	11.3	17.5	11.4	1.0	14.2	22.9	16.9	0.9
Portugal	17.3	22.6	34.9	0.8	21.2	28.4	44.0	0.8
United Kingdom	15.8	19.8	22.0	0.8	17.1	24.3	25.5	0.6

(1) Consumption by households, agriculture, fisheries, administration, services and others
Source: Eurostat

Table 4: Electricity generation and distribution
Breakdown of electricity consumption by sector

(%)	1980	1986	1987	1988	1989	1990
Industry	48.4	44.2	44.0	44.8	44.7	44.2
Transport	2.5	2.5	2.4	2.4	2.4	2.5
Households	28.6	30.1	30.3	28.9	28.4	28.4
Other	20.5	23.2	23.3	23.9	24.5	24.9

Source: Eurostat

United Kingdom after the year 2000 will not be sufficient to offset the steady decline in generation capacity (though life-extension programmes are expected to draw out operating spans by as much as 40 years for most reactors).

The slowly declining shares of nuclear and hydro/geothermal power over the next decade will allow the share of conventional thermal power to expand. Consequently, the major capacity development questions facing the Western European electricity supply industry surround the refurbishing, replacement, and expansion of conventional thermal power generation capacity. In 1990, the conventional thermal generation fuel mix in the EC was split roughly 65% solid fuels, 18% oil products and 13% natural gas, with 4% to other thermal sources. Fossil fuel use in conventional thermal power plants continues to dominate the energy input mix within the power generating sector. Nevertheless, their share has declined substantially over the past two decades, from 83% in 1973 to 67% in 1991. By-and-large it has been the increase in nuclear power generation that has caused the decline in fossil fuel's share of the total energy input into the sector. Nuclear's share has risen from 5.4% in 1973 to 33.2% for the EC as a whole in 1991.

In the meantime, hydro-electric power, having maintained a relatively stable share of the total energy input over the 1970s and first half of the 1980s, has seen its share edge lower. As electricity production increases over the next decade, it is expected that hydro-electric's share of the total will fall further. The scope for additional hydro-electric development is limited for a variety of political, economic, and environmental reasons, with the result that the remaining exploitable hydro resources will see limited development throughout most of the EC. Significant developments are only expected to occur in the Mediterranean area.

Environmental arguments against the continued development of solid fuel-fired generation capacity can be met by installing pollution abatement equipment. Italy is an example, where new capacity, planned and under construction by ENEL, is split between 26% combined-cycle plants, fuelled by natural gas or gasified coal, and 74% multi-fuel plants capable of burning oil, gas, or coal and equipped with flue gas desulphurisation (FGD), de-NOx and third generation electrostatic precipitators: whatever fuel is burned, the emission levels are within the limits set by the Italian government. The heavy investment in emission abatement equipment and fuel flexibility reflects the importance to the power generating utilities of continued use of coal-fired power plants, which in turn reflects the expectation that coal will retain a relatively low and stable price profile.

The use of natural gas in combined cycle generation offers higher thermal efficiency than "conventional" generation. However, improvements in the efficiency of coal can also be achieved using Integrated Gasification Combined Cycle (IGCC) generation. There are four main reasons why a shift towards natural gas can be expected in the power generation fuel mix:

- Environmental advantages: growing concern about the environmental impact of energy consumption helps to sustain interest in natural gas, which is less polluting than most of the other fossil fuels.
- Price: although marginal costs (fuel and operating costs) are higher than those of coal, the total cost, including capital costs, per MWh of output are less.
- Co-generation: growth in the application of combined heat and power is creating many new market openings for natural gas consumption in industry. The countries showing the largest growth potential for gas-fired co-generation are Denmark, Italy and the United Kingdom.
- Changes in industry structure: the European electricity generation industry is undergoing some degree of change. There is a trend, most noticeable in the United Kingdom, to encourage the generation of electricity from many different sources and new entrants are encouraged into the industry. It will not be unusual for new entrants to enter the industry on a small scale - perhaps supplying to a small group of local industrial customers or to one distribution company. Generators such as these will be encouraged to use natural gas. Gas-fired generation is possible from relatively small units without a great loss in economies of scale.

To achieve a more open internal market in the field of electricity, the Commission has identified a certain number of potential obstacles which must be eliminated. Amongst these, a lack of harmonisation of kWh prices between EC members is one key problem. Prices are strongly influenced by certain elements that the electricity generating companies do not control, such as national and regional policy in the field of energy, the environment and taxation. Within the EC these various policies can be strongly linked and sometimes contradictory.

Table 5: Electricity generation and distribution
Breakdown of final electricity consumption by country and by sector, 1990

(%)	EC	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK
Industry	44.2	52.7	30.1	47.8	42.5	50.6	37.5	37.8	51.8	63.4	45.2	51.9	36.5
Households, etc. (1)	53.3	45.1	69.2	49.2	57.0	46.4	59.6	62.1	45.6	35.3	53.1	46.8	61.4
Other	2.5	2.2	0.7	3.0	0.5	3.0	2.9	0.1	2.6	1.3	1.7	1.3	2.1

(1) Households, etc. includes households, administration, agriculture, fisheries and others
Source: Eurostat

Table 6: Electricity generation and distribution
Electricity intensity of GDP (1)

(kWh per thousand ECU)	1985	1986	1987	1988	1989	1990
EC	392	392	397	393	394	N/A
Belgique/België	459	462	474	473	472	471
Danmark	331	336	350	356	360	361
BR Deutschland	425	420	425	416	411	N/A
Hellas	546	545	568	586	594	N/A
España	471	466	459	456	467	459
France	366	373	382	375	380	381
Ireland	395	414	412	401	399	399
Italia	309	311	318	321	325	329
Luxembourg	830	800	790	766	738	722
Nederland	369	367	381	389	386	389
Portugal	643	659	655	674	679	697
United Kingdom	402	400	395	387	386	390

"(1) At 1985 constant prices for GDP; consumption is defined here as final consumption of electricity"
Source: Eurostat

Table 7: Electricity generation and distribution
EC electricity trade, 1990

(GWh)	Total	B	DK	D	GR	E	F	I	L	NL	P	UK
Total exports	100.4	8.5	4.9	26.4	0.6	3.6	52.4	0.9	0.8	0.5	1.7	0.0
Total imports	117.0	4.8	12.0	25.3	1.3	3.2	6.7	35.6	4.7	9.7	1.7	12.0
Net exports	-16.6	3.7	-7.1	1.1	-0.7	0.4	45.7	-34.7	-3.9	-9.2	0.0	-12.0

Source: Eurostat

Table 8: Electricity generation and distribution
Maximum nuclear output capacity and share
in electricity production

	1990		1991		1995	
(GWe)	Capacity	Share (%)	Capacity	Share (%)	Capacity	Share (%)
EC	105.3	35.2	107.2	33.2	111.0	34.9
Belgique/België	5.5	58.5	5.5	59.3	5.5	53.5
BR Deutschland	22.9	37.5	22.5	27.7	22.5	35.0
España	7.4	34.3	7.1	36.0	7.1	30.0
France	55.5	74.4	56.8	72.7	61.4	77.6
Italia	1.3	0.0	1.3	0.0	1.3	0.0
Nederland	0.5	5.2	0.5	4.9	0.5	4.2
United Kingdom	12.1	19.8	13.5	20.6	12.7	19.6

Source: DG XVII

Table 9: Electricity generation and distribution
Structure of electricity production (1)

(%)	1973(2)	1980(3)	1988	1989	1990	1991
Hydro	11.5	12.3	12.6	8.7	9.2	9.5
Nuclear	5.4	12.4	40.0	35.7	34.9	33.2
Thermal, of which	83.0	75.3	53.4	55.6	55.9	57.2
Oil	31.0	21.9	9.4	10.7	10.1	N/A
Natural Gas	10.3	8.9	6.5	7.1	7.2	N/A
Solid Fuel	38.5	42.2	35.5	35.7	36.6	N/A
Other	3.2	2.3	2.0	2.1	2.0	N/A
Total (billion kWh)	980	1200	1611	1656	1698	1848

(1) 1991 figures include former East Germany
(2) EC9
(3) EC10
Source: Eurostat

Another major consequence of the establishment of the internal energy market is the opening up of tenders for the supply of equipment ordered by the public electricity companies. These companies must open up their bid procedures in order to treat, on an equal footing, all EC suppliers. These measures have contributed to the acceleration in the concentration/restructuring of the European electro-mechanical industry.

Production process

The nature of electricity production requires that it must be transmitted to the point of use within areas, regions and Member States. This imposes technical requirements for the operational management of electricity transmission to reduce the inevitable power losses to a practical minimum in the interests of economy and energy efficiency. Electrical interconnections across national frontiers have developed over many years as a logical extension of local, regional and national interconnections and have been driven by the economic and technical advantages which a more profitable use of generating facilities provides.

In the EC, this trend has resulted in one of the most closely integrated high-voltage international networks in the world, although Ireland and Greece are still not directly interconnected with any other Member State. In the case of Greece, the EC is currently studying a plan to connect it to Italy as a means of providing Greece with greater security of supply. Greece is currently importing electricity from Albania, Yugoslavia and Bulgaria.

International exchanges are managed, without executive powers, by a cooperative organisation of electricity authorities. These are UCPTE (Austria, Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Switzerland, Greece, Portugal, Spain and Yugoslavia), UFPTES (France and the Iberian group of islands), SUDEL (Austria, Italy, Yugoslavia) and NORDEL (Denmark, Norway, Sweden, Finland and Iceland).

UCPTE announced in March 1990 the creation of a computerised exchange, grouping surplus capacity and electricity needs of member organisations. This system enables the daily management of exchanges instead of the previous weekly sessions.

The electric utilities enter into commercial arrangements for the exchange of electrical energy, with the transfer arrangements falling under three main types: hour-by-hour exchanges on a cost basis, including back-up in the event of grid difficulties; contracts (usually short-term) for net transfers; permanent arrangements for the transfer of energy from joint-owned production plants in a neighbouring country. Furthermore, it should be noted that all the elements of the international interconnection system are owned by the monopolies and transfer arrangements are cooperative and not mandatory. These interconnections do not, by any definition, constitute a common carrier system.

INDUSTRY STRUCTURE

Companies

The electricity supply industry (generation, transmission and distribution) in the EC is characterised by the existence of national monopolies which are either de jure monopolies or de facto monopolies (such as the contracts signed between municipalities in Germany). The supply of electricity involves numerous activities from fuel input and energy generation to transmission, transmission network maintenance and local distribution.

The electricity supply sector in the Member States can be divided into three major categories: integrated State-owned; decentralised mixed ownership; mixed ownership, State-dominated. France has the highest level of vertical and horizontal integration, whilst at the other extreme Germany and the Netherlands have the most decentralised structures.

In Belgium, the three private generators (Ebes, Intercom, Unerg) have grouped together since July 1990 to create a new entity, Electrabel. This grouping is the result of sector rationalisation process under way since the 1950s and will enable them to better confront foreign competition. The municipalities are responsible for the distribution of electricity destined for lighting and domestic use, as well as to industrial users who consume less than 1000 kW.

In Denmark, the electricity generation is in the hands of twelve companies, most of which directly or indirectly owned by municipalities. The public electricity generation companies are grouped into two associations, ELSAM and Elkraft, which are responsible for coordination and planning of generation and transmission capacities, as well as the daily operational coordination of fuel purchases for power stations. Electricity distribution is provided by 111 companies, five of which are generating companies, 54 are municipal companies and 52 are cooperatives or foundations.

In France, the monopoly for electricity generation, transport and distribution was given to Electricité de France (EdF) in 1946. EdF covers 88% of installed capacity and 96% of electricity distribution.

In Germany, the electricity supply industry is highly decentralised, with some 960 individual public electricity companies. However, the sector is tightly controlled by several federal and regional organisations which are responsible for coordination and regulation. Nine large public companies (two of which are nationalised) own and operate the majority of gen-

eration capacity, including all the nuclear power stations and almost the entire national high-voltage grid.

East Germany will be shortly interconnected with the UCPTE networks. Prior to unification, East Germany was connected to the Mir grid, which primarily received power from the Soviet Union for base load supply rather than peak exchange as in the case of the UCPTE grid.

In Greece, the Public Power Corporation holds the monopoly for generation, transmission and distribution. The situation in Ireland is the same with the Electricity Supply Board.

In Italy, Ente Nazionale per l'Energia Elettrica (ENEL) is a state company responsible for electricity generation, imports, exports, transmission and distribution throughout the country. The only exceptions to ENEL's monopoly are the following: municipal companies in existence before 1962; generating organisations which consume more than 70% of their own production; production by combined heat and power plants of less than 3MW; generation from renewable resources. A recent electricity law in Italy provides for pre-privatisation changes in the structure of ENEL.

In the Netherlands, electricity generation transmission and distribution is in the hands of municipal and provincial companies. After the sector re-organisation in 1987, there are now seven provincial companies and one municipal company responsible for electricity generation and transmission. They are grouped within the electricity generators cooperative (SEP), which is responsible for capacity planning and inter-provincial and international electricity exchange coordination. Sixty seven municipal companies distribute electricity and are grouped within VEEN.

In Portugal, Electricidade de Portugal (EdP) has the quasi-monopoly for generation and transmission. Independent generation and transmission is permissible in those areas not covered by the EdP distribution grid. A recent electricity law in Portugal provides for a new structure (removing generation monopoly) for EdP.

In Spain, the electricity industry is composed of a large number of public companies, 21 of which are grouped under Unidad Electrica (UNESA), which is responsible for co-ordinating generation and transmission activities. The electricity grid was nationalised in 1984 and is operated by REDSA.

The United Kingdom undertook a privatisation programme in 1990 and 1991, with the sale of the twelve Area Boards, the CEGB and the Northern Irish and Scottish generating and distribution companies. From these sales seven new generating entities have emerged: National Power, PowerGen, Scottish Power, Scotland Hydro-Electric, Scottish Nuclear, the Northern Ireland Power Generation Company and the state-owned Nuclear Electric. The latter is responsible for all non-military nuclear power stations and has remained in public ownership. The transmission grid is jointly owned by the Regional Electricity Companies, but its operations remain independent.

ENVIRONMENT

The directive (no. 88/609) on emissions control from large combustion plants (those with a rated thermal input equal to or greater than 50 MW) was adopted by the Council in November 1988, after four years of lively debate. The directive comprises two parts and is based on the use of best available technology at a reasonable cost. Applying this technical constraint helps to ensure the evolution of new and better technologies aimed at pollution abatement.

The first part of the directive applies to new combustion plants, built after 1st January 1990 and whose rated thermal input is greater than 100 MWh (coal) or 50 MWh (oil and natural gas). Under the directive, all new large combustion plants are subject to a licensing procedure to ensure that the plant meets specified emission standards for SO_2, NOx and particulate. The second part applies to existing stationary combustion sources (those for which authorisation was given prior to 1st July 1987), and specifies target values for reduction of emissions based on the 1980 level. Compared to 1980, SO_2 emissions must be reduced by 60% by the year 2003, and NOx emissions by 30% by 1998, the former in three stages, the latter in two phases. Plants authorised prior to 1987 and built before 1990 must either conform to the new plant standards or be taken into account in the global ceiling value.

Although new plant emissions standards have been uniformly established, global targets still vary from country to country. In addition, exceptions have been included at the request of specific countries, as well as a number of caveats that allow for the relaxation of targets and or target dates "If a substantial and unexpected change in energy demand or in the availability of certain generating installations creates serious technical difficulties for the implementation by a Member State of its programme [of SO_2 and NOx abatement]."

The emission limits for large combustion plants favour the penetration of natural gas in the power generating sector. The limits imposed on NOx emissions in new plants can be met without the need for expensive NOx emission abatement equip-

Table 10: Electricity generation and distribution Power generating capacity by country, 1989 (output capacity)

(MW)	Nuclear	Thermal	Hydro	Total
EC	101 296	253 068	78 336	432 700
Belgique/België	5 500	7 175	1 402	14 077
Danmark	0	8 239	10	8 249
BR Deutschland	22 709	68 645	6 861	98 215
Hellas	0	6 042	2 302	8 344
España	7 469	20 093	16 250	43 812
France	52 600	22 800	24 400	99 800
Ireland	0	3 293	512	3 805
Italia	1 120	37 589	18 237	56 946
Luxembourg	0	106	1 132	1 238
Nederland	508	16 726	25	17 259
Portugal	0	3 326	3 054	6 380
United Kingdom	11 390	59 034	4 151	74 575

Source: Eurostat

ment, though the SO_2 emission limits are relatively restrictive as regards the use of coal.

The current discussions on the proposed CO_2/energy tax focus on the stage of the electricity production process where the CO_2 tax is levied, i.e. on the input fuels (coal, nuclear, oil...) or on the output (electricity itself). The main problem of an input tax is that conversion losses would be taxed too.

REGULATIONS

The development of electricity exchange within the EC has received considerable attention from the European Commission, with the Council adopting a number of directives which constitute a first step towards the completion of the internal market in electricity.

The transit directive (no. 90/313/30), approved by the Council on 30th October 1990, provides that "each high voltage transmission utility shall facilitate power exchanges between other utilities through its grid, provided that transmission reliability is not affected." Meanwhile, the price transparency directive (no. 90/185/16), approved by the Council in June 1990, provides that "electricity and gas utilities shall supply to the Statistical Office the rates they charge to all categories of customers on the understanding that published aggregate figures will respect confidentiality."

The Commission has also presented plans for the further development of an internal energy market within the EC, involving two stages in addition to the two directives cited above. The second stage is based on three elements:

- The creation of a transparent and non-discriminatory system for granting licences for the production of electricity and the building of electricity lines. The aim of this proposal is to "open up investment in production and transport to independent operators, and in particular to large industrial users."
- The creation of transparency of operations by the separation of the management and accounting of production, transmission and distribution operations in vertically integrated undertakings.
- The introduction, on a limited basis, of third party access (TPA). The transmission and distribution companies will be obliged to "offer access to their network to certain eligible entities at reasonable rates, within the limits of available transmission and distribution capacity." Those eligible will include large industrial users and distribution companies.

The Commission also wishes to see subsidiarity play a substantial role during the second phase. This involves Member States retaining their regulatory powers for all end-users not eligible for TPA, as well as determining the extent and nature of distribution companies' rights and their public service obligations. Member States will also be free to establish the criteria used for granting licences to build power stations and transmission and distribution lines. The Commission would like to see this second stage entered into force on 1st January 1993. The third stage will be defined in detail in the light of the experience acquired during the second stage and will be entered into force on 1st January 1996.

OUTLOOK

The principal concerns in the outlook for power generation surround the evolution of the fuel mix for conventional thermal power generation. Development of hydro power, renewable sources, and nuclear power will remain constrained over the next decade. As a result increases in demand will have to be met by increases in conventional thermal capacity.

Within this context their is considerable scope for natural gas use for power generation in Europe. It is, however, only in few EC countries where the use of gas in power generation will increase substantially. Italy, Belgium, Denmark and the United Kingdom are all in the process of changing the fuel mix in favour of gas. Such a move is also planned in Greece and Portugal, but in these countries the future of gas is much more speculative and uncertain. Natural gas fired power generation could almost double its share of the power generation fuel mix in the EC by the year 2010, from its 1990 level, almost tripling the volume of gas consumed in this use.

By the year 2000, the demand for natural gas fired power generation will increase to the detriment of oil-fired power. Nevertheless, solid fuels will continue to dominate the conventional thermal power generation fuel mix.

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Transmission and distribution of natural gas

NACE 162

In 1990, EC natural gas production rose by 4.6% over the previous year, and accounted for 62.4% of gross consumption. The United Kingdom and the Netherlands both increased their output in 1990 compared to 1989: these two countries account for 74% of the EC total natural gas production. The Soviet Union was the major supplier of natural gas to the EC, followed by Norway and Algeria.

Growing concern about the environmental impact of energy consumption has helped to sustain interest in natural gas. It contains relatively low levels of sulphur and by-and-large emits less NOx per unit of energy than other fossil fuels, it also produces less CO_2 per unit of energy burnt than any other fossil fuel. As a result, natural gas is expected to become increasingly important within the energy fuel mix.

INDUSTRY PROFILE

Description of the sector

Natural gas is normally burned as a fuel for space heating and hot water production, as well as being used in power stations to generate electricity and used as a feed stock in the chemical industry. The natural gas industry embraces a range of activities, of which the three principal ones are exploration/production, transmission and distribution. Some companies carry out all three activities, although exploration and production are generally considered to be outside the gas sector, since it is mainly carried out by major oil companies. The industry applies the term transmission to:

- the purchase of gas from producers or from other transmission companies;
- the transportation and storage of natural gas;
- the sale of gas to other transmission companies, to industrial consumers and power stations and to local distribution companies.

The distribution activity is concerned with the supply of natural gas by a local network to domestic and non-domestic consumers linked to its network.

Main indicators

In 1990, EC natural gas production rose by 4.6% over the previous year, to 6026.7 TJ (terajoule). As a proportion of gross EC consumption, production edged higher to 62.4% in 1990, though it remains below the levels seen in 1985, when production represented 68.8% of gross consumption. The two largest producers within the EC, the United Kingdom and the Netherlands, both increased their output in 1990 compared to 1989, with production rising 14% and 0.8% respectively.

Gross consumption in 1990 increased by 3.1% from 1989s level to 9660.2 TJ. Consumption increased in virtually all the EC countries in 1990, with the only exception of the Netherlands, where it fell 0.7%, and of Portugal which consumes no natural gas. Germany and the United Kingdom consumed the largest amount of natural gas of all the EC countries in 1990, with both representing 22.9% of the EC total, followed by Italy (18.8% in 1990), the Netherlands (14.9%) and France (12.1%). Spanish consumption only accounted for 2.5% of the EC total in 1990, although it has risen at the rate of 22.7% per annum from 1.4% of the EC total in 1987. This expansion rates reflects the creation of a market in a very underdeveloped sector, with industry accounting for 75% of natural gas demand.

Recent trends

The average rate of increase in consumption was 2.4% per annum over the second half of the 1980s, which represents a slowdown if compared to an yearly growth rate of 4.8% between 1982 and 1985. The slowdown in natural gas consumption reflects the decline in the domestic sector's demand for natural gas over the second half of the 1980s, although 1990 itself saw an increase in consumption of 3.9% in the residential and commercial sector's consumption. Demand in the industrial sector has shown strong growth over the 1980s, and rose by 3% per annum between 1987 and 1990. Nevertheless, the greatest increase in consumption in recent years has occurred in the power generating sector, where consumption rose by 5.6% per annum between 1987 and 1990.

Foreign trade

Imports from outside of the EC rose by 2.8% in 1990 to 3843.6 TJ, representing nearly 40% of the gross EC consumption. The Soviet Union was the major supplier of natural gas to the EC, accounting for 44% of the total EC imports from outside the EC. This represents an increase from 1989, when Soviet supplies accounted for less than 40% of the total and it also representing a 14% increase over the previous year. Imports of natural gas into the EC in 1990 were divided between Germany (45%), Italy (32%) and France (23%).

It is estimated that the existing production and transmission infrastructure will permit the former Soviet Union, without much incremental cost, to increase its exports to western Europe by around an additional 20 million toe (tonnes of oil equivalent). Given the size of the Russian gas reserves and provided the appropriate political and economic conditions prevail, substantially greater supplies into the EC could be envisaged.

The other major sources of natural gas supplies from outside the EC are Norway (27% of the total in 1990) and Algeria (28% of the total in 1990).

Norwegian natural gas deliveries into the EC will take on a new dimension when the development of the Troll-Sleipner project and the corresponding infrastructure are completed

Table 1 : Transmission and distribution of natural gas
Main indicators

thousand TJ (GCV) (1)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Gross EC consumption	8 152.6	7 792.0	8 217.0	8 592.1	8 689.3	9 221.4	8 956.6	9 371.2	9 672.1
Primary EC production	5 395.5	5 579.5	5 580.2	5 913.5	5 798.3	6 001.6	5 509.1	5 762.5	6 026.7
Extra-EC imports	2 226.3	2 436.0	2 777.9	2 858.8	3 094.0	3 427.2	3 487.9	3 738.6	3 843.6

(1) GCV = gross calorific value
Source: Eurostat

Table 2: Transmission and distribution of natural gas
Trends in consumption and usage of natural gas

thousand TJ (GCV) (1)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Gross EC consumption	8 152.6	7 792.0	8 217.0	8 592.1	8 689.3	9 221.4	8 956.6	9 371.2	9 672.1
% of total energy consumption	16.6	17.4	17.8	17.9	17.9	18.6	17.9	18.3	18.8
Final non-energy consumption	540.3	569.0	646.2	626.6	529.7	527.2	531.2	534.9	N/A
Transformed in power stations	965.0	1 046.7	1 152.4	1 055.0	1 020.0	1 108.0	1 098.7	1 244.3	1 288.7
Final energy consumption	5 666.4	5 807.5	6 135.4	6 536.7	6 698.6	7 193.5	7 016.7	7 247.0	N/A
of which -industrial	2 151.3	2 260.9	2 331.9	2 376.7	2 341.7	2 632.5	2 681.8	2 850.8	3 059.8
-domestic and commercial	3 502.9	3 634.5	3 791.5	4 148.8	4 355.5	4 549.7	4 324.5	4 387.4	4 546.4

(1) GCV: gross calorific value
Source: Eurostat

in the mid-1990s. The Norwegian authorities have also agreed on the construction of a new pipeline linking the Norwegian North Sea to Emden in Germany, which is due to come on stream in the second half of 1995. By the year 2000, Norwegian natural gas exports are likely to be at a level of around 50 million toe, most of it heading into the current EC countries.

Algerian natural gas imports into the EC in 1990 were divided between Italy (38%), France (35%), Spain (12%) and Belgium (15%). Algerian gas is either transported by pipeline via Tunisia and into the Italian grid or is exported as liquefied natural gas via Arzew and Skikda to terminals in Belgium, France and Spain. Within few years Greece will also receive Algerian natural gas in this manner.

MARKET FORCES

Demand

There is an important market for gas in industrial co-generation. This market accounts for about 10% of western European power generation. growth in the application of combined heat and power is creating many new market openings for natural gas consumption in the industry. the countries showing the largest growth potential for gas-fired co-generation are Denmark, Italy and the United Kingdom.

In Denmark, the government has made a commitment to expand gas-fired combined heat and power applications. In Italy, the lack of power generation capacity and the constraining site approval regulations for public power plants have made new industrial co-generation more attractive as it is the easiest capacity to expand.

Under the 1983 Electricity Act, co-generators in the United Kingdom could sell surplus power to the Central Electricity Generating Board. This was not a great success, at least until the advent of electricity privatisation, which allowed large consumers to purchase from any one of the twelve area boards or the two conventional generators. This prompted consumers to carefully consider co-generation, because they no longer faced one buyer for their surplus power and could seek the buyer offering the best price.

Co-generators do not necessarily need to use a gas-fired system. Nevertheless, the total cost is less than that of a coal or oil-fired equivalent , although marginal cost comparisons are not so favourable.

Supply and competition

In many countries the price of gas is linked to that of competing oil products. Some countries index gas prices to the prices of light heating oil as well as heavy fuel oil, reflecting the fact that gas competes in the space heating market in addition to the power generation market. An alternative method is to link gas prices to those of coal.

Third party access could result in natural gas prices falling as increased competition leads to the removal of monopoly rent and penalises inefficiency. However, the increased risks associated with the loss of monopoly power by the natural gas companies, will lead to the gas company's requiring higher returns to cover those risks. The resulting effect on prices depends upon the relative effects of encouraging new entrants into the national markets and what impact that will have on actual levels of competition, against the risk adversity of gas companies. The effects need not be uniform across all countries.

Production process

The physical infrastructure of the gas industry consists of pipelines and of other equipment needed to regulate the passage of gas through the pipelines (notably compressors) as well as for storage and gas treatment. Investment in 1988 was ECU 4.77 billion, an increase of 6% from 1987, and involved an increase in both transmission (+9.67%) and distribution (+5.6%). From 1982 to 1988, transmission investment declined by about 22%, but investment in distribution activities has increased by 56%, resulting in an overall increase of 24%.

This pattern reflects the maturity of the transmission grid in the majority of Member States, and the continuing expansion of the distribution lines to supply new end-users.

There are plans for a sub-sea pipeline, which will link the republic of Ireland to the United Kingdom. In Portugal, which as yet has no natural gas supply, planning continues for a proposed LGN terminal to the south of Lisbon, from which it is planned to construct pipelines running north to Lisbon and other principal cities. Spain and Algeria have agreed to a new link between Algeria and Europe through Morocco, with a further extension into France currently being considered. It has been decided to upgrade the existing link between Algeria and Italy. The gas infrastructure needs of eastern Europe is expected to result in more integration with the West.

INDUSTRY STRUCTURE

Companies

The organisation and structure of the gas industry varies from country to country. In some Member States one company covers the whole gas chain, while in others there may be a number of companies involved in the production, transmission and distribution of natural gas. Additionally, some companies are owned by public authority, while in others ownership is mainly in the private sector.

The United Kingdom, France and Ireland all have a vertically integrated gas industry, a structure that Greece is also planning to develop. The French (GdF), Irish (BGÉ) and Greek (DEPA) companies are 100% owned by the State, while in the United Kingdom, British Gas was privatised in 1986.

Table 3: Transmission and distribution of natural gas
EC trade by origin

thousand TJ (GCV) (1)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Primary production	5 395.5	5 579.5	5 580.2	5 913.5	5 798.3	6 001.6	5 509.1	5 762.5	6 026.7
Intra-EC trade	1 297.4	1 306.2	1 207.0	1 297.4	1 115.7	1 123.5	964.2	1 131.0	1 199.3
Extra-EC imports	2 226.3	2 436.0	2 777.9	2 858.8	3 094.0	3 427.2	3 487.9	3 738.6	3 843.6
Norway	1 007.8	1 005.1	1 090.6	1 030.4	1 039.2	1 133.2	1 126.6	1 057.9	1 024.4
USSR	841.7	823.8	949.4	979.6	1 215.0	1 294.7	1 351.7	1 475.2	1 683.9
Algeria	333.7	530.0	684.6	797.9	797.9	961.5	970.2	1 040.5	1 077.5
Other	43.2	77.1	53.5	50.1	41.9	37.8	39.4	164.9	57.8
Extra-EC imports as a % of gross EC consumption	29.8	31.3	33.8	33.3	35.6	37.2	39.2	40.2	39.7

(1) GCV: gross calorific value; TJ = 10KJ"
Source: Eurostat

However, in the United Kingdom a process designed to change the structure of the industry is well underway. British Gas has agreed to halve its share of the industrial gas market by 1994 and by a further 10% in 1995, by making available gas to competitor companies in the retail distribution sector. At the same time, British Gas is to create a separate subsidiary to run its pipeline and storage systems, which will also serve its competitors on an equal basis.

In Belgium, Luxembourg, Denmark, Italy, the Netherlands and Spain, a two-tiered structure has developed. There is a national transmission company and local governments tend to own the companies that distribute gas. In Italy and Spain, the transmission company is state owned, with their respective transmission companies, SNAM and ENAGAS, subsidiaries of government controlled companies. Other companies, such as DISTRIGAZ of Belgium, SOTEG of Luxembourg and Gasunie of the Netherlands, are a mixture of state and private ownership, with the state holding 50% of the company.

Two companies, notably those with some public sector involvement, have exclusive national concessions for the purchase and/or transport and storage of gas. In Italy this is limited geographically, with SNAM having the exclusive rights in major parts of the country.

There are exceptions to this model within the two-tier structure, the most notable of which is in Germany, where there are six companies importing gas, 18 transmitting it over long distances, as well as over 500 regional transmission companies operating local concessions.

Overall, these various structures have differing consequences for the gas transmission market structure, with some companies having monopolist or virtual monopoly positions. In Italy, SNAM has about 98% of the domestic market, while in Germany, Ruhrgas, the largest of the transmission companies, has about 75% of the market.

REGIONAL DISTRIBUTION

In 1990, two countries accounted for 74% of the EC total natural gas production, respectively 32% for the United Kingdom and 42% for the Netherlands. Of the other EC countries, Italy, Germany, France and Denmark accounted for 23% of the total EC production in 1990. Greece, Spain and Ireland all produce natural gas, though their combined output fell 4% in 1990. Portugal and Luxembourg have no natural gas production.

ENVIRONMENT

Natural gas contains virtually no sulphur at all and by-and-large it emits less NOx per unit of energy than other fossil fuels. It can also make a contribution towards reducing the risk of adverse effects of global warming, as natural gas combustion produces less CO_2 per unit of energy burnt than for the other fossil fuels.

Growing concern about the environmental impact of energy consumption has helped to sustain interest in natural gas. In late 1988, the EC directive concerning emissions from large combustion installations was adopted, which imposes environmental abatement measures on new power plants. Increasingly stringent emission limits for SO_2 and NOx favour the use of natural gas which, in most cases, does not require the heavy investments in emission abatement equipment that are associated with use of solid fuels and "normal" (i.e. high sulphur) heavy fuel oil.

The years 1989 and 1990 were marked world-wide by increasing concerns about the environment in general, and the greenhouse effect in particular. As a consequence, several countries (i.e. the Netherlands, Denmark, Italy and Belgium) have adjusted their generation capacity plans in order to incorporate an increased share of combined-cycle, gas-fired base and mid load power.

Methane, which contributes to the greenhouse effect if it is leaked or vented, contributed around 15% to the "radiative forcing" added to the atmosphere in the 1980s, based on the estimate that one molecule of methane has about 3.7 times the global "climate forcing" effect of one molecule of CO_2. However, emissions of methane from the natural gas chain currently contribute not more than 1 to 2% of the overall effect.

REGULATIONS

With the creation of the Single Market scheduled for the end of 1992, the European Commission has turned its attention to the ways in which a single energy market can be created. There are a number of elements to the Commission's approach within the gas sector, which can be seen as an evolution towards third party access (TPA) legislation. Firstly, in some countries the electricity or gas carrier is defined by statute. The Commission took action to remove the discriminatory aspects of these statutory monopolies in 1991 under article 37 of the Treaty of Rome, which requires that state monopolies should create no commercial discrimination. Secondly, the Commission is taking further action in the form of draft directives concerning two aspects. Two directives are aimed at providing

Table 4: Transmission and distribution of natural gas
Share of natural gas in gross EC energy consumption

(%)	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC (1)	16.6	17.4	17.8	17.9	17.9	18.6	17.9	18.3	18.8
Belgique/België	16.4	17.6	17.6	16.8	14.6	16.1	15.6	17.1	17.3
Danmark	0.0	0.1	0.6	3.0	5.5	6.9	7.8	8.9	9.8
BR Deutschland	15.4	15.9	15.8	15.5	15.5	17.1	16.5	17.6	17.7
Hellas	0.0	0.4	0.5	0.4	0.6	0.6	0.7	0.6	0.7
España	3.1	3.2	3.0	3.3	3.6	3.6	4.2	5.3	6.2
France	12.0	12.7	12.6	12.5	12.3	12.5	11.8	11.7	11.9
Ireland	20.5	22.3	22.7	22.2	15.1	14.4	17.2	19.6	19.8
Italia	17.3	17.9	20.5	20.6	21.5	22.8	23.5	24.7	25.8
Luxembourg	9.2	9.1	9.2	9.7	9.8	11.4	11.3	12.0	12.1
Nederland	48.3	50.6	51.2	52.8	51.2	51.5	47.3	47.9	46.7
United Kingdom	21.0	21.9	22.6	23.1	23.2	23.3	22.1	21.6	22.4

(1) Excluding Portugal
Source: Eurostat

third party access in gas and electricity markets, which find their legal basis in Article 90 of the Treaty of Rome. Other two directives seek to create a level playing field for both the gas and electricity industries, based upon Article 100A of the Treaty of Rome.

The directives based upon Article 100A have severe ramifications for some Member States. They seek to remove the influence of national governments in setting and approving tariffs other than for certain social welfare and rural supply protection cases. The directives also seek to separate the transmission and distribution functions of utilities and require them to produce transparent accounts.

The draft proposals put forward by the Commission under Article 90 concerning TPA are broadly as follows:

- the removal of "special and exclusive" rights awarded that cover the "conversion, liquefaction or storage of natural gas". Furthermore, exclusive rights on the creation of new transmission, distribution and storage infrastructure are also to be removed. Member States, however, retain the authority to refuse to authorise pipelines should the existing transmission and distribution arrangements be deemed adequate;
- should special or exclusive rights be granted, then third party access must also be granted - thus negating the exclusivity. This access should be grounded on principles that are "public, objective and non-discriminatory". However, access to interconnected grids can be restricted by Member States to those consumers who consume in excess of 1 mcm/year of natural gas;
- provisions are made for "essential requirements" such as "reliability, security [and] technical integrity". These provisions allow the compliance of Member States to the directive to be adjusted in the light of these factors, although it is the duty of Member States to ensure that private undertakings "shall be required to comply with only the minimum formalities which are indispensable in order to ensure that the essential requirements are met";
- Member States are obliged to ensure that conditions of licensing and the definition of "minimum formalities" are carried out by a body that is independent of the bodies administering the grids and of the bodies competing in either the gas or electricity markets;
- Commission approval is required for a member state to grant aid to participants in these markets;
- Member States are empowered to take action when there is a serious threat to their energy supply although they must first inform the Commission.

Eurogas, the European Union of the Natural Gas Industry, does not endorse the analysis of consequences of TPA. In short, it is the view of Eurogas that TPA is likely to create significant potential disadvantages for the Community in terms

Table 5: Transmission and distribution of natural gas
Trends in natural gas consumption by country

thousand TJ (GCV) (1)	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC (2)	8 152.6	7 792.0	8 217.0	8 592.1	8 689.3	9 211.4	8 956.6	9 371.2	9 672.1
Belgique/België, Luxembourg	328.3	343.3	354.8	355.0	317.7	356.1	352.1	391.8	399.9
Danmark	0.0	0.6	4.6	26.3	47.8	60.8	64.8	69.3	75.0
BR Deutschland	1 781.8	1 843.0	1 896.1	1 918.2	1 908.5	2 115.7	2 069.6	2 175.6	2 219.8
Hellas	3.5	3.2	3.5	3.3	4.5	5.2	6.2	6.3	6.5
España	97.3	99.5	94.8	109.4	118.8	121.9	155.7	206.5	243.9
France	981.8	1 042.6	1 090.2	1 129.1	1 131.8	1 168.3	1 104.5	1 137.6	1 172.5
Ireland	771.2	82.6	87.8	90.5	63.2	62.8	75.7	87.0	87.8
Italia	1 022.8	1 048.6	1 234.0	1 265.2	1 343.3	1 491.5	1 561.5	1 716.6	1 820.0
Nederland	1 274.2	1 356.7	1 433.7	1 503.7	1 512.9	1 563.6	1 416.7	1 451.9	1 436.4
United Kingdom	1 891.7	1 971.9	2 017.5	2 191.4	2 240.8	2 265.5	2 149.8	2 128.6	2 210.4

(1) GCV: gross calorific value
(2) Excluding Portugal
Source: Eurostat

of reduced supply security, potentially increased cost of supply and conflicting economic signals.

OUTLOOK

The share of natural gas in Western Europe's energy mix is expected to increase steadily throughout the next two decades. Natural gas for industrial and residential use will make significant inroads in some as yet undeveloped markets such as Portugal, Spain, Greece and Ireland. The principal area of demand growth is expected to be in power generation.

There are various other factors which are anticipated to continue to influence the use of natural gas, including: environmental concerns and their consequences for the pattern of fossil fuel use; security of supply; developments in other fuel markets, notably the trends in oil availability and prices, as well as the role of nuclear electricity generation within the EC; the exploitation of new sources (e.g. Nigeria, Northern Norway, etc.); the competitive position of natural gas in the different end-markets; the impact on the gas sector of the Commission's moves towards an integrated energy market; the long-term effects on the supply and demand patterns of natural gas, given the anticipated growth in European demand underpinned by the need for cleaner forms of energy.

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Renewable energy

In 1991, renewable energy contributed around 4% to gross inland energy consumption in the EC. Of this percentage, the majority of the share comes from large scale hydro-electricity production (31%) and from the combustion of biomass in one form or another (60%). Of the remaining 9% are a variety of renewable technologies in varying stages of development, bordering on commercial viability. Through national and EC funded R,D&D programmes, this share is expected to increase to 23% of total primary renewable energy production by the year 2005.

Funding for renewable energy, though low compared to other energy research programmes, has increased substantially in past years. All the signs suggest that this trend will accelerate, driven predominantly by environmental considerations. At EC level, of the major programmes, the Joule programme has finished but its work is being continued as part of the Non-Nuclear Energies programme; funding will continue through the Thermie and Valoren programmes, and begin through the Altener programme as part of the policy to stabilise carbon dioxide emissions by the year 2000.

INDUSTRY PROFILE

Description of the sector

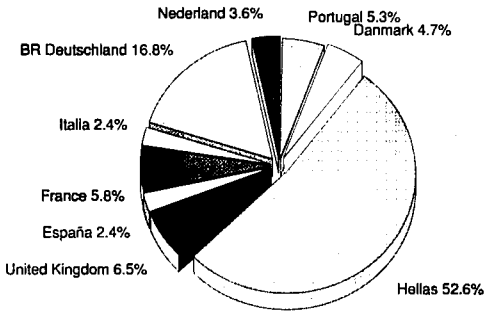
The main renewable energy technologies are the following:

- Geothermal energy, which is used in two ways, either for electricity generation or direct use of heat. The temperature of the extracted fluids, rising from the earth, determines the use to which it is put;
- Tidal power, which extracts energy from the tides using the same principles as hydropower facilities but capturing the tidal ebbs and flows rather than the flow of a river to generate electricity;
- Small hydro-electricity generation, which is basically the same as conventional hydro electricity, though at a smaller scale;
- Biomass, i.e. all the matter that can be derived directly or indirectly from plant photosynthesis. "Indirectly" refers to the products available via animal husbandry and the food industry. Feedstocks for the technologies include wood resources, agricultural wastes, residues and surpluses and energy crops.
- Wind power generation, which uses wind turbines;
- Active solar generation, usually consisting of one or more collectors, an energy transport system to move the heat to the point of use, an electronic control system, and an energy storage system;
- Photovoltaic systems, which convert solar radiation into DC (direct current) electricity without moving parts or thermal energy sources.

MARKET FORCES

The situation in 1989, by Member State, for each of the renewable energy technologies is shown in Table 1. Before discussing each technology, the following salient points can be noted. Greece has the largest installed capacity of solar collectors. In France, Spain and Portugal, where the climate is particularly favourable, active solar technology also makes a contribution. The Danish have by far the largest amount of wind power installed. Italy, France and Spain generate the majority of small hydro generated electricity in the EC. Italy has the largest geothermal energy industry, a large proportion

Figure 1: Renewable energy
Active solar collectors' market in the EC, 1990



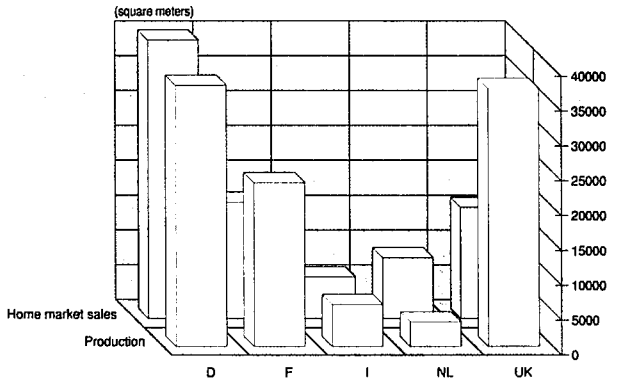
Source: Eurostat

of which (520 MW) used for electricity generation. Portugal and France have a significantly high biomass consumption due to much direct combustion of wood. Denmark, however, uses a high proportion of agricultural waste, mainly crop residues like straw.

Geothermal energy

From a world perspective, the production of electricity from geothermal sources has seen a increase in the rate of growth over the past decade. Between 1980 and 1990 the production increased by 50% from 3 900 MWh (megawatt/hour) to 5 850 MWh. In the EC by far the greatest amount of electricity was generated in Italy (545 MW in 1991) where over 50 geothermal units are in operation. Other countries include France (4.2 MW in Guadeloupe), Portugal (3 MW in the Azores), Greece (2 MW on Milos). Germany has a 10 MW plant at Neubrandenburg. The capacity of this plant is to be doubled in the near future and a second 50 MW plant is being considered at Schwerin. Further developments are centred in Italy where a 60 MW plant opened at the end of last year in Tuscany making it the largest in the world. Plans for three more plants of this size are being considered in line with governments policy to increase the share of geothermal derived electricity to 3% of total national energy production.

Figure 2: Renewable energy
Active solar production and sales in selected EC countries, 1990



Source: Eurostat

Table 1: Renewable energy
Primary energy production in 1989

(ktoe)	Active solar	Wind	Heat pumps	Hydroplants <5MW	Hydroplants >5MW	Biogas	Biomass	Geo-thermal energy	Total	Renewables contribution in total (%) Primary energy production	Renewables contribution in total (%) Gross inland consumption
EC	168.2	47.0	156.8	603.4	10 646.5	231.5	21 871.1	2 195.5	35 920.0	6.0	3.2
Belgique/België	1.0	0.6	3.1	2.2	24.0	6.4	334.7	1.0	373.0	3.1	0.8
Danmark	1.9	36.9	11.8	(1)	2.3	26.4	770.8	1.1	951.2	10.7	5.4
BR Deutschland	N/A	2.2	N/A	(1)	1 421.0	N/A	3 450.0	0.0	4 873.2	3.8	1.8
Hellas	67.1	0.1	N/A	0.8	163.0	20.0	564.0	1.6	816.6	9.6	3.8
España	21.1	1.2	N/A	102.5	1 650.0	(2)	2153.2	2.4	3930.4	12.0	4.6
France	20.0	N/A	N/A	252.0	3 729.0	N/A	9 666.0	122.0	13 789.0	13.1	6.3
Ireland	0.0	0.0	3.0	0.3	59.0	2.2	82.7	0.0	147.2	4.3	1.5
Italia (3)	7.2	0.2	13.0	244.0	2 688.0	52.7	2 919.0	2 067.0	7 991.1	30.2	5.2
Luxembourg	0.0	0.0	0.1	0.6	6.4	0.3	15.0	0.0	22.4	100.0	0.7
Nederland	1.6	3.2	25.8	(1)	3.2	60.1	376.6	0.0	470.5	0.8	0.7
Portugal	39.8	0.0	0.0	0.0	500.0	2.0	1 138.6	0.0	1 680.4	96.2	10.7
United Kingdom	8.5	2.5	N/A	1.0	400.6	61.4	400.5	0.4	874.9	0.4	0.4

(1) Included in large hydroplants production
(2) Included in biomass production
(3) Limits for hydro in Italy are 3 MW
Source: Eurostat

In addition to geothermal energy for electricity production, hot water from deep in the ground may be used for space heating on a smaller scale. World-wide, the consumption of geothermal energy for heating was around 2 million toe (tonnes of oil equivalent), predominantly in Japan, China, Iceland and Hungary. In the EC it is estimated that in terms of primary energy, it represented 370 000 toe in 1990. The regional distribution is the same as that for geothermal electricity production, yet it differs in that it is used extensively in urban areas. In 1990 the equivalent energy saving by using this source of energy, was 170 000 toe in France and 200 000 toe in Italy. Other countries with geothermal potential for heating include Spain, Portugal, Greece and Germany. In former East Germany much use was made of geothermal energy for district heating and in the west, a new geothermal project in Bavaria hopes to save around 2.5 million litres of heating oil a year.

Tidal power

The largest tidal power station in the world is at La Rance, in France. Conceived as a prototype for other, possibly larger, tidal plants along the Brittany coast, it has been operating since 1968, with an installed capacity of 240 MW_e (megawatt of electricity).Predominantly due to concern over the environmental impact of tidal barrages, no further sites have been developed despite their considerable potential. The best sites are to be found along the west coast of Portugal, France, Ireland and the United Kingdom. In the United Kingdom, where the tidal potential is approximately 54 TWh/year (terawatt/hours per year), the government has been heavily investing on tidal energy research and feasibility studies since 1979. Two studies are well established: the largest, a barrage across the Severn Estuary could generate around 17 TWh_e (terawatt/hours of electricity), equivalent to about 2.5 large (1 000 MW) power stations, while the other project proposed is across the Mersey which could generate 0.5 TWh_e. The environmental impact of all these projects is the major factor preventing their implementation.

Small hydro-electricity generation

In the EC the total installed hydroelectric capacity is about 80 GW (gigawatt). Small hydroelectric plants (less than 10 MW) contributed 5 GW to this or just over 6%. However, there is a marked trend towards small scale applications of hydropower which have a far smaller impact on the environment than their larger counterparts. The reason for this shift is mainly due to the limited availability of new large scale sites. It is estimated that the percentage of sites economically exploitable already used is 95% for large hydro but only 20% for small hydro-electricity. France, Italy and Spain have by far the largest small hydro potential. It has been estimated by other sources that the total EC exploitable potential for small hydro-electricity is around 4-5 GW.

Biomass

The theoretical potential for biomass in the EC is very large at around 100-120 million toe. Within the EC, wood, straw and municipal solid waste are the most commonly used biomass fuels. The primary energy derived from these sources amounted to almost 22 million toe in 1989.

The great proportion of this total is given by wood. The EC currently consumes around 20 million toe of wood energy. France is by far the largest consumer of wood taking 45% of the EC total due to the large proportion of wood burning stoves used in rural areas.

The biggest consumer of straw for energy is Denmark. Here there are over 12 000 straw-burning stoves on farms and over 30 district heating schemes using straw. Its importance is shown when one considers that it provides 1.5% of Denmark's primary energy needs. Biomass globally provides 5.8% of Denmark's primary energy requirements and the government intends to increase this to 9% by the year 2000.

The most widely used method of recovering energy from municipal solid waste (MSW) is by incineration; the other major source is landfill gas which is expanding fast. In the EC around 550 schemes were operating in 1988, 174 with heat recovery of which more than 80% are in France, Germany and Denmark. Disposal of MSW to landfill is widely practised in many Member States. The United Kingdom is notable in that 90% of MSW is disposed of to landfill. Typical schemes generate between 1 to 5 MW and may be used to generate electricity or used directly as fuel in industry.

Table 2: Renewable energy
Required energy for heating water

(mtoe)

EC	63.03
Belgique/België	1.98
Danmark	1.04
BR Deutschland	15.54
Hellas	1.43
España	6.68
France	9.57
Ireland	0.72
Italia	9.77
Luxembourg	0.08
Nederland	2.98
Portugal	1.78
United Kingdom	11.46

Source: ""Solar thermal equipment in Europe"", TECSOL "

Table 3: Renewable energy
Exploitable small hydro potential

(GWH/year)

Belgique/België	N/A
Danmark	N/A
BR Deutschland	2 000
Hellas	2 000
España	66 000
France	75 000
Ireland	190
Italia	65 000
Luxembourg	5
Nederland	130
Portugal	6 500
United Kingdom	400

Source: Water power and dam construction (May 1991)

Biogas is a gas, mostly methane, produced from the anaerobic digestion of organic residues. Agricultural waste, sewage and a variety of liquid industrial effluents can be treated anaerobically. The technology is widespread at sewage works and it is expected to be used increasingly in treating food industry waste and slurry from intensive livestock farming. Member States currently using biogas to any extent are Italy and the United Kingdom and also Denmark and the Netherlands, due to their livestock farming industry. The world's first biogas plant was finished in July 1991 in Denmark and is planned to generate 3 million m3 of methane.

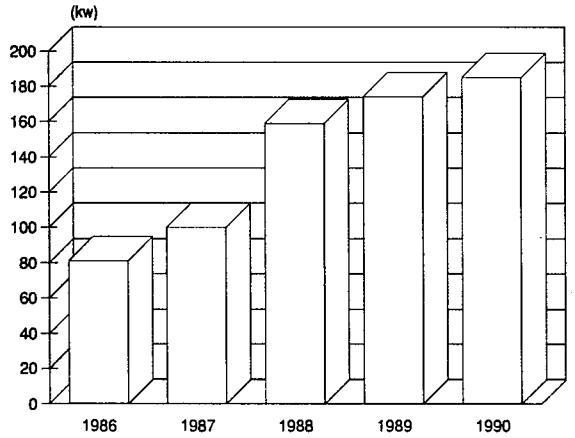
Other than wood, energy crops do not contribute significantly to energy produced from biomass. The development of energy crops is closely tied up with the Common Agricultural Policy (CAP) and it is not clear what the result will be. Wood could be sustainably harvested or copiced (i.e. outer branches of a tree are stripped away without causing it any terminal damage) on land set aside for non food production. If 15 million hectares of farmland is in surplus by the end of the century, and if it was all turned over to fuel wood crops then it is estimated that 120-150 million tonnes of wood with an energy content of 55 to 65 million toe might be produced.

Biofuels may also be produced from energy crops by the processes described. The Netherlands are investigating using feedstocks such as elephant grass, poplar wood or straw for gasification for use in electricity generation plants. In Denmark, Copenhagen's bus company is planning to run 5 buses on diesel from rapeseed oil. The Italian chemical manufacturer Novamont is starting work on a refinery to produce biodiesel from feedstocks of rapeseed and soya. It will have a capacity of 60 000 tonnes/year and a second such plant is planned for 1993.

Wind power

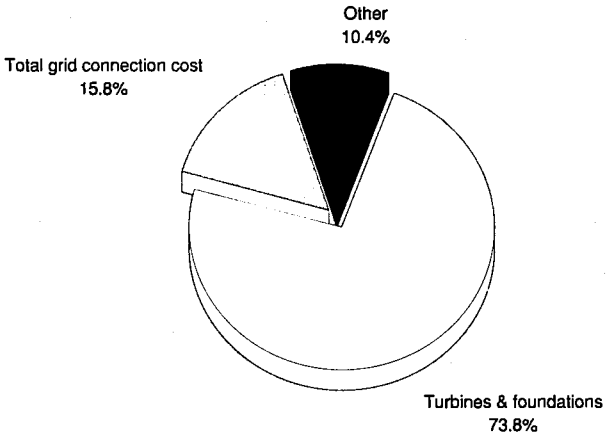
Denmark is the largest generator of electricity from wind energy in the EC. The industry has expanded considerably so that in 1991, the total installed capacity in the EC was 509 MW of which Denmark accounted for 70%, the Netherlands and Germany both for 11%. By way of comparison, it is estimated that the installed capacity in the USA is 1 500 MW consisting of around 15 000 turbines. The important point to note is that Denmark has one of the smallest wind power capacities, and yet has by far the largest installed capacity. This is mainly due to subsidies given by the Danish government during the late 1970s and early 1980s and the opportunity of a large export market in California. The recent government ban in Denmark on turbines at single sites should not significantly harm the Danish wind industry as the market is largely for exports. The United Kingdom on the other hand has the largest potential but relatively few turbines installed.

Figure 3: Renewable energy
Average wind turbine size



Source: E. W. E. A.

Figure 4: Renewable energy
Installation costs for wind farms



Source: E. W. E. A.

Table 4: Renewable energy
Wood contribution in biomass

(ktoe)	Primary energy production wood	biomass	Contribution of wood in biomass (%)
Belgique/België	92	335	27
Danmark	258	771	33.
BR Deutschland	3 010	3 450	87
Hellas	472	564	84
España	N/A	2 153	N/A
France	9 000	9 666	93
Ireland	82	83	99
Italia	2 800	2 919	96
Luxembourg	N/A	15	N/A
Nederland	1	377	0
Portugal	1 002	1 139	88
United Kingdom	163	401	41

Source: Eurostat

Recent developments have been the starting of work on a 10 MW wind farm in the Canaries Islands, designed to provide for 10% of the islands' electricity needs; it consists of 45 turbines and will be used to run a water desalination plant. In Spain, a 10 MW plant is also planned by Endesa, the state electricity company, and Ecotecnica, a Spanish turbine manufacturer. In Greece, a series of wind projects have been approved for use on the Aegean islands.

Technical difficulties have meant that off shore farms are less commercially developed. In Denmark, however, the electric utility Elkraft brought on-line the world's first off-shore wind farm consisting of eleven 450 kW (kilowatt) turbines. A second 5 MW farm is planned by the other electric utility, Elsam consisting of ten 500 kW turbines.

Active solar collectors

By far the largest user of active solar collectors is Greece. In 1989, the total installed solar collector surface area was around 1 300 thousand m2. It is estimated that this contributes around 67 thousands toe to primary energy production. In Greece, hot water from active solar collectors contributes 4.5% to the total hot water needs. In the other Member States, this fraction is considerably less due to less favourable climatic conditions and a smaller area of collectors installed.

Today, solar collector sales in Greece represent over half the total sales in the EC. Solar collector production in Greece, however is solely for the home market, which is very large. At EC level, imports from outside Europe are decreasing: they amount to about 2 500 solar water heaters and about 1 000 additional collectors each year.

Photovoltaic systems

The decrease in cost accompanied by the increase in efficiency of photovoltaic (PV) cells has enabled a rapid growth in the world photovoltaic market. Since 1978, when a mere 1 MW was installed, it has increased to reach around 56 MW in 1991. This growth has been primarily for isolated sites. However, it is now becoming feasible to use PV for power generation in a centralised manner. In April 1992, in Switzerland, Europe's largest and most modern PV power station came on line with a capacity of 500 kW. In Spain, Germany's RWE and Union Electric Fenosa are to build a PV power station of twice this capacity (1 MW) near Toledo, to be completed in 1993. Currently the demand in Europe exceeds the production capacity.

Production process

Geothermal energy

Electricity generation is the most attractive use due to the low distribution costs. At temperatures below 150° C the most common application is for direct heat. This has advantages in terms of its simplicity, efficiency, adaptability and is relatively cheap. The hot water cannot economically be transported a distance greater than about 1 km so the site location is limited by the end use location. Other methods such as magma, geopressured and hot dry rock technologies have been investigated though none are near to commercial viability.

Tidal power

The simplest systems generate power by capturing water at high tide and running the head of water through turbines. More complicated systems impede the flow of water in both directions. The turbine best suited for the low head characteristics is the bulb-type turbine and units are manufactured with runner diameters of 7.5 metres and capacities of 60 MWe.

Small hydro-electricity generation

Countries and institutions define what is small differently. An upper limit for small hydro is 10 MW, while they may have capacities as low as a few hundred kW. The technology differs in that turbines are specifically designed for low head conditions and the control equipment differs in its complexity.

Biomass

The resource base is huge and is said to be in the order of 100-120 million toe. On a global scale, the majority of the population relies on biomass as its primary source of fuel. In the industrialised world, where energy production is more centralised, biomass energy conversion is perhaps the most technically, economically and socially complex renewable energy option. Old, well developed technologies co-exist with completely new, advanced techniques for converting biomass to useful energy. The end uses to which biomass energy source can contribute are liquid fuels, heating and electricity generation.

Liquid fuels may be produced by various methods, three are mentioned here. First, "bio-diesel" consisting of complex natural esters from the esterification of oils extracted from plants such as rapeseed, linseed and the sunflower. Second, the hydrolysis and subsequent fermentation of plants with a high energy value can produce methanol or ethanol which can be used as fuels in vehicles with engine modifications. Lastly,

Table 5: Renewable energy
Specific characteristics, 1989

	Solar collectors surface (1000 m2)	Photovoltaics kWp	Installed capacity Wind turbines MW
Belgique/België	34	74	5
Danmark	51	N/S	263
BR Deutschland	N/A	821	20
Hellas	1 300	254	1
España	273	3 000	6
France	370	N/A	1
Ireland	1	55	N/A
Italia	290	2 400	3
Luxembourg	N/S	N/S	N/S
Nederland	80	329	39
Portugal	265	N/S	0
United Kingdom	276	150	9

N/S: not significant
Source: Eurostat

liquefaction is a variant of the pyrolysis technique where a diesel or gasoline fuel may be produced by one of two methods. An indirect method gasifies the biomass and is followed by the catalytic conversion of the product to a liquid fuel. Direct liquefaction misses out the gasification step using lower temperatures to produce partially deoxygenated, complex oils which are then upgraded.

Electricity generation and heating requirements can be met by direct combustion or gasification of wood, straw or other dry biomass. Household waste may be incinerated or the landfill gas used to provide heat. Agricultural waste such as slurry from animal husbandry may be used in the anaerobic digestion process to produce biogas, a high grade gas consisting mostly of methane. In addition, any organic material may be gasified (or liquefied) by its thermal decomposition in the absence of oxygen by pyrolysis.

Wind power

Wind power in Europe in its present form can be said to have begun in the mid 1970s in the wake of the oil crisis. Over this time there has been considerable improvement in the design of turbines so that the efficiency, measured in energy in kWh per swept area per year, doubled between the beginning and the end of the 1980s. Modern wind turbines can be of two configurations: a horizontal or vertical axis. The horizontal axis machines, however are the most common units manufactured. The average size of wind turbines installed in the EC has increased steadily and the trend is still continuing as can be seen in Figure 3. There is no consensus as to the optimum size for machines, though R,D&D work is currently centring on 300 kW machines with rotor diameters of 25 metres. Along with improved technology comes increased reliability. A study of the top performing wind farms in California showed an increase in the availability electricity generated from 60% to around 95% over the 1980's. As for the plant cost for a wind farm, based on Danish experience, for turbines in the range 100-300 kW the average cost per swept area is 280 ECU/m2. The costs vary from country to country and from site to site: depending on the terrain and other factors the total costs per swept area may vary between 400 and 600 ECU/m2.

In addition to onshore wind sites, a very great potential exists for turbines sited off-shore. There are particular problems associated with this, however, such as difficulties of operation in a saline environment, achieving designs rigorous enough to stand up to storms, and the difficulties of access for maintenance. Off-shore sited turbines tend to be larger than their land based counterparts and environmental constraints hindering turbines on land are more relaxed for off-shore sites.

Active solar collectors

Beside operating in temperature ranges that satisfy building energy needs, active solar technology can supply heat for industrial processes at moderate temperatures. The essential component in system is the collector and several designs are available: flat plate collectors (glazed or unglazed), evacuated tube collectors and air collectors.

Unglazed solar water heaters are used in outdoor applications, predominantly for heating swimming pools. Glazed solar water heaters form the bulk of the market, representing approximately 90% of total installed collector surface area. Evacuated tube collectors form a small but growing part of the market, particularly in northern Europe. In value terms they account approximately for 10% of total EC sales. Air collectors are generally built into the building structure to produce warm air directly or in connection with a heat pump for space heating. The most important and widely used application is for drying hay, particularly used in Sweden where an estimated 200 thousand m2 have been installed.

Photovoltaic systems

The basic element is the photovoltaic (PV) or solar cell. This comprises of semiconductor materials which have both negative and positive charge carriers. When photons from ultraviolet, visible and near infra-red light are incident on the cell, electrons in the semiconductor are freed, and an electric current is generated. Cells are built into modules of size of around 1 m2 and may generate in the region of 100 W_p (peak watts). Efficiency has been increased by around 50% over the past decade The different technologies used are the following:

First, single crystal silicon is a well established technology, with cells that tend to be stable and relatively efficient. The cost of manufacturing, though decreasing, is relatively high. Second, polycrystalline silicon ingots with grain sizes of several millimetres can be produced by a casting process less expensive than single crystalline process. Larger areas are needed for the same power, and module efficiency is slightly lower. Polycrystalline silicon ribbons may be manufactured using edge defined film fed growth and dendritic web processes. The manufacturing process is complex though it has high potential for high speed production. Third, thin film technology is an area of intense research effort. Films are deposited directly onto substrates by technologies such as glow dis-

charge, chemical vapour and electro-chemical deposition. Semiconductor materials being investigated include amorphous silicon, copper indium diselenide, gallium arsenide, and cadmium telluride.

ENVIRONMENT

In the mid 1970s, interest in renewable energy was born as a result of high crude oil prices after the first oil crisis. Nowadays the interest is inspired more on the environmental benefits that renewables offer, particularly with respect to their use in reducing carbon dioxide emissions.

With the exception of biomass, renewable energies are almost free of pollution. This stands them out very clearly from conventional methods of energy production where increasing concerns over pollution from the energy sector is forcing very large investments in emission control equipment. This is not to say that renewable energy has a negligible environmental impact. Ironically the growth of the renewable energy industry is driven on the one hand by world scale environmental factors such as the threat of global warming, while being constrained by environmental factors on a local or regional level, such as the visual impact of wind turbines and the environmental impacts of hydro schemes.

The main environmental factors promoting the industry are the following:

- Biomass releases carbon dioxide when burnt to produce energy. However, during its growth, carbon dioxide is sequestered from the atmosphere. If the biomass use is accompanied by afforestation then the net carbon dioxide emissions may be zero or even negative.
- With the exception of biomass, energy produced from renewable sources does not produce sulphur dioxide, sulphur trioxide or nitrous oxide, the principal components of acid rain.

The environmental impacts of renewable energy technologies, though less than that of conventional energy sources, are significant as they affect implementation:

- Tidal power has an enormous impact on the environment. This is the single major factor constraining its development. Most of the potential impacts arise from three main causes: changes in water levels, flow patterns and velocities; sediment movement and the physical presence of the barrage. The most serious effects are felt in navigation and for port facilities, water quality will be affected and the impact on wildlife, particularly birds and fish, is particularly acute.
- The environmental impact of wind power is essentially on the human rather than the natural environment. Visual impact is the key factor, especially since the best sites are often the most beautiful with the least signs of human interference. Noise levels are another factor. Telecommunications may be affected though this is a localised problem. The impact of large scale implementation of wind turbines on birdlife and bird migration is relatively unresearched.
- Active solar collectors and photovoltaics have a visual impact since their use is predominantly in a widely dispersed fashion and because they must, for maximum efficiency, be placed in prominent positions.

EC AND MEMBER STATE SUPPORT

Over the last decade several countries have successfully encouraged the development of domestic renewable energy industries. At EC level, several initiatives are underway. The more interesting policies in Member States are:

In Denmark, subsidies for installing wind turbines were phased out in 1989 and replaced by tax credits. Shareholders obtain income from the electricity sold tax-free below a set limit. State aid also encourages the use of straw as fuel, biogas plant and certain solar projects.

In France special grants have been used to cover the exploration risks of geothermal development. In the area of biofuels the French government also gives grants derived from the tax on petroleum products.

In Germany a new law (Einspeiseverguetungsgesetz, 1991) has helped wind and photovoltaic energy by forcing the electricity utilities to pay for electricity generated by these methods at a premium rate of 90% of the price paid by end consumers. Subsidies encouraging the installation of wind power are also available. For electricity produced by small hydro-electric generation, biogas and agricultural and forest waste the rate they are paid is fixed between 65-75% of the electricity sale price.

In Greece, the government has made particular commitments to the promotion of wind and geothermal installations. Financial incentives take the form of subsidies in the region of 40-55% of the total investment.

In Portugal, the EC Valoren project and a national programme to promote renewable energy (SIURE) have benefited around 100 projects such as small hydro-electric generation, active solar collectors, photovoltaics, geothermal energy, wind power, the use of wood residues and the production of biogas. The relaxation of the authorisation procedure for the production of electricity from small installations has particularly benefited small hydro, biomass and biogas. In addition to EC funding, 10 million ECU have been invested in projects in the areas of active solar collectors, photovoltaics, biomass and biogas

In Italy, funding is available covering 30% of the capital costs for renewable energy projects. For demonstration projects 50% funding is available and for the installation of photovoltaic equipment in buildings, 80% subsidies are available. Efforts to remove barriers to the incorporation of electricity from small generators has resulted in very favourable tariffs for wind, photovoltaics and geothermal energy in particular.

In the Netherlands, wind power installation is subsidised on the basis of the swept area and in the area of R,D&D, funding for 50% of the costs are made available. General subsidies go to solar, biomass and geothermal projects of up to 40% of costs.

In the United Kingdom's privatised electricity sector, regional electricity companies (REC's) are obliged to purchase a portion of their electricity from non-fossil sources under the Non-fossil Fuel Obligation (NFFO). This obligation also forces the REC's to purchase the electricity at premium prices organised in bands. Different renewable technologies are associated to different price bands according to their commercial status. Other than energy from waste, wind and small hydro-electric generation projects are currently being supported under the scheme.

The European Commission has several programmes running which support renewable energy. The major ones are:

The Altener programme has been deigned by DG XVII (Energy) to promote greater penetration of renewable energy. It is destined to run to 1993 currently with commitments of 1.2 million ECU. It may continue through to 1997 with additional funds.

A non-nuclear energies programme has taken over from the Joule programme which had run from 1989 under the Community's Framework Programme on research and technological development. The renewable energy systems covered are: wind energy, photovoltaics, biomass and geothermal energy.

Thermie is the DG XVII R,D&D programme designed to promote, among other objectives, the greater use of new and renewable energy sources. Renewable energy takes its share

Table 6: Renewable energy
Primary energy production in the EC, 1991-2005

(ktoe)	Photo-voltaics	Active solar	Wind	Hydroplants <10MW	Hydroplants >10MW	Biomass (total)	Geo-thermal	Total	Contribution to gross inland consumption (%)
1991	N/S	200	100	1 300	13 300	25 400	2 300	42 600	3.7
2005	100	1 200	1 700	2 600	17 100	66 600	3 000	108 700	7.8

Source: Altener report, DG XVII, 1992

of the funds along with R,D&D into the rational use of energy, hydrocarbons and solid fuels. The programme is designed to run from 1990-1994 with an estimated 700 million ECU of funds.

Valoren is a Community programme relating to the development of certain less favoured regions of the Community by the encouragement of their indigenous energy potential. DG VIII (Development) offers 50% subsidies for wind farms in selected countries, such as Ireland.

The Reward programme of DG XII (Science and Technology) is a two year programme, due to end in 1992, for research and development into the recycling of waste and is a continuation of a programme started in 1986.

OUTLOOK

Strong growth in the renewable energy industry is predicted into the next century. Some technologies will see faster growth than others and this will depend on the type and effectiveness of policies easing their market penetration rather than any technological development, though this will take place. Photovoltaics, however, are less commercially viable than the other renewable energies discussed. A decrease in the module cost per kW is a prerequisite before photovoltaic technology can compete seriously in the electricity generation industry.

The shares of each renewable energy technology in 1991 and 2005, according to the objectives of the Altener programme, are given in Table 6. Biomass is the area where strongest growth could occur; other renewable energy technologies, notably wind and geothermal energy, will also grow considerably. The share of large hydro-electric generation, though remaining large, will see relatively slow growth due to the lack of suitable sites remaining.

For electricity generation, biomass, predominantly wood, agricultural residues like straw, and waste will be increasingly used. Direct combustion will be the main method though gasification will see the largest growth. Wind energy will see strong growth though it is dependent on political factors to enable its widespread development. The introduction of the single energy market will greatly benefit wind power in the long term through trade. In the generation of electricity from geothermal sources, only Italy and Greece have high temperature geothermal resources. Italy is likely to see the largest growth in this area in the short term. Small hydro-electricity generation will experience higher growth than its larger counterpart. Photovoltaics, though a small component, will see growth in applications for remote locations. In the long term PV will see higher growth through grid connection, from either centralised or decentralised generation sites.

For heating applications, biomass will again play the major part, gasification technology showing the largest growth. Geothermal energy for heating will experience growth in all Member States where resources are available. The future prospects for the active solar collectors market depends to a large extent on the effectiveness of national and EC energy plans. Denmark and the Netherlands will see large growth due to government commitments to reducing carbon dioxide emissions; similar conditions should favour the industry in Germany. Italy has recently included the development of active solar energy into its national energy plan, ambitious targets have been made and these should promote strong growth. Spain has considerable potential, a government commitment combined with public education campaigns could result in active solar being widely implemented. In Greece, the market, though large, is not near to saturation and is likely to continue increasing steadily.

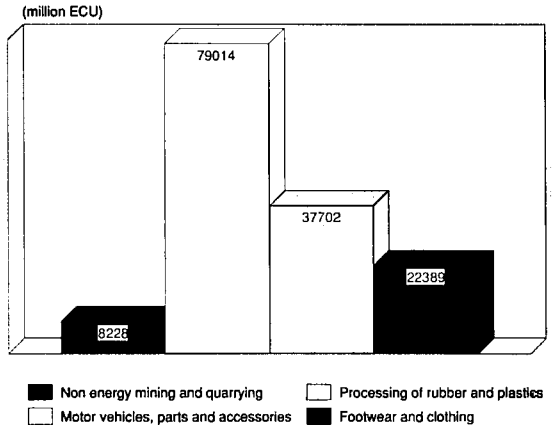
The future for biofuels, formed from energy crops such as rapeseed or sunflowers, depends very much on future agricultural policy in the EC. Economic factors are extremely complicated making predictions difficult. Given the very large potential, the relatively high value of liquid fuels and the environmental benefits (weighed against the costs) of using biofuels, the use of biofuels is likely to increase.

Written by: DRI Europe

Non energy mining and quarrying
NACE 21, 23

The non energy mining and quarrying industry is a mature and relatively stable industry of minor significance in the production of metallic ores, but of world status in industrial minerals, in particular construction raw materials. The limited resources of high grade and tonnage non-ferrous ores make this sector dependent upon imports to satisfy metal industry demand. The industrial minerals sector is capable of meeting net demand.
The non-ferrous metals mining sector is dependent upon international supply conditions, which largely determine prices, as well as certain industry activity levels which establish demand. The industrial minerals sector is affected by international competition to a lesser extent, but its profitability is directly related to industrial activity, in particular in the construction industry.
EC consumption of mined products is slightly higher than that of the USA, although production is lower. EC companies are major participants in mining activities overseas.

Figure 1: Non energy mining and quarrying Value added in comparison with other industrial sectors, 1990



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The non energy mining and quarrying sector can be divided into two main categories: the extraction and preparation of iron ore and non-ferrous metal ores (NACE 21); and the extraction of minerals other than metal ores, such as construction raw materials, sands and clays, salt, stone, potash and phosphate, other industrial minerals and peat (NACE 23).

Main indicators

Approximately three thousand mines and quarries of various sizes are operated within the EC, producing mined products of about thirty commodities. Industrial minerals account for 90% of production in terms of both value and volume.

The EC is a major world producer of building materials, sands and clays which alone account for 75% of total mine production. More than 10% of world production of ten other minerals is also achieved. The EC is also a minor producer of non-ferrous metal ores and concentrates and has a small output of iron ore. In total the EC produces between 10 and 20% of its raw material needs in the metallic and industrial minerals sectors, and almost 100% in the construction materials sector.

Production figures in current terms reflect the improved economic trading conditions enjoyed in the early/middle and at the end of the decade. A downward trend in the numbers of people employed in the industry is also noticeable as a result of improvements in mechanisation.

Germany is the most significant producer in the EC in terms of both volume and value, and this position will strengthen as production figures from the former Eastern Germany are added in the future. Five countries, Germany, France, the United Kingdom, Italy and Spain together account for 83% of EC mine production by value.

Recent trends

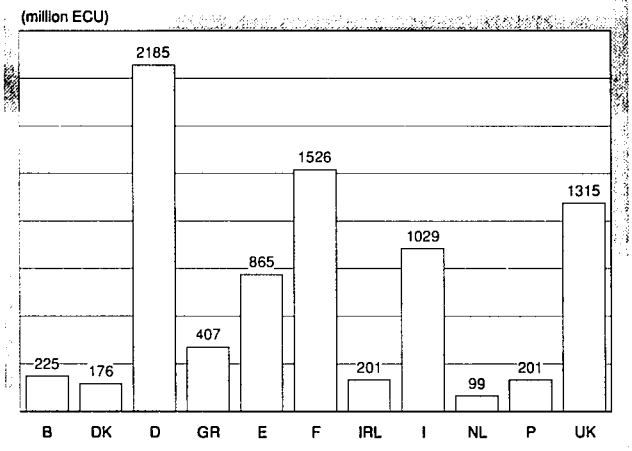
Although each of the commodities mined in the EC has unique aspects which affect its price and demand, the overall figures are heavily influenced by the industrial minerals and in particularly by the bulk construction raw materials whose prices are relatively constant in real terms. Thus changes in output and consumption mirror industrial activity, especially in the construction sector.

A small decline in overall production occurred during the 1980s. Modest increases for most commodities are forecast from 1993.

International comparison

EC consumption remains ahead of US consumption, but higher US production, particularly of non-ferrous metals, continues to allow the USA to enjoy a net neutral trade balance for all mined products. The EC is a significantly larger producer of construction raw materials. The increases in production in the USA arise from significant increases in the non-ferrous metals and construction raw materials sectors. The Japanese non energy mining and quarrying sector is not very significant: In 1990, Japanese production was about one quarter of that of the EC, and overall consumption approximately half.

Figure 2: Non energy mining and quarrying Value added by Member State, 1990



Source: Eurostat

Table 1: Non energy mining and quarrying
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	20 889	21 606	24 108	25 335	22 480	21 954	24 452	27 193	24 217	22 948	22 748
Production	14 573	14 854	16 079	17 118	15 928	16 199	17 673	19 283	17 322	16 236	16 116
Extra-EC exports	1 226	1 189	1 476	1 395	1 091	1 096	1 200	1 570	1 437	1 404	1 383
Trade balance	-6 316	-6 752	-8 029	-8 217	-6 602	-5 755	-6 779	-7 910	-6 895	-6 712	-6 632
Employment (thousands)	206.4	190.9	205.0	206.4	199.4	194.6	193.2	194.0	191.7	188.2	186.6

(1) B.M.Coope & Partners estimates
Source: Eurostat, B.M.Coope & Partners

Foreign trade

EFTA countries continue to be the main destination for exports, with the balance being fairly evenly distributed between the industrialised and third world countries. The major contributors to exports are construction raw materials (40%), non-ferrous metals (25%), other industrial minerals (20%) and potash (15%). Exports from the EC represent less than 10% of production and follow production trends. Imports similarly follow consumption trends and have remained relatively constant at around 35% of consumption levels.

Overall import requirements have remained relatively constant over the 1986-91 period. Third world countries, particularly those in South America and Africa, provide the largest contribution to imports. North America and Australia are also major suppliers. The largest import requirements are for non-ferrous metals (38%) and iron ore (34%).

MARKET FORCES

Demand

Approximately 25% of overall consumption is of ferrous and non-ferrous metal concentrates which are the raw materials for iron and steel making or metal smelting. Iron ore production is very limited (less than 1% of world production) and is mostly derived from remnant orefields in proximity of steelworks. Demand for non-ferrous metal ores reflects final finished metal demand, the major consuming industries being electrical (copper), construction (zinc and aluminium), transport (lead and aluminium) and containers (aluminium). Other significant industry users are machinery and chemicals. Prices and production levels for non-ferrous metal ores follow the general trends of these industries, although they are also influenced by supply and, more recently, environmental factors. Substitution threats to metals produced in the EC are not significant.

The major consuming industry for industrial mineral products is construction which receives 45% of all EC mined materials. As these minerals are the fundamental ingredient of roads and buildings, their demand is totally related to the level of construction activity.

The position is more complex for other industrial minerals where the primary consumers, such as the glass industry, are subject to different forces and relationships. As a result the demand, in this instance for silica sand and limestone, is subject to diverse glass industry markets such as transport (windows) and containers (bottles). The container industry is also a good example of intense competition between raw materials, in this case glass, aluminium and plastic. Other industrial minerals enjoy a wide spread of applications and thus overall have some protection against the poor performance of one industrial sector. Their demand, in consequence, reflects general industrial and consumer demand.

Table 2: Non energy mining and quarrying
Breakdown by product line, 1990

(million ECU)	Apparent consumption	Production	Extra-EC exports
Building materials sand and clays	13 323	13 105	550
Non-ferrous metal ores	3 663	855	351
Iron ore	2 930	93	5
Other industrial minerals and peat	2 635	2 109	280
Potash and phosphate	1 370	826	200
Salt	297	334	50

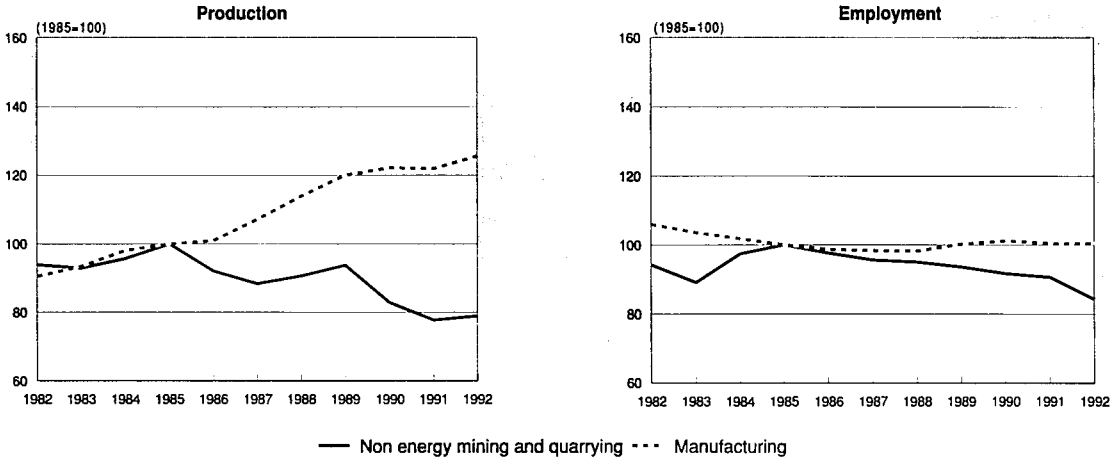
Source: Eurostat, B.M.Coope & Partners

Table 3: Non energy mining and quarrying
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.2	-3.8	-2.9
Production	2.1	-1.6	-2.1
Extra-EC exports	0.1	3.4	0.2
Extra-EC imports	4.6	-6.8	-4.0

(1) B.M.Coope & Partners estimates
Source: Eurostat

Figure 3: Non energy mining and quarrying
Production and employment indices compared to EC manufacturing



1992 are B.M. Coope & Partners estimates
Source: Eurostat, B.M. Coope & Partners

Supply and competition

As indicated, the small production of iron ore in the EC has a local convenience factor and is not typical of international supply which is dominated by large, high grade, low cost producers overseas. This competitive situation applies to non-ferrous metals which are under significant threat from overseas operations, with supply a dominant factor in setting price levels. The EC has a small number of world-class mines which are able to compete effectively in currently general over-supply situations, based on the size and quality of the deposits.

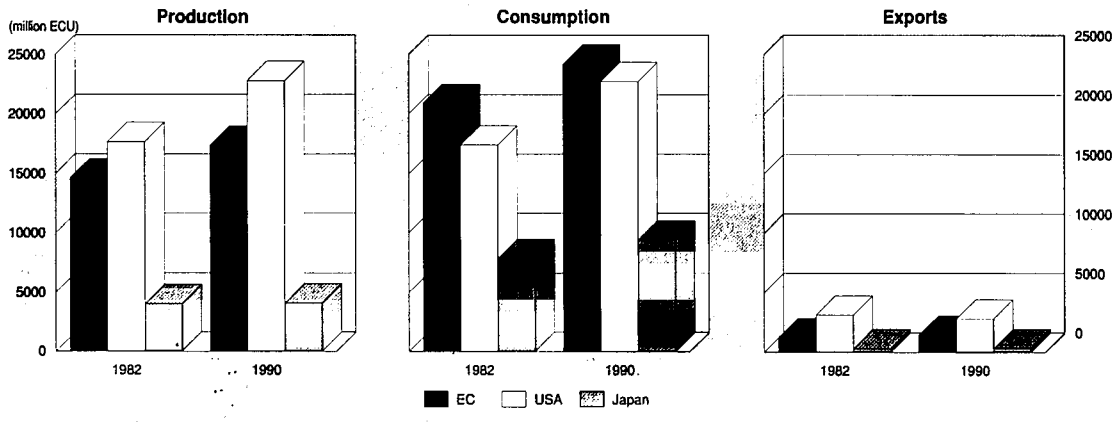
For industrial minerals the relatively low cost of the bulk materials and the costs of transportation ensure that local materials will be used in normal circumstances, and this provides the EC industrial minerals sector, with its generally adequate resources, with resilience in the case of international over-supply. The same factors restrict export potential, except where special conditions apply.

For the major mining area of construction raw materials there is a large degree of co-ownership of mining and consuming companies which secures mine output. Price levels are often not disclosed as a result. There is no supply of phosphates within the EC, but potash operations are threatened by potential oversupply from overseas, in particular from Canada and Israel, as previous protectionist policies are dismantled, in part due to the Single Market. Overcapacity exists in the EC salt mining industry, primarily due to lower utilisation of road salt but low price levels safeguard EC markets. Involuntary sulphur production from other industries ensures adequate supplies of sulphur, mainly as sulphuric acid. There are no EC supplies of certain important industrial minerals, most notably borates, and competition from countries such as Morocco (barite) and China (magnesia and fluorspar) is placing considerable pressure on other EC industrial mineral operations.

Production process

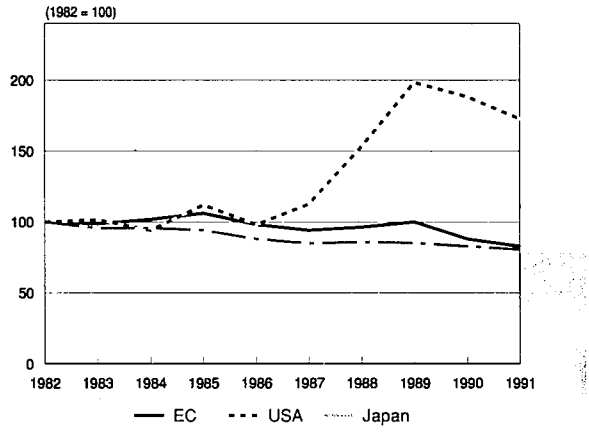
Mining operations vary widely from large "superquarries" for bulk stone products to smaller, sophisticated plants for products such as magnesite. Major underground operations also exist for base metals and potash, and most of the sulphur produced is as a by-product from other industries. Skilled labour availability in the EC is good, as are labour relations in comparison to North America and Australia. Most types

Figure 4: Non energy mining and quarrying
International comparison of main indicators at current prices



Source: Eurostat, Bumines

Figure 5: Non energy mining and quarrying
International comparison of production at constant prices



Source: Eurostat, Bumines, B.M. Coope & Partners

of mining have improved by the use of modern equipment rather than changes in technology, although improved mineral processing techniques in certain areas, in particular for white filler minerals such as kaolin, calcium carbonate, and talc, have allowed new product grades to be developed.

The productivity of the industry has increased over the last decade principally due to advanced equipment. Peaks have occurred coincident with economic upturns and higher commodity prices.

INDUSTRY STRUCTURE

Companies

There are approximately 50 companies, virtually all European owned mostly, but not always by the private sector, who have major interests in EC mining and quarrying. Medium to large sized operations are estimated to number around 150, with a substantially larger number of small operations. In addition to their European operations, EC mining companies also have significant overseas interests and control more than 20% of world production of several commodities including bauxite, lead, zinc, china clay, beach sands and borates.

Strategies

Companies involved with non-ferrous metals mining have as their prime objective the discovery of high quality deposits which can be developed to international competitiveness. Currently, the primary EC exploration target is the Iberian peninsula, where bore metals (Cu, Zn, Pb) are the main target.

For construction raw materials companies, strategic objectives include extending and strengthening linkages with downstream activities and expansion by acquisition. EC companies have increased their ownership of overseas companies in this sector, in particular in the USA. Company strategies in the phosphate industry have concentrated on product development and for potash and other industrial minerals, cost reduction and productivity increases are a priority. To date only minor investments have been made in the former Eastern Bloc, but the evolving policies of several countries, including Russia, strengthen the medium-term prospects of increased participation in this area.

Investment figures for a number of industrial minerals are not available but it is estimated that capital investment for the total mining industry in 1990 was in the order of 1 750 million ECU.

REGIONAL DISTRIBUTION

Spain, Portugal and Greece are the most important countries for non-ferrous metals production. Spain and France are the only producers of iron ore. Aggregates and cement are produced throughout all EC countries, with ornamental stone concentrated in Italy and Spain. Silica sand production is also fairly evenly distributed, with purer deposits in Belgium, Germany and France. The United Kingdom is the major producer of kaolin. Potash operations are mainly in Germany, France, Spain and the United Kingdom, and other industrial minerals are dispersed throughout the EC.

ENVIRONMENT

Environmental legislation, as applied to mining operations, is continuously tightening and is a significant factor in the industry. The major hazard for non-ferrous metals is acid mine drainage derived from oxidation of exposed sulphide minerals. For potash the problems are the salt produced during processing and the consequences of excess fertiliser usage. All commodities are now subject to legislation on dust and noise emissions, and in particular to waste dumping limits and aftercare of sites.

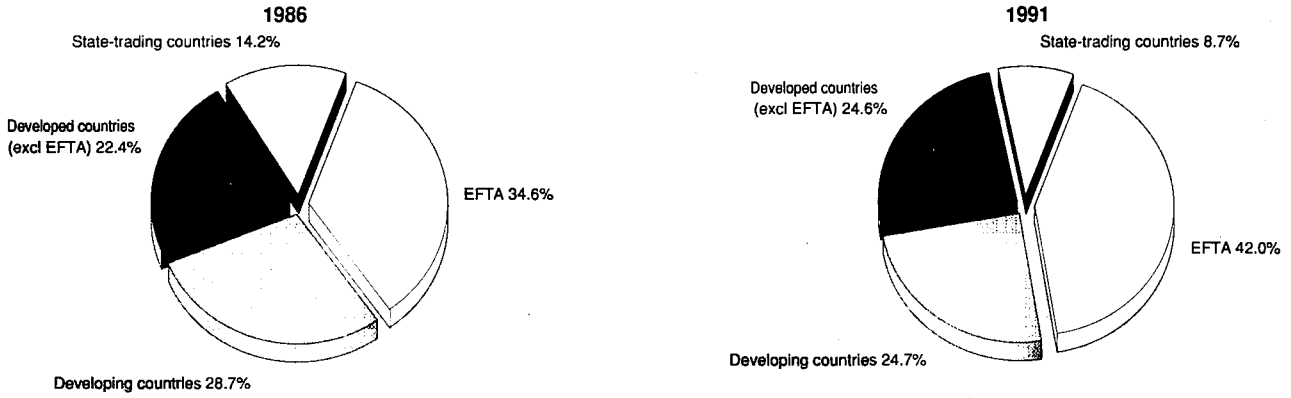
Other consequences of increased environmental awareness are the increasing amounts of sulphur products arising from the prevention of sulphur emissions. Some sulphur is stabilised as chemical gypsum which will reduce the demand for natural gypsum. The mining of peat is also under attack due to its occurrence in low-lying areas with the consequent risk of land loss by flooding. It is notable that large quantities of industrial minerals are used for environmental clean-up and as filter media and absorbents.

Table 4: Non energy mining and quarrying
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 226	1 189	1 476	1 395	1 091	1 096	1 200	1 570	1 437	1 404
Extra-EC imports	7 542	7 941	9 505	9 612	7 693	6 851	7 979	9 480	8 333	8 116
Trade balance	-6 316	-6 752	-8 029	-8 217	-6 602	-5 755	-6 779	-7 910	-6 896	-6 712
Ratio exports/imports	0.16	0.15	0.16	0.15	0.14	0.16	0.15	0.17	0.17	0.17
Intra-EC trade	2 142	2 279	2 589	3 163	3 074	2 885	2 925	4 058	4 195	4 111
Share of total imports (%)	22.1	22.3	21.4	24.8	28.6	29.6	26.8	30.0	33.5	33.6

(1) Estimates
Source: Eurostat

Figure 6: Non energy mining and quarrying
Destination of EC exports



Source: Eurostat

REGULATIONS

The main regulations which affect non-energy mining and quarrying are environmental and are summarised in Table 7. Single market regulations have been notable for the removal of market restrictions within the EC industrial minerals industry.

OUTLOOK

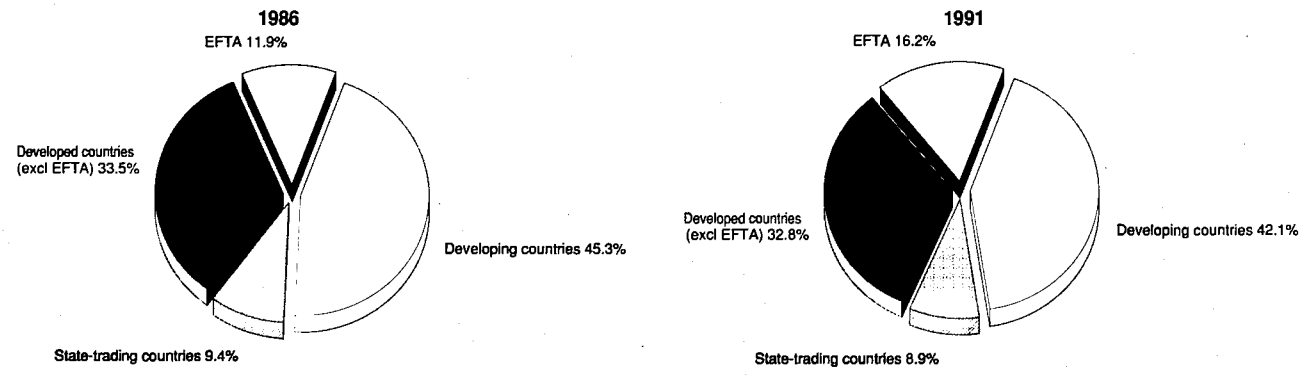
The EC will remain a minor domestic producer of non-ferrous metal ores and concentrates and will continue to be heavily dependent on imports for the metal manufacturing industry. The EC will also continue to be a major producer of construction raw materials, and EC companies will continue to be major international participants in overseas production of non-ferrous metals and industrial minerals. The EC potash industry is expected to undergo restructuring to meet low growth forecasts. In general terms the entire mining sector provides the raw materials for all subsequent industries and its prosperity will be directly related to overall industrial economics, in particular the building industry which accounts for the highest percentage of mined products.

Table 5: Non energy mining and quarrying
Distribution of end markets, 1990

	(million ECU)	(%)
Construction	11 296	46.6
Iron and steel	3 566	14.7
Non ferrous metal smelters	2 791	11.5
Glass & ceramics	1 497	6.2
Agriculture	1 444	6.0
Fillers, coatings etc	963	4.0
Chemicals	926	3.8
Pigment production	81	0.3
Road salt	75	0.3
Metal powders and oxides	60	0.2
Food	30	0.1
Fuel	239	1.0
Others	1 249	5.2

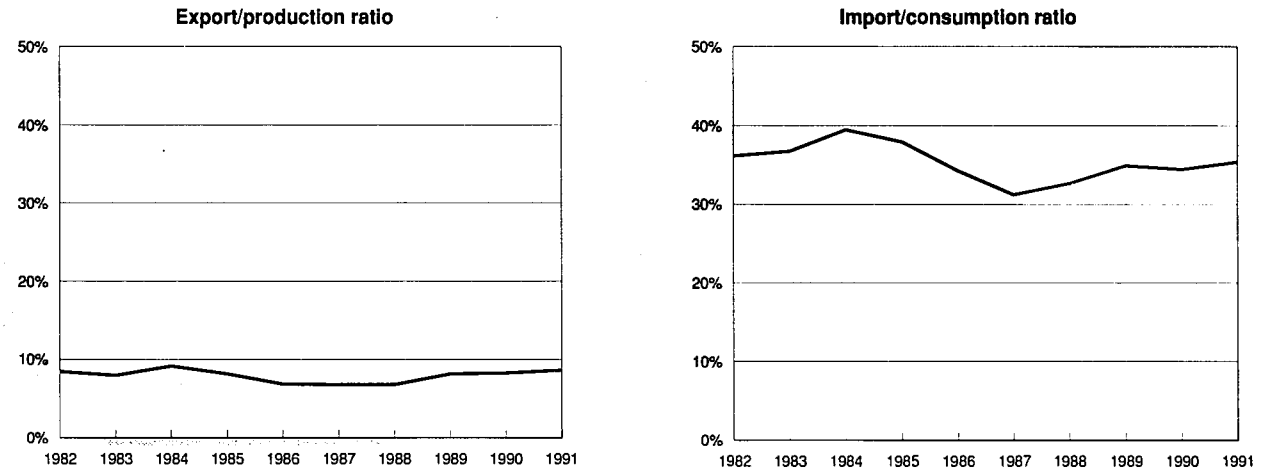
Source: Eurostat

Figure 7: Non energy mining and quarrying
Origin of EC imports



Source: Eurostat

Figure 8: Non energy mining and quarrying
Trade intensities



Source: Eurostat

Table 6: Non energy mining and quarrying
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	28.1	28.0	27.6	28.5	27.9	30.9	35.0	39.2	38.0	33.6
Productivity index	98.7	98.3	96.9	100.0	98.2	108.5	123.1	137.7	133.6	118.2
Unit labour costs index (2)	84.0	85.4	93.1	100.0	104.6	109.0	115.1	122.3	136.4	147.4

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
Source: Eurostat, B.M.Coope & Partners

Table 7: Non energy mining and quarrying
EC directives and proposals

EEC/75/442	Waste
EEC/76/464	Pollution into the acquatic environment
EEC/80/68	Groundwater pollution
EEC/84/360	Emissions
EEC/86/279	Waste
Proposed	Eco-audit
	Integrated pollution control

Source: Commission Services

Table 8: Extraction and preparation of iron ore
Expected real annual growth rates

(%)	1992-93	1992-1996
Apparent consumption	1.0	2.7
Production	1.0	2.0
Extra-EC exports	1.0	1.5

Source: B.M.Coope & Partners

Individual risks and opportunities apply to each of the commodities mined. The major risks applying to all materials are associated with general recession, with extra production costs being incurred by the need for higher standards of environmental compliance. Opportunities are conversely associated with general industrial prosperity with the possibilities of further mineral deposits being developed in southern areas of the EC and in Ireland.

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The industry is represented at the EC level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville, 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Iron ore
NACE 211

The EC is a minor producer of iron ore, providing only 3% of the Community's requirements. Virtually all of the mined ore, which is of low grade, is utilised within the EC for the production of iron and steel. Iron ore mining in the EC is expected to continue to reduce gradually in competition with larger, higher quality and cheaper to mine deposits overseas.

INDUSTRY PROFILE

Description of the sector

NACE 211 covers the extraction and the preparation of iron ore. The industry mines iron oxide ores, normally with little further processing, as feedstock to the iron and steel industry. The preparation activity consists of three different phases: crushing, sintering and concentrating.

Main indicators

Production within the EC has declined, with 1990 output in tonnage terms around 50% of 1985 levels. The EC remains heavily dependent upon imported iron ore. Apart from a small, specialist usage for pigments, virtually all the mined ore is used in the manufacture of iron and steel. Only France and Spain are major producers, with nominal production only in Germany and the United Kingdom. Production in France and Spain is of non-agglomerated ore only, the French production being of low grade and consumed exclusively by a nearby related steelworks in Belgium.

Recent trends

Consumption within the EC has remained relatively constant at around 170 million tonnes of ore per year (compared with production in 1990 of only 12 million tonnes). Ore prices in current values have remained consistent, but have fallen substantially in real terms. Because of its poor quality, the unit value of the iron ore mined in the EC is significantly lower (by over 50%) than normally traded ore. Exports of iron ore are insignificant compared with imports which supply most of consumption requirements.

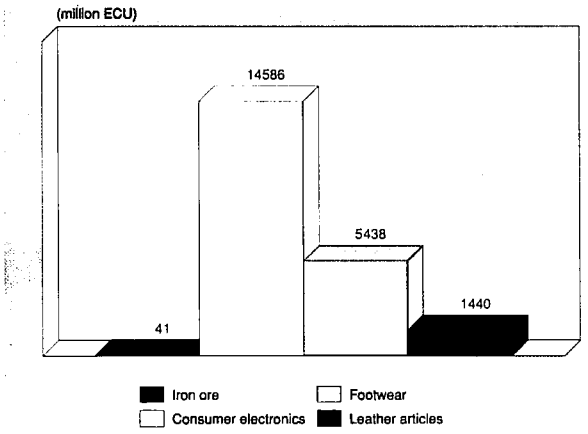
International comparison

Comparison with Japan shows similar dependency on imports, but with consumption in the EC remaining stagnant relative to the two other countries. Japan has discontinued iron ore mining, but USA operations have increased over the period. In tonnage terms the USA has produced at relatively constant levels, around 50 million tonnes per year, since 1984. EC production has fallen from 30 million tonnes per year to 12 million tonnes since 1982. Total world production is approximately one billion tonnes.

Foreign trade

The trade balance has remained fairly constant at current values during the 1982-1991 period. The level of exports is insignificant and is dominated by minor trade to Eastern European countries. Brazil remains the major exporter of iron ore to the EC. Together with other South American countries imports from this region are approaching 50%, the balance being fairly evenly distributed between EFTA, Canada, Africa and Australia. Intra-EC and extra-EC exports are at such low levels that the trends shown are insignificant, but the reduction in production is clearly demonstrated. The ratio of imports to consumption has shown a small upward trend, reflecting in part the fall in production.

Figure 1: Iron ore
Value added in comparison with other Industries



Source: Eurostat, B.M. Coope & Partners

MARKET FORCES

Demand

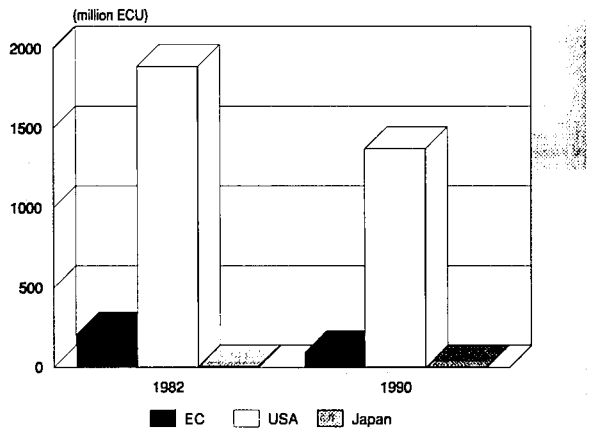
Virtually all EC iron ore production is consumed by neighbouring EC steel makers. The demand for iron ore is responsive to market factors and specific industries which consume steel. The recessionary decline in the automotive industry, for instance, reduced steel demand by more than 10% in this area between 1990 and 1991. Similar reductions were experienced in construction and machinery.

EC production of iron ore is very small in world terms, (less than 1% of world production), and with the remaining production coming from low-cost mines, it is relatively insensitive to market factors, being viable only because of local convenience. Virtually every major steel producer in Western Europe has shown a significant fall in output in 1991.

Supply and competition

The prolonged steel boom came to an end in 1989, with 1990 showing negative growth of just under 2% and 1991 nearly 5%. Although iron ore prices have remained firm for special reasons associated with stock positions and individual supplier nation disruptions, the iron ore market must inevitably follow

Figure 2: Iron ore
International comparison of production at current prices



Source: Eurostat

Table 1: Iron ore
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	2 953	2 901	3 450	3 399	2 997	2 556	2 987	3 107	2 930	3 151	3 085
Production	208	176	154	129	118	114	101	106	93	86	88
Extra-EC exports	2	1	1	1	1	1	5	2	5	3	3
Trade balance	-2 745	-2 725	-3 296	-3 270	-2 879	-2 442	-2 886	-3 001	-2 837	-3 065	-2 997
Employment (thousands)	5.9	5.2	4.5	3.8	3.5	2.9	2.5	2.1	1.9	1.7	1.7

(1) B.M.Coope & Partners estimates
Source: Eurostat

Table 2: Iron ore
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.4	-7.5	-3.2
Production	-17.5	-9.0	-12.3
Extra-EC exports	-23.9	19.4	3.3
Extra-EC imports	2.5	-7.5	-2.7

Source: Eurostat

Table 3: Iron ore
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2	1	1	1	1	1	5	2	5	3
Extra-EC imports	2 747	2 726	3 297	3 271	2 880	2 443	2 891	3 003	2 842	3 068
Trade balance	-2 745	-2 725	-3 296	-3 270	-2 879	-2 442	-2 886	-3 001	-2 837	-3 065
Ratio exports/imports (%)	0.07	0.04	0.03	0.03	0.03	0.04	0.17	0.07	0.18	0.10
Terms of trade index	155.2	120.1	N/A	100.0	138.5	159.7	117.9	87.0	83.9	66.0
Intra-EC trade	N/A	82	68	91	435	540	330	153	764	817
Share of total imports (%)	N/A	2.9	2.4	2.7	11.7	15.8	11.9	5.0	20.3	22.3

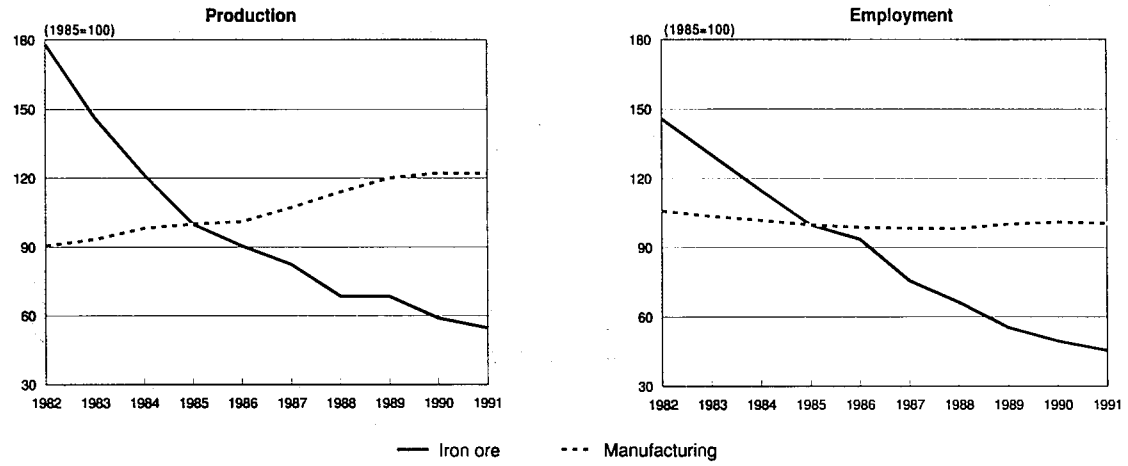
(1) Estimates
Source: Eurostat

Table 4: Iron ore
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	21.3	22.1	20.0	16.3	15.4	18.2	17.8	22.3	21.0	21.2
Productivity index	130.4	135.7	122.5	100.0	94.2	111.8	108.9	136.9	128.5	129.7
Unit labour costs index (2)	69.2	74.2	84.0	100.0	99.1	97.7	105.5	121.3	131.5	134.7

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
Source: Eurostat, B.M.Coope & Partners

Figure 3: Iron ore
Production and employment indices compared to EC manufacturing



Source: Eurostat

steel demand which has been affected by recession since 1989 in the major consuming industries.

Internal competition within the EC is limited to France and Spain, with France producing at more than twice the Spanish level, and in both cases declining. Foreign competition and lack of adequate reserves will continue to leave the EC as a minor producer only. Overseas competitors do enjoy some advantages over EC mines, but the overriding influence is the low grade and limited nature of reserves in the EC. No figures exist to establish a profitability index, but production levels within the EC and prices in real terms have declined.

Production process

There have been no significant impacts upon mining operations which have been modernised without major innovation. Employment levels have fallen over the period to reflect reduced production and productivity increases. The unit labour cost has also risen. The specifications for iron ore have remained fairly constant but with some pressure for higher grade material.

INDUSTRY STRUCTURE

Companies

The iron ore mining industry in the EC is very small, with only a handful of operations. The largest operations are in the French region of Lorraine at Mairy and L'Orne (Lormines) and Terres Rouges (ARBED). Iron ore mining in the EC is a small industry with relatively low investment. The mining companies concerned are medium-sized private enterprises whose aims are limited to profitable development of deposits in their geographical region.

ENVIRONMENT

Environmental concerns in iron ore mining are significantly less than for non-ferrous metals mining because of the absence of sulphur in the ores and the small scale of the activities. Factors are the discoloration of rivers and despoliation of the countryside. Good husbandry by the operators and the long tradition of mining in the areas concerned has ensured there are no major problems.

OUTLOOK

EC production is likely to remain at a low level with consumption steady and proportional to steel demand. Export levels will continue to be nominal. Iron ore mining will be adversely affected by increasing environmental compliance costs and during periods of low demand. Increased output will be encouraged by high steel demand.

Table 5: Iron ore
Expected real annual growth rates

(%)	1992-93	1992-1996
Apparent consumption	3.0	2.5
Production	2.0	1.5
Extra-EC exports	0.0	0.0

Source: B.M.Coope & Partners

Written by: B. M. Coope & Partners

Non-ferrous metal ores
NACE 212

The EC retains a small but significant non-ferrous metals mining industry which provides around 15% of the EC's raw material requirements for metal production. Non-ferrous metals in the EC is a mature industry subject mainly to international influences. Little change to the established pattern is expected during the 1990s.

INDUSTRY PROFILE

Description of the sector

NACE 212 covers the extraction and preparation of non-ferrous metal ores. A number of underground and open-pit non-ferrous mining operations are located within the EC. Mined ores are processed to concentrates which form the feedstocks for metal smelting and refining activities covered in Chapter 4. The major metals mined in the EC are zinc, copper, aluminium and lead, with smaller amounts of nickel, tin and tungsten. The extraction and preparation of uranium and thorium ores are not included.

Main indicators

Copper concentrate production has increased substantially since 1989 with the coming on stream of the Neves Corvo mine in Portugal. Revenues from copper and zinc production in the EC are now approximately equal and together with bauxite account for over 80% of non-ferrous metal turnover. All the metals mined in the EC have been affected by the recession since 1989, but copper has performed with more resilience, dropping in value around 20% between 1989 and 1991 compared with more than 20% for other base metals. By virtue of the world-class copper deposit at Neves Corvo, now in full production, Portugal has become the leading EC producer of non-ferrous metal concentrates. Portugal, together with Spain (zinc) and Greece (bauxite) accounts for over two-thirds of EC production.

Recent trends

Overall production levels have remained relatively constant, with increased production in copper compensating for reduced zinc and lead output since 1989. The fall in value of production since that time reflects the decline in international metal prices. Estimated figures for 1991 and 1992 indicate that with copper performing better than other base metals and zinc production declining, production revenues from these metals will become similar. Trade figures reflect strongly metal prices which reached a peak in 1989. Employment figures, however, continue to reduce as a result of productivity improvements.

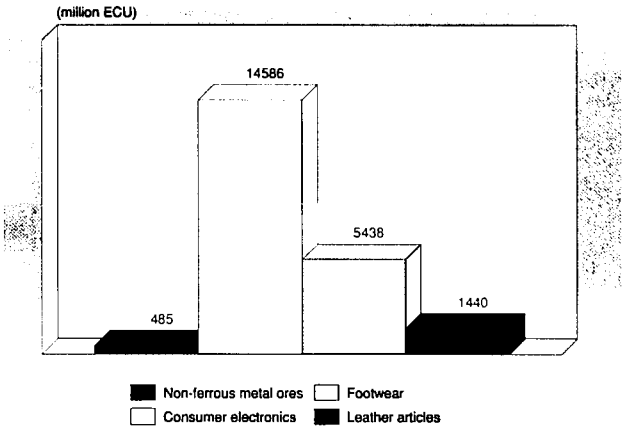
International comparison

EC and Japanese trends have remained roughly in parallel except that the small Japanese production base has further reduced. The trend in the USA to produce more concentrates is notable. USA figures in current dollar terms are closer for both years, the difference in part reflecting changes in parity of the US dollar with the ECU.

Foreign trade

The EC remains dependent upon imports, with a very small value exported. Exports are dominated by zinc and lead concentrate shipments to EFTA countries and copper shipments to Japan. There has been no significant change in the East-West movements for base metal concentrates to date. The dependence of the EC upon a wide geographical spread is illustrated in Figure 5. The largest individual volumes are from Africa, (aluminium), Canada and South America (zinc). The consistency of the non-ferrous metals mining industry is highlighted by the relatively constant ratio of imports to consumption shown in Figure 6.

Figure 1: Non-ferrous metal ores
Value added in comparison with other industries, 1990



Source: Eurostat, WBMS

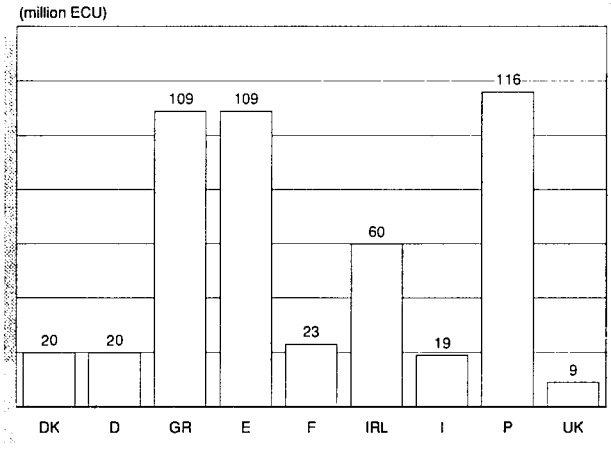
MARKET FORCES

Demand

None of the concentrates mined and processed are products in their own right, and all proceed for added-value processing to metals. Within the EC the largest consumers are the lead and zinc smelters, followed by steel making and copper smelting. Very few of the EC non-ferrous metal mining operations are vertically integrated on site, although some of the consumers have ownership interests in the mining operations.

Final metal products are influenced by the international economic situation, and the decline in consumer spending since 1989 has been partly responsible for reduced prices and demand. With prevailing recessionary influences, base metal prices are showing no signs of improvement. Unlike many other industries, other factors are also significant in affecting the market, most notably supply continuity, East-West trade and, more recently, environmental considerations.

Figure 2: Non-ferrous metal ores
Value added by Member State, 1990



Source: Eurostat, WBMS

Table 1: Non-ferrous metal ores
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	2 675	3 118	3 897	3 930	2 828	2 621	3 269	4 449	3 663	3 151	3 128
Production	573	645	800	799	597	479	632	987	855	738	703
Extra-EC exports	246	202	287	245	157	153	170	427	351	299	275
Trade balance	-2 102	-2 473	-3 097	-3 131	-2 281	-2 142	-2 637	-3 462	-2 808	-2 413	-2 425
Employment (thousands)	20.1	18.8	18.8	17.4	15.1	15.5	14.5	14.4	14.3	14.2	13.5

(1) B.M.Coope & Partners estimates
Source: Eurostat, WBMS

Table 2: Non-ferrous metal ores
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	10.0	-2.5	-2.1
Production	8.1	0.7	-0.5
Extra-EC exports	-4.2	15.3	0.9
Extra-EC imports	9.1	-1.6	-2.2

Source: Eurostat, WBMS, B.M.Coope & Partners

Table 3: Non-ferrous metal ores
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	246	202	287	245	157	153	170	427	351	299
Extra-EC imports	2 348	2 675	3 384	3 376	2 438	2 295	2 807	3 889	3 159	2 712
Trade balance	-2 102	-2 473	-3 097	-3 131	-2 280	-2 142	-2 637	-3 461	-2 807	-2 413
Ratio exports/imports	0.10	0.08	0.08	0.07	0.06	0.07	0.06	0.11	0.11	0.11
Terms of trade index	99.3	90.3	90.7	100.0	99.9	97.5	91.2	87.0	81.9	79.7
Intra-EC trade	303	341	468	505	318	285	347	773	652	509
Share of total imports (%)	11.4	11.3	12.1	13.0	11.5	11.0	11.0	16.6	17.1	15.8

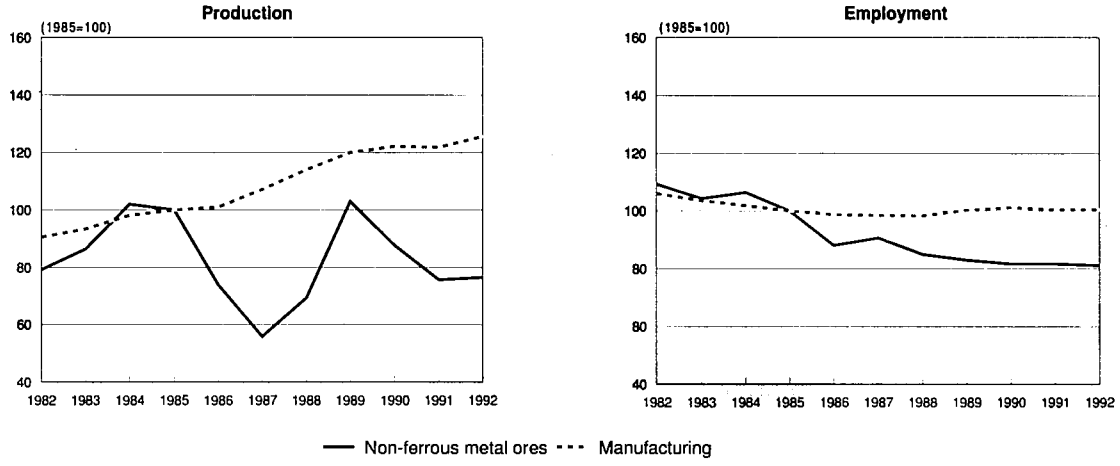
(1) Estimates
Source: Eurostat

Table 4: Non-ferrous metal ores
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	20.3	19.6	21.5	17.9	16.7	18.5	26.1	40.2	34.4	30.6
Productivity index	113.2	109.3	119.9	100.0	93.0	103.1	145.6	223.9	191.8	170.3
Unit labour costs index (2)	103.8	93.9	102.3	100.0	108.1	103.8	140.4	156.4	173.2	192.6

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
Source: Eurostat, B.M.Coope & Partners

Figure 3: Non-ferrous metal ores
Production and employment indices compared to EC manufacturing



1992 are B.M. Coope & Partners estimates
Source: Eurostat

The overall situation may be summarised as steady demand with potentially more than adequate supply, resulting in pressure on prices unless demand is disrupted. Reductions in mine production in Eastern Europe and environmental pressures may provide sufficient influence to moderate supply to improve prices when general consumer demand improves. The non-ferrous metals markets are mature, and little affected by substitution or innovation.

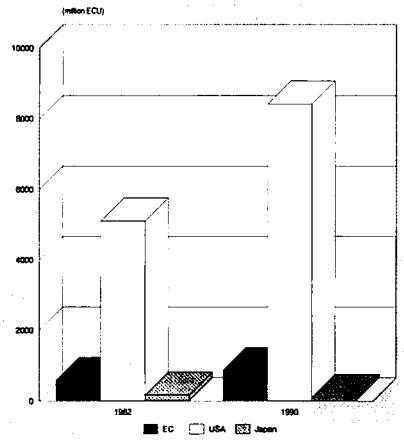
Supply and competition

The EC is a small but significant producer of lead, zinc, copper and aluminium concentrates, producing a small part of the material for EC requirements and operating in a strongly competitive international supply situation with no control over prices charged.

The strong supply position provides smelters with a strong negotiating position on prices, and they in turn are being pressed by fabricators and metal consumers. Internal EC competition is not a factor in market competition in mining, which is dominated by overseas metal mines. Factors which strengthen the competitiveness of overseas, third-world producers include lower labour costs, higher grade and larger ore deposits and lower environmental compliance costs. EC operations (in common with those in North America) enjoy better technology and productivity, and where ore deposits are of high quality (e.g. Neves Corvo), EC operations are highly competitive.

The maintaining of a higher level of revenues than may be expected after the 1989 boom reflects the increasing value of copper production, which increased nearly tenfold between 1987 and 1991. Copper has suffered less than other major non-ferrous metals over this period in terms of prices.

Figure 4: Non-ferrous metal ores
International comparison of production at current prices



Source: Bumines, Eurostat

Production process

There are no particular external factors affecting the mining of non-ferrous metals in the EC, which possesses appropriate levels of energy, labour and technology. Operations under threat are affected by international metal price considerations and the quality of deposits being mined. No radical changes in mining methods have been introduced, although modern equipment has allowed productivity to increase.

INDUSTRY STRUCTURE

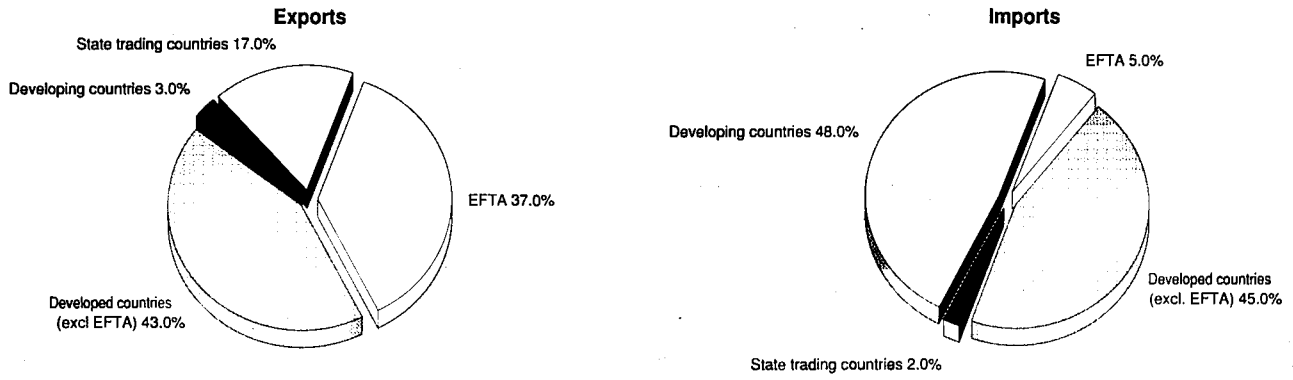
Companies

The largest mines are Neves Corvo (Portugal, copper) and Navan (Ireland, lead/zinc). European ownership of EC non-ferrous metal mining companies is virtually 100%. The major European companies also have a significant share of world mine production, in 1989 being bauxite (25%), copper (11%), nickel (20%), lead (20%) and zinc (20%). EC companies overall are responsible for approximately 10% of world mine production, the largest companies being RTZ (UK) and Metallgesellschaft (D).

Strategies

Many mining companies are also involved in final metal production and their strategies are best considered in a combined context. On the mining side the policies of the major EC companies can be simply defined as locating and developing high quality ore deposits, for which the priority is regional geology above all. Within the EC the Iberian peninsular represents the best geological target, although there is considerable activity in Ireland also. Exploration is intensive in this area, although several other regions of the world, notably Chile, have a greater focus. The finding of Neves Corvo has

Figure 5: Non-ferrous metal ores
Destination of EC exports and origin of EC imports, 1990



Source: Eurostat

strengthened enthusiasm for finding other major deposits, but they are likely to be deep and difficult to locate.

EC mining companies are taking preliminary interests in opportunities in Eastern Europe as well as the former Soviet Union, but it is too early to say whether they will be developed on a major scale. The single European market is not a factor in mining company strategy. Investment within the EC is in proportion to the level of mining operations. The last major investment was approximately 400 million ECU in 1988/89 for the Neves Corvo mine.

As for M&A activity, RTZ extended its pre-eminence as Europe's largest mining company with the acquisition of the mineral division of BP in 1986.

REGIONAL DISTRIBUTION

The most significant mining regions of the EC are Spain and Ireland for lead and zinc and Portugal for copper. Germany and Italy are also significant for lead and zinc, with Greece for bauxite and nickel and Portugal also for tin. Lead and zinc production from Denmark (Greenland) is discontinuing in 1991.

ENVIRONMENT

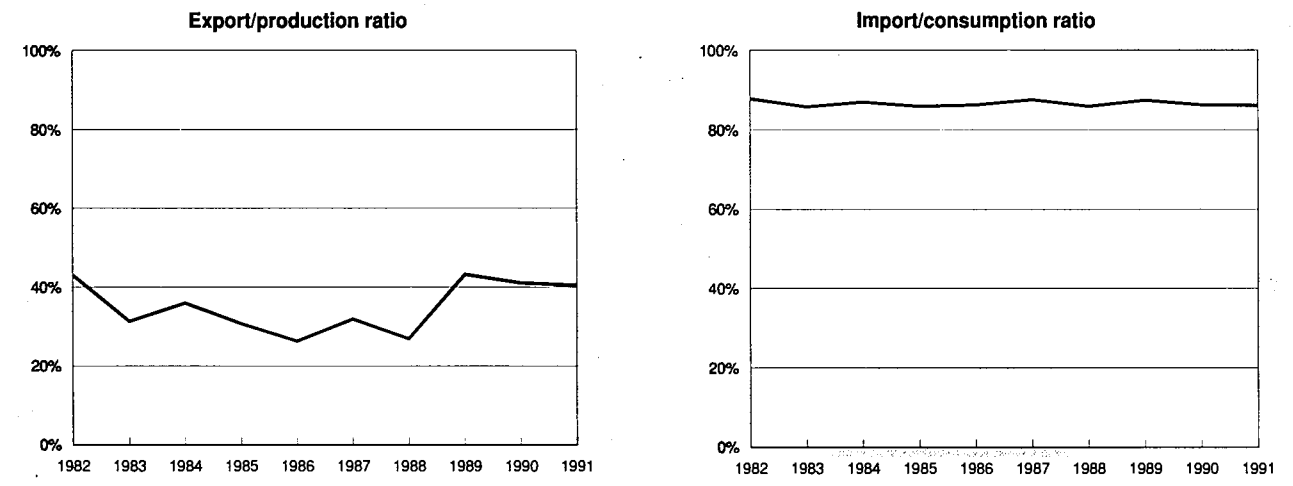
Mining hazards are principally water-related, in particular acid mine and rock drainage. To date within the EC there has been no major conflict between mining and environmental interests, but EC legislation is becoming more stringent and companies are being urged to comply. One example which highlights the water problem has occurred in the United Kingdom following closure of the tin mines. Acidic mine water has entered water courses and there is no longer a mine operator to take responsibility for the problem. This situation will be avoided under forthcoming legislation.

OUTLOOK

The EC is expected to remain a minor producer of ores and concentrates with dependence upon imports, mainly from outside Europe, for subsequent metals production. This picture is unlikely to change over the decade.

Internationally in neutral economic conditions continuing modest increases in metal consumption are expected, with metal prices rising from their historically low positions in

Figure 6: Non-ferrous metal ores
Trade intensities



Source: Eurostat

1991. For mining operations, however, the supply situation will remain competitive with only low-cost mines remaining viable. This will result in the closure of some higher cost lead/zinc mines in the EC, but will not affect the larger, modern mines responsible for most of EC output.

At the same time, output will continue to be affected by recessionary influences and mines will have to absorb higher environmental costs. A long-term risk would occur if large tonnages are exported from the former Eastern Bloc, although this should not affect the large EC mines.

The mining industry will be boosted by shortages of supply and increased from whatever causes, but a major increase in EC output can only arise from the discovery of new deposits. Large new projects are under investigation in Ireland (Lisheen), France (Chessy) and the United Kingdom (Parys Mountain). Other prospects exist in Greece, Ireland, Spain and Portugal.

Table 5: Non-ferrous metal ores
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.0	1.5
Production	2.0	1.2
Extra-EC exports	2.0	0.5

Source: B.M.Coope & Partners

Written by: B. M. Coope & Partners
The industry is represented at the EC level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Stone
NACE 245

The European stone industry is the oldest and today still an important section of the world's non-energy mining industry. Europe produces, transforms, trades and consumes all kinds of stone materials including marble, granite and travertine. These products are destined for various uses although the largest consumer is the building industry, particularly the upper end of the industry, where there is strong competition from alternative materials such as ceramics and glass which have greater investment capacities for research, development and marketing.

INDUSTRY PROFILE

Description of the sector

The ornamental stone industry is divided into two main sections: the excavation of raw materials and their subsequent transformation into the various finished products. The processed materials are mainly calcareous (marble, travertine, etc.) or siliceous (granite, serizzo, beola, etc.) and their relative uses differ to some extent. Granites are principally employed for exteriors or wherever greater resistance is required to stand wear and tear and atmospheric pollution. Marbles are principally destined for interiors or where there is greater protection from external elements.

Main indicators

In the 1980s the industry experienced a real boom. From 1981 to 1991, world quarry production rates rose from around 20 to over 30 million metric tonnes and this was accompanied by an equally significant increase in the number of producer countries. At present only nine countries exceed an annual production of one million metric tonnes and six of these belong to the EC (see Table 1). Up until 1991 the EC ornamental stone industry accounted for over 50% of world production and around the same percentage of global international exchange in terms of volume. The products exchanged within and outside the EC include rough blocks and a wide variety of finished articles.

Recent trends

Present production figures amount to an average of around 30 million metric tonnes per year with a recent, constant upward trend mainly due to the entry of new producer countries into the world market. Since the early 1980s at least ten new producers of some significance have emerged and become self-sufficient, a phenomenon which has also led to an increase in machine production for the quarrying, sawing and processing of stone. Recently, this off-shoot of the stone industry has been flourishing and is mainly based in EC countries like Italy, Germany and France. The EC Mediterranean countries form the heart of the sector at both a European and a world level even though other areas in the world are now also developing. In 1991 the largest producer of blocks for ornamental use was Italy which has always held the leading position in the market, followed in the EC by Spain, Greece, Portugal and France.

International comparison

Since 1985 Japan has been a significant importer mainly of granites which are primarily destined for funeral art. Japan buys lower range semi-processed or finished articles from Taiwan and South Korea, and stone for complex work which requires the use of sophisticated production techniques and a wide range of different products from Italy. The same applies to the USA even though it has good national production rates. But since 1988 the USA has witnessed a gradual reduction

Table 1: Stone
Production in volume

(thousand metric tonnes)	1981	1988	1991
EC	13 535	14 214	16 216
Belgique/België	2 070	467	350
Danmark	N/A	N/A	N/A
BR Deutschland	N/A	137	150
Hellas	900	1 700	1 800
España	2 730	2 155	3 528
France	734	920	1 051
Ireland	N/A	N/A	N/A
Italia	6 700	7 480	7 200
Luxembourg	N/A	N/A	N/A
Nederland	N/A	N/A	N/A
Portugal	409	640	1 062
United Kingdom	N/A	715	1 075
USA	875	1 062	1 200
Comecon countries	1 000	2 600	1 250
Sweden	92	143	100
Finland	200	257	165
Norway	177	100	100
Austria	25	40	27
Turkey	150	485	700
Brazil	850	970	1 200
Mexico	165	263	525
South Africa	330	700	750
India	400	700	2 700
China	N/A	N/A	1 100
South Korea	N/A	687	1 000
Others	2 000	2 800	3 500

Source: EURO-ROC

Table 2: Stone
Imports of blocks and slabs

(thousand metric tonnes)	1988	1991
EC	2 493.6	3 355.5
Belgique/België	72.8	110.4
Danmark	N/A	N/A
BR Deutschland	416.2	844.7
Hellas	N/A	N/A
España	142.9	290.0
France	191.0	226.8
Ireland	1.7	10.6
Italia	1 467.4	1 724.2
Luxembourg	N/A	N/A
Nederland	56.9	54.2
Portugal	12.2	15.0
United Kingdom	132.5	79.6
USA	415.3	290.0
Japan	1 100.8	1 500.0
South Korea	75.4	89.5

Source: National Statistical Institutes

in demand for finished products, especially in granite, due to the slump in the non-residential buildings market. Compared with the other building activities in North America, the European stone industry has felt the decline less than ceramics and other competitors. Moreover, the US market, like the Far Eastern market, generally remains a privileged market as regards the average unit value of the product it absorbs.

In South East Asia there is a tendency towards self-sufficiency which is likely to continue over the next few years. The great buying power of the Japanese market, the extensive building activities in some of the newly industrialised countries, the availability of low-cost labour, the proximity of areas with high raw material production rates such as India, South Africa and more recently China, all create a shorter distribution chain for products which excludes all competitors, but a few privileged niches in the market. The EC industry occupies a strong position as far as the latter are concerned.

Foreign trade

Trade in volume mainly involves raw and semi-finished materials. In 1991, the leading importer was Italy, closely followed by Japan which has only recently attained this position. Important exporters apart from Italy include Spain, Greece, and South Korea. South Korea is the only country to have recently (1988-1989) penetrated the market as a producer, transformer and consumer. EC exports mainly consist of finished products which are principally destined for the building industry.

Until 1982-1983, there was also a strong demand from the Middle East countries. Subsequently, external factors led to an abrupt decline in demand to a mere 35% of its most memorable peak. The effects of the international crisis in the Persian Gulf are mostly responsible for the 1990-1991 figures, although some improvements appeared in 1992. Nevertheless, the most important market is still the EC itself, first and foremost in Italy and Germany, followed by Spain and France.

Table 3: Stone
Imports of finished products

(thousand metric tonnes)	1988	1991
EC	955.5	1847.6
Belgique/België	252.9	640.8
Danmark	N/A	N/A
BR Deutschland	352.3	510
Hellas	N/A	N/A
España	132.3	137.5
France	72.4	164.3
Ireland	1.9	2.3
Italia	15.4	34.4
Luxembourg	N/A	N/A
Nederland	50.3	65
Portugal	N/A	N/A
United Kingdom	78	293.3
USA	875.4	168.9
Japan	341.9	416.3
South Korea	75.3	82.8

Source: National Statistical Institutes

MARKET FORCES

Demand

The demand for stone materials is widespread. It ranges from the large importers of blocks which amount to only a few dozen firms throughout the world, concentrated in Italy and Germany, to the large North American building firms and developers and the final consumers for all the other sections of the market.

The greatest problems for the sector arise from the extreme fragmentation of the consumer market together with the very limited average size of companies. Moreover, the lack of capital to invest in research, development, promotion and marketing makes it difficult to exploit this dispersed consumer market which is often regional and not even national.

On the other hand, the factors which sustain demand are above all the intrinsic factors regarding the products themselves such as their reputation, response to technical problems, aesthetic variety and image.

Quarrying technology is relatively simple and therefore problems mainly arise from the lack of infrastructures. Countries capable of offering technologically advanced finished articles at competitive prices are however very few. With the exception of Italy and to a lesser extent Spain and the other EC countries, all remaining significant stone consumers are far from being self-sufficient even within their own home markets.

Supply and competition

The traditional usage, the extensive and intensive production, the ability to transform raw materials, a building industry very much oriented towards maintenance and restoration, all favour the use of stone. It is often considered a material which adds prestige to buildings where it is used, be they residential or non-residential. The difficulties of a sector which is not in a position to invest sufficient capital in promotional and marketing activities may affect its development over the next few years. Sections of the market which are in a position to expand despite the recession which is now threatening certain countries are still confronted with the deep penetration of the market by their competitors such as glass and ceramics. Indeed, the general increase in the competitiveness of all markets has already adversely affected the price trends in 1991, which had to decrease in real value to retain a hold in the major markets.

Production process

The development in processing technology has widened the field for the use of stones, especially in the building and furnishing industries, and this development has been accompanied by improvements in stone laying and maintenance techniques. The new uses have emerged mainly thanks to the techniques for obtaining minimal thicknesses and applying them. This has enabled stone products to penetrate the avant-garde markets such as the removable floorings market for

Table 4: Stone
Exports of blocks and slabs

(thousand metric tonnes)	1988	1991
EC	1 083.6	1 697.4
Belgique/België	6.3	20.0
Danmark	N/A	N/A
BR Deutschland	55.5	160.0
Hellas	23.1	41.1
España	405.0	635.0
France	20.5	57.4
Ireland	N/A	1.0
Italia	398.2	478.5
Luxembourg	N/A	N/A
Nederland	17.9	12.5
Portugal	157.0	292.0
United Kingdom	N/A	N/A
USA	N/A	150.0
Sweden	265.0	280.1
Finland	247.5	260.3
Norway	61.9	90.0
Austria	24.6	4.5
Turkey	23.4	31.8
Brazil	459.8	378.4
South Africa	550.0	650.0
India	560.0	650.0
China	250.0	410.0
South Korea	324.4	250.0

Source: National Statistical Institutes

electronic processing centres and the light vertical claddings market. Marbles and granites can therefore be used inside lifts, in ships, on skyscraper facades in areas subject to typhoons and in other situations which would otherwise be inconceivable for traditional methods. Alongside these avant-garde uses, there are of course the more traditional, well-established areas of usage, such as funeral art, furnishings, monuments, decorative architecture, where production processes have also undergone a radical technological transformation. For some of the traditional uses, the processing of stone is part of production in other industrial sectors. Particularly in the case of furniture production, marble and granite cutting and polishing workshops for vanity tops, kitchen table tops and bathroom furniture coverings work as an integral part of the production line of finished furniture. However, the most interesting market as regards the quantity of material sold and the value added absorbed is still the building industry.

INDUSTRY STRUCTURE

Companies

The average size of companies in the sector is generally very limited. In Italy, for example, the average company has no more than 10 employees, although there are various companies which have joined forces to develop market strategy and pool resources. Recent and reliable statistics are not available for all the EC countries but it is estimated that there are now around 500 000 employees overall, at least half of whom work in the quarries. There have been great changes in the production methods, speed and costs in recent times due to the mass introduction of diamonds in the quarrying and processing of marble at the beginning of the 1980s. The greatest concentration of productive firms is in Italy, where stone materials are available in nearly all its regions but mainly in Tuscany, in Carrara and the surrounding area, Sardinia, Sicily, Puglia, Lazio, Lombardy, Piedmont and Veneto. It is calculated that in all there are over 70 000 quarry workers, in addition to those working in industries connected to quarrying, transformation and commerce. The same situation can be seen in Spain and to a lesser extent in France, Greece and Portugal, whereas in Germany the transformation industry prevails.

Strategies

A problem which affects almost all EC countries is the ageing labour force. The turnover of the generations of workers is very slow indeed and this is a problem which may become very serious in the future for a sector which often requires a long period of complete professional training. The biggest question mark in the sector remains the economic and commercial prospects. The sector is inevitably dependent on the building industry, especially its upper end (residential, non-residential, urban landscape, restoration of old town centres, renovation in general). The tendency towards self-sufficiency of certain foreign markets could reduce the overall market of the European stone industry and limit it more and more to the market within the EC itself. As far as stone companies are concerned, this could lead to even more problems for smaller companies which would be forced to specialise still further or opt for subcontracting, leaving the larger companies to deal with the more complicated contracts and the more distant markets. The major companies are already directly present on distant markets, have local associates and coordinate complex projects.

ENVIRONMENT

Important environmental issues involve the stone industry in both its productive divisions, that is, quarries and workshops. There are serious problems as regards the respect for and restoration of the structure of the mountains where quarrying activities are carried out. Various countries and regions do actually impose a programme of temporary management of the quarry dumps and at least partial reconstruction of the natural habitat to be included in the quarrying plans. This is not always feasible and sometimes leads to the interruption of activities due to the impossibility to comply with regulations in force.

Respect for the environment must continue after the quarrying process. This requires compliance with the regulations regarding interior working environments (microclimates inside the workshops, noise levels, dust, mud, complete safety) and mutual respect between workers and inhabitants. Thus, the management of refluent slurry, the protection against noise, the protection of water courses from polluted waste, overloaded roadways, are problems which concern technical re-

Table 5: Stone
Exports of finished products

(thousand metric tonnes)	1988	1991
EC	2 073.4	2 343.5
Belgique/België	9.4	19.0
Danmark	N/A	N/A
BR Deutschland	44.4	116.3
Hellas	89.1	166.0
España	129.5	160.0
France	25.5	42.7
Ireland	N/A	6.2
Italia	1 627.6	1 610.7
Luxembourg	N/A	N/A
Nederland	15.1	17.2
Portugal	131.8	194.7
United Kingdom	1.0	10.7
South Korea	269.9	181.0
Hong Kong	15.0	33.0

Source: National Statistical Institutes

searchers, machine manufacturers and environmentalists alike. Technical researchers are in fact working to find the best solutions (for example, the reutilisation of marble rubble) while manufacturers are trying to produce machines with lower noise levels and less dust production (sound-proof machines, purified plants at the design stage, etc.) and environmentalists are involved in imposing respect for the environment and the regulations in force.

REGULATIONS

The EC's stone industry is subject to the regulations which in general cover building material products. Today, it has to face two major restraints: as regards production, the respect of the environmental and workers' safety regulations both inside and outside the quarry and the workshops; as regards usage, the respect of special safety regulations regarding anchorage systems for vertical cladding and the development of a joint set of regulations for the EC with respect to certain production methods. There are various technical committees within the Normalisation European Committee (NEC), which have an internal sub-commission which deals with processed stones. Among these, we can name:

- TC 125, which deals with masonry, and plans to set up a sub-commission for natural stone masonry;
- TC 128, which deals with building coverings, etc., and has a work group for slates as covering;
- TC 178, which deals with roadways and curbs, and has a sub-committee for natural stones;
- TC 246, which deals with floorings in general in natural stone, interiors, stairs, terraces, balconies, etc., and exterior facings. It is already organised into three subgroups, one for terminology and classification, one for test methods and the most important one, for the prerequisites and limits for specific products. In view of '93, stone products must be ready with the necessary prerequisites so as to be able to circulate freely within the EC and withstand competition from similar materials.

OUTLOOK

Although the world's stone sector is in constant but modest overall expansion, the European sector's future is more closely linked to the general tendencies of the European economies and their building activities. The achievement of the Single Market will not affect the firms already operating outside their own region. At worst they will have to conform to the standardised regulations and the consequent quality certification prerequisites. Trade relations with distant markets will be more difficult as the latter are forming autonomous productive systems to face European firms. It will be more complicated for individual firms, especially smaller ones, to gain a place on such markets without having privileged partnerships with local firms and the necessary support in the form of assistance, services and credit facilities.

On the other hand, the opening of new quarrying activities in developing countries and the consequent increase in familiarity with using natural stones since the late 1980s, is gradually creating better prospects for new markets. Whether or not the European stone market will be able to continue to expand in the 1990s depends on how effectively it equips itself to face these new realities.

Table 6: Stone Employment

	Companies	Employees
EC	22 920	186 590
Belgique/België	374	6 500
Danmark	N/A	N/A
BR Deutschland	350	N/A
Hellas	4 000	50 000
España	3 343	30 000
France	900	10 000
Ireland	N/A	N/A
Italia	11 000	70 000
Luxembourg	N/A	N/A
Nederland	N/A	N/A
Portugal	2 448	15 000
United Kingdom	505	5 090
Sweden	21	1 000
Finland	72	1 500
Norway	40	750
Turkey	765	10 000
South Africa	30	N/A
India	300	200 000
China	3 000	50 000
South Korea	1 142	13 643

Source: National Statistical Institutes

Written by: Internazionale Marmi e Macchine Carrara S.p.A. Research office. The industry is represented at the EC level by: European International Federation of Natural Stone Industries (EURO-ROC). Address: Avenue Henry Dunant 2, Bte. 15, B-1140 Brussels; tel: (32 2) 736 0245; fax: (32 2) 736 0245.

Construction raw materials, sands and clays

NACE 231

The EC is one of the world's major producing and consuming regions for construction raw materials, sands, and clays. In the construction raw materials sector the EC is self-sufficient for virtually all mainstream products and external trade tends to be in material chosen on aesthetic grounds. The economic performance of this industry is tied directly to the level of building and construction activity in the EC, which has been stagnating in recent years.

The EC's industrial sands and clays industries can justifiably be considered as world leaders in both the size of production and influence in world markets. The EC is also theoretically self-sufficient in these materials although external trade is prominent among the more specialised grades. The economic performance of this sector is closely related to overall manufacturing activity in the EC and in particular by such industries as glass and ceramics, metallurgy, paper, paints, plastics, etc.

INDUSTRY PROFILE

Description of the sector

The mainstream products covered by NACE 231 include: crushed stone for construction and road aggregate; sand and gravel for construction and road aggregate; limestone and chalk for cement and lime; gypsum for plaster and cement; common clays for bricks, tiles and pipes; dimension stone (including marble and granite). For more information about this last, please refer to the previous chapter on stone.

Construction aggregates are the bulk raw materials used in the building or roads, railways, and buildings. They are produced throughout the EC and a typical operation will consist of a sand and gravel pit or a hard rock quarry producing crushed and graded limestone or granite.

Limestone and chalk are the main raw materials used in cement and lime manufacture and quarries for these end-uses are invariably captively owned by large cement (or lime) manufacturing groups. In a similar way common clays for the production of bricks, tiles, and pipes are also owned by the manufacturers of these products.

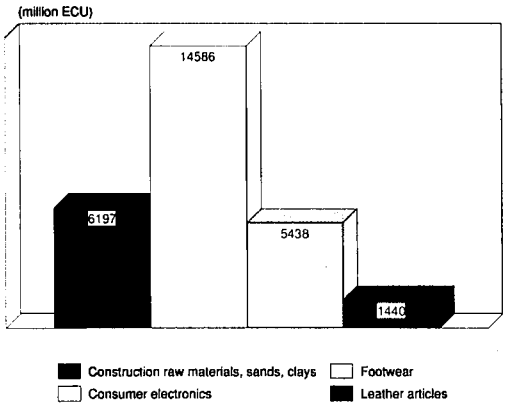
Main indicators

Production levels increased gradually throughout the 1980s but fell away during 1990 and 1991. This reflects not only the strong performance of the construction industry in the late 1980s but also the more recent downturn in construction activity. EC production volumes remained fairly constant during the 1980s compared to strong growth in the USA.

Since production of the major product lines are universal it is not surprising that value added data are in line with overall economic activity. Thus Germany displays the largest value followed by France, the United Kingdom, and Italy.

Prices for most of the bulk construction raw materials tend to be more or less constant in real terms and thus value growth for both production and consumption tends to reflect volume growth. Likewise the higher levels of extra-EC exports in recent years reflect higher volume sales of products such as gypsum, dimension stone granite, and carbonate fillers.

Figure 1: Construction raw materials, sands and clays Value added in comparison with other industries, 1990



Source: Eurostat, B.M. Coope & Partners

Foreign trade

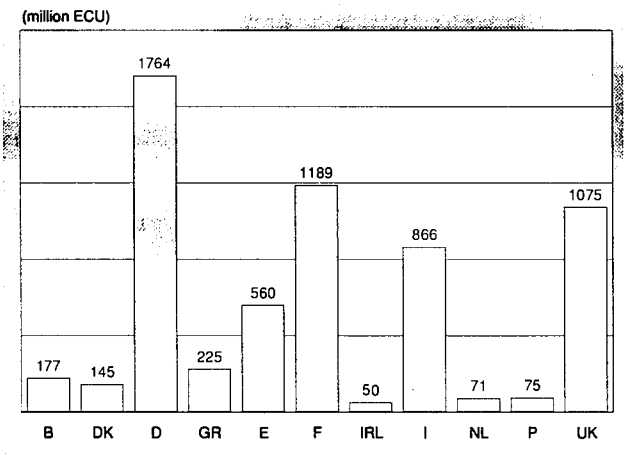
The EC is highly active in both the importing and exporting of these materials but in recent years has become a net importer. This is primarily due to a surge in the imports of dimension stone granite from countries such as Norway, South Africa, Brazil, and India. It should also be noted that most of this product is imported in raw form for processing by the EC's domestic stone processing industry (particularly in Italy).

The large increase in intra-EC trade sustained throughout the 1982-1991 period is primarily a function of rising volumes across a range of products including kaolin, bentonite and other special clays, sand and gravel, crushed stone, marble, and granite.

Exports are dominated by shipments to EFTA countries, particularly of paper grade kaolin to Finland and Sweden and construction aggregates to Switzerland. Highlights in export trade to non-EFTA countries are the shipments of dimension stone marble and granite to Japan and the USA. In 1985 Saudi Arabia was also a major destination for the latter products.

As far as sources of 1990 imports are concerned, the EFTA countries accounted for about one third of total and the main

Figure 2: Construction raw materials, sands and clays Value added by Member State, 1990



Source: Eurostat

Table 1: Construction raw materials, sands and clays
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	10 305	10 713	11 312	12 019	11 443	12 220	13 672	14 977	13 323	12 551	12 375
Production	10 310	10 717	11 305	11 978	11 399	12 190	13 553	14 798	13 105	12 277	12 100
Extra-EC exports	384	422	496	495	445	466	528	596	550	578	585
Trade balance	5	4	-7	-41	-44	-30	-119	-179	-218	-274	-275
Employment (thousands)	132.5	123.0	134.3	136.7	134.6	136.0	137.9	139.9	139.1	137.9	137.1

(1) B.M.Coope & Partners estimates
Source: Eurostat, B.M.Coope & Partners

Table 2: Construction raw materials, sands and clays
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.8	-0.1	-1.8
Production	1.7	0.7	-1.3
Extra-EC exports	4.4	5.1	3.3
Extra-EC imports	6.6	-17.7	-8.2

Source: Eurostat, B.M.Coope & Partners

Table 3: Construction raw materials, sands and clays
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	384	422	496	495	445	466	528	596	550	578
Extra-EC imports	379	418	503	536	489	496	647	775	768	852
Trade balance	5	4	-7	-41	-44	-30	-119	-179	-218	-274
Ratio exports/imports	1.01	1.01	0.99	0.92	0.91	0.94	0.82	0.77	0.72	0.68
Terms of trade index	104.7	104.4	100.7	100.0	105.4	111.5	117.6	112.7	113.7	113.6
Intra-EC trade	853	875	990	1 011	1 038	1 072	1 220	1 369	1 460	1 493
Share of total imports (%)	69.2	67.7	66.3	65.4	68.0	68.4	65.3	63.9	65.5	63.7

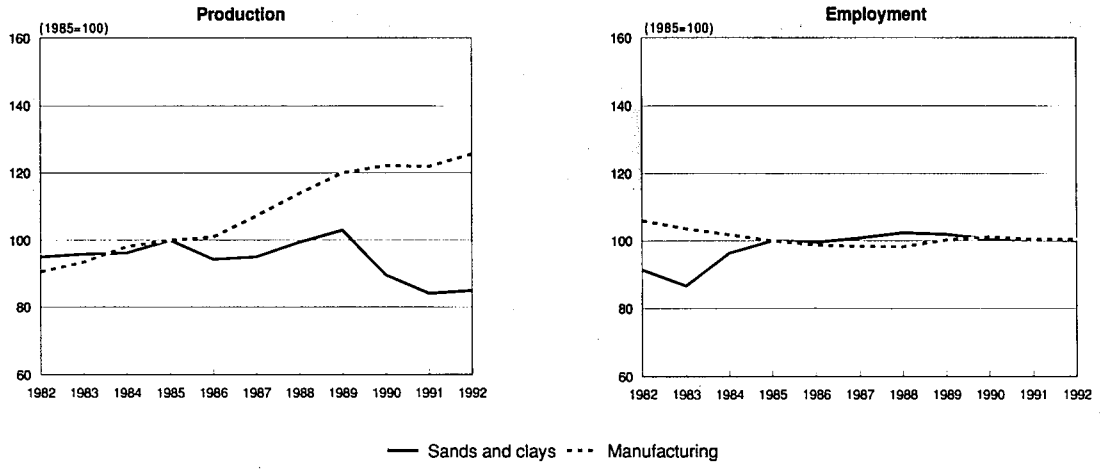
(1) Estimates
Source: Eurostat

Table 4: Construction raw materials, sands and clays
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	35.0	39.5	38.4	40.2	39.1	41.7	46.0	49.8	44.6	42.5
Productivity index	87.1	98.2	95.5	100.0	97.3	103.7	114.3	123.9	111.0	105.6
Unit labour costs index (2)	86.4	88.6	93.7	100.0	106.8	111.5	116.5	120.7	128.4	124.7

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
Source: Eurostat, B.M.Coope & Partners

Figure 3: Construction raw materials, sands and clays
Production and employment indices compared to EC manufacturing



1992 are B.M. Cooper & Partners estimates
Source: Eurostat

highlights were dimension stone granite from Sweden, Finland, and Norway. Other important countries were represented by the USA (mainly kaolin and bentonite) and South Africa (mainly granite and andalusite).

MARKET FORCES

Demand

The construction industry is clearly the dominant factor in any discussion of markets for this group of raw materials. As the fundamental ingredients involved in the construction of roads and buildings demand for the major product lines are directly dependent on overall construction activity.

One notable trend which has been hinted at in earlier sections concerns the increasing use of natural stone (as represented by dimension stone granite and marble) for the exterior and interior surfaces of buildings. Traditional clay facing bricks also experienced strong demand during the 1980s for much the same aesthetic reason.

A more complex picture is in evidence with regard to markets for industrial sands and clays and the industrial grades of limestone and chalk. Major consuming industries for these products are glass and ceramics, metallurgical industries, and fillers and coatings (in the paper, paints, plastics, rubber, sealants and adhesives industries). Silica sand and limestone are both essential ingredients of glass. In the fillers and coatings category it is worth noting the fierce rivalry between two mineral products of this sub-group, namely kaolin and calcium carbonate (prepared from white limestone, marble, or chalk). Demand for both products was strong during the 1980s but calcium carbonate has been replacing kaolin in many paper products, partly as a result of a technological change in the paper making process (from acid to neutral of alkaline sizing).

Supply and competition

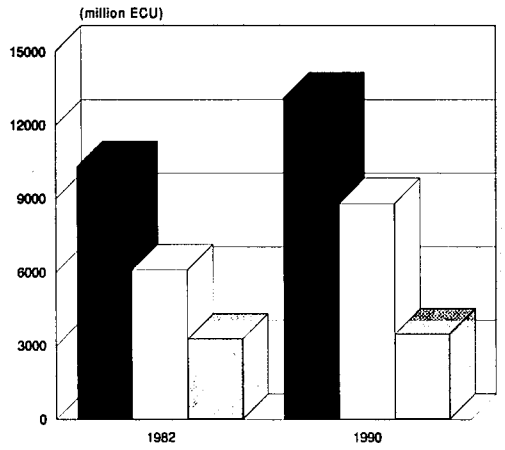
The EC is a major world producer and is theoretically self-sufficient for virtually all the minerals and rocks in this group. Thus prices tend to be an intra-EC affair based on contracts negotiated between producer and consumer. Indeed because of the high degree of captive ownership in the construction minerals area many prices tend to be an intra-company affair.

Transportation is major consideration in bulk raw material markets and thus producers often operate their own trucks and sell on a delivered basis and in many cases sell semi-finished or finished products such as ready-mixed concrete, coated roadstone, and plasterboard. Sales of these value-added products plus the strong element of service offered to the customer often combine to give attractive operative margins for companies operating in the sectors.

Transportation is also the factor which normally rules out foreign competition in bulk construction raw materials on cost grounds. The exceptions to this rule cover situations where non-EC countries are neighbours (e.g. Norwegian and Swedish stone shipped to Denmark and Germany), where "superquarries" have been set up to export stone in low-cost bulk carriers (e.g. Glen Sanda in Scotland), and where high value items are preferred on aesthetic grounds (e.g. dimension stone granite from South Africa, Brazil, and India). In the latter case it should be noted that the EC stone processing industry adds major value to the material before sale and is actively engaged in extra-EC exports of the cut and polished versions of the products.

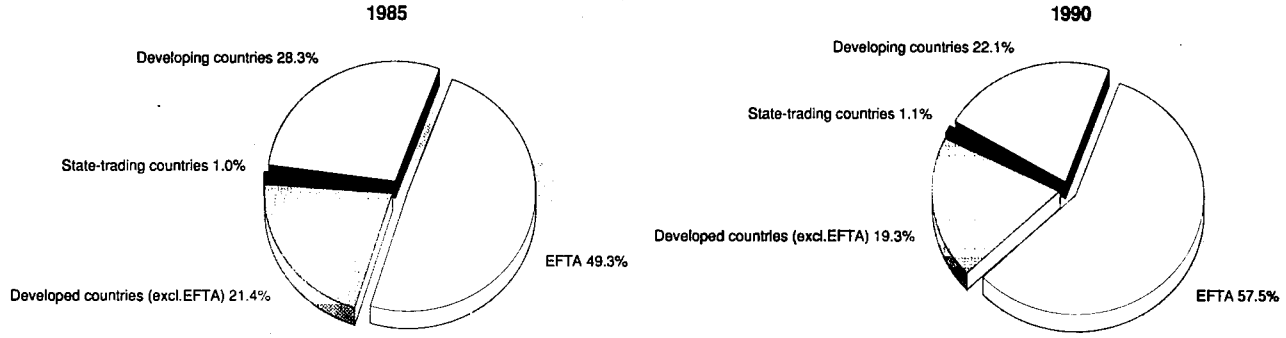
Meanwhile in the industrial clays, sands, and carbonates sub-group the chief foreign competition arises in the kaolin and special clays area. Paper-coating grades of kaolin satisfy many

Figure 4: Construction raw materials, sands and clays
International comparison of production at current prices



Source: Bumines, Eurostat, B.M. Coope & Partners

Figure 5: Construction raw materials, sands and clays
Destination of EC exports



Source: Eurostat, B.M. Coope & Partners

of the requirements of a "strategic mineral" as a result of the scarcity of deposits and their economic importance to a major industry. Large scale world production is limited to south-west England in the United Kingdom, Georgia in the USA, and Amazonia in Brazil. Although the United Kingdom is the principal source for the EC and EFTA countries overall demand is supplemented by significant tonnages imported from the USA and Brazil. The paper industry is highly cyclical and kaolin prices tend to offer high margins at the top end and low margins at the bottom end of the cycle. Market shares do not alter markedly during different stages of the cycle, suggesting that producers from the three areas are more or less balanced in competitive terms within the European arena.

The USA is also a major supplier of bentonite and other smectite clays to EC markets. Some of the products have a technical edge over EC products (for instance, the US sodium bentonites have superior properties over the calcium bentonites of European origin) but this particular field is marked by its diversity (in both range of products and range of end uses) and EC producers continue to satisfy the bulk of demand.

Production process

As discussed earlier, construction raw materials extraction is often in the hands of large construction groups whose activities may range from cement and plaster products manufacture to civil engineering. The quarrying divisions of such groups tend to be large scale, highly mechanised operations with quality control well in evidence to cover what is in essence a crushing and grading exercise. In the aggregates sector these operations co-exist alongside smaller, less sophisticated operations which nevertheless have an important role to play in highly localised markets.

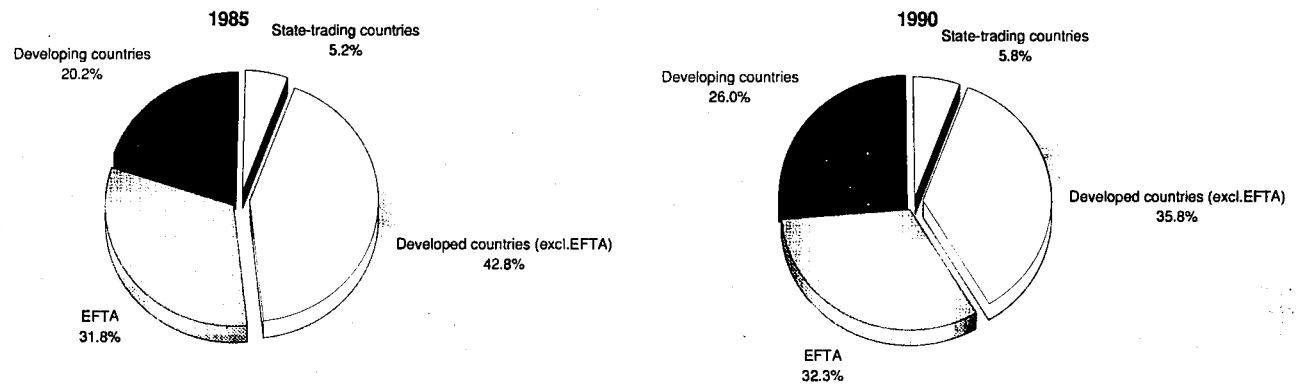
In the industrial clays, sands, and carbonates sector the mineral processing requirement is much greater and may involve a variety of beneficiation techniques as well as fine particle processing and surface modification. Recent advances in processing technology (using techniques such as high intensity magnetic separation, acid treatment, high temperature processing, jet milling, air separation, coating and agglomeration) have improved product quality, expanded raw material reserves, and led to the development of entirely new product grades.

INDUSTRY STRUCTURE

Companies

Certainly some of the largest enterprises operating in construction raw materials sector are the major cement, brick, and aggregates groups such as Lafarge Coppee and Ciments Francais of France; RMC, Redland/Steetley, Tarmac, Tilcon

Figure 6: Construction raw materials, sands and clays
Origin of EC imports



Source: Eurostat, B.M. Coope & Partners

Table 5: Construction raw materials, sands and clays
Distribution of consumption by user demand, 1990

(million ECU)		(%)
Construction	10 658	80.0
Glass & ceramics	932	7.0
Metallurgica	1666	5.0
Fillers & coatings	666	5.0
Other	401	3.0

Source: Eurostat, B.M.Coope & Partners

(BTR), Blue Circle, Hanson, and Evered Bardon of the United Kingdom; Heidelberger Zement, Dyckerhoff, and Basalt AG of Germany; Holderbank of Switzerland; Italcementi of Italy; CBR of Belgium; and CRH of Ireland - all of which measure their employees in thousands or tens of thousands.

Other major enterprises extracting limestone include the lime specialists such as Lhoist, Carmeuse, Rheinische Kalkstein-Werke (Wulfrath), and Buxton Lime (Minorco) and the carbonates producing Omya group (Pluess-Staufer). In the gypsum and plaster sector the major enterprises are BPB Industries (UK), Lafarge Coppee (F), and Gebr. Knauf (D). Major players in the industrial sands industry are Sibelco (B), Quarzwerke (D), Hepworth (UK), and their subsidiaries in other EC countries. In the kaolin and ceramic clays sector major enterprises include English China Clays and Watts Blake Bearne (UK), Amberger Kaolinwerke (D), and AGS and Imetal (F). Major enterprises in the bentonite and special clays sector are Sud Chemie (D), Laporte (UK), Tolsa (E), and Eliopoulos (GR).

In each of the sub-sectors in which they operate, the above named enterprises represent over 60% of total EC turnover. All these companies are either European or international in character. Most of the large cement and aggregate groups maintain major international interests, particularly in North America. This is also true of the major industrial sands and clays enterprises: Sibelco, English China Clays, WBB, and Sud-Chemie.

Strategies

In the construction raw materials sector, market strategies of the larger enterprises are bound up in their downstream activities. Nevertheless there has been a marked consolidation of the industry in the EC itself as major groups have continued to increase reserves of raw material and influence in downstream products by acquisition.

The EC and North America tended to be main areas of focus for acquisitions in the cement and aggregates sectors during the 1980s. More recently the shift of focus towards Eastern Europe has been much in evidence although the 1992 take-over of Steetley by Redland demonstrates that intra-EC consolidation will continue. No major moves have yet been made in the CIS and this is unlikely to happen until greater stability rules.

US acquisitions have also been made by major EC operators in the industrial sands and clays sector. Sibelco of Belgium acquired the USA's largest silica sand producer, Unimin, in the mid-1980s and incidentally the second largest producer there, US Silica, is now owned by RTZ (UK). In 1990/91 English China Clays (UK) acquired the USA's largest kaolin producer, Georgia Kaolin Co, to add to its existing operations in the USA. Watts Blake Bearne (UK) acquired United Clays in 1989 and Laporte (UK) acquired Southern Clay Products and Waverley Mineral Products.

In the aggregates sector the acquisition of quarries (or sand gravel pits) is a prime motive - i.e. the best way to increase aggregate reserves (with planning permission) and to maximise involvement in major construction activity is to acquire existing operations and invest to expand or modernise as required.

In the cement sector the prime motive is in acquiring the cement producing unit and the limestone reserves a secondary consideration. The European cement industry has suffered from overcapacity in the past and thus many mergers and acquisitions were part of the rationalisation process. However, more recent acquisitions by the big international groups have been aimed at increasing influence in non-traditional regions - e.g. the USA, Iberia, Eastern Europe, Turkey, etc. Intra-EC investments have often involved new technologies to cut production (and particularly energy) costs.

Meanwhile investment by the industrial sands and clays sector in recent years would appear to be directed at product development and process improvements rather than to exploration or expansion.

REGIONAL DISTRIBUTION

Aggregates and cement are produced throughout the EC with all 12 countries recording production. With regard to aggregates, sand and gravel is more prevalent in low-lying regions and crushed stone more common in highland areas. Dimension stone workings tend to be highly concentrated, for instance in the Carrara marble district of Italy and the Pontevedra/Badajoz granite district of Spain. Gypsum is not nearly so widespread as limestone but large deposits exist in Germany, France, Spain, and the United Kingdom and mining (both open cast and underground) and processing (including plaster and plasterboard) tend to be carried out at single sites. Silica sand is fairly widespread although the naturally pure deposits suitable for glass sand are located in Belgium and in the north of Germany and France. Sand deposits elsewhere usually require intensive beneficiation to achieve acceptable levels of purity.

The Cornwall and Devon region of England accounts for about two-thirds of total EC kaolin output. Other significant centres include Bavaria in Germany and Brittany in France. The main ball and ceramic clay producing districts in the EC are Westerwald in Germany, Charente in France, and Devon in the United Kingdom. The main bentonite centres are Bavaria in Germany, Milos island in Greece, Sardinia in Italy, and South-East England whilst the region around Madrid is the sepiolite capital of the world.

ENVIRONMENT

Most of the minerals and rocks in this group are mined by open cast methods and operations therefore consist of a quarry (or sand and gravel pit) with associated processing plant. Many such operations are thus highly visible and subject to the so-called NIMBY factor (Not In My Back Yard).

The modern quarrying industry has an excellent record for dealing with potential problems such as dust emissions and noise pollution during the life of an operation and for restoration of the land once the extractive process has finished.

Many of the products of these industries are used in environmental processes (e.g. limestone and lime in water and air treatment, silica sands for water filtration, absorbent clays for oil spills, etc.). Paradoxically many limestone and lime-based processes to remove sulphur from gases or waste streams yield chemical gypsum as by-product. The use of this by-product gypsum will reduce demand for natural gypsum.

OUTLOOK

The EC will continue to be a major centre for the production of construction raw materials, sands, and clays. EC enterprises operating in this sector will continue to be major players on

Table 6: Construction raw materials, sands and clays
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	0.9	3.3
Production	2.0	3.5
Extra-EC exports	0.0	0.0

Source: B.M.Coope & Partners

the world scene. Future development of EC production and consumption will be closely tied to the overall level of building activity.

With regard to future demand, construction raw material markets will remain an predominantly intra-EC affair with any resurgence governed by overall EC building activity. Some influence from the expected building boom in Eastern Europe will be apparent although the EC's exported products are more likely to be finance, management expertise, and technology rather than physical volumes of bulk construction minerals.

The latter comment can also be applied to the field of industrial clays, sands, and carbonates although there will undoubtedly be increased levels of inter-trade between the EC and former CMEA countries - initially with eastward trade prompted by quality requirements and westward trade more a function of price.

Written by: B.M. Coope & Partners
The industry is represented at the EC level by: European Aggregate Association / Union Européenne des Producteurs de Granulats. Address: Rue Alfred Roll 3, F- 75017 Paris Cedex 17; tel: (33 1) 44 01 47 01; fax: (33 1) 40 54 03 28.

Potassium salts and natural phosphates
NACE 232

The EC is a major producer, consumer, and exporter of potassium salts (generally referred to under the commercial title, potash). It does not, however, produce any natural phosphates and is thus a major importer of phosphate rock. These two products are used primarily in the manufacture of chemical fertilisers, an activity in which the EC features strongly as a major producing region. The economic performance of this industry is closely tied to levels of agricultural output.

INDUSTRY PROFILE

Description of the sector

The EC potash industry mines potash ores from underground workings and at associated plants at the surface processes the ore into saleable products. The principal techniques used for producing rock potash include flotation, electrostatic separation, and evaporation and crystallisation for special grades. The main commercial product is potassium chloride, also known as muriate of potash, although the EC producers also prepare grades of potassium sulphate and mixed salts containing potassium and magnesium.

Potash in this form can be applied directly to the soil but is normally sold to fertiliser manufacturers for blending with phosphate and nitrogen compounds into mixed (NPK) fertilisers. Purer grades of potassium chloride are used to produce potassium hydroxide, and industrial chemical used in soaps and detergents, glass and ceramics, chemical dyes and drugs.

Potash statistics are often presented in terms of K_2O content. For instance, potassium chloride has a theoretical K_2O content of 63.2% and is commonly sold on a minimum 60% K_2O basis.

Potash ores are commonly associated with rock salt (the sodium chloride ore, halite) and thus potash producers tend to produce salt as a by-product or co-product.

Main indicators

As shown in Figure 2, potash is produced in five EC countries, with Germany and France accounting together for more than 70% of total production. During the 1982-1991 period both production and consumption of potash rose to a peak in 1985, since which time production has declined by 24% and consumption by 38%. The declines reflect both falling tonnages and prices. Employment in the sector was also badly affected by this poor performance, declining of about 7 000 units in the 1982-1992 period.

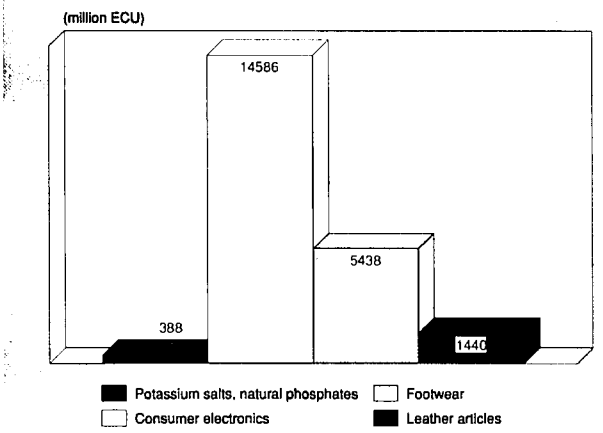
International comparison

The USA is a major producer of both phosphate rock and potash although the bulk of its potash requirements are actually met by imports from its northern neighbour, Canada. Combined production and consumption showed a small increase in tonnage during the period under review but in real value terms showed a similar decline to the EC. Japan does not produce either product and consumption, particularly of phosphates, declined markedly during the 1982-1990 period.

Foreign trade

The EC is active in both import and export trade in potash. Imports during the 1982-1991 period were primarily from Israel, the former Soviet Union, former East Germany, and Canada. Exports were primarily to India, China, Brazil, Japan,

Figure 1: Potassium salts and natural phosphates Value added in comparison with other industries, 1990



Source: Eurostat

and Algeria. With no production of its own, the EC is a major importing region for phosphate rock and the main sources are Morocco (about 40% of total) followed by the USA, Israel, Togo, and South Africa.

The patterns of trade have remained more or less the same throughout the period under review although the total (particularly for phosphate rock) has fallen. It should be noted that some source countries increasingly ship phosphoric acid rather than phosphate rock to the EC countries.

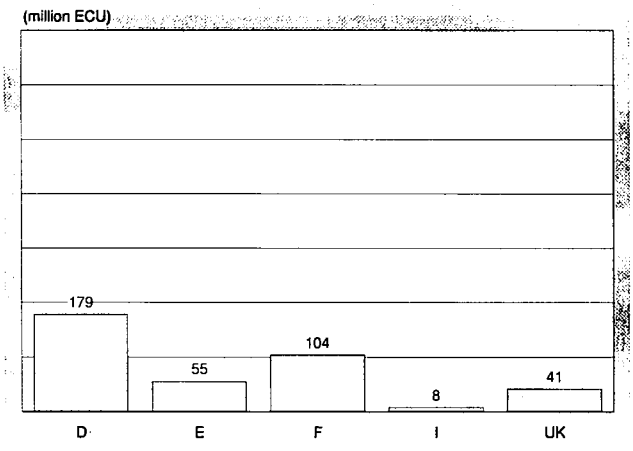
Production and exports (both intra- and extra-EC) both increased in the early part of the 1980s but after 1985 production declined, extra-EC exports fell and partially recovered, and intra-EC exports remained stable. Both extra-EC imports and EC consumption declined during the 1982-91 period.

MARKET FORCES

Demand

The fertiliser industry is clearly the dominant factor in any discussion of markets for potash and phosphate rock. This industry is itself highly dependent on demand from EC agriculture and is thus subject to political factors and environ-

Figure 2: Potassium salts and natural phosphates Value added by Member State, 1990



Source: Eurostat

Table 1: Potassium salts and natural phosphates
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
Apparent consumption	1 743	1 762	1 990	2 081	1 702	1 599	1 577	1 581	1 370	1 295	1 260
Production	899	915	1027	1082	920	952	960	852	826	822	815
Extra-EC exports	182	191	272	228	177	165	184	194	200	200	200
Trade balance	-844	-847	-963	-999	-782	-647	-617	-729	-544	-473	-445
Employment (thousands)	17.0	16.1	15.2	12.9	12.9	12.5	12.0	11.6	11.1	10.7	10.2

(1) B.M.Coope & Partners estimates
Source: Eurostat

Table 2: Potassium salts and natural phosphates
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.6	-11.7	-7.0
Production	2.9	-10.0	-4.2
Extra-EC exports	3.4	-3.6	-0.2
Extra-EC imports	2.5	-11.6	-8.2

Source: Eurostat, B.M.Coope & Partners

Table 3: Potassium salts and natural phosphates
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	182	191	272	228	177	165	184	194	200	200
Extra-EC imports	1 026	1 038	1 235	1 227	959	812	801	923	744	673
Trade balance	-844	-847	-963	-999	-782	-647	-617	-729	-544	-473
Ratio exports/imports	0.18	0.18	0.22	0.19	0.18	0.20	0.23	0.21	0.27	0.30
Terms of trade index	117.7	77.5	82.6	100.0	102.3	110.2	108.9	121.0	134.4	159.0
Intra-EC trade	238	249	274	316	269	311	283	314	297	280
Share of total imports (%)	18.83	19.35	18.16	20.48	21.91	27.69	26.11	25.38	28.53	29.38

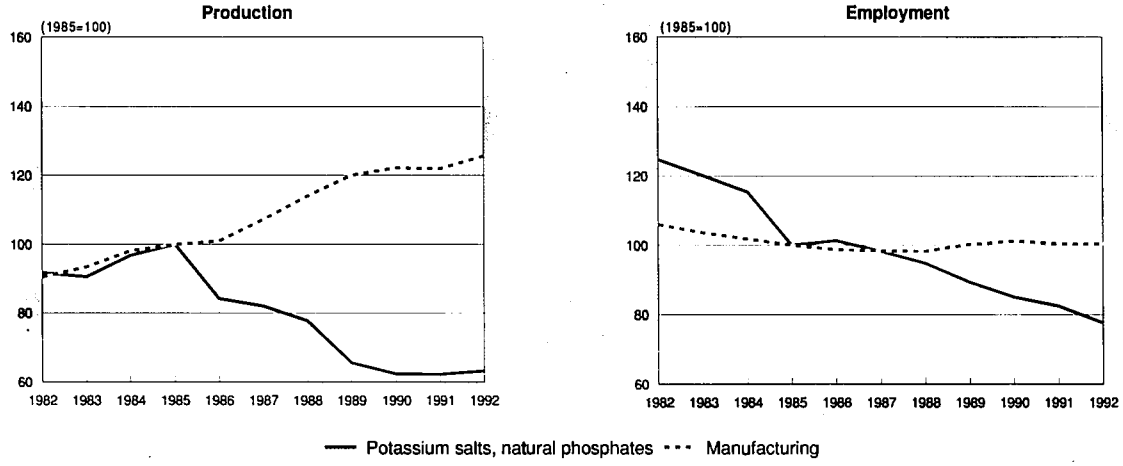
(1) Estimates
Source: Eurostat

Table 4: Potassium salts and natural phosphates
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	23.5	25.5	30.5	38.0	32.4	34.9	36.7	34.1	34.6	35.9
Productivity index	61.8	67.1	80.3	100.0	85.3	91.9	96.6	89.7	91.1	94.6
Unit labour costs index (2)	82.1	89.1	96.7	100.0	101.7	105.2	114.6	122.3	128.3	132.7

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
Source: Eurostat

Figure 3: Potassium salts and natural phosphates
Production and employment indices compared to EC manufacturing



1992 are B.M. Coope & Partners estimates
Source: Eurostat

mental issues as well as the vagaries of agricultural production and practices.

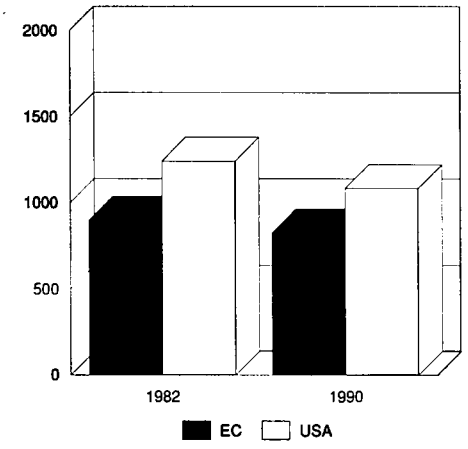
Both potassium and phosphorus are essential to plant growth and neither can be substituted. If levels of usage are cut in one year it normally means that correspondingly higher levels are required in subsequent years to maintain agricultural production levels.

Demand should continue to grow in Third World countries that are eager to boost agricultural yields but their ability to pay may be governed by aid programmes.

Supply and competition

In world terms both the potash and phosphate rock industries have tended towards oversupply in recent years as demand has fallen, particularly in the developed world. Potash prices have been subjected to greater downward pressure because of the much higher overcapacity existing in countries such as Canada and the former Soviet Union (the world's two largest producers) and because of lower prices being offered from the former Eastern Bloc and from low-cost brine-based producers.

Figure 4: Potassium salts and natural phosphates
International comparison of production at current prices



Source: Bumines, Eurostat, B.M. Coope & Partners

The EC potash industry will face competition from foreign suppliers with lower labour costs (e.g. the former Soviet Union), high productivity (e.g. Canada with its economies of scale), and more accessible raw materials (e.g. the brine deposits of the Dead Sea exploited by Israel and Jordan).

Production process

EC potash production involves underground mining, which is still fairly labour intensive despite the use of continuous mining machines and ancillary equipment. Processing plants are based on modern versions of long-established technologies but improvements in productivity have been achieved through increasing recoveries, etc.

INDUSTRY STRUCTURE

Companies

Today the EC potash industry consists of five large enterprises, one each in the five countries recording production. The most recent corporate change has been the grouping of the three Spanish operations under the collective ownership of the state owned INI.

The principal enterprises, with the approximate numbers of employees and shares of overall turnover are: Kali und Salz (D) with 5 000 employees and 46% of total turnover; MDPA (F) 3 000 and 27%; INI (E) 2 000 and 14%; Cleveland Potash (UK) 880 and 11%; Italkali (I) 660 and 2%.

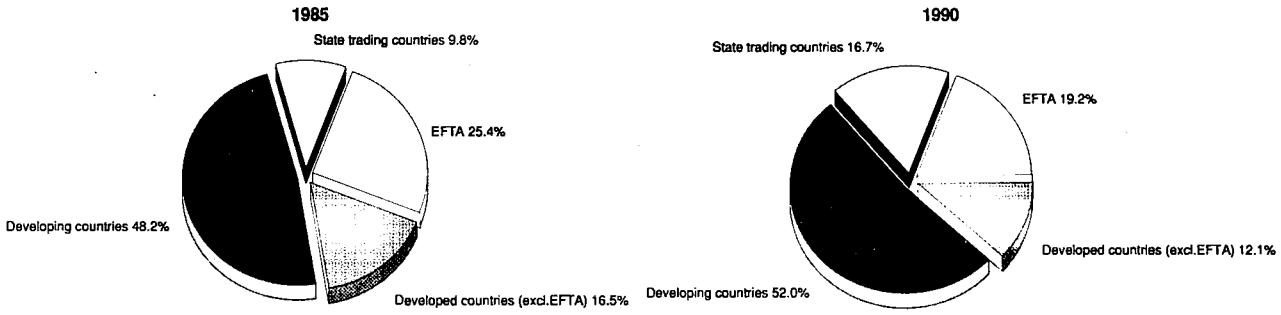
Government involvement in the industry is well in evidence in France, Spain, and Italy. Meanwhile Kali und Salz is predominantly owned by the German chemical company, BASF, and Cleveland Potash is owned by Anglo-American Corp. of South Africa.

It should also be noted that the former East Germany is a major producer of potash and in former days operated at the 3.5 million tonnes K_2O level. Since the reunification of Germany the industry has been reorganised under the banner of Mitteldeutsche Kali. Some of the uneconomic and most heavily polluting operations have been closed and the leaner and fitter organisation remaining has a capacity closer to 1.8m tonnes K_2O per year.

Strategies

Within the EC, the French and German producers still exercise strong influence over the marketing of potash in continental

Figure 5: Potassium salts and natural phosphates
Destination of EC exports



Source: Eurostat

Europe. The two enterprises also have a joint venture based in Vienna to conduct extra-EC sales and another in Canada which owns the New Brunswick potash producer, Potacan. It should be noted that the French MDPA has a schedule in which current production levels will be maintained until the late 1990s before a progressive reduction will result in closure in 2004 as reserves are depleted.

Investment in the industry during the 1980-1991 period has tended to be aimed at product development (e.g. adding granulating plant to produce granulated grades of potash) or process improvement. The last totally new operation to be built in Europe was the Cleveland Potash operation in the United Kingdom which entered production in the mid-1970s.

REGIONAL DISTRIBUTION

The EC's main producing centres are around Hanover and to the west of Halle in Germany; Alsace in France; to the north of Barcelona and near Pamplona in Spain; north-east England in the United Kingdom; and in Sicily in Italy.

ENVIRONMENT

The principal environmental issue for the EC potash industry concerns the salt that is produced during the processing of potash ores. Although some is processed into a commercial product the scale of production often means that vast tonnages of waste salt are generated. In the past this waste has been discharged into rivers such as the Rhine (and the Werra in former East Germany) but legislation has forced producers to adopt alternative means of disposal, to increase production of saleable salt, or to close down the main offending operations.

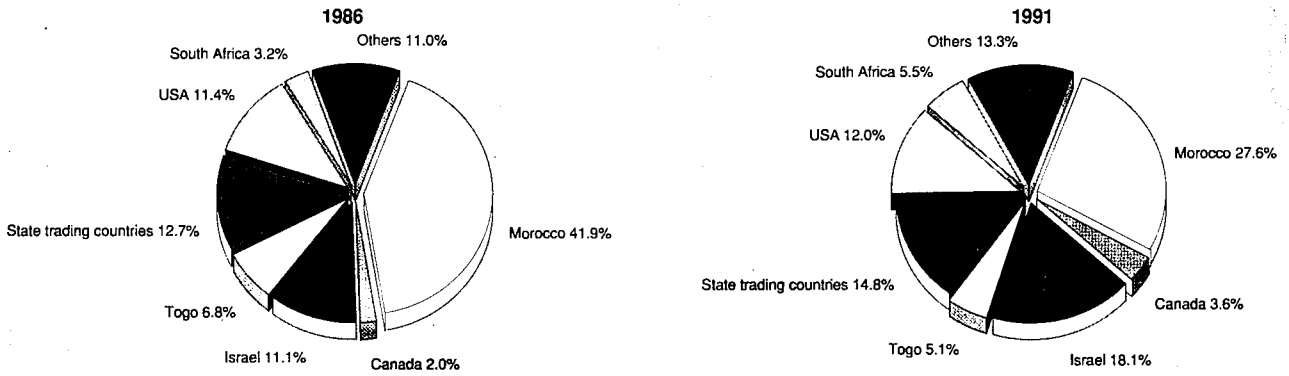
Fertiliser usage has also become a major environmental issue in recent years because of the damaging effects of phosphorus and nitrogen in water courses. Thus although potassium is not regarded as a direct problem it is affected by the cutback in mixed fertiliser application.

OUTLOOK

The EC potash industry is likely to undergo an orderly wind-down over the next decade, particularly in France, Spain, and Italy. Production in Germany and the United Kingdom will probably be maintained at current levels. Those companies wishing to continue or expand production will tend to seek participation in foreign ventures.

Future EC consumption of potash and phosphates is likely to show only modest growth. The further requirement for extra-EC imports of potash (to meet the above shortfall) should

Figure 6: Potassium salts and natural phosphates
Origin of EC imports



Source: Eurostat

Table 5: Potassium salts and natural phosphates
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.0	2.2
Production	1.0	1.0
Extra-EC exports	1.0	1.0

Source: B.M.Coope & Partners

be met from existing capacity in the former Soviet Union and Canada.

Written by: B.M. Coope & Partners
The industry is represented at the EC level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville, 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Crystallised salt
NACE 233

EC production of crystallised salt reached 20.4 million tonnes in 1991. Consumption amounted to 19.9 million tonnes. Over-capacity and diversity are the main features of the salt sector: demand fluctuates with climatic and economic conditions. In the recent past, three successive mild winters have led to a dramatic reduction in the sales of road salt. Deliveries collapsed from 6.4 million tonnes in 1985 to 1.4 million tonnes in 1989. There is also some industry concern that the demand for chlorine which is the main outlet for salt may again decline.

INDUSTRY PROFILE

Description of the sector

Salt production basically involves solar evaporation (sea salt), dry mining (rock salt) and solution mining (vacuum salt, salt in brine). In the monograph, salt in brine will be excluded unless otherwise specified.

Main indicators

Output of crystallised salt contracted in recent years from 23.8 million tonnes in 1986 to 19.3 million tonnes in 1990. It recovered in 1991 to 20.4 million tonnes. Salt consumption within the EC is now back to the 1986-1987 level of 20 million tonnes, after falling to a low of about 17 million tonnes.

The breakdown of production by main product line shows that in 1991 rock salt accounted for 43% of total crystallised salt production, followed by vacuum salt with 39% and solar salt with 18% respectively. During the period 1988 to 1990 production of rock salt had decreased sharply (by nearly 25% in 1988 alone), thus making vacuum salt the main product line of the EC salt industry.

International comparison

Salt consumption is higher in the USA than in the EC. In 1991, US overall salt consumption stood at 23.8 million tonnes compared to 19.9 million tonnes in the EC. The proportion increases if per capita consumption is considered. In fact, in 1991 overall per capita consumption of salt in the USA reached 95.2 kilos, compared with 62.2 kilos in the EC. However, consumption patterns vary according to the end use of salt. For example, per capita consumption of food grade salt is higher in the EC than in the USA (7.2 kilos against 4.4 kilos respectively). On the other side, US road salt consumption is twice the size of that of the EC (9.7 million tonnes compared to 5 million tonnes respectively).

Foreign trade

In 1989, extra-EC imports amounted to 0.5 million tonnes and extra-EC exports reached 1.3 million tonnes. Intra-EC trade was 3.2 million tonnes, equivalent to 71% of total exports and 94% of total imports. Both the exports to imports ratio and the trade balance steadily decreased during the 1982-1990 period, and showed some signs of recovery in 1991.

Trade in salt is relatively unimportant, accounting for 10% or less of total production on average. The EFTA countries represent the main destination of extra-EC exports, while on the import side developing countries supply nearly three quarters of total extra-EC imports.

MARKET FORCES

Demand

Successive mild winters have had an adverse effect on the requirements for road salt. This is reflected in the reduced output of rock salt which is mainly used as a de-icing agent (except in Germany). Rock salt is not alone in being exposed to the climate changes: solar salt too is also dependent upon climate variations. Heavy rains in summer may have a detrimental impact on solar evaporation.

Demand for salt in other outlets has essentially remained static although the chemical industry has registered sustained growth during the 1988-90 period. Salt sales have been fuelled by the water treatment processes, which are expanding. The recent buoyancy in chloralkalis has changed to some sluggishness.

Other clients of the salt industry include the dyestuffs and the soap manufacturing industries. Pure salt is added to some explosives as a flame retardant. Leather tanning used special grain size of salt for the preparation of skins. High purity salt is utilised in the production of pharmaceuticals.

Supply and competition

The EC market for crystallised salt is shown in Figure 2. Certain quantities mentioned under the "food grade salt" heading relate to other outlets. The importance of the "miscellaneous industries" heading illustrates the difficulty of allocating certain tonnages under the right heading.

In 1991, sales of food grade salt amounted to some 2.3 millions tonnes. Salt sales to the food industries and to the households do not relate solely to the dietary use of this type of salt. Although sales of food grade salt reach about 20 grams daily per capita, the actual dietary salt intake is only around six to seven grams. According to INTERSALT and other studies, median salt intake is far lower than anticipated.

For miscellaneous industries, which includes agriculture, water softening and other outlets, salt sales amounted to 3.2 million tonnes. In agriculture, salt is used in cattle feed, to preserve green fodder and to improve soil deficiency in sodium (fertiliser for sugar beet in the United Kingdom). One of the increasing outlets for salt is the regeneration of ion exchange resins used in water softening. In the United States the sales of special salt for water conditioning increased by 12% over five years. In the EC the situation remains contrasted and varies from one Member State to another.

Sales of crystallised salt to the chemical industry amounted to 9.4 million tonnes in 1991. The production of chlorine

Table 1: Crystallised salt
Main indicators in volume

(million tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Consumption	17.5	16.1	17.1	21.2	20.1	20.8	17.7	17.1	17.6	19.9
Production	21.0	19.5	20.4	22.4	23.8	23.2	21.4	20.1	19.3	20.4
Intra-EC trade (1)	2.6	2.5	2.9	3.9	3.7	3.5	3.1	2.9	3.1	3.4
Extra-EC exports (1)	2.3	2.0	1.9	2.3	2.0	1.7	1.4	1.3	1.5	2.0

(1) 1991 estimates
Source: European Committee for the Study of Salt, Eurostat

Table 2: Crystallised salt
External trade in value

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	95.5	89.4	72.6	72.1	53.9	65.8	49.6	53.3	51.0	66.2
Extra-EC imports	6.5	6.0	9.6	10.9	12.5	13.4	11.1	14.0	13.0	10.5
Trade balance	89.0	83.4	63.0	61.2	41.4	52.4	38.5	39.3	38.0	55.7
Ratio exports/imports	14.6	14.9	7.6	6.6	4.3	4.9	4.5	3.8	3.9	6.3
Terms of trade index	95.3	99.0	104.2	100.0	114.3	124.1	120.5	122.8	119.4	117.7
Intra-EC trade	87.5	88.1	109.0	141.7	139.9	131.8	124.6	120.9	132.3	149.5
Share of total imports (%)	93.1	93.6	91.9	92.9	91.8	90.8	91.8	89.6	91.0	93.4

(1) Estimates
Source: Eurostat

decreased by 5%. In Europe as a whole there is a structural surplus of chlorine. The production levels have fallen in most of the Member States. The requirements are also estimated to have dropped by 5%. This slump is accredited to weaker demand from both the paper and pulp and the aluminium industries. Three technologies are used at present to manufacture chloralkalis by electrolysis. The breakdown of the technologies in 1991 was as follows: mercury (crystallised salt), 68%; diaphragm (salt in brine), 5%; membrane (crystallised salt), 7%.

The requirements for road salt to clear ice and snow from roads depend on weather conditions. In 1991, demand amounted to 5 million tonnes. The substantial contribution of winter maintenance to traffic safety and transport economics depends not only on the level of service but also on the improvements of salt spreading. Many countries extensively use wet salt for preventive treatment. Apart from the reduction in spreading quantities, direct environmental improvements are also achieved. But winter maintenance with curtailed salt spreading, including the so-called white networks, increases the risk of accidents significantly.

INDUSTRY STRUCTURE

Companies

The structure of the EC salt industry is characterised by a high degree of concentration. The most powerful operators are chemical companies which have departments specialised in salt production for their activity. Among the largest companies are Akzo (NL), the world's largest salt producer, Solvay (B), ICI (UK) and Kali und Salz (D), which belongs to the BASF group. Elsewhere one finds a number of private companies such as the Compagnie des Salins du Midi (F) and British Salt (UK), or semi-public companies, particularly in Greece and Italy. For soda ash, the main supplier is Solvay with production facilities in seven countries. Brunner Mond & Co. is the second largest manufacturer in Europe. The company was formed in 1991 following the sale of ICI Soda Ash Products to a group of investors led by Penrice Ltd.

Strategies

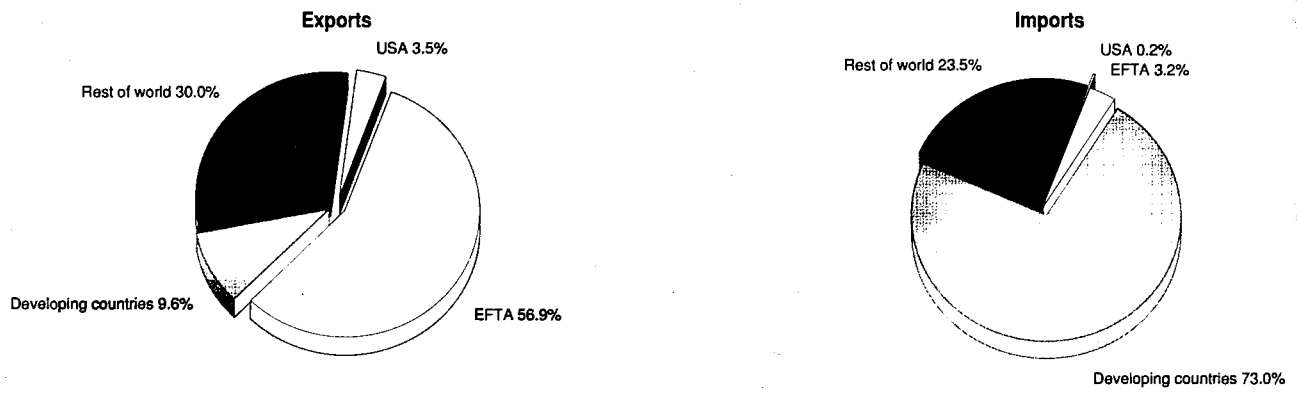
ICI has sold its salt facilities: the Winsford mine with a capacity of 1.8 million tonnes and the Weston Point operation with a 1.0 million tonnes capacity. The new owner, a US based group of investors, is now operating both of them under the name of Salt Union Ltd. ICI said that supplies of brine, essential for its own chlorine production, will continue.

Solvay has recently increased its annual production capacity of soda ash by 540 000 tonnes with the return of its Bernburg plant.

Kali und Salz, BASF's potash and rock salt subsidiary, decided in the beginning of 1991 to shut down part of its operations and reduce its services. All rock salt production is to be concentrated at the mine at Braunschweig-Luneburg.

Finally, in 1991, the company Asensio Madrid SA (E) started vacuum salt production in a plant with an initial capacity of 30 000 tonnes per year.

Figure 1: Crystallised salt
Destination of EC exports and origin of EC imports, 1991



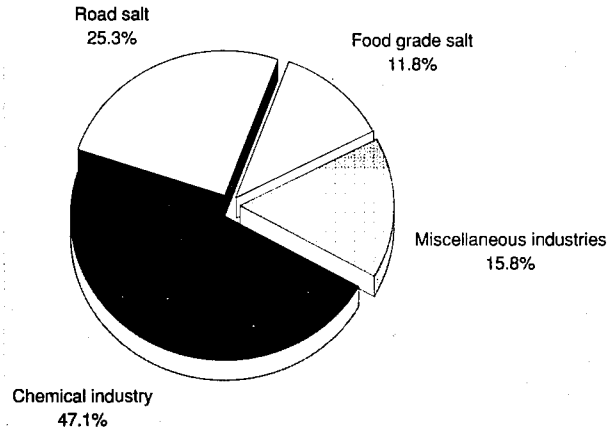
Source: Eurostat

Table 3: Crystallised salt
Breakdown by product line

(thousand tonnes)	Rock salt	Solar salt	Vacuum salt	Total
1982	9 569	2 820	8 573	20 962
1983	8 812	2 565	8 120	19 497
1984	9 543	2 539	8 281	20 363
1985	11 194	2 456	8 780	22 430
1986	11 806	3 728	8 284	23 818
1987	11 176	3 725	8 332	23 233
1988	8 456	4 068	8 869	21 393
1989	7 707	3 714	8 721	20 142
1990	7 851	3 300	8 151	19 302
1991	8 889	3 536	7 998	20 423
1992 (1)	8 100	2 900	7 700	18 700

(1) COMESEL estimates
Source: European Committee for the Study of Salt

Figure 2: Crystallised salt
Consumption by sector



Source: European Committee for the Study of Salt

ENVIRONMENT

In selecting different studies irrespective of their scientific standards, to obtain "a quantitative estimate of the effect of sodium intake on blood pressure" researchers are still emphasising the importance of sodium restriction in the population at large and recommending both low sodium food and low sodium diet. However, recent data indicate that a life-long restriction of salt is dangerous for the general population. Moreover, salt is used in several Member States as a carrier of iodine and/or fluoride. In that case, sodium restrictions might have a detrimental impact on preventive steps recommended by the World Health Organisation (WHO) and supported by national authorities.

OUTLOOK

It is very difficult to predict the future of the salt industry. Almost 50% of crystallised salt is used in the chemical industry. Therefore, the salt industry is highly dependent on developments in the chemical industry. Furthermore, many clients of the chemical industry, such as the paper industry and water treatment plants, are expected to decrease their use of chloralkalis in the coming years.

The second largest use of crystallised salt is as road salt. Variations in the severity of winter weather conditions from year to year have unforeseeable effects on demand for road salt. The continuing decline in consumption of food grade salt is a source of concern for salt producers.

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Other minerals and peat

NACE 239

The EC is a major world producer of industrial minerals. Amongst the remaining industrial minerals grouped in NACE 239 the EC can claim to produce more than 25% of the world's diatomite, dolomite, feldspar, perlite and pumice and more than 10% of the world's barite, fluorspar, magnesite, sulphur and talc. The EC is also an important producer of peat, a fuel mineral with important agricultural applications. EC producers account for more than half the peat produced outside the former Soviet Union.

INDUSTRY PROFILE

Description of the sector

The industrial minerals included in NACE 239 include multi-purpose bulk products such as dolomite (used in construction, agriculture, metallurgy, chemicals, glass, ceramics, and as industrial fillers); single-purpose bulk items such as sulphur (used to produce sulphuric acid); and low volume, high value items such as graphite (used in refractories, lubricants, electronics, brake linings, carbon brushes, etc.).

The full list of EC-produced items would cover asbestos, barite, celestite, diatomite, dolomite, feldspar, fluorspar, graphite, iron oxide pigments, magnesite and other magnesium compounds (e.g. magnesium chloride brines and natural magnesium sulphate), mica, olivine (and dunite), perlite, pumice and pozzolana, sulphur (including pyrites and by-product sources), and talc.

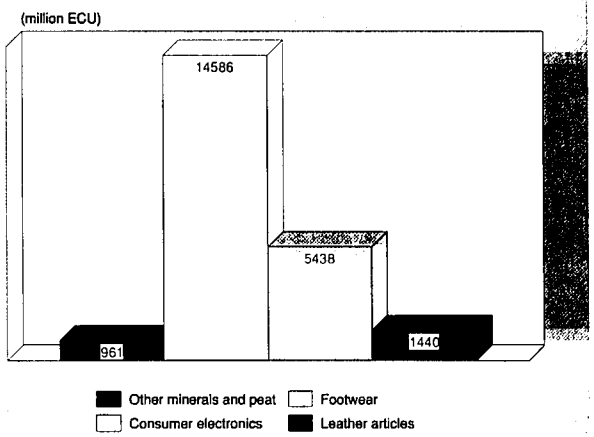
A number of the operations producing these minerals are controlled by consuming companies, for instance, refractory manufacturers (magnesite and dolomite), chemical manufacturers (fluorspar and barite), oil and gas companies (by-product sulphur), and glass producers (feldspar and dolomite). Others are controlled by specialist industrial minerals companies whose interests would also include related products in NACE 231 and NACE 232. Some major metals and metallic ore producers also have interests in some of these operations.

Main indicators

Consumption peaked in 1989 and the subsequent decline reflects the current industrial recession. In contrast production values peaked in 1985 but the picture was distorted by the high prices of sulphur prevailing during the mid-1980s. Germany, France, and the United Kingdom are the leading producers in this group followed by Italy, Spain, Ireland (almost solely on account of its peat production), and Greece (where magnesite, perlite, and pumice are prominent).

In value terms sulphur, dolomite, and peat are the major items in this group (accounting respectively for 25%, 26% and 12% of total production). The special position of magnesia and magnesium compounds should also be mentioned. Within the EC magnesia is obtained from natural magnesite in Greece and Spain; from sea water in the United Kingdom, Ireland, and Italy; from solution mining of magnesium-rich salts in the Netherlands; and as by-product of solar salt production in France. Magnesium sulphate and magnesium chloride are also extracted as a by-product of potash mining in Germany. However, since the greater proportion of this production is derived by chemical process it does not meet the strict definition of NACE 239 and thus only magnesite-based magnesia is included in production figures for this section (although for foreign trade it should be noted that figures do not differentiate between magnesia of natural or synthetic origin).

Figure 1: Other minerals and peat
Value added in comparison with other industries, 1990



Source: Eurostat, B.M. Coope & Partners

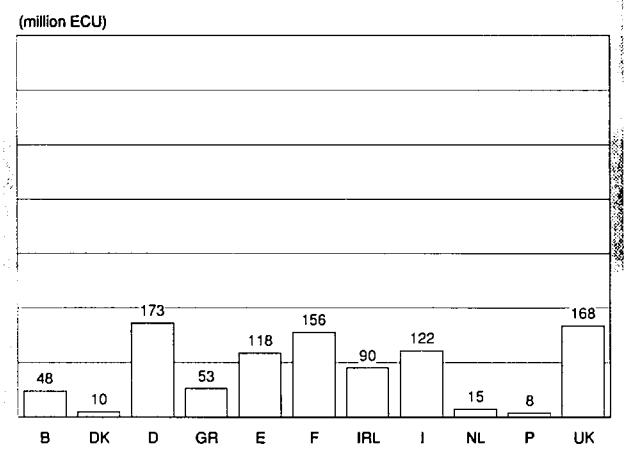
International comparison

Declining production values for the USA and Japan since 1985 are also partly attributable to the sulphur price factor although in the case of Japan the falling price of iodine was an extra factor in the scale of its decline. Production of products such as asbestos and barite fell in all three regions throughout the 1982-1991 period. It should also be noted that apparently stable prices for many industrial minerals represented a price fall in real terms which often masked volume growth during the 1985-1990 period.

Foreign trade

The EC is an active exporter of magnesia and magnesium compounds, sulphur, and peat. As Table 3 shows, however, the EC is very much a net importer with the major imported items being magnesia and magnesium compounds, sulphur, asbestos, and borates but with products such as talc, graphite, feldspar, fluorspar, peat, barite, and vermiculite also prominent. The negative trade balance has decreased significantly since 1985 and at the same time the levels of intra-EC trade have grown to account for 50% of total imports.

Figure 2: Other minerals and peat
Value added by Member State, 1990



Source: Eurostat, B.M. Coope & Partners

Table 1: Other minerals and peat
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
Apparent consumption	2 801	2 767	2 999	3 397	2 949	2 507	2 593	2 838	2 635	2 535	2 650
Production	2 082	1 973	2 270	2 560	2 291	1 960	2 034	2 260	2 109	1 993	2 100
Extra-EC exports	316	284	347	354	257	245	263	298	280	258	250
Trade balance	-719	-794	-729	-837	-658	-547	-559	-578	-526	-542	-550
Employment (thousands)	20.8	19.5	22.2	24.7	21.9	18.5	19.0	20.9	19.3	18.0	18.8

(1) B.M.Coope & Partners estimates
Source: Eurostat, B.M.Coope & Partners

Table 2: Other minerals and peat
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.2	-9.6	-5.0
Production	3.7	-7.4	-3.7
Extra-EC exports	-0.4	-3.9	-3.5
Extra-EC imports	1.0	-12.8	-7.3

Source: Eurostat, B.M.Coope & Partners

Table 3: Other minerals and peat
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	316	284	347	354	257	245	263	298	280	258
Extra-EC imports	1 035	1 078	1 076	1 191	915	792	822	876	806	800
Trade balance	-719	-794	-729	-837	-658	-547	-559	-578	-526	-542
Ratio exports/imports	0.31	0.26	0.32	0.30	0.28	0.31	0.32	0.34	0.35	0.32
Terms of trade index	105.9	106.6	99.7	100.0	114.1	117.8	120.3	121.8	115.7	112.7
Intra-EC trade	579	658	657	754	769	755	797	717	837	825
Share of total imports (%)	35.9	37.9	37.9	38.8	45.7	48.8	49.2	45.0	50.9	50.8

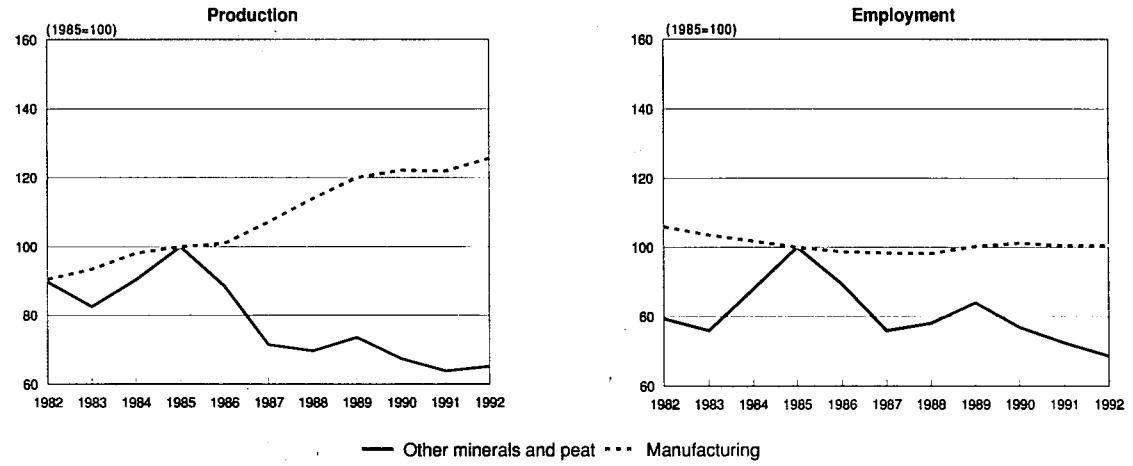
(1) Estimates
Source: Eurostat. B.M.Coope & Partners

Table 4: Other minerals and peat
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	44.5	45.3	46.0	46.8	47.6	48.4	49.2	50.1	50.9	51.7
Productivity index	95.0	96.7	98.3	100.0	101.7	103.4	105.2	106.9	108.7	110.5
Unit labour costs index (2)	85.2	89.6	94.4	100.0	105.7	112.0	118.4	123.7	135.3	121.8

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
Source: Eurostat, B.M.Coope & Partners

Figure 3: Other minerals and peat
Production and employment indices compared to EC manufacturing



1992 are B.M. Coope & Partners estimates
Source: Eurostat, B.M. Coope & Partners

EFTA countries and developing countries feature prominently as destinations for exports. Highlights include exports of sulphur from France to north and west Africa; exports of magnesia and other magnesium compounds not only to EFTA countries such as Austria and Sweden but also to distant destinations such as the USA, South Africa, and the Far East; and exports of peat from Germany to Switzerland and Austria.

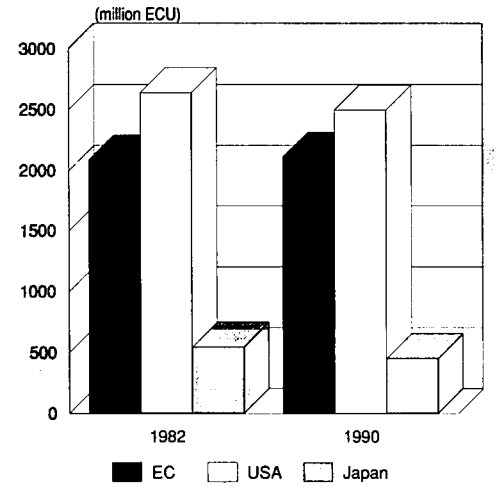
The developed countries (with the exception of EFTA) are prominent among the sources of imports of minerals in this group and together with the former Eastern Bloc countries account for 70% of total extra-EC imports. Highlights include imports of borates from Turkey; asbestos and sulphur from Canada; diatomite and sulphur from the USA; sulphur from Poland; magnesia, talc, and graphite from China; talc from Finland and Austria; and feldspar from Norway.

MARKET FORCES

Demand

The minerals in this group are consumed by a wide range of industries amongst which chemicals, construction, and glass and ceramics are prominent. Demand depends very much on general income developments since not only are the products consumed across the whole range of manufacturing industry but also in the construction, agricultural, and energy sectors.

Figure 4: Other minerals and peat
International comparison of production at current prices



Source: Bumines, Eurostat, B.M. Coope & Partners

Since sulphur is the dominant industrial mineral in terms of production and consumption value it is worth considering in detail. At first sight it is virtually a single use raw material with over 90% being used by the chemical industry for the production of sulphuric acid, the cheapest and most versatile industrial acid. Although the range of applications for sulphuric acid is virtually endless it is nevertheless the case that 60% is actually consumed by the fertiliser industry. Thus demand for sulphur itself is highly dependent on fertiliser manufacturing activity and ultimately influenced by agricultural performance and practice. The volatility of sulphur prices appears to have little effect on demand which in volume terms has remained surprisingly stable in the EC during the 1982-1991 period. This is primarily due to the fact there is no real substitute for sulphur or sulphuric acid.

Another mineral in this group which deserves individual attention is peat and this because it is arguably a fuel mineral rather than an industrial mineral. Over 70% of EC peat consumption is for application as a combustible fuel for which markets tend to be local and on a large scale tend to be bound up in long term arrangements between producers and power generating companies. The other 30% is used primarily in horticultural applications where it vies with other organic materials such as straw and compost as well as certain industrial minerals such as absorbent clays and perlite.

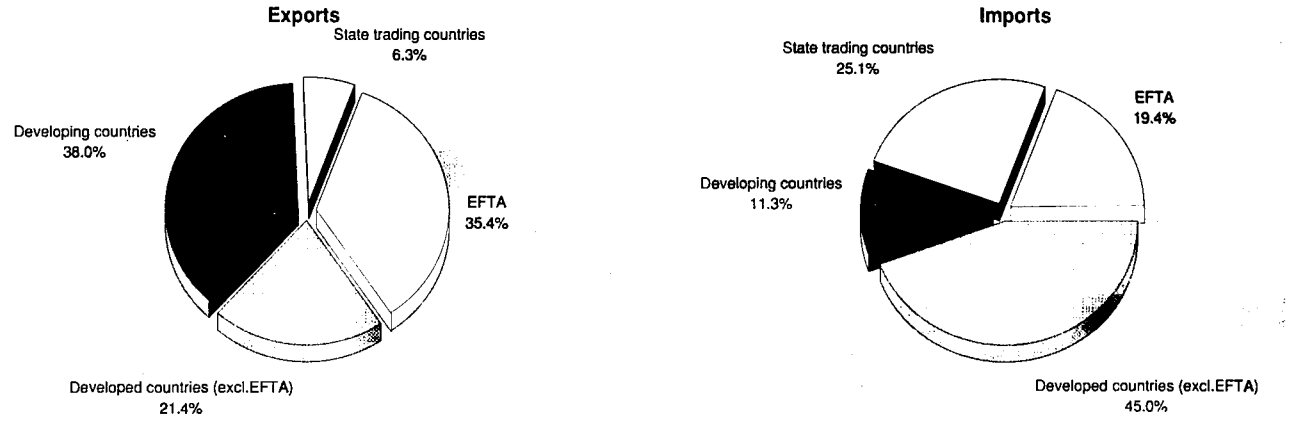
Barite is used primarily as a weighting agent in oil well drilling muds and demand is thus heavily influenced by oil industry drilling activity, particularly in the North Sea.

Diatomite's use as a filtration agent in foods, beverages, pharmaceuticals, water treatment, complements its other use in the construction industry.

The refractory raw materials, magnesia and dolomite, have been affected by the trend to use high performance materials with longer lives. For magnesia this actually means that total volume consumption in refractories is decreasing (and has been for several decades) but volume consumption of high quality grades (of higher value) has been increasing.

Finally, the demand for minerals such as asbestos and fluorspar (the raw material for CFC production) have been affected adversely by environmental legislation.

Figure 5: Other minerals and peat
Destination of EC exports and origin of EC imports, 1990



Source: Eurostat

Supply and competition

It has been noted earlier that even for the major export items in this group, the EC still tends to be a net importer. This can be attributed to the practice of upgrading imported raw products (a portion of which may be re-exported) or to geographical factors (e.g. Italy supplies Switzerland but Sweden supplies Denmark). However, it is also due to the multiplicity of grades available and the suitability of certain grades for specific end-uses.

With regard to sulphur supply, the aspect of involuntary production demands attention, not least because it is the primary cause of the sulphur price volatility noted previously. Apart from pyrites, all sulphur produced in the EC is a by-product of other processes, either of extractive processes (of sulphur-rich oil and gas) or of industrial processes (such as the smelting of metallic sulphide ores or from the burning of high-sulphur coals in power generating plants). The recovery of sulphur dioxide gas (as sulphuric acid) from stack gases is a legislative requirement to combat acid rainfall. This domestic recovered sulphur supply now accounts for the bulk of the EC requirements and extra-EC imports tend to consist of elemental sulphur from natural sources.

With regard to supply of the more mainstream industrial minerals a number of different conditions exist: the EC is totally lacking in certain resources (e.g. borates and vermiculite) for which all requirements are imported; the EC possesses resources limited by both quality and quantity of minerals such as asbestos and graphite and thus the bulk of the requirement (including special grades) are imported; for some minerals, the EC possesses adequate resources and is theoretically self-sufficient but foreign sources are preferred by some consumers on grounds of cost or quality. For example Moroccan barite is significantly more cost-competitive than domestic produced due to lower labour costs. For quality a straightforward example would cover the supply of certain grades of talc for cosmetic, ceramic, and paper processing applications from Australia, the USA, and China.

Low labour costs in China are well-recognised and for magnesite large, accessible deposits do lead to low operating costs. However, pricing policies which do not appear to take full account of fuel and transportation costs are of clear concern to EC producers.

Production process

The type of production process for industrial minerals varies widely. At one end of the spectrum is the large quarrying operation with associated crushing and sizing/grading plant serving large volume, low value markets such as construction (e.g. certain dolomite, pumice, and pozzolana operations). At the other end of the spectrum may be a magnesite operation employing a range of sophisticated processing techniques: laser sorting, high intensity magnetic separation, heavy media, flotation, and high temperature calcination and sintering. Elements of the processing of diatomite, talc, and graphite also qualify for the sophisticated label.

INDUSTRY STRUCTURE

Companies

The top enterprises (with more than 500 employees) involved in this sector include two energy companies producing sulphur from sour gas, Elf-Aquitaine (F) and BEB (D); three dolomite producing groups, Redland/Steetley (UK), the Lhoist group (B), and Dolomitwerke Wulfrath (D); one magnesite/magnesia producer, Grecian Magnesite (GR); the Irish state-owned peat producer, Bord na Mona (IRL); and the two major metal mining groups, RTZ (UK) for its talc interests, administered through Talc de Luzenac and Metallgesellschaft (D) for its fluorspar, barite, and pyrites interests administered through Sachtleben.

Apart from the largest ones, there are other important enterprises, which tend to have their principal producing operations in one country but the market outlook is very much European or international in scope. Many of the them have their origins in family-owned companies and connections are still strong. The large international metals and energy groups have been drawn into the sulphur (or sulphuric acid) production and fluorspar and barite have also attracted metals groups.

Government involvement in this group tends to be the exception rather than the rule but major exceptions are the French state-owned Elf-Aquitaine and the Irish state-owned Bord na Mona.

Strategies

No single coherent strategy can be described for industrial minerals other than to point out that as a result of the 1979-1983 industrial recession, EC industrial minerals producers became much more cost-conscious and all sought to improve productivity in the more competitive environment of the 1980s. Thus efforts to reduce labour costs and energy costs were combined with engineering endeavour to improve recoveries and product quality.

New mining projects included barite in Scotland (MI and Minworth); feldspar in Italy (Sassifo), Spain (Rio Piron), and

Greece (Porcel and Mevior); and natural sodium sulphate in Spain (Minersa and Santa Marta).

Corporate changes in the dolomite sector were noted through the acquisitions of Carmeuse in Spain to set up Calcinor and the more recent take-over of Steetley by Redland in the United Kingdom although in both cases dolomite was secondary to the main purpose.

An acquisition more directly relevant to this group of minerals was the 1988 take-over of Talc de Luzenac of France by RTZ. Talc de Luzenac is the major talc producer in Europe with production facilities in France, Italy, Spain, Austria, and Canada.

A current example of the strategy of diversification into downstream products concerns the Greek magnesite producer, Grecian Magnesite, which is constructing a plant to manufacture magnesia-based monolithic refractories.

REGIONAL DISTRIBUTION

Not surprisingly geology is the prime factor in deciding the location of most of the operations in this group, except for the by-product sources of sulphur which are governed by the location of smelters and petrochemical plants. Dolomite is the most abundant mineral in the group and production occurs in most EC countries apart from Denmark and the Netherlands, although its should be noted that special grades (e.g. high whiteness or refractory grades) are limited to only a few locations. Large deposits of pumice and pozzolana occur in the volcanic regions of Germany, Italy, Greece, and Spain and a large number of operations are active. Peat occurrences are also widespread, although by far the largest concentration of EC production is in Ireland. Feldspar is another common mineral with a number of operations spread throughout the EC.

ENVIRONMENT

The main ecological issues concerned with the quarrying of the bulk products in this group are shared with the products of NACE 231. Once again it should be noted that the modern quarrying industry has an excellent record for dealing with potential problems such as noise and dust and has developed land rehabilitation techniques to a considerable degree. Most major problems arise over "visual pollution", particularly if a quarry is close to urbanisation or in an area of outstanding natural beauty.

Two of the minerals in this group have been in decline because of ecological issues. The health hazard problems of asbestos are well documented and although safer methods of handling asbestos are now in evidence, usage will continue to fall. A number of industrial minerals, such as wollastonite and mica (as well as minerals used in glass and mineral fibres), are substituting asbestos.

As the principal raw material for the manufacture of CFCs (chlorofluorocarbons), fluorspar has been subject to declining consumption as result of efforts to stem ozone depletion. In the long term this industry may well recover if hydrofluorocarbons (also based on fluorspar as starting raw material) are accepted as more benign alternatives.

Several minerals in this group are benefiting from "eco-markets", such as dolomite and magnesia for water and sludge treatment. Insulating minerals such as diatomite, perlite, vermiculite, and magnesia also benefit from energy conservation and fireproofing legislation.

Lastly it should be mentioned that EC production of sulphur is largely based on the recovery of sulphur dioxide which would otherwise be released to the atmosphere. Although sulphur recovery plants can often be justified on commercial grounds alone, the importance attached to preventing sulphur emissions from all sorts of industrial processes will ensure that recovery is maximised.

OUTLOOK

The EC will continue to be a major consuming centre for the minerals in this group. The presence of domestic resources can give both commercial and technical advantages to downstream industries (and are often the "raison d'être" for such industries in the first place). The EC will continue to require imports of some products from outside the region on the grounds that EC supplies are limited either by quantity or quality or both.

For some imported minerals prices and costs became an issue of contention during the 1980s which seems set to continue well into the 1990s, particularly if well-run EC operations are being harmed by unfair competition.

Table 5: Other minerals and peat
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.0	3.2
Production	2.0	3.2
Extra-EC exports	2.0	3.2

Source: B.M.Coope & Partners

Written by: B. M. Coope & Partners
The industry is represented at the EC level by: International Association of European Mining Industries (EUROMINES). Address: Avenue de Broqueville 12, B-1150 Brussels; tel: (32 2) 775 6311; fax: (32 2) 779 0523.

Ferrous metals
NACE 221, 222, 223

Since 1990, EC production of ferrous metals has been declining. During 1988 and 1989, however, production in real terms rose by 8% per year on average. This revival took place after a period of crisis dating back to the 1970s which was caused by both low growth in the main customer sectors and the emergence of new producing countries. The 1980s were characterised by a steady process of rationalisation and reduction of capacity, which began at the end of the 1970s and caused major cutbacks in employment. This restructuring made sizeable productivity gains possible, and allowed most EC firms to return to profitability.

INDUSTRY PROFILE

Description of the sector

The production and preliminary transformation of ferrous metals covers both the steel industry as defined by the ECSC Treaty and the preliminary processing of ferrous metals. According to the NACE classification, it includes the following branches: iron and steel, as defined in the ECSC Treaty (NACE 221); the manufacture of steel tubes (NACE 222); drawing, cold rolling and cold folding of steel (NACE 223).

Iron and steel is by far the largest component of the sector. It accounts for 74% of total ferrous metal production. Both the manufacture of steel tubes and the industry of drawing, cold rolling and cold folding accounts for only 13% of ferrous metals production.

Main indicators

In 1988 and 1989, the ferrous metals industry in the EC had achieved record levels of production and consumption. With the economic slowdown in most of the consuming sectors that began in 1990 and intensified in 1991, however, the ferrous metals industry experienced significant declines. Apparent consumption (in terms of constant prices) decreased by 2.4% in 1990 and by 2.9% in 1991. Production fell even more, causing a sharp decline in trade balance. For 1992, a further decrease must be expected for the EC ferrous metals industry.

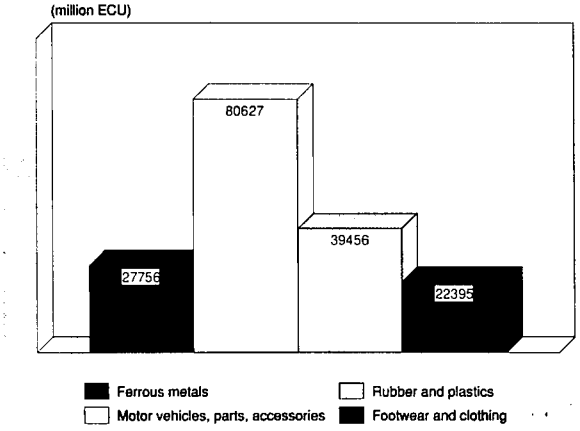
Figure 2 shows a breakdown of value added by Member States. Four countries (Germany, Italy, France and the United Kingdom) account for more than three-quarters of total value added in the EC.

Recent trends

Growth in the ferrous metals industry has clearly lagged behind development in the manufacturing industry as a whole (see Figure 3). While the overall manufacturing industry is characterised by a strong growth of production and consumption, stagnation has occurred in the ferrous metals sector. The most remarkable development, however, is the rapid deterioration of extra-EC exports of the ferrous metals industry since the mid 1980s, which had a negative impact on the production level. The strong and continuous decline in employment over the whole period 1982 to 1991 is the result of great rationalisation efforts and of restructuring measures introduced in the early 1980s, especially in the iron and steel industry.

Table 2 shows a breakdown of consumption, production and extra-EC exports by major industries of the ferrous metals sector. Iron and steel is by far the largest component, accounting for more than 70% of production and consumption, and for almost 60% of exports to non-EC countries.

Figure 1: Ferrous metals
Value added in comparison with other industrial sectors, 1991



Source: Eurostat

International comparison

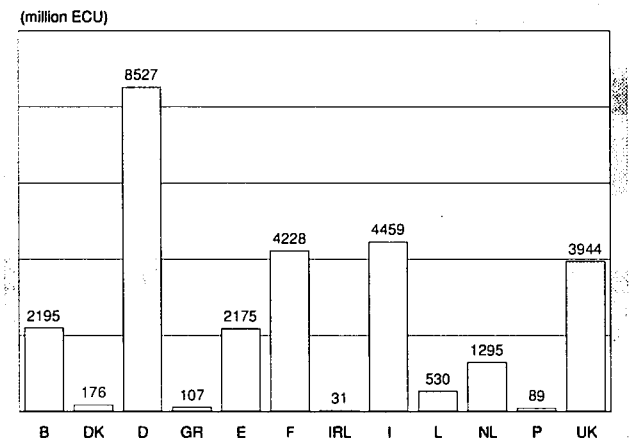
International comparisons are difficult due to lack of data on ferrous metals production. Taking crude steel as an indicator, it can be seen from Figure 4 that the EC is the largest producer in the world, followed by Japan and the USA. The EC and Japan also are the most important exporters. While the EC has maintained its export level in the period 1982 to 1990, Japan experienced a considerable decrease in exports. In the USA (in contrast to the EC), steel consumption is significantly higher than steel production. A lack of competitiveness in the USA has led to growing imports.

The development of production is shown in Figure 5. Regarding the relatively strong growth in the USA it must be taken into account, however, that the USA suffered a downturn in production of nearly 40% in 1982.

Foreign trade

Ferrous metals account for about 4% of total EC exports of goods and 2% of imports. The trade balance of the sector shows a large surplus.

Figure 2: Ferrous metals
Value added by Member State, 1991



Source: Eurostat

Table 1: Ferrous metals
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	66 437	62 807	71 002	74 798	70 815	66 822	80 786	91 569	88 390	82 376	81 500
Production	77 060	73 089	84 288	89 790	79 933	75 072	89 087	100 031	94 591	89 015	87 200
Extra-EC exports	15 114	14 624	18 027	20 403	14 936	13 620	14 707	16 533	14 017	13 849	13 000
Trade balance	10 622	10 283	13 286	14 991	9 118	8 250	8 301	8 462	6 201	6 639	5 700
Employment (thousands)	992.2	910.7	844.5	796.2	751.8	690.8	658.3	646.0	628.0	600.6	575.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) ifo estimates
Source: Eurostat

Table 2: Ferrous metals
Breakdown by majors sectors of the industry, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Iron and steel	60 431	63 909	8 085
Steel tubes	9 810	12 047	3 696
Drawing, cold roling, cold fording of steel	12 134	13 060	2 068

(1) Estimates are used if country data is not available
Source: Eurostat

Table 3: Ferrous metals
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-0.5	1.1	0.5
Production	0.9	-0.4	0.0
Extra-EC exports	6.9	-5.4	-1.4
Extra-EC imports	1.4	3.2	2.6

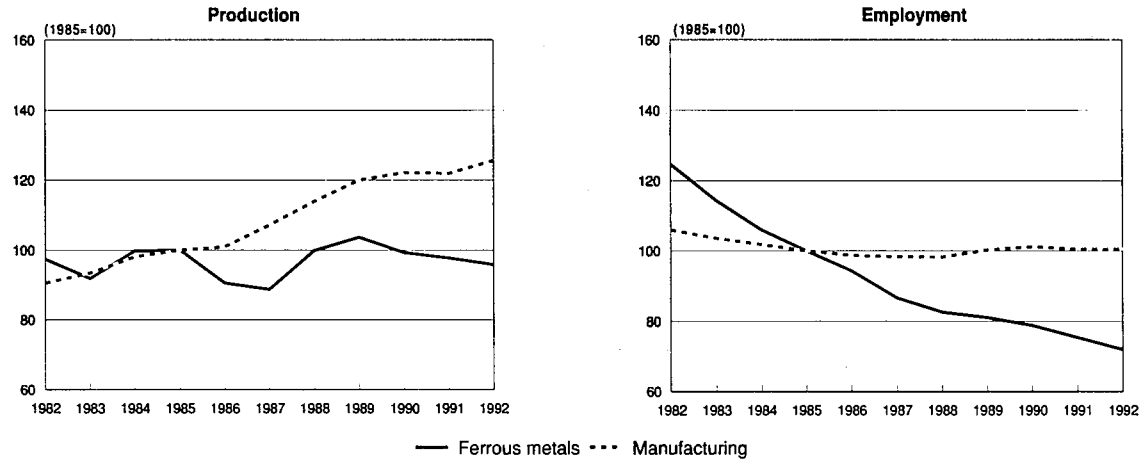
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Ferrous metals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	15 114	14 624	18 027	20 403	14 936	13 620	14 707	16 533	14 017	13 849
Extra-EC imports	4 491	4 342	4 741	5 412	5 817	5 370	6 407	8 071	7 817	7 210
Trade balance	10 622	10 283	13 286	14 991	9 118	8 250	8 301	8 462	6 201	6 639
Ratio exports/imports	3.37	3.37	3.80	3.77	2.57	2.54	2.30	2.05	1.79	1.92
Terms of trade index	105.0	99.8	100.4	100.0	91.8	91.6	87.6	85.9	89.4	85.4
Intra-EC trade	14 890	14 547	17 004	18 969	19 215	18 531	21 749	26 488	26 174	25 390
Share of total imports (%)	76.8	77.0	78.2	77.8	76.8	77.5	77.3	76.7	77.0	77.9

(1) Estimates
Source: Eurostat

Figure 3: Ferrous metals
Production and employment indices compared to EC manufacturing



1992 are estimates
Source: Eurostat

As can be seen in Table 4, the ferrous metals industry achieved its best results in trade with third countries in 1985. The export surplus amounted to nearly 15 billion ECU. Since then, however, trends in foreign trade have turned noticeably against the EC. While extra-EC imports continued to increase strongly (with the exception of 1991), extra-EC exports suffered sharp declines. This led to decreasing export surpluses and a declining export-import ratio.

Figure 6 shows significant changes in the destination of EC exports between 1986 and 1991. For the EFTA countries, the major export market, and for the OPEC countries the export shares have increased, whereas the US market has lost importance. Japan's share in EC exports of ferrous metals is of no significance.

The EFTA countries play a major role as suppliers of the EC market with ferrous metals. Almost 60% of total EC imports originate from these countries. The share of imports from the USA as well as from Japan has increased but accounts for only 5% of extra-EC imports. Among the countries included in the rest of world, the East European countries in particular have gained importance in recent years.

Intra-EC trade has increased strongly in the period 1982 to 1991, owing to the long existence of an integrated European market in the field of ferrous metals. At the same time, however, the penetration rate of foreign competitors supplying the internal market increased steadily from 6.8% in 1982 to 8.8% in 1991.

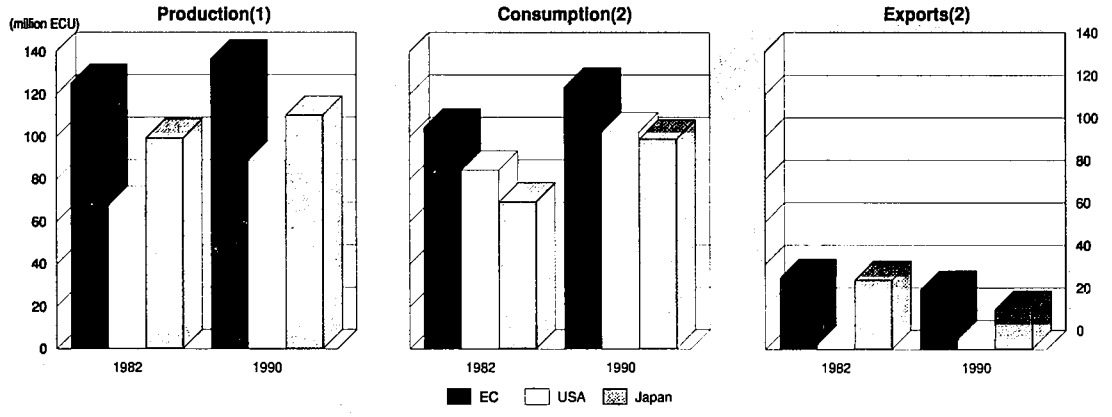
MARKET FORCES

Demand

The ferrous metals sector is a major supplier of intermediate goods, especially to the following industries: the metal products industry, mechanical engineering, electrical machinery, the transport equipment sector and the construction sector.

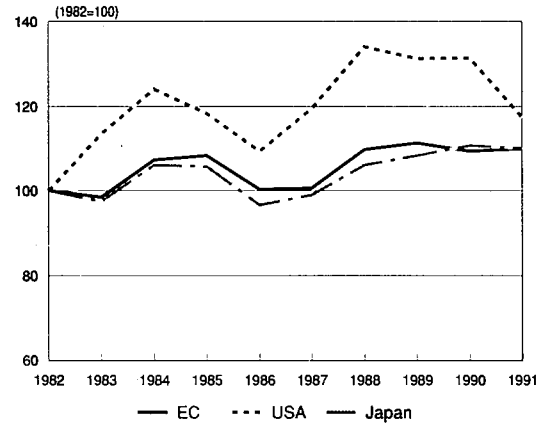
According to the improvement in the activity level of ferrous metals, consuming industries consumption of ferrous metals increased strongly in 1988 and 1989. In addition, strong stockpiling on the part of producers, traders, and consumers had a positive impact on domestic demand.

Figure 4: Ferrous metals
International comparison of main indicators at current prices



(1) Crude steel
(2) ECSC and non-ECSC steel products in crude steel equivalent
Source: Eurostat

Figure 5: Ferrous metals
International comparison of production growth at constant prices



Source: Eurostat

The recovery in the ferrous metals industry took place after a long period of crisis. From 1982 to 1987, production within the EC (measured in terms of constant prices) decreased at a yearly average of 1.8%. The origins of this crisis, however, go back to the 1970s and the first oil embargo. Most of the ferrous metal consuming sectors went through difficult times in the course of the second half of the 1970s and in the first half of the 1980s, reducing their consumption of intermediate products.

Nonetheless, other factors also contributed to the downturn in the ferrous metals industry. These include the emergence of substitute products, such as plastics, and the emergence of new competitors, particularly in the newly industrialised countries. These countries (which profit from low production costs) experienced a substantial increase in production level. A growing number of newly industrialised countries were able to cover not only their own needs, but to compete successfully on the world market. With the reduced demand of traditional export markets in Eastern Europe and China, this led to a severe downturn in extra-EC exports. The export rate of the EC ferrous metals industry (measured in real terms) fell from 22.7% in 1985 to 16.7% in 1991.

Supply and competition

The ferrous metals industry in the EC (while permanently cutting back work force and technical capacity) suffers from worldwide overcapacities. The effects on price setting margins are considerable, especially in export markets and for products with a low share of value added. Given the ample possibilities of worldwide supply, customers are accustomed to exercising strong price pressure on the producers.

Internal competition within the EC is strong, which is reflected in a high intra-EC trade. In 1982, intra-EC trade of ferrous metals amounted to 14.5 billion ECU or 22.4% of EC consumption. In 1991, intra-EC imports increased to 25.4 billion ECU or 30.8% of consumption.

The EC ferrous metals industry has a strong competitive position against non-EC countries, particularly because of their technological advantages. Unfavourable, however, is the competitiveness of European suppliers with regard to cost. Newly industrialised nations offering production cost benefits compared with EC suppliers, emerged as new suppliers on the European market. The import pressure from East European countries also toughened, especially given that their selling prices do not reflect true production costs. The share of foreign competition in the internal market has increased from 6.8% in 1982 to 8.8% in 1991.

Production process

In terms of technology, the EC ferrous metals industry is one of the most advanced in the world. Research and development constantly assure high quality in steel production and rolling processes. Drastic restructuring measures (especially in the iron and steel industry) have led to significant labour reductions. In the period from 1982 to 1991, the number of employees in the ferrous metals sector dropped by 40%, a rate of 5.4% per year.

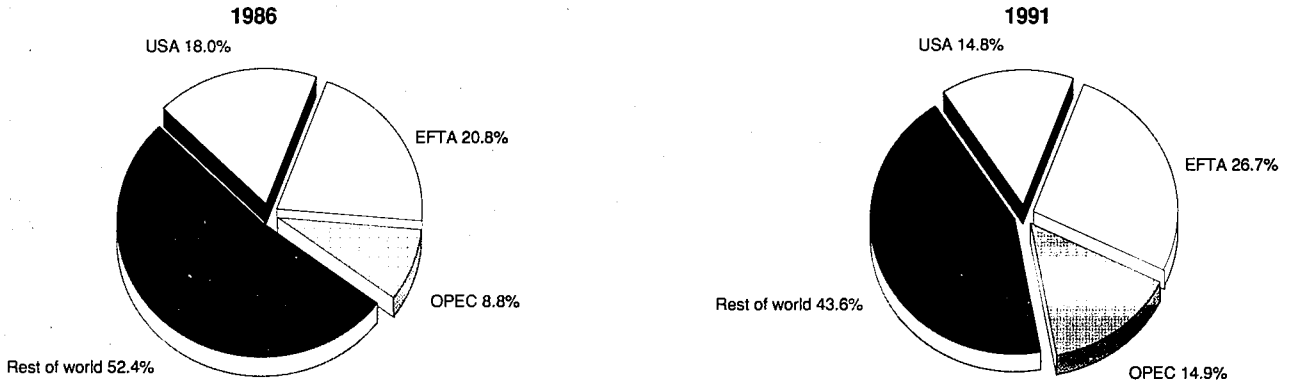
The necessary modernisation of the EC industry was undertaken fairly late, having only begun at the end of the 1970s. This explains why the return to profitability did not begin until the second half of the 1980s.

INDUSTRY STRUCTURE

Companies

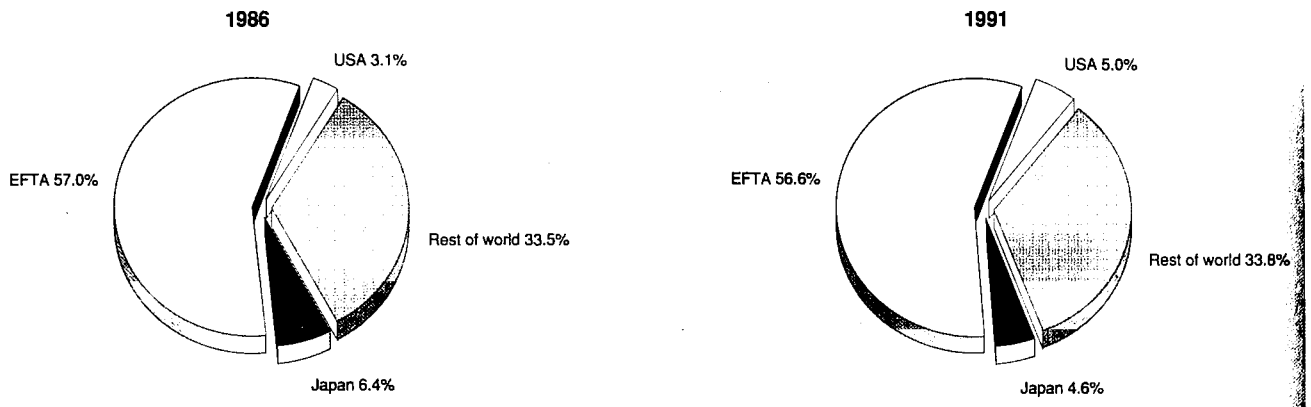
With regard to concentration of the ferrous metals industry, one has to distinguish between the iron and steel industry and the steel tube sector on one hand, and the drawing, cold

Figure 6: Ferrous metals
Destination of EC exports



Source: Eurostat

Figure 7: Ferrous metals
Origin of EC imports



Source: Eurostat

rolling and cold folding industry on the other hand. Both the iron and steel industry and the steel tube sector are characterised by large companies and a high degree of concentration. Drawing, cold rolling and cold folding mills, in contrast, are mostly medium-sized enterprises with low concentration. Moreover, steel tube manufacturers are often linked to steel producers, and a considerable part of output of the drawing and cold rolling mills is manufactured by the subsidiaries of the major steel groups.

Strategies

The modernisation and restructuring of the ferrous metals industry is reflected (especially in the iron and steel sector) in a number of mergers, acquisitions and joint-ventures. For example, the merger between Usinor and Sacilor in France, the creation of Ilva in Italy and the takeover of Hoesch by Krupp in Germany.

In contrast to the major companies in the steel industry and the steel tube sector, mergers, acquisitions and joint-ventures form a less suitable strategy to strengthen the competitiveness for the medium-sized firms of the drawing and cold rolling sector. These firms tend to emphasise rationalisation and specialisation.

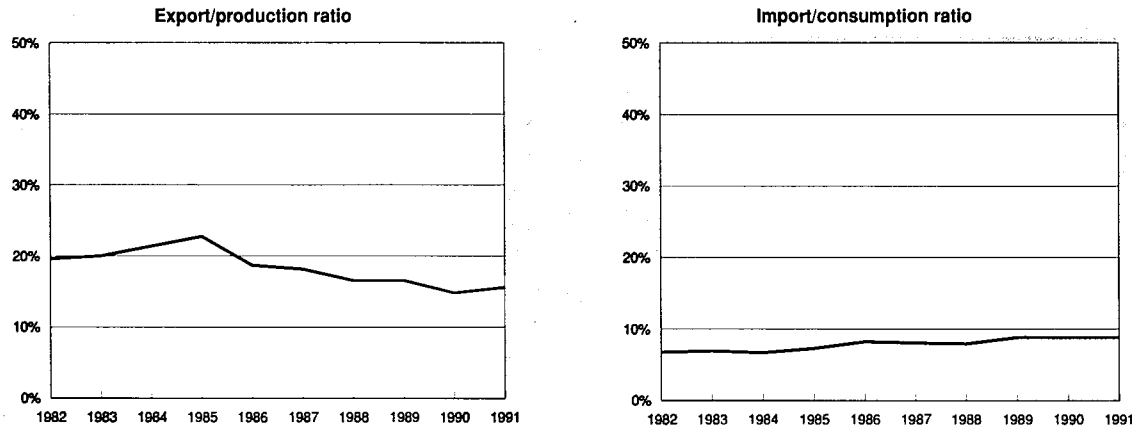
Finally, it should be noted that product diversification is taking place. Companies are reducing their supply of ordinary, mass-produced steel products in favour of more sophisticated products. For example, the development of high-yield point sheet steels and coated sheets, (for the car industry in particular) have enabled the steel industry to increase unit prices and value added. Furthermore, special alloyed and non-alloyed steels are becoming increasingly important.

The great efforts EC ferrous metals industry is undertaking to rationalise and modernise their facilities in view of the Single Market, however, are not visible in the development of home investment, due to a lack of current data.

REGIONAL DISTRIBUTION

The distribution of ferrous metals production among Member States does not closely reflect the ranking in terms of GNP. The ranking of the four main producers of ferrous metals, (from which almost 80% of the production originates) is as follows: Germany ranks at the top, followed by Italy, the United Kingdom and France.

Figure 8: Ferrous metals
Trade intensities



Source: Eurostat

Table 5: Ferrous metals
The top 12 companies in Europe, 1991

Company	Country	Turnover (million ECU)	Employees	Net profit (million ECU)
Thyssen	D	17 773	148 250	152
Usinor-Sacilor	F	13 907	97 845	-434
VIAG	D	11 501	74 122	142 (1)
Metallgesellschaft	D	10 296	38 173	9
British Steel	UK	6 534	49 100	-48
Degussa	D	6 489	34 482	48
ARBED	L	4 684	52 920	102
Cockerill Sambre	B	4 101	29 000	86
Krupp Stahl (1)	D	3 828	25 147	43
Alusuisse-Lonza Holding	CH	3 569	25 399 (1)	57
Hoogovens	NL	3 501	26 248	8
Stahlwerke Peine-Salzgitter	D	2 962	14 355	66

(1) 1990
Source: DABLE

The development of ferrous metals production was similar in most EC countries over the course of the 1980s and the share of each Member State in total production changed very little over this period. There are, however, some exceptions. The share of France decreased significantly, whereas that of Belgium and Luxembourg increased. Italy took second place from France during the 1980s.

ENVIRONMENT

Costs arising from environmental protection are considerable, especially for the iron and steel industry. They are, to a large extent, due to costs incurred by the treatment of smoke emissions from raw material production units and by reheating furnaces, treatment of waste water from the pickling installations and noise control in the production units.

In light of the high costs and the fact that the requirements and enforcement of environmental protection is not equally strict in all countries, a harmonisation of environmental protection legislation in Europe is absolutely essential for avoiding distortion of competition. European steel producers therefore continue to work with the European Commission in the framework of the Environmental Protection Research Programme (established under Article 55 of the Treaty of Paris).

REGULATIONS

With the signing of the treaty establishing the European Community for Coal and Steel in 1951, the founding states obligated themselves to subordinate their respective national steel policies the decisions of the ECSC institutions. The institutions of the ECSC are authorised powers which were used particularly during the years of the steel crisis between 1980 and 1988. Such powers include: introducing quotas limiting production and deliveries on the internal market; fixing steel prices; limiting imports with non-ECSC countries; and directing investments.

Government subsidies are strictly prohibited by the ECSC Treaty. Nevertheless, the EC Commission tolerated the granting of subsidies by the Member States for a long time. Moreover, in 1980 the EC Commission even restricted the prohibition of subsidies established in the EC Treaty by stating in the so-called Aid Code that this prohibition is not meant for subsidies with which a common steel policy is pursued and aims of the ECSC Treaty are supported. Therefore, in the course of the restructuring of the EC steel industry many subsidies were allowed. The Aid Code of 1980 was to expire at the end of 1985. However, it has been prolonged several times following a clearly restricted guidelines. Since the beginning of 1986, government subsidies for the steel industry may only be granted to foster research and development, to safeguard the environment and to meet the social costs incurred by total plant closures.

In summary, regulations for the steel market and the steel policy of the EC in future are expected to be more oriented towards liberalisation. Instead of direct interventions, supporting measures and measures for monitoring the competition will be emphasised.

OUTLOOK

At the end of 1989, ferrous metals producers were confronted with weakening demand, which intensified in 1990 and 1991. A slow-down in production growth of consuming industries was the main reason for the decline in EC consumption. In addition, EC exports to non-EC countries fell considerably in 1990, due to a strong reduction of demand from the USSR and China. The slight recovery of extra-EC exports in 1991 was caused primarily by exceptional deliveries of steel tubes to Norway. According to these trends in domestic and foreign demand, EC production of ferrous metals dropped by 4.1% in 1990 and 1.6% in 1991.

Production levels in most of the consuming industries will remain low, especially in the car industry, mechanical engineering and the building sector. Under these circumstances, a further drop of consumption in the Single Market of about 1% must be anticipated. EC exports are expected to fall considerably, owing to a reaction in the steel tube sector. Production of ferrous metals is likely to decrease. As far as the mid-term prospects for the development of EC ferrous metals industry are concerned, they are more favourable than in the past. The reason for this positive assessment is attributed especially to expected EC economic growth of 3% annually for the period 1992 to 1996.

Table 6: Ferrous metals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.0	1.5
Production	1.0	1.3
Extra-EC exports	0.0	0.5

Source: Eurostat

Written by: ifo Institut für Wirtschaftsforschung

Iron and steel
NACE 221

After achieving record levels in steel production and consumption in 1988 and 1989, the EC steel market has performed less spectacularly since 1990. In most Member States, with the exception of Germany, a reduction of steel consumption and production set in during the course of 1990 intensified in 1991. This was primarily caused by weaker production activity in the steel-using industries.
In the years between 1974 and 1987, steel industries in the industrial countries suffered serious set-backs owing to reduced production in steel-using industries, a decrease in the quantity of steel required to produce given products, and increased competition from newly industrialised countries.
A major restructuring effort was undertaken in the EC during the 1980s which led to large capacity cuts and important productivity gains, which have allowed European companies to take advantage of a favourable economic climate since 1988.

INDUSTRY PROFILE

Description of the sector

The steel industry encompasses steel production from raw material processing to the production of finished and final rolled steel products. Steel and coal were the subject to the ECSC Treaty in 1952, one of the first European industry agreements. The special provisions governing theses two products remained in force after the two administrative bodies of the Community were merged.

The steel industry as defined by the EC covers the following operations:

- coke manufacture (except if coke is purchased from the coal industry or independent coking plants);
- ore preparation, especially in the manufacture of sinter and pellets
- pig-iron production in blast furnaces;
- steel production from pig iron in converters;
- steel production from scrap in electric furnaces;
- continuous casting and/or hot rolling of semi-finished products;
- hot rolling of long and flat products;
- cold rolling of flat products;
- metallic and organic coatings.

The finished and final products of the steel industry, including ordinary, special and alloyed steels, can be divided into hot-rolled and cold-rolled products.

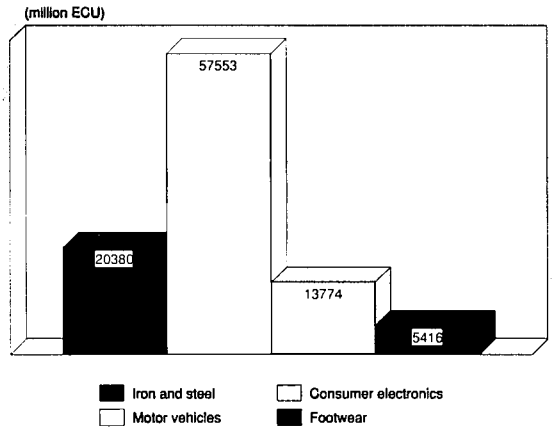
Hot-rolled

- flat products: coils, rolled strip or strip cut from coils, heavy or medium plate, rolled or cut from coils;
- long products: heavy sections, light sections, including reinforced concrete rounds, wire rod.

Cold-rolled

- thin sheet steels and coated sheet steels (tin plate, galvanised, electro-galvanised, lead-covered, aluminium-coated, plastic-coated, pre-painted, etc.).

Figure 1: Iron and steel
Value added in comparison with other industries, 1991



Source: Eurostat

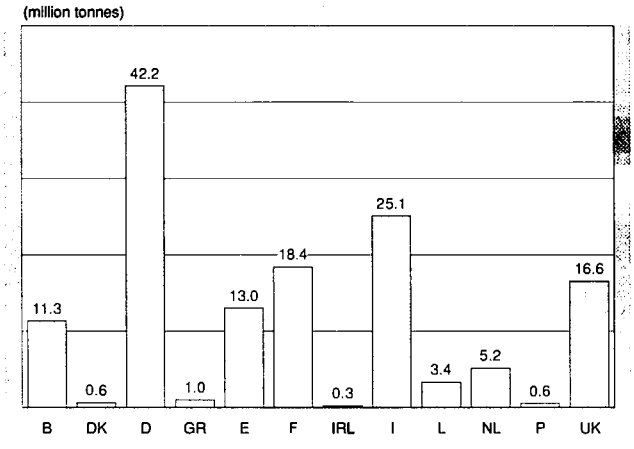
Main indicators

The steel boom of 1988 and 1989 (set off by overall economic growth) led to record levels in steel production and consumption in the EC. With the economic slowdown that began in 1990 and intensified in 1991, especially in the steel-using industries, significant reductions in production and consumption were recorded by the EC steel market. The rise in production and consumption shown in Table 1 for 1991 is solely attributable to the inclusion of the former GDR. Without this regional effect, EC production for 1991 would have been 3.4 million tonnes lower and steel consumption 2.6 million tonnes lower. For 1992, a further weakening is expected in the EC steel market.

Table 2 shows a breakdown of steel production according to the most important product categories. The proliferation of new production techniques since the 1970s (such as continuous coating and electric arc furnaces has greatly improved productivity in certain steel production processes.

Figure 2 indicates the distribution of total EC steel production among the Member States. Four countries, Germany, Italy, France and the United Kingdom, account for nearly three-quarters of production.

Figure 2: Iron and steel
Crude steel production by Member State, 1991



Source: Eurostat

Table 1: Iron and steel
Main indicators (1)

(million tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption (3)	101.9	98.5	102.5	101.9	111.7	110.0	123.5	127.0	125.9	126.3	126.7
Net exports (3)(4)	11.3	11.8	16.8	18.8	15.5	17.4	13.9	11.2	9.5	10.9	10.0
Stock variation (3)(5)	-1.6	-0.6	1.0	0.2	-1.3	-1.2	0.2	1.7	1.8	0.6	-0.5
Scrap consumption (3)(6)	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2
Crude steel production (3)	111.4	109.5	120.1	120.6	125.6	126.0	137.4	139.6	136.9	137.6	136.0
Employment (thousands) (7)	513.6	479.2	450.0	425.8	456.5	424.0	408.9	394.6	379.4	388.5	365.0

(1) 1982-85 EC10; since 1991, including East Germany"
(2) Ifo estimates
(3) In crude steel equivalent(4) ECSC steel(5) Merchants' and producers' stocks
(6) In rolling mills
(7) At the end of the year
Source: Eurostat

Table 2: Iron and steel
Breakdown by major product line (1)

(million tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Pig iron	76.8	74.5	83.3	85.9	85.4	85.6	93.7	95.1	91.7	89.9
Crude steel	111.4	109.5	120.1	120.6	125.6	126.0	137.4	139.6	136.9	137.6
Hot-rolled products	89.8	89.8	97.9	99.6	106.6	109.0	119.7	123.4	121.1	N/A
Finished products	87.3	85.9	94.4	95.7	103.0	105.1	115.1	119.0	116.4	119.0

(1) 1982-85 EC10; 1991 including East Germany
Source: Eurostat

Table 3: Iron and steel
Average real annual growth rates

(%)	1982-86	1986-91	1982-91
Apparent consumption (1)	-0.3	2.5	1.3
Production (2)	0.1	1.8	1.1
Extra-EC exports (1)(3)	2.8	-3.0	-0.4
Extra-EC imports (1)(3)	3.0	1.8	2.3

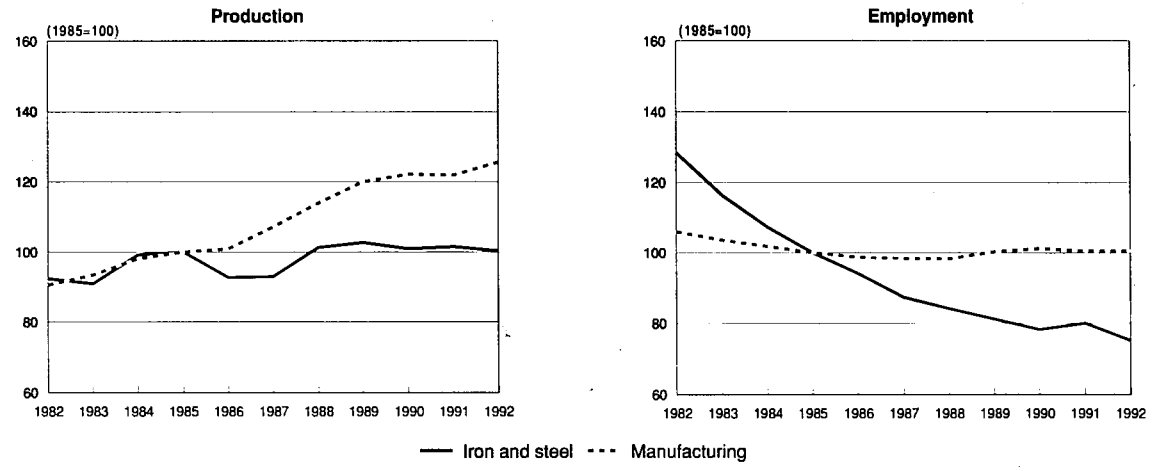
(1) Crude steel equivalent
(2) Crude steel
(3) ECSC steel products
Source: Eurostat

Table 4: Iron and steel
External trade in volume (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	18 349	18 883	22 413	25 188	23 025	23 698	21 018	19 339	19 261	19 913
Extra-EC imports	8 736	8 491	8 087	8 616	9 281	8 833	9 694	10 735	11 624	10 709
Trade balance	9 613	10 392	14 326	16 572	13 744	14 865	11 324	8 604	7 637	9 204
Ratio exports/imports	2.10	2.22	2.77	2.92	2.48	2.68	2.17	1.80	1.66	1.86
Terms of trade index	99.7	97.0	100.6	100.0	90.6	90.8	83.1	80.5	88.9	86.1
Intra-EC trade	21 740	23 085	24 713	25 088	29 350	30 647	33 920	36 853	37 905	40 100
Share of total imports (%)	71.3	73.1	75.3	74.4	76.0	77.6	77.8	77.4	76.5	78.9

(1) In ECSC steel products; 1982-85 EC10; 1991 including East Germany"
Source: Eurostat

Figure 3: Iron and steel
Production and employment indices compared to EC manufacturing



1992 are ifo estimates and include former east Germany
Source: Eurostat

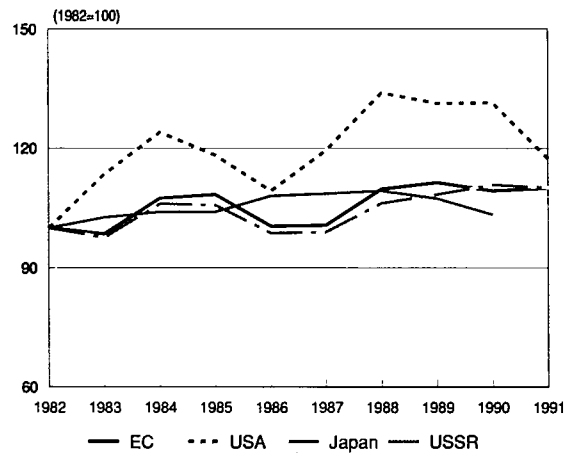
Recent trends

In all industrialised countries, growth in the steel industry is dependent upon growth in the economy as a whole, and particularly in those manufacturing industries which are high consumers of steel products. Despite the strong recovery in 1988 and 1989, steel production and consumption at the beginning of the 1990s was only slightly above the level of 1982. The strong and continuous decline in employment over the entire period under observation is a result of the restructuring measures introduced in the early 1980s.

International comparison

The EC is the largest steel producer in the western world, followed by Japan and the USA. In the EC and Japan, steel production far exceeds domestic steel consumption, reflecting the EC's role as the most important steel exporter. While the EC has maintained its export level in the period 1982-90, Japan, however, experienced a considerable decrease in steel exports. In the USA, by contrast, steel consumption is significantly higher than steel production. A lack of competitiveness in the USA has led to growing steel imports.

Figure 4: Iron and steel
International comparison of main indicators in volume



Source: Eurostat, IISI

The development of steel production over time is shown in Figure 5. The USA, it seems, has had the strongest growth in production compared with the EC and Japan. However, it should be kept in mind that the USA suffered a downturn in production of nearly 40% in 1982.

Foreign trade

EC steel exports to non-EC countries are indicated in Table 4. After a peak in 1985, extra-EC exports have decreased. This reduction actually continued during the peak production years 1988 and 1989 as EC steel production was primarily required to service the exceptionally high demand in domestic markets. In contrast to exports, extra-EC imports show a clearly growing trend, which has led to reducing foreign trade surpluses and a declining export-import ratio.

The USA and the EFTA countries are the most important export markets for the EC, receiving about half of extra-EC exports. Exports to Eastern Europe have decreased considerably as a result of the recent political and economic changes in these countries.

The main suppliers of steel to the EC are the EFTA countries with an import share of nearly 40%. Approximately 25% of extra-EC imports are from Eastern Europe, whereas Japan exports relatively low quantities to the EC.

Although extra-EC exports have declined since the mid-1980s, the importance of intra-EC trade between the Member States has increased. This development is attributable to the long existence of an integrated European steel market.

The market share for foreign competitors in the internal EC market fluctuates from 1982 to 1991 between 8.3% and 10.2%. The development of the import share from 1982 to 1985, however, is not fully comparable with the years thereafter due to Spain and Portugal having joined the EC.

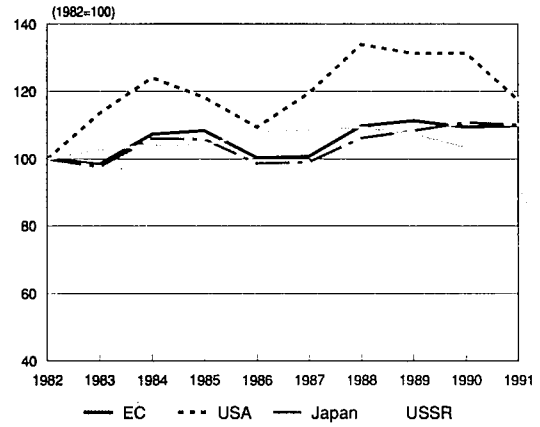
MARKET FORCES

Demand

The apparent consumption of ECSC steel in the EC for 1991 was 126 million tonnes (approximately 17% of world consumption) in crude steel equivalent.

Primary processing industries account for approximately 35% of the ECSC steel used in the EC, the most important of which were the steel tube sector (14%), wire and bright drawing (9%) and cold-rolling and cold-forming (6%). In terms of

Figure 5: Iron and steel
International comparison of production growth in volume



Source: Eurostat, IISI

final internal demand the most important consumers are building and civil engineering (15%), vehicles (11%), metal goods (10%), mechanical engineering (7%), and structural steel work (6%).

There are a number of factors that caused a drop in the share of steel consumption of the EC (and of industrial countries in general) in world steel production since the mid-1970s. These factors were:

- a reduction in the tonnage consumed due to weak overall economic growth and especially to production cuts carried out in a number of steel-using industries;
- a continuing reduction of specific steel consumption, i.e. a decrease in the quantity of steel required to produce a given product. This drop in specific steel consumption can be attributed to major improvements in the quality, properties and performance of steel products themselves as well as to the substitution of steel by other materials (plastics, aluminium).

In contrast to western industrial countries, steel consumption in the newly industrialised and developing countries (as well as in the controlled economies of Eastern Europe) experienced strong increases in the past. Their share of world steel consumption increased from 40% in the mid-1970s to 55% in 1987.

Since 1988, the trend of industrialised countries towards a declining share of steel consumption has stopped. The sharp increase in domestic demand in most western industrial countries had led to a strong increase of steel consumption in the period for 1987 to 1990, especially in the EC (+22%) and Japan (+31%). At the same time, East European countries and the former Soviet Union experienced sharp contractions in steel consumption (10%) as a result of the radical political and economic changes taking place.

The general slowdown in the economic growth of most industrial countries in 1991 caused a drop in world steel production and consumption by 4.4%. In the EC steel consumption (excluding former East Germany) fell by 2%. This reduction was attributed particularly to the fall in demand from the motor-vehicle and construction industry.

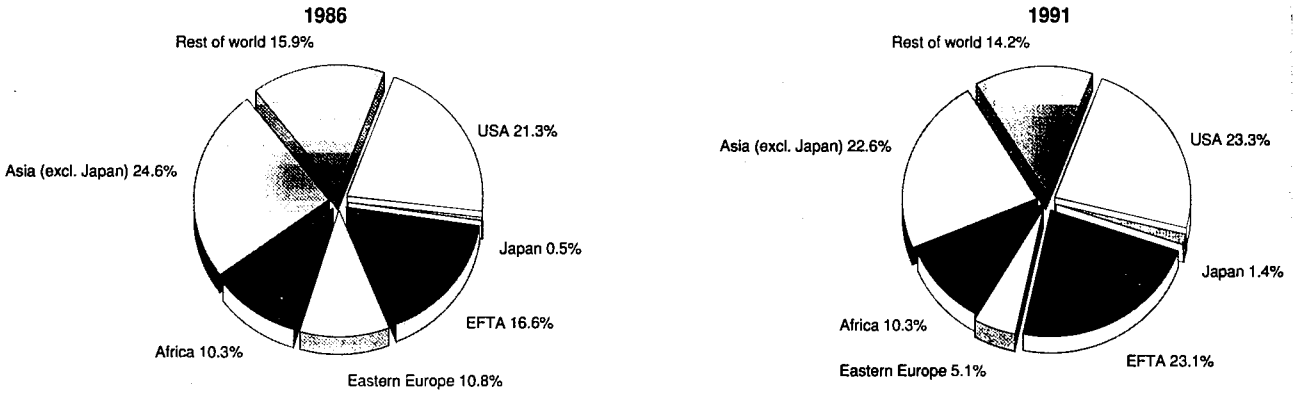
Supply and competition

In response to the reduction in consumption induced by the structural and economic factors listed above, a massive restructuring effort took place in the EC during the 1980s. This was aided between 1980 and 1986 in part by assistance from national governments under the terms of the State Aid Code approved by the Council and the market controls regulated by Article 58 of the ECSC Treaty. The controls expired on June 30, 1988. As far as crude steel is concerned, this resulted in a 40 million tonnes reduction in production capacity, which represents a 19% cut in capacity. Furthermore, by the end of 1988, 34 million tonnes (18%) of hot rolling capacity in the EC 12 had been terminated.

At the same time, however, a substantial increase in production took place in the newly industrialised countries, which profited from low production costs (cheap labour, cheap energy, indigenous raw material supply) as well as from developments in steel production technology (mini-mills). A growing number of these countries did not only cover their own needs, but were competing successfully with the traditional exporting countries. This led to a reduction in EC producers' share of the international market and prevented them from compensating reducing domestic demand by increasing exports.

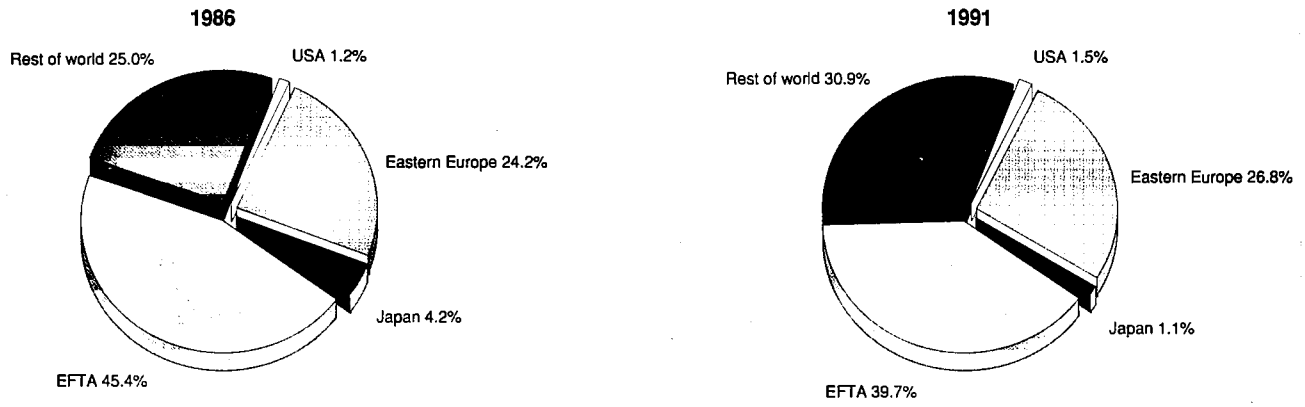
In addition, the newly industrialised countries broke into EC markets where large quantities of steel are often dumped at

Figure 6: Iron and steel
Destination of EC exports (1)



(1) ECSC steel products
Source: Eurostat

Figure 7: Iron and steel
Origin of EC imports



Source: Eurostat

prices that bear no relation to production costs. Practices of this sort led to a sudden jump in imports from non-EC countries, which rose from 5% to 11% of apparent consumption between 1975 and 1977. The buoyant climate on the international market of 1974, (caused by a steel shortage), and the relative openness of the EC market prepared the way for this increase. The subsequent downturn in the economic situation confirmed the presence of price dumping. Since 1978, however, imports have stabilised at around 10% of apparent consumption.

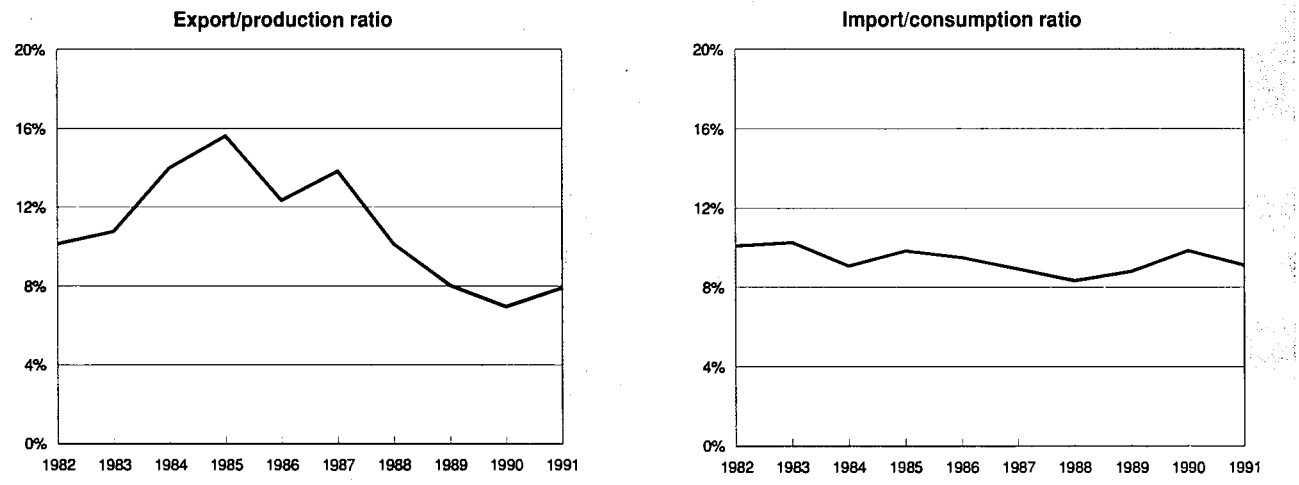
The effect of the restructuring undertaken since 1980 led not only to a progressive reduction of production capacity in the European steel industry, but also strengthened the financial results and the competitiveness of EC steel companies.

The EC steel industry has a strong competitive position in foreign trade. More than 20% of world steel exports in 1990 stemmed from EC countries. In contrast to Japan, whose share decreased from more than 25% in 1982 to only 14% in 1990, the EC has been able to hold its position.

Even stronger than their competitive position in foreign trade is the technological competitive advantage of the European steel producers. This is indicated by the international share of inventions. On the basis of applications for patents (in at least two countries) the EC steel industry is in first place in world-wide ranking. More than 40% of the innovations in steel industry came from EC countries in the period 1983 to 1989, compared with a share of 26% from Japan and 18% from the USA.

Much more unfavourable, however, is the competitiveness of the European steel suppliers with regard to costs. Former West Germany, which has the highest labour costs per hour worked in the EC, was only exceeded in recent years by the USA. In a better position are the United Kingdom and France. In 1989, labour costs per hour worked in the United Kingdom were about 30% and in France about 15% below the level of German producers.

Figure 8: Iron and steel
Trade intensities



Source: Eurostat

Table 5: Iron and steel
Labour productivity and unit costs

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	24.2	24.8	27.3	29.6	32.0	36.9	47.1	49.7	49.5	51.1
Index	81.5	83.7	92.2	100.0	107.8	124.6	159.0	167.8	166.9	172.3
Unit labour costs index (2)	78.9	83.9	93.3	100.0	104.0	111.2	119.4	126.6	132.5	N/A
Total unit costs index (3)	65.8	68.8	88.9	100.0	89.1	89.9	111.7	131.4	128.8	126.8

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
(3) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Production process

Major technological advances in production techniques accompanied the termination of production capacity, thereby enabling the remaining installations to operate with greatly reduced costs and enhanced efficiency. The proliferation of continuous-casting plants, (whereby one step in the production process is eliminated and the requirements for crude steel consequently lowered) is one example of this. The share of the continuous casting method in crude steel production rose from 35% in the EC 10 in 1980 to 90% in 1991. In some countries (and in some companies) it reached 100%.

Workforce reductions have also taken place, due principally to plant closures and lower production in those plants which remained open. In the period from 1980 to 1990 the number of employees in the steel industry of EC 9 dropped by 43%, a rate of 5.5% per year. Productivity (measured as value added at constant prices per person employed) has risen constantly since the beginning of the 1980s. Over the whole period from 1982 to 1991 productivity improved by an average growth rate of 8.7% per year. Discarding inefficient production methods, investment in rationalisation programmes and constant technical research have achieved these productivity gains. They were necessary for the EC steel industry to compensate increasing production costs. Total costs per person employed in current prices have increased from 1982 to 1991 by 7.6% per year. Increases in unit labour costs have been somewhat lower.

INDUSTRY STRUCTURE

Companies

Steel producers can be classified above all according to their manufacturing methods.

The first category is made up of integrated companies which account for 70% of production. These companies produce pig iron in their blast furnaces and convert it in oxygen-based steel works, using a certain tonnage of scrap to maintain the temperature of the molten steel. Companies using this method are usually geared to the production of flat products, including subsequent cold rolling into thin sheet steel (which may be coated), and the production of heavy sections and wire rod. Integrated mills often have large-scale production capacity ranging from 2 to 10 million tonnes of finished products. Although cost reductions occur from economies of scale, integrated mills allow little production flexibility.

The second category is made up of small companies with more specialised types of production. These so-called mini-mills comprise enterprises whose sole operation is electric steel works, continuous casting plant, and rolling mill. Mini-mills play a considerable role in the management of industrial waste by converting scrap into quality steel products. These products include reinforcing bars, reinforcing mesh and small and medium-sized sections for the construction industry, as well as merchant bars and wire rods used particularly in the automobile industry.

Mini-mills have much smaller capacity than integrated companies. Their annual capacity ranges from 150 000 to 1 200 000 tonnes. The success of mini-mills, even in the past years of crisis in the steel sector, is explained by their flexibility and greater freedom to adapt production to market demand. In certain Member States, mini-mills account for a substantial amount of overall steel production. In Italy, for example, mini-mills account for 55% of steel production. Another example is Spain where 42% of all steel is processed by mini-mills.

The iron and steel industry is an industry with a high degree of concentration. In 1990, almost half of EC crude steel production was produced by only five steel companies. In descending order of output they were: Usinor-Sacilor (F), British Steel (UK), Ilva (I), Thyssen Stahl (D) and Hoogovens (NL). In addition, the top fifteen companies accounted for 73% of EC crude steel production.

A number of mergers and acquisitions have taken place in the course of modernisation and restructuring of the EC steel industry. For example, the merger between Usinor and Sacilor in France, the creation of Ilva in Italy and the rationalisation agreement between Krupp and Mannesmann in Germany. The most recent example is the takeover of Hoesch by Krupp.

It should be kept in mind, however, with the exception of Usinor-Sacilor, British Steel, Ilva and Thyssen, most of the European steel producers are only medium size in comparison to other international steel firms.

Table 6: Crude steel
International comparison of electric arc process (EAP) in crude steel production, 1991

	EC	USA	Japan
Crude steel production (million tonnes)	137.6	79.2	109.6
Oxygen (%)	68.4	62.0	68.6
EAP (%)	31.6	38.0	31.4

Source: EfSA

Strategies

In 1952, the ECSC Treaty created for coal and steel the necessary conditions for the "Single Market", which after 1992 should extend to all other industrial sectors. Consequently the formation of the Single Market is already a reality for the EC steel industry. Such a situation can only be considered as a new opportunity for reinforcing open competition and the complete freedom of intra-EC exchanges.

The 1992 project should provide a windfall for the industry in other ways, with a "very considerable" effect on energy costs, and a possible reduction in financing costs of 10% at least.

A side effect of the 1992 deadline is a new dynamism on the part of steel companies. Companies are starting to protect themselves against future downturns and strong competition from outside. Such measures include: paying more attention to customer service and commercial investment; diversifying into areas other than steel; take-overs and mergers; specialising in high-quality products; and more integrated production techniques.

The great efforts EC steel producers are undertaking to rationalise and modernise their facilities partly in view of the Single Market have become evident in the strong growth of investment in recent years.

REGIONAL DISTRIBUTION

There are steel plants throughout the EC, with varying levels of production capacity. A number of them were built inland, usually near the coal or iron-ore fields from which they used to draw their supplies, or near steel consumers. Those built more recently are on the coast, where they have easy access to imported raw materials, without the cost of land transport. They are also better placed to capture international markets.

The importance of the steel industry in the economy of member states varies largely. For example, in Luxembourg the share of steel production in total industry exceeds 40%. By contrast, the contribution of steel to total manufacturing production only accounts for about 1% in Denmark, Ireland and Portugal.

With regard to mini-mills, the highest concentrations of such mills can be found in northern Italy and Spain.

ENVIRONMENT

The steel industry is fully conscious of its responsibility with regard to environmental protection. Long before the protection of the environment had been placed on the political agenda, the steel industry intensively developed and generated techniques to reduce environmental pollution. These measures include the low-pollution manufacture of steel products, steel recycling and the utilisation of waste material.

The restructuring of the industry in the 1980s has resulted in the closure of many older installations and their replacement by modern plants, fully equipped with a whole range of pollution-control equipment. These new plants are which incorporate the best available anti-pollution technology in this field.

The steel industry's dust emissions have been considerably lowered. Emissions of carbon dioxide (CO_2) have also been strongly reduced by energy optimisation of process technology and an overall reduction in energy inputs. The increasing use of electric arc furnaces (EAF) across Europe is a leading example of such new processes.

In recent years the EC steel sector consumed about 60 million tonnes of steel scrap, the bulk of which was collected from discarded used steel-containing products. This recycling of scrap, which represents about 45% of total steel production, is one of the highest rates for any industry.

Environmental protection places considerable financial burdens on the iron and steel companies. In light of the high costs and the fact that the requirements and enforcement of environmental protection is not equally strict in all countries, a harmonisation of environmental protection legislation in Europe is absolutely essential for avoiding distortion of competition. European steel producers continue to work with the European Commission in the framework of the Environmental Protection Research Programme established under Article 55 of the Treaty of Paris.

REGULATIONS

For more than forty years, the European steel industry has been regulated by the European Coal and Steel Community (ECSC). The ECSC was originally established in 1952 to regulate pricing, transport, tariffs, etc. for coal, iron ore and scrap iron among the Member States.

As mentioned above in the section pertaining to the environment, European steel producers are working with the European Commission in order to harmonise environmental protection legislation in Europe.

OUTLOOK

A strong decrease of consumer stocks, induced by a weakening of production growth in steel consuming industries, was the main reason for the decline in demand of the internal EC steel market in 1990. In 1991, the downturn in production of steel consuming industries has strengthened; while the output of construction industry stagnated, the production of mechanical engineering and of motor vehicles actually declined. Apparent consumption in the EC (excluding former East Germany) decreased by 1.8% and crude steel production dropped to 134.2 million tonnes, a decrease of 2% in comparison with 1990.

Overall economic growth in the EC will remain weak and a reduction of steel stocks on the part of merchants and producers will have a negative impact on domestic demand. As a result, apparent consumption is likely to stagnate. Furthermore, there is no foreseeable improvement in exports or imports, as the EC has become an area with strong currencies and demand from some traditional export markets (USA, USSR, China) is shrinking while at the same time many more suppliers are appearing on the world market.

As far as the mid-term prospects for the development of EC steel industry are concerned, it can be said that they are more favourable than they were a few years ago. This growth should allow the continuing trend of reduced steel consumption over the past 15 years to be replaced by a positive development. Accordingly, the decline in specific steel consumption in the past few years seems to have slowed down considerably. New or improved steel qualities have evidently improved the market position of steel in competition with other materials. In addition, there has been better marketing on the part of the steel industry by offering their customers more specific solutions to compensate their needs. Apparent consumption of ECSC products (expressed in crude steel equivalents) therefore, is expected to have a growth potential of the order of 1% per annum in the period until 1996.

On the other hand, net import demand in the NICs and developing countries, and also in Eastern Europe, has declined drastically. The net exports of the two major exporters, (i.e. Japan and the EC) fell from about 70 million tonnes (crude steel equivalent) in 1974 to 22 million tonnes in 1990. As no change can be expected in this development for the medium term and since competition is expected to intensify, net EC steel exports for 1996 are expected to be only 10 million tonnes (crude steel equivalent).

Table 7: Iron and steel
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.0	1.0
Production	1.8	1.2
Extra-EC exports	2.3	1.9

Source: Ifo institute

These forecasts are well in line with those published by the European Commission in their publication "General Objective Steel - 1995". According to these forecasts, crude steel production in the EC will be about 138 to 143 million tonnes in 1995.

Given the developments in the second half of 1990 and in 1991, it seems unlikely that the favourable scenarios underlying these forecast (in particular for the oil price and exchange rates) will be met. Therefore, the lower forecasts for production are likely to be the more realistic.

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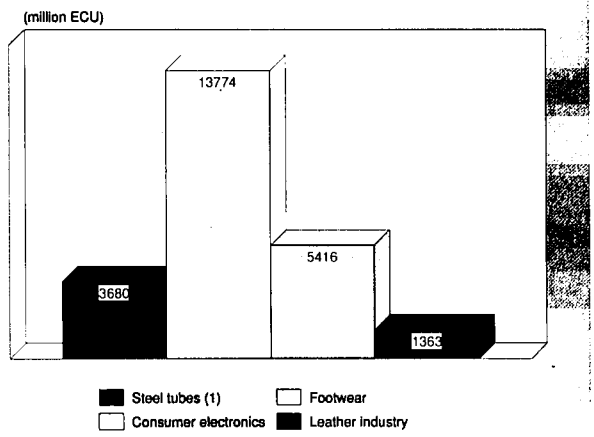
The industry is represented at the EC level by: European Independent Steelworks Association (EISA). Address: Rue Belliard 205, Bte 18, B-1040 Brussels; tel: (32 2) 230 7962; fax: (32 2) 230 0136; and,
European Confederation of Iron and Steel Industries (EUROFER). Address: Rue du Noyer 211, B-1040 Brussels; tel: (32 2) 736 0100; fax: (32 2) 512 3001.

Steel tubes
NACE 222

The steel tube industry has faced a severe volume and financial downturn since the mid-1980s due to worldwide overcapacity. Seamless tubes and welded tubes with an outside diameter of over 406.4 mm in particular were deeply influenced by the oil crisis, by the quotas imposed by the USA on its competitors to limit imports, and more recently by the low exchange rate of the dollar and by the lack of orders from the former USSR and from China, all of which have impaired the competitive position of EC manufacturers.
The EC has maintained its leading position in the world market, ahead of the USA and Japan, due to continuous productivity gains achieved over the last few years brought about by restructuring. Nevertheless, foreign trade has been steadily deteriorating.
Despite its improved competitiveness, the EC steel tube industry is under rising pressure from massive volumes of low-priced imports from Central and Eastern Europe which will force EC producers to further reduce their output.

Figure 1: Steel tubes
Value added in comparison with other industries, 1991



(1) NACE 222
Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The activity of NACE 222 includes the manufacture of steel tube fittings and compressed gas cylinders in addition to the manufacture of steel tubes. This monograph, which covers only steel tubes manufacture, is based on figures produced by surveys conducted by the professional organisations located in the EC Member States.

Steel tubes covers three product categories which differ considerably in their manufacturing procedures, raw materials, and investment requirements. These categories are classified in the following subheadings of Chapter 73 of the Harmonised Commodity Description and Coding System:

- No 73.04: seamless steel tubes;
- No 73.05: welded steel tubes of circular cross-section over 406.4 mm in outside diameter;
- No 73.06: welded steel tubes of circular cross-section up to and including (uti) 406.4 mm in outside diameter and welded steel tubes of non-circular cross-section of any perimeter.

Energy markets, e.g. oil, gas, nuclear, steam generation industries, as well as the car industry, machines, structural steel, mechanical service and construetion industries, are some of the main users of steel tubes. The developments in each of the product areas in steel tubes manufacturing thus vary according to their different end markets.

Main indicators

In 1991, apparent consumption of steel tubes in the EC decreased 7% against 1990 while production increased 1.8% generated by a strong performance in exports. Extra-EC exports increased by 30.6% because of an exceptional shipment of 934 509 tonnes of welded tubes (over 406.4 mm in outside diameter) to Norway. As a result, the trade balance improved by 54% in 1991 although with strong import pressure, EC producers' share of the domestic market decreased by 8.2%. Employment in the steel tubes industry declined by 1 800. The situation for 1991 by category is shown in Table 2.

Recent trends

Table 1 shows a marked decrease in production and exports of steel tubes which resulted - among other effects - in a loss of employment of 30 625 (30%) people between 1984 and 1991. Although apparent consumption increased steadily over the past decade (with the exception of 1991), it has mostly been to the advantage of third country competitors. The share of imports from third countries in EC consumption, measured in terms of tonnes, increased strongly from 9.3% in 1984 to 14.5% in 1991.

Growth in the steel tube sector has clearly lagged behind the developments in the manufacturing industry as a whole. Over the last ten years, the manufacturing industry has been characterised by strong growth in production and consumption and a stagnation in extra-EC exports and employment. In contrast, all indicators for the steel tube sector, with the exception of consumption, show a sharp decline.

International comparison

EC production of steel tubes in 1991 corresponded to 18.9% of world production against 20.6% in 1984. In the world ranking, the EC is ahead of Japan and the USA. The former Soviet Union has also been at the top of the list for the past several years. Particularly in Japan, but also in the EC, steel tube production easily exceeds consumption which refleets their role as the most important steel tube exporters.

While the EC, the USA and Japan suffered setbacks in terms of their shares of world production in the 1980s, the newly industrialised countries (NICs) and the developing countries (DCs) were the winners. Some of these countries have continued to expand their production capacity, often supported by heavy public subsidies. This group of countries includes Turkey, Mexico, Venezuela, Brazil, Argentina, Taiwan, the Republic of Korea and Thailand.

Foreign trade

A look at Table 4 shows the serious deterioration in external trade. Extra-EC exports of steel tubes have decreased continuously since 1984, with the exception of 1991 for the reason mentioned above concerning Norway. On the other hand, extra-EC imports increased steadily, leading to a declining trade balance and a declining export-import ratio.

Figure 5 shows big changes in the destination of EC exports between 1986 and 1991. Exports towards EFTA and OPEC countries doubled during this period. As for the former Soviet Union, the major export market in the past, the lack of hard currency has reduced its share of EC exports to less than one quarter of that of 1986.

The EFTA countries are dominant suppliers to the EC steel tube market. However, Figure 6 shows a decrease in the share

Table 1: Steel tubes
Main indicators

(thousand tonnes)	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
Apparent consumption	8 140	8 417	8 221	8 378	9 677	9 877	10 546	9 811	9 300
Production	14 363	14 462	13 132	12 624	13 329	12 908	12 306	12 524	11 300
Extra-EC exports	6 978	6 754	5 723	5 095	4 784	4 317	3 166	4 134	3 500
Trade balance	6 223	6 044	4 911	4 246	3 652	3 031	1 760	2 713	2 000
Employment (thousands)	99.9	94.8	87.8	74.7	74.9	74.8	71.0	69.2	67.0

(1) ifo estimates
Source: CDL, Eurostat

Table 2: Steel tubes
Breakdown by major product line, 1991

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports	Trade balance
All steel tubes	9 811	12 524	4 134	2 713
Seamless tubes	2 441	3 758	1 810	1 317
Welded tubes OD406.4mm U.T.I.	773	2 021	1 429	1 248
Welded tubes OD406.4mm (1)	6 597	6 745	895	148

(1) Includes tubes of non-circular cross section
Source: CDL, Eurostat

Table 3: Steel tubes
Average real annual growth rates

(%)	1984-87	1987-91	1984-91
Apparent consumption	1.0	4.0	2.7
Production	-4.2	-0.2	-1.9
Extra-EC exports	-10.0	-5.1	-7.2
Extra-EC imports	4.0	13.8	9.5

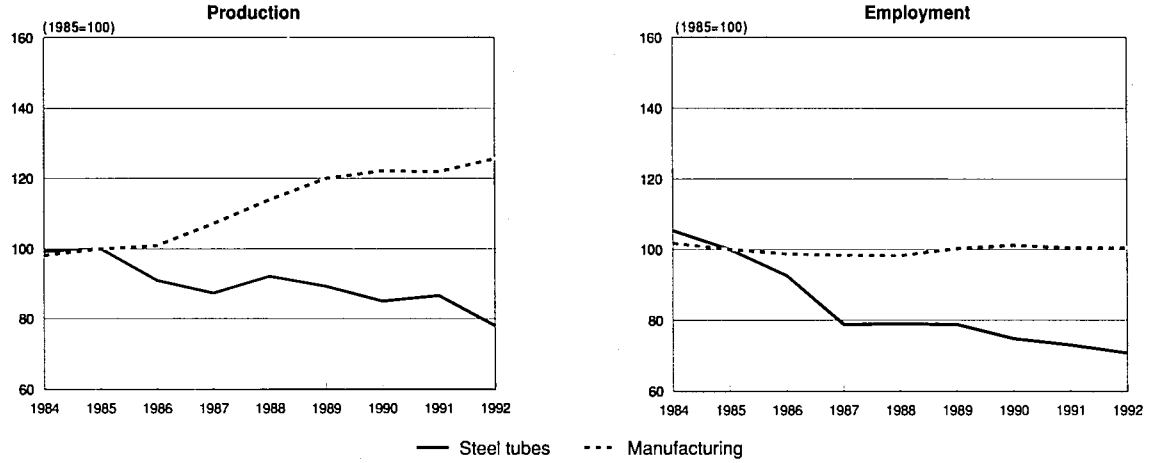
Source: CDL, Eurostat

Table 4: Steel tubes
External trade at current prices

(million ECU)	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	4 513	4 789	3 539	2 971	3 294	3 577	2 678	3 092
Extra-EC imports	643	681	714	683	904	1 141	1 148	1 116
Trade balance	3 871	4 108	2 825	2 289	2 391	2 436	1 530	1 976
Ratio exports/imports	7.02	7.03	4.96	4.35	3.65	3.14	2.33	2.77
Intra-EC trade	1 763	1 991	1 912	1 724	2 239	2 700	2 958	3 116
Share of total imports (%)	73.3	74.5	72.8	71.6	71.2	70.3	72.0	73.6

Source: CDL, Eurostat

Figure 2: Steel tubes
Production and employment indices compared to EC manufacturing



Source: Eurostat

of EC imports held by EFTA and Japan while for the countries of Central and Eastern Europe, the share has more than doubled between 1986 and 1991.

As a result of the slowdown of exports and the increase of imports (measured in constant prices), turnover has declined since 1984 although there was a slight improvement in 1989.

MARKET FORCES

Demand

The most important steel tube consuming sectors are: oil and gas exploration and extraction, transport of oil and gas by pipelines, nuclear and other steam generation industries, mechanical engineering, the automotive industry, structural steel work, the building industry and other metal processing industries.

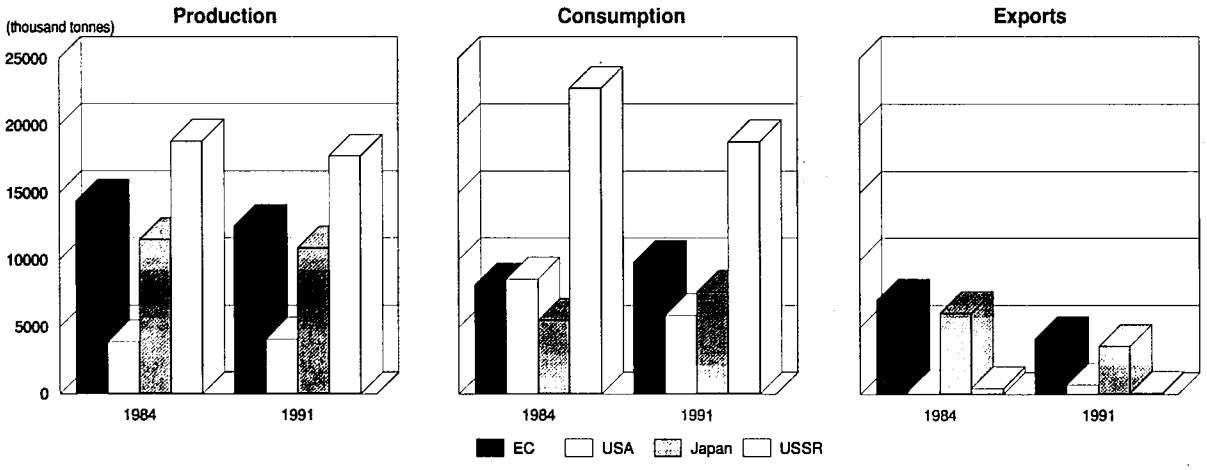
Due to developments in these sectors, apparent consumption of steel tubes in the European Community amounted to 9.8 million tonnes in 1991. Compared to 1984 this was an increase of 20.5% or 2.7% annually on average.

In view of this positive development in the domestic market it must be kept in mind, however, that the EC steel tube industry is highly export-oriented. In 1984 48.6% of EC steel tube production was exported to third countries. The decrease in this share to 33.0% in 1991 shows a serious change in the sales opportunities of the industry. If the exceptional delivery of 1 million tonnes to Norway is not taken into account in 1991, the ratio of exports to production would fall to 25.6%. The main reason for the reduction in extra-EC exports is the steeply diminished volume of orders from the CIS and from China.

Supply and competition

The EC steel tube industry, while continuously cutting back its work force and production capacity, still suffers from worldwide over capacity. The effects on financial margins are considerable especially in export markets and for ordinary categories of steel tubes. Given the range of possibilities for supply worldwide and coupled with rising imports into the EC, customers are in a strong position to dictate prices to producers.

Figure 3: Steel tubes
International comparison of main indicators



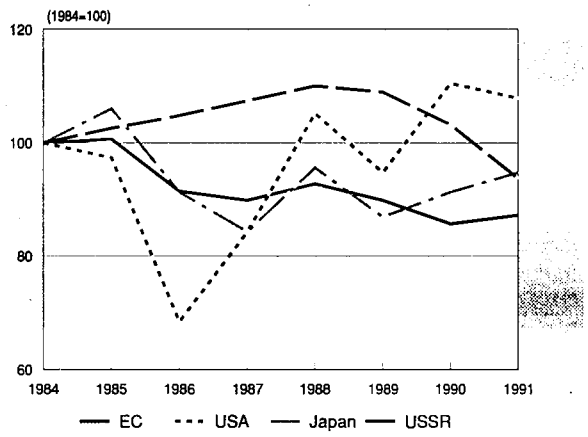
Source: Eurostat

Table 5: Steel tubes
Imports from Central and Eastern Europe

	Development			Variation (%)	Share of total Extra-EC imports(%)		
	1986	1990	1991	1991/86	1986	1990	1991
In volume (tonnes)	74 921	187 972	265 455	+254	9.2	13.4	18.7
In value (thousands ECU)	30 849	72 400	101 491	+229	4.3	6.3	9.1

Source: CDL, Eurostat

Figure 4: Steel tubes
International comparison of production in volume



Source: Eurostat

Internal competition within the EC is high and has strengthened in the recent past. In 1984, intra-EC trade amounted to 2.474 million tonnes or 30.4% of the consumption of steel tubes, whereas in 1991 imports were 4.149 million tonnes or 42.3% of consumption. In value, intra-EC imports totalled 1 763.2 million ECU or 31.5% of consumption. By 1991 this figure had increased to 3 115.5 million ECU or 42.9% of consumption. This development is an indication of the fact that there are very few trade barriers remaining in the steel tube sector today. The impact of the single market, therefore, is expected to be low.

EC competitiveness with respect to third countries, however, is threatened when imported steel tubes are subsidised in their production and/or are produced under non-market-economy conditions.

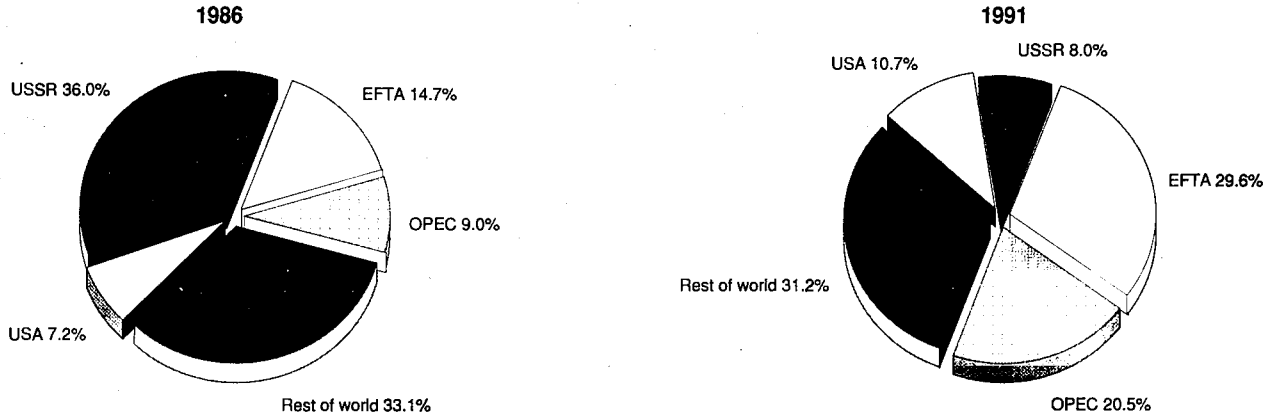
This is in fact the case with most of the imports streaming in from the Central and East European countries, especially from the second half of 1991. Their "costs" are not real ones and thus are often not reflected in pricing. For example, raw materials are often purchased in exchange for other materials and electric power, as well as water supply, are heavily subsidised.

Given such circumstances, these imports flood the EC market with price differences of 30 to 50% of the EC price level. The consequences are plant closures: two production lines for seamless tubes in the UK were closed in 1991 and several modern operations with very high productivity were closed in 1992, including one well-known continuous mill in Germany. In contrast, old and uneconomic mills in Central and East European countries have been trying to run at full capacity, mainly to generate exports directed to the EC. These imports are shown in Table 5. The trend will be marked by a further sharp increase in the future.

Production process

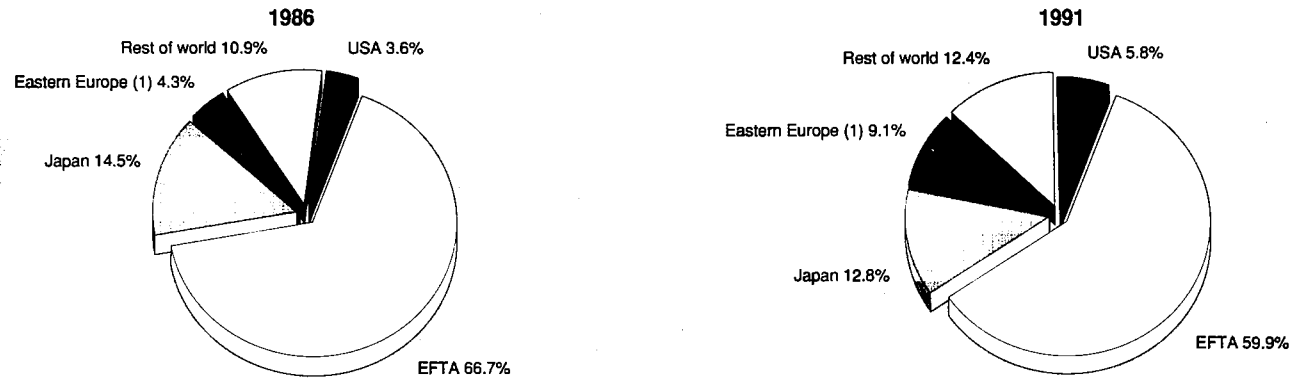
Technically speaking, the EC steel tube industry is a very strong performer. Continued investment in research and development assure high quality in steel production and rolling processes. On-going rationalisation efforts in production and labour have kept the costs at a competitive level. In the period

Figure 5: Steel tubes
Destination of EC exports



Source: Eurostat

Figure 6: Steel tubes
Origin of EC imports



(1) Bulgaria, Czechhoslovakia, Hungary, Poland, Romania
Source: Eurostat

from 1984 to 1991, the number of employees in the steel tube industry dropped by 31%, a rate of 5.1% per year. Productivity (measured in terms of tonnes per person employed) increased by 3.3% per year over the same time period.

One important fact has to be emphasised: in many groups of seamless and welded tubes different categories are produced on the same mill, i.e. tubes of ordinary grade as well as tubes of highly sophisticated quality. This means that the installations need to be filled with a substantial base load of commodity products as well as high grades to obtain a cost level which is competitive in the world market.

INDUSTRY STRUCTURE

Companies

The steel tube industry is a primary steel processing industry with a highly concentrated structure: four countries, Germany, Italy, France and the United Kingdom, account together for more than three-quarters of total production. In some countries, a single company can account for 50% or more of national output. In addition to the major steel tube manufacturers, who are usually linked to the large steel producers, there is a relatively large number of medium-sized and small firms. Among these companies there are some manufacturers, often small in tonnage terms, operating in small, highly value-added markets, specialised in the manufacturing of special dimension tubes and grades according to customers specifications.

At the end of 1991 there were 306 production units in the EC belonging to an estimated 250 enterprises, 72 of which were specialised in cold drawing of seamless or welded tubes.

Strategies

No significant investment has taken place in recent years owing to the reductions in capacity imposed by difficulties on the market since 1985. Contrary to the beginning of the 1980s where some investment was directed towards expanding capacity, current investments relate to improvements in productivity and quality (mainly in small diameters).

In the past, specialisation and concentration in tube manufacturing was a general trend in all tube producing companies and countries. To strengthen the competitiveness of the industry, consideration is now being given to cross-border cooperation followed by capacity reductions.

ENVIRONMENT

Costs arising from environmental protection are considerable. They are to a large extent due to costs incurred by the treatment of emissions from raw material production units and reheating furnaces, treatment of waste water from the pickling installations and noise control in the production units. These costs can amount to as much as 50 ECU per tonne, or 1% of the turnover of some EC firms.

REGULATIONS

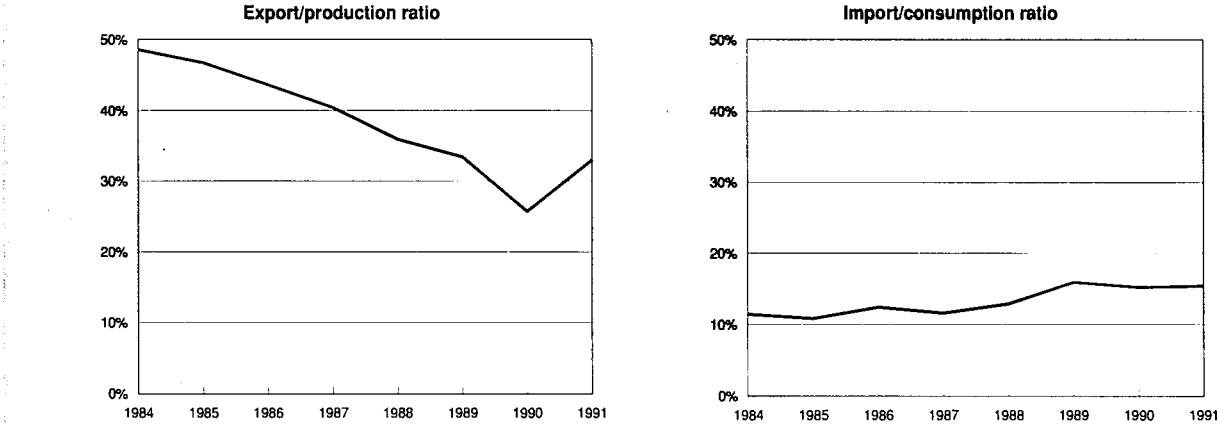
Trade regulations are a key source of concern for the EC steel tubes producers. Trade barriers in the USA hamper the penetration of EC exports. These barriers might be subject to revision in the framework of the Uruguay Round trade negotiations.

Table 6: Steel tubes
Labour productivity and unit costs

(1985 = 100)	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (tonnes/employee)	143.8	152.5	149.6	172.4	178.0	172.4	173.3	181.0
Productivity index	94.3	100.0	98.1	113.0	116.7	113.0	113.6	118.7
Unit labour costs index (1)	95.6	100.0	106.1	113.8	116.6	121.0	127.2	N/A
Total unit costs index (2)	92.3	100.0	94.0	97.4	128.3	129.3	127.2	133.8

(1) For the whole Nace 222; based on labour costs per person employed in current prices
(2) For the whole Nace 222; based on total costs per person employed in current prices, excluding costs of goods bought for " resale
Source: CDL, Eurostat

Figure 7: Steel tubes
Trade intensities



Source: Eurostat

The harmonisation of EC standards in the sector is well advanced: internal barriers are very low and do not impede the free circulation of goods among the Member States.

OUTLOOK

In 1991, apparent consumption of steel tubes in the EC decreased of 7% due to the slowdown of overall economic growth as well as a reduction of stocks on the part of both distributors and users. In contrast to consumption, EC production registered an increase of 1.8%.

Taking this fact into account, extra-EC exports in 1992 will probably drop again by nearly 16%. As apparent consumption is likely to stagnate due to weak overall economic growth and a further reduction in stocks, EC production is expected to decrease by around 10%. A recovery of the steel tube industry cannot be expected before 1994, brought on by stronger overall economic growth and a stabilisation of exports.

In the medium term, the development of the EC steel tube industry will be characterised by a number of risks and opportunities.

The main risks are a further increase of imports from the Central and East European countries which could lead to further plant closures. Continued weak demand in the US market and an increase of the export activities of subsidised mills in third countries will also dampen demand for EC steel tube manufacturers. CIS imports will not improve for some years.

On the other hand, three main opportunities might be seized by the industry. First, in the medium to long term, the economic recovery in the CIS and in Central and East Europe. Second, free access to the US market under GATT conditions, and third, an improvement in the world economic situation with a related increase in the demand from the energy industry.

Table 7: Steel tubes
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-1.0	2.3
Production	-3.0	2.0
Extra-EC exports	-5.0	2.8

Source: ifo institute

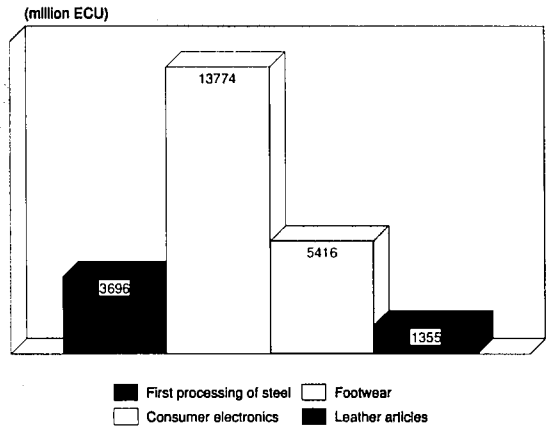
Written by: CDL and ifo Institut für Wirtschaftsforschung
The industry is represented at EC level by: CDL: Liaison Committee of the European Community Steel Tube Industry. Address: 130, rue de Silly, F-92100 Boulogne Billancourt; tel: (33 1) 49 09 35 91; fax: (33 1) 49 09 39 20.
Statistics are collected by: Stahlrohrverband e.V. Address: Tersteegenstrasse 3, D-4000 Düsseldorf 30; tel: (49 211) 43 47 54; fax: (49 211) 43 47 57.

First processing of steel

NACE 223

After substantial growth in 1988 and 1989, production of first processed steel fell in 1990. This was primarily due to the economic downturn experienced by their customers, particularly those in the building sector, the automobile industry and in mechanical engineering.
In the past, developments in the drawing and cold rolling mills were marked by decidedly weak growth rates due to slack demand at home and an ongoing deterioration of foreign trade. New suppliers from emergent industrial nations and competition from Eastern Europe made incisive inroads into the markets of the European Community as EC exports to non-EC countries receded simultaneously. One consequence of this unfavourable trend (and of intensified rationalisation measures) was a drastic drop in employment.

Figure 1: First processing of steel
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

First processing of steel usually includes forging and the steel tube industry, which are considered separately in this publication. According to the NACE/NIPRO classification, NACE 223 encompasses the following activities:

- Cold drawing of steel;
- Cold rolling of hoop and strip;
- Cold forming of angles, shapes and sections from flat rolled steel products;
- Steel-wire drawing and the manufacture of finished wire products.

Cold drawing includes the production of cold machined steel bar stock. The transformation of hot-rolled steel bar into so-called bright steel is achieved primarily by two methods: drawing or reducing the material thickness by turning, scalping or grinding the steel bar.

Cold-rolled strip steel (cold strip) is produced in rolling mills (outside the ECSC Treaty). This is done by secondary rolling out of hot-rolled strip stock in a type of mill termed a strip mill. Cold-rolled strip steel can also be produced in rolls by splitting cold-rolled plate lengthwise. The resulting product, classified as split strip also falls within the cold rolling mill sector according to the NACE definition. In 1991, total production of cold rolled strip steel in the EC reached about 1.5 million tonnes.

Cold forming of steel includes two types of activity: press folding; and continuous forming by rolling machines. The first way of processing is used to produce small quantities of simple forms, while the second process allows the production of large quantities of complex forms. Within the continuous forming by rolling machines activity, one can distinguish two main production areas: long formed products (multi-purpose products and more specific products such as sheet steel piling) and large formed products for the building sector (corrugated and sectioned sheets). The production of cold formed products in the EC has been estimated at about 2.5 million tonnes in 1991.

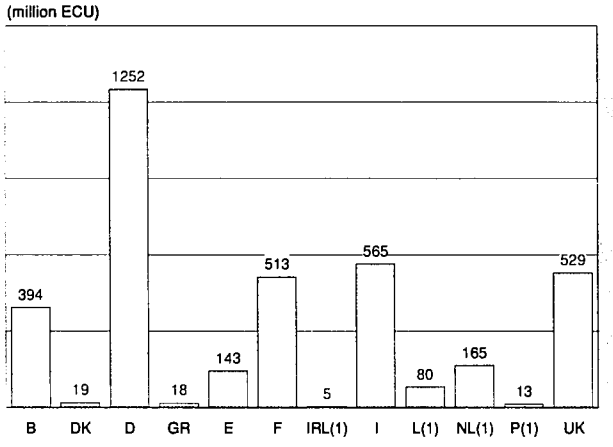
Wire drawing is a process in which the initial stock is stretched cold in drawing machines until it assumes the shape of wire. The resulting cold drawn wire can then either be used directly or be processed to make finished wire products. Important finished wire products include: welded reinforcement mesh, pins and nails, barbed wire, cables etc. Cold drawing is the largest branch of the sector of first processing of steel. Production of drawn wire in the EC amounts to about 3.5 million tonnes, while consumption reaches about 4 million tonnes. If we also consider the production of by-products of drawn wire, the production of the sector is estimated at about 7 million tonnes, while consumption nears 8 million tonnes.

Main indicators

After several years of negative production growth, the drawing, cold rolling and cold forming mills in the EC were able to record healthy growth rates in 1988 and 1989. With the slowdown of production in consuming industries that began in 1990 and intensified in 1991, however, consumption of drawn, cold-rolled and cold-folded products again decreased slightly. Production fell even more significantly due to a remarkable decline in the trade balance.

Table 2 shows a breakdown of consumption, production and extra-EC exports by major product categories. The drawing, cold rolling and cold folding sector is especially important in Germany, Italy, the United Kingdom and France. This is indicated in Figure 2, which provides a breakdown of value added by Member State.

Figure 2: First processing of steel
Value added by Member State, 1991



(1) ifo Institute estimates
Source: Eurostat

Table 1: First processing of steel
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	8 525	9 097	9 909	9 441	9 765	9 530	10 726	12 375	12 593	12 134	11 890
Production	9 702	10 278	11 463	11 122	11 004	10 682	11 923	13 695	13 701	13 060	12 740
Extra-EC exports	1 677	1 706	2 195	2 423	2 041	1 961	2 153	2 519	2 319	2 068	2 000
Trade balance	1 176	1 181	1 554	1 681	1 239	1 152	1 197	1 320	1 109	925	850
Employment (thousands)	129.5	122.9	115.8	108.8	106.2	104.8	104.5	109.7	109.5	107.0	104.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) ifo estimates
Source: Eurostat

Table 2 : First processing of steel
Breakdown by product line, 1989 (1)

(million ECU)	Apparent consumption	Production (2)	Extra-EC exports
Bright steel bars	2 340	2 496	343
Cold-rolled strip	2 925	3 319	652
Cold-formed sections	1 345	1 306	77
Cold-drawn wire	5 549	5 792	577

(1) Estimates are used if country data is not available
(2) Including only Belgium, Germany, France, Italy, Luxembourg, the Netherlands and the United Kingdom
Source: Eurostat

Table 3 : First processing of steel
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-1.2	2.4	1.2
Production	-0.2	1.2	0.7
Extra-EC exports	6.8	-2.9	0.3
Extra-EC imports	7.4	5.5	6.1

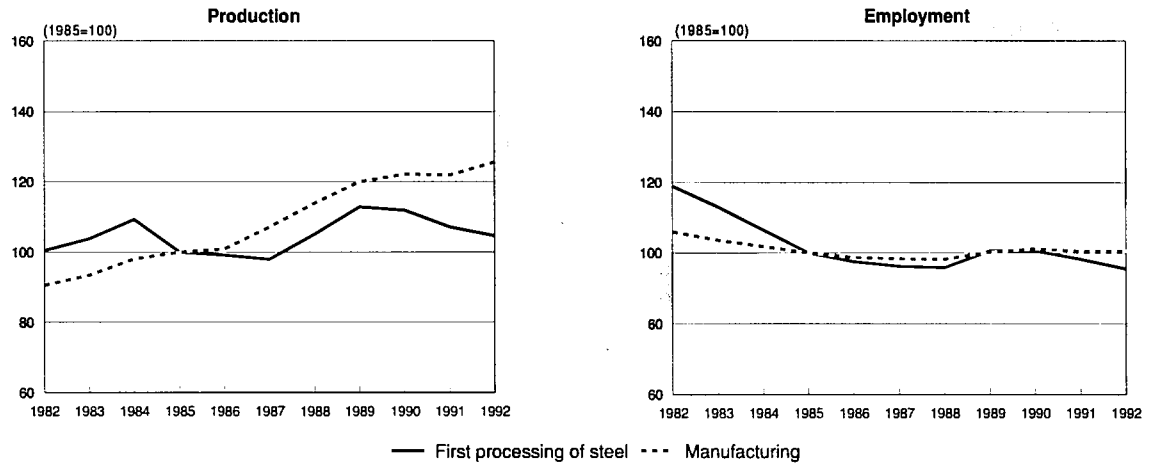
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: First processing of steel
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 677	1 706	2 195	2 423	2 041	1 961	2 153	2 519	2 319	2 068
Extra-EC imports	500	525	642	742	802	809	956	1 200	1 210	1 143
Trade balance	1 176	1 181	1 554	1 681	1 239	1 152	1 197	1 320	1 109	925
Ratio exports/imports	3.35	3.25	3.42	3.27	2.55	2.42	2.25	2.10	1.92	1.81
Terms of trade index	101.0	102.0	100.8	100.0	96.2	94.7	93.9	91.5	91.6	90.9
Intra-EC trade	2 076	2 150	2 596	2 974	3 115	3 108	3 525	4 147	4 082	3 870
Share of total imports (%)	80.6	80.3	80.1	80.0	79.5	79.3	78.6	77.5	76.4	76.3

(1) Estimates
Source: Eurostat

Figure 3: First processing of steel
Production and employment indices compared to EC manufacturing



1992 are ifo estimates
Source: Eurostat

Recent trends

As in the steel industry, growth in the sector of first processing of steel has clearly lagged behind development in the manufacturing industry as a whole. The strong deterioration of extra-EC exports had a negative impact on production level. The recent decline in consumption and production will continue in 1992 and 1993. The long-term development of employment is the result of great rationalisation efforts. In 1989, the downward trend in employment was halted for the first time during the 1980s.

International comparison

As can be seen in Table 4, the drawing, cold rolling and cold forming mills achieved their best results in trade with non-EC countries in 1985. The export surplus amounted to nearly 1.7 billion ECU. Since then, however, trends in foreign trade have turned noticeably against the EC. While extra-EC imports continued to increase strongly, extra-EC exports suffered a sharp decline, leading to decreasing export surpluses and a declining export-import ratio.

Of all the recipients of EC exports, the EFTA countries play a major role, receiving more than a third of extra-EC exports. Other important export markets are the USA and the OPEC countries; whereas Japan's share is of no significance.

The EFTA countries are even more dominant as suppliers of the EC market with drawn and cold-rolled products. About two-thirds of extra-EC imports originate from EFTA. While the import share from the EFTA countries is decreasing, however, countries such as the USA, Japan and especially the East European countries are gaining importance.

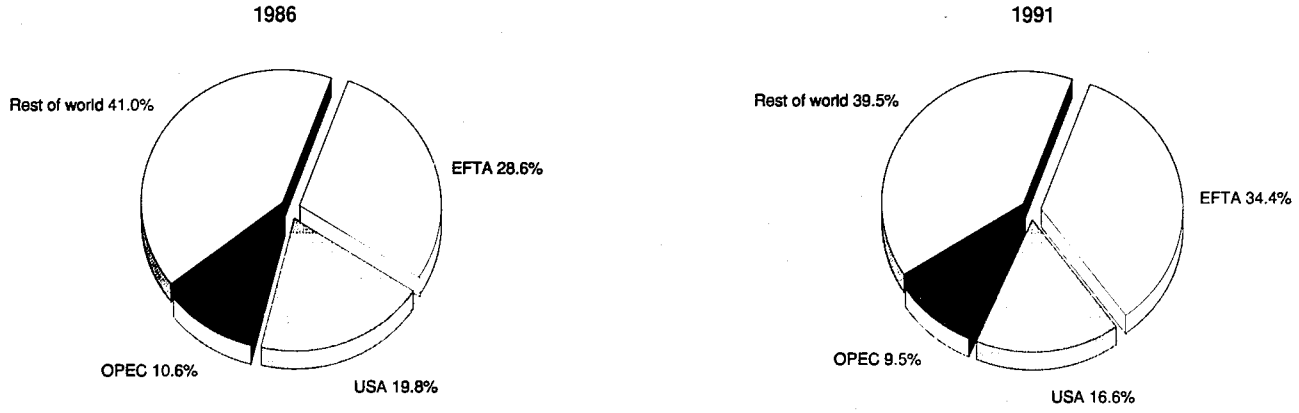
Intra-EC trade has increased strongly in the past. Given the even stronger growth of extra-EC imports, however, the importance of intra-EC trade for the supply of the EC market has decreased. Simultaneously, the penetration rate of foreign competitors supplying the internal market increased steadily from around 6% at the beginning of the 1980s to about 10% in recent years.

MARKET FORCES

Demand

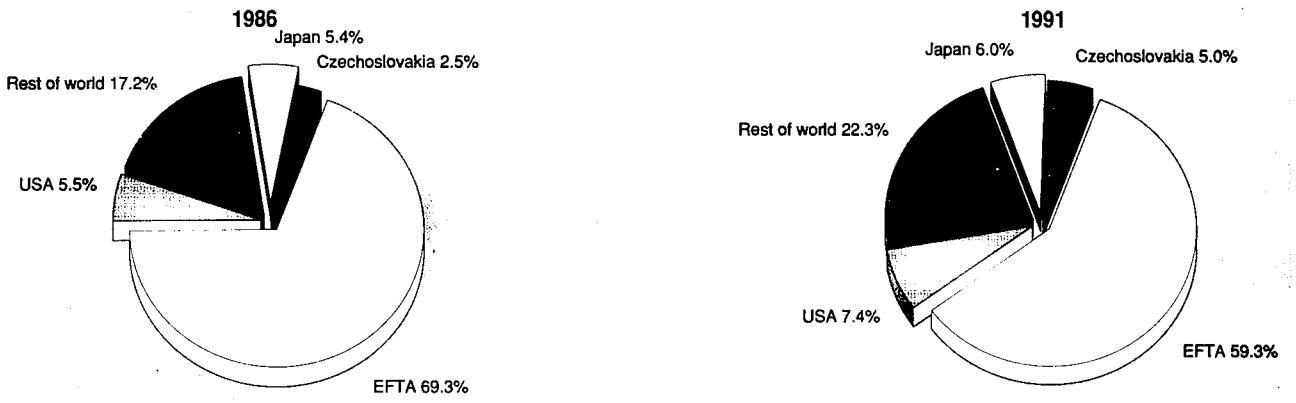
The apparent consumption of products of the first processing of steel industry in the EC (in 1985 prices) amounted in 1991

Figure 4: First processing of steel
Destination of EC exports



Source: Eurostat

Figure 5: First processing of steel
Origin of EC imports



Source: Eurostat

to 10 900 million ECU. Compared to 1982 this was an overall increase of 11.4% or of 1.2% per year on average.

A more positive development in consumption was prevented by two factors. To begin, the unfavourable development in production occurred in the most important user industries, above all the automobile and construction industries. The mechanical and electrical engineering industries are also major consumers of drawn, cold-rolled and cold-formed products. Most of these industries experienced significant losses in production, especially in the first half of the 1980s. For many areas, it was not until 1988 that the production level of the early 1980s was reached. The consumption of products from drawing and cold rolling mills consequently showed a declining trend through 1987, with a strong recovery not coming until 1988.

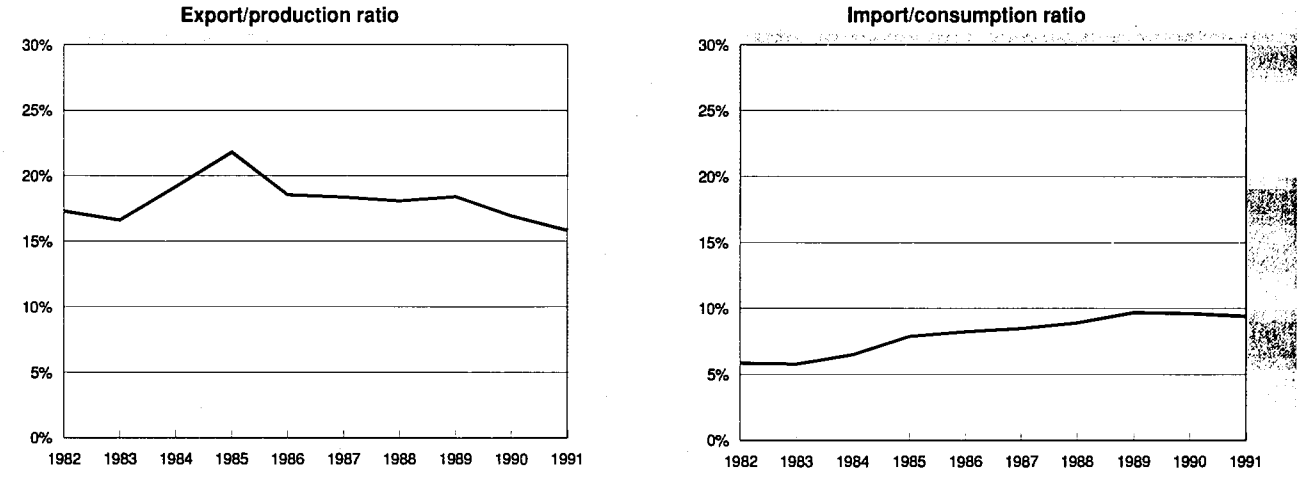
Secondly, the products from drawing and cold rolling mills were exposed to competition from other substitute materials. Wire and cold-rolled strip steel were forced to compete with plastic and aluminium to a certain extent. Bright steel and cold-rolled sections in particular were under threat from products of the steel industry. The enhanced properties and closer tolerances of steel products enabled some processors to substitute steel bar and hot-rolled sections for bright steel and cold-rolled sections respectively (i.e. to opt for a cheaper initial material).

Compensation for weak internal demand in the EC market was not to be found in foreign markets. The export of drawing and cold rolling mills to non-EC countries (measured in real terms) merely increased by 2.5 % between 1982 and 1991. The export quota fell from 21.8% in 1985 to 17.1% in 1991 as a result of the worldwide slump in demand coupled with intensified competition. Nevertheless, all major producer countries of the EC still manage to show a surplus in foreign trade with non-EC countries.

Supply and competition

As a typical supplier industry with a small to medium sized business structure, the drawing and cold rolling mills have little market power. On the demand side, they are confronted with some very strong major customers, such as the automotive industry, which creates fierce competition. Due to the homogeneity of the product, the drawing and cold rolling mills also have little chance of retreating from price competition to milder quality competition. In these circumstances, the

Figure 6: First processing of steel
Trade intensities



Source: Eurostat

Table 5: First processing of steel
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	25.9	28.4	30.7	29.6	31.7	34.0	37.2	34.9	35.5	34.5
Productivity index	87.6	95.8	103.6	100.0	106.8	114.8	125.6	117.7	119.7	116.6
Unit labour costs index (3)	81.3	87.3	95.0	100.0	105.1	109.5	115.3	118.9	128.0	N/A
Total unit costs index (4)	73.2	83.0	97.7	100.0	97.6	92.7	105.7	117.3	117.2	115.4

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

chances for drawing and cold rolling mills lie above all in closely cooperating with their clients. This cooperation can extend to joint development of constructive elements. New corporate strategies of the clients (like just-in-time deliveries) favour EC firms in the Single Market since physical proximity is an advantage vis-à-vis competitors from non-EC countries. On the other hand, the drawing and cold rolling mills in the EC, as all supplier industries, are subject to increasing competition because of the tendency of the client industries to industrialise their purchases.

The share of foreign competitors in the internal market has increased rapidly since the mid-1980s. Young industrial nations such as South Korea and Taiwan (offering production cost benefits over European suppliers) emerged as new suppliers on the European market. The import pressure from East European countries also toughened, especially given that their selling prices rarely reflect their true manufacturing costs. Another unfavourable factor affecting the drawing and cold rolling industries in the past has been the fact that steel producers have shifted their export activities to products of the drawing and cold rolling mills in an effort to circumvent obstacles implemented to protect the ECSC steel industry during a crisis.

Production process

The drawing and cold rolling mills are the largest industrial consumers of rolled steel products. Expenses for intermediate materials from the iron and steel industry therefore are much more significant than in other industries. The independent drawing and cold rolling mills are unusually dependent on the prices and conditions of one supplier having great market power. Apart from cyclical fluctuations, the prices of the drawing and cold rolling mills thus tend to follow the cost prices of steel in the long run.

Since the drawing and cold rolling mills have no influence on the price formation of the steel industry, investments by drawing and cold rolling mills in the past have tended to concentrate on rationalisation with the main aim of saving labour costs. In 1991, the sector still employed 107 000 people, 22 500 (17%) fewer than in 1982. Labour saving measures caused productivity to strengthen from 1982 to 1991 by an average of 3.2 % per annum as gauged by value added per person employed at constant prices.

INDUSTRY STRUCTURE

Companies

The drawing and cold rolling steel industries are typical of most supplier industries in that they consist mostly of medium sized enterprises. Most firms are independent private businesses but a considerable part of output (whose percentage varies among the Member States) is also manufactured by the subsidiaries of the major steel groups.

A breakdown of drawing and cold rolling mills by size of enterprises is provided in Table 6, based on data from Germany, France, Italy and the United Kingdom. It shows the domination of small and medium sized enterprises in terms of the number of enterprises. However, only 4% of the enterprises account for 30 % of turnover.

Strategies

In contrast to the major firms in the steel industry and the steel tube sector, mergers, acquisitions, alliances and cooperation form a less suitable strategy for the medium sized drawing and cold rolling mills. The emphasis will continue to be placed on investments in rationalisation to achieve productivity gains. In addition, the trend towards specialisation will intensify. This applies also with regard to the completion of the Single Market.

The introduction of the Single Market will have only relatively minor effects on the drawing and cold rolling mill sector, given that trade among the various member countries is virtually unimpeded at present.

Products of the drawing and cold rolling mill industry are exchanged every year within the EC at a value of approximately 4 billion ECU. Due to comparable production techniques in all Member States, the quality of these products is relatively consistent.

REGIONAL DISTRIBUTION

Germany is the largest producer within the EC with around one-third of production and employees, followed in descending order of importance by the United Kingdom, Italy, Spain, France and Belgium. Together these five countries constitute

Table 6: First processing of steel
Breakdown by size of enterprise, 1988

employees	% of enterprises	% of employment	% of turnover
20-99	71	26	29
100-499	25	42	40
More than 499	4	32	31

Source: Eurostat

Table 7: First processing of steel
Production at constant prices and employment by Member State (1)

	Production (million ECU)		Employment (thousands)	
	1982	1991	1982	1991
Belgique/België	968.2	1 116.1	10 973	10 697
Danmark	29.9	38.1	433	461
BR Deutschland	3 489.5	4 001.1	37 347	34 964
Hellas	94.7	71.7	1 619	N/A
España	346.2	576.4	6 100	N/A
France	1 967.8	1 753.5	24 503	16 325
Italia	1 965.1	1 807.7	15 723	10 380
Portugal	36.3	70.2	1 047	726
United Kingdom	1 759.7	1 841.9	26 233	22 462

(1) Estimates are used if country data is not available, especially in 1991
Source: Eurostat

some 90 % of total EC production of products from drawing and cold rolling mills.

The relative shares in production of individual countries have changed little over the past ten years. Germany and Belgium have achieved minor percentage gains while the United Kingdom and France have seen their output diminish. The same two countries have also sustained the largest reductions in employment as a consequence.

OUTLOOK

The decline in the market for drawn and cold-rolled products in the EC, which began in 1990 and intensified in 1991, was caused both by weakening domestic demand and a worsening export situation. Production cut-backs in the most important customer industries, especially in mechanical engineering, and the automobile and construction industries, led to a 3% decline in real apparent consumption in the EC market. At the same time, extra-EC exports fell by 10% as a result of the poor world economic situation and loss of business due to the economic upheavals in Eastern Europe.

In light of increasing competition and the persisting economic difficulties in Eastern Europe it is expected that extra-EC exports will remain at current levels.

Table 8: First processing of steel
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	0.5	1.6
Production	0.4	1.4
Extra-EC exports	0.8	0.0

Source: ifo Institute

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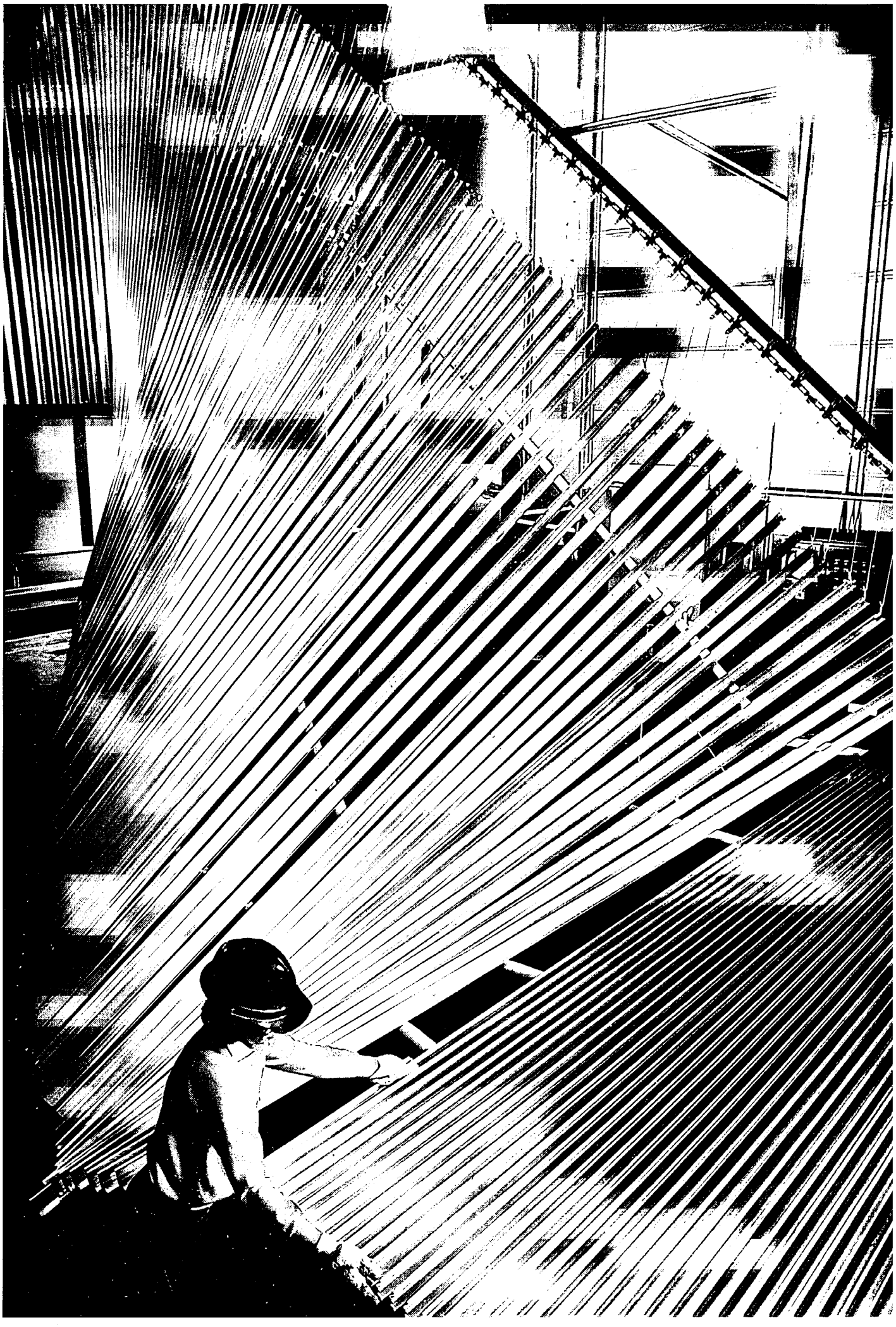
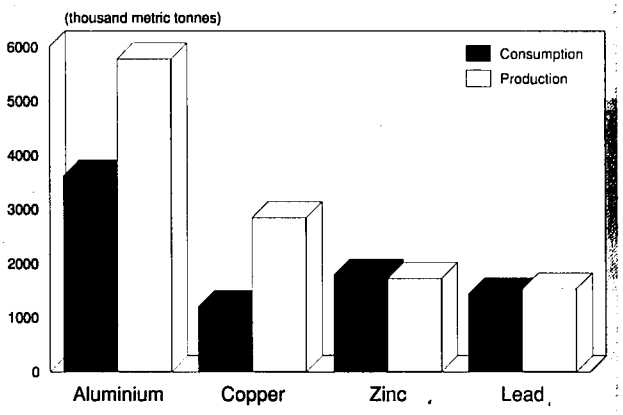
Comité internationale de profilage à froid (CIPF). Address: 1, Rue Paul Cézanne, F-75008 Paris; tel: (33 1) 49 53 72 43; fax: (33 1) 49 53 72 44; and,
European Bright Bar Association (EBA). Address: c/o Stabziehereien-Vereinigung e.V., Kaiserwether Strasse 137, D-4000 Düsseldorf; tel: (49 211) 45 07 21; fax: (49 211) 454 31 07.



Non-ferrous metals
NACE 224

The EC non-ferrous metals industry had an annual turnover of about 30 billion ECU, and employed just under 300 000 people at some 3 000 industrial units in 1991. Having very few mining resources at its disposal, the EC is responsible for less than 5% of the mining production of the market-economy countries for aluminium, copper, zinc and lead. Nevertheless, in refined metal production it is of leading importance in the Western world, with refinement of the four major non-ferrous metals (Al, Cu, Zn and Pb) representing 24% of the world total. EC consumption of these same metals is even higher, representing 35% of world demand. The EC non-ferrous metals industry is a net importer of raw materials: ores, concentrates and other raw materials for refining, and unwrought metals for processing. It is also highly dependent on secondary materials (scrap and residue), which constitute the only "domestic" resource of major size in the EC. In purchasing the raw materials which are necessary for its supplies, and, to a lesser extent, in selling its products outside the EC borders, the EC non-ferrous metals industry is very much present on the international market, and is subject to its price fluctuations.

Figure 1: Refined metal
EC production and consumption, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The EC non-ferrous metals industry is widely diversified in terms of metals which are produced or processed, and which include the major non-ferrous metals aluminium (Al), copper (Cu), zinc (Zn) or lead (Pb); precious metals such as gold (Au), silver (Ag) or the platinum metals (platinum, palladium, rhodium); and alloy metals and other minor non-ferrous metals (molybdenum, vanadium, tungsten, manganese, cobalt, germanium, cadmium, etc.). In view of the fact that the EC is relatively poor in mining resources, its industry is largely dependent on primary raw materials imports, and also finds a significant proportion of its supplies in secondary materials (waste and residue). It is consequently geared to primary and secondary smelter metallurgy and to processing.

The most important consumer markets for the EC non-ferrous metals industry are within the EC itself, but outlets have also been found beyond EC borders. The industry is therefore involved in the international non-ferrous metals market, not only as a purchaser of raw materials, but also as a vendor of metals and processed or special products. In both these respects, it is extremely sensitive to the world balance of markets and to their cyclic developments, which are often irregular. The EC non-ferrous metals industry operates in a highly competitive field, and is supported by long years of technological experience, which has made it the world leader in various segments of its activities.

MARKET FORCES

Demand and supply

In terms of volume produced, aluminium, copper, zinc and lead are the dominant metals of the EC non-ferrous metals industry.

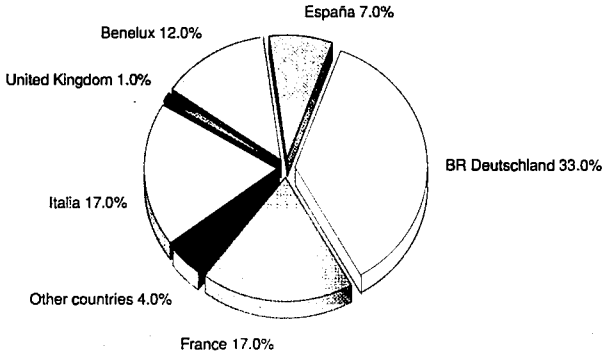
In the aluminium sector, EC production is about 4 million tonnes of metal per year, which is equivalent to almost 70% of EC demand. This represents only 17% of world production, however. The aluminium industry is facing two serious problems:

Table 1: Non-ferrous metals
Imports and exports by Member State, 1991

(thousand tonnes)	Aluminium		Copper		Lead		Zinc	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Belgique/België	371	54	236	181	20	47	43	131
Danmark	29	8	0	0	5	0	14	0
BR Deutschland	1 007	290	557	63	117	63	270	74
Hellas	27	62	47	0	9	0	11	0
España	62	119	27	61	11	1	7	146
France	552	128	437	12	36	55	82	81
Ireland	8	2	0	0	0	0	0	0
Italia	512	18	407	19	77	0	71	35
Nederland	183	332	18	1	39	16	25	140
Portugal	50	0	26	0	20	0	11	0
United Kingdom	197	130	243	16	37	75	120	16

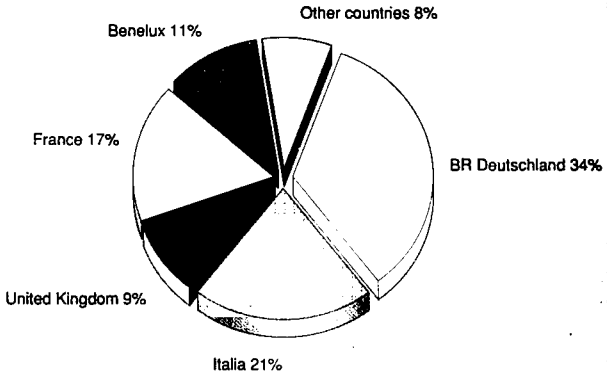
Source: World Metal Statistics

Figure 2: Aluminium semis
Breakdown of production by Member State, 1991



Source: EAA

Figure 3: Copper semis
Breakdown of production by Member State, 1991



Source: WBMS

- the recent massive increase in exports of metal from the CIS;
- the ongoing problem of the tendency to move production units to geographic zones in which energy (an important cost component) is both abundant and inexpensive.

The EC zinc industry produces about 1.7 million tonnes of metal per year, 30%-35% of which come from the processing of ores and concentrates extracted in the EC - an exceptional ratio in EC non-ferrous metals. The industry's major problem is unquestionably how to manage the long cycles which affect its market, with a certain degree of inertia in the adjustment of supply to demand.

In the copper sector, the EC produces about 1.2 million tonnes of metal each year. As the EC is the largest consumer market in the world, this production volume equals somewhat less than 45% of its requirements. In order to lessen its dependence on imported cupreous materials, the EC industry has considerably developed recycling technologies, and is therefore able to obtain a significant amount of its supplies in the form of waste and residue within the EC itself.

Producing about 1.4 million tonnes of metal per year (one quarter of world production), the EC lead industry is able for the most part to satisfy the requirements of its market. The industry is experiencing problems due to inherent properties of the metal, the use of which, particularly in "diffuse" applications, is tending to decrease due to constraints connected with the environment. With this in view, the car battery sector is the only client industry capable of offsetting the losses of consumption in the other sectors, and increased recycling will further boost the share of secondary lead in the industry's supplies (more than 50%).

INDUSTRY STRUCTURE

Companies

The EC non-ferrous metals industry comprises about 3000 companies, most of which are active in the processing sector. The upstream sectors of primary and secondary smelter metallurgy are more concentrated.

Of the four basic non-ferrous metals - aluminium, zinc, copper and lead - the activities of the primary aluminium industry are most strongly integrated.

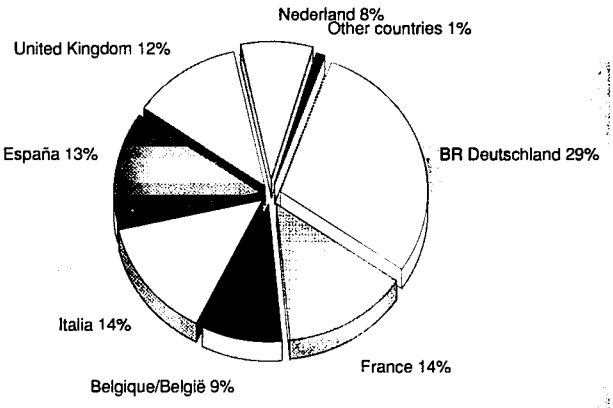
Germany produces 29% of the refined metal output of the EC, compared to 14% each for France and Italy (the next highest producers). Spain and the United Kingdom follow closely, while Belgium and the Netherlands trail behind.

RECYCLING

Recycling is an important aspect of the EC non-ferrous metals industry. "Secondary" materials or recyclable waste constitute an essential input for many of its metallurgical and processing concerns. Some of the latter's supplies depend entirely on access to secondary materials, although, for the most part, recourse to secondary materials goes together with raw materials supplies, for both economic and technical reasons.

The EC non-ferrous metals industry has much experience in the processing of secondary materials - especially in view of the scarcity of European mining reserves. Recycling has therefore traditionally enabled the industry to reduce its dependence on raw materials imports by making use of the "surface" resources generated by the consumption of goods ("old" waste) and by the industry itself (new or industrial waste). Considerable investments are devoted to recycling, in terms of research, equipment and human resources, to such an extent that recycling is at the root of more than 50% of total EC production of the four major non-ferrous metals (aluminium,

Figure 4: Refined metal
Breakdown of EC production by



Source: WBMS

Table 2: Non-ferrous metals
Production of primary and secondary products

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Aluminium									
EC	2 973	3 024	3 160	3 068	3 612	3 693	3 905	4 019	3 933
World	17 854	18 517	20 275	19 977	20 132	21 296	22 799	23 598	23 757
EC share (%)	16.7	16.3	15.6	15.4	17.9	17.3	17.1	17.0	16.6
Copper									
EC	899	965	921	973	1 136	1 097	1 188	1 236	1 264
World	9 384	9 662	9 528	9 724	9 874	10 159	10 536	10 809	10 733
EC share (%)	9.6	10.0	9.7	10.0	11.5	10.8	11.3	11.4	11.8
Lead									
EC	1 155	1 175	1 235	1 214	1 345	1 374	1 441	1 422	1 389
World	5 280	5 287	5 444	5 618	5 477	5 651	5 752	5 903	5 674
EC share (%)	21.9	22.2	22.7	21.6	24.6	24.3	25.1	24.1	24.5
Zinc									
EC	1 229	1 299	1 348	1 373	1 616	1 667	1 708	1 686	1 699
World	6 062	6 382	6 665	6 870	6 827	7 024	7 246	7 254	7 097
EC share (%)	20.3	20.4	20.2	20.0	23.7	23.7	23.6	23.2	23.9

Source: Metallgesellschaft, European Aluminium Association

copper, zinc and lead), and accounts for more than 35% of their consumption in the EC.

More than ever, environmental concerns are impelling the EC non-ferrous metals industry to keep abreast of innovation in the recycling sector. The processing and upgrading of waste are contributing to the protection of the environment, reducing dependence on non-renewable natural resources, and allowing considerable energy savings in the extraction and implementation of metals (from 60% for copper to 90% for aluminium).

ENVIRONMENT

EC environmental policy emphasises integrated pollution control. Many of the issues related to the protection of the environment are of direct relevance to the non-ferrous metals industry.

The draft directives currently being drawn up in the field of industrial pollution are based on the concept of "Best Available Technologies". This approach increases the need to analyse the whole life-cycle of a product, managing the specific risks accordingly at each individual stage. Legislation on hazardous products is developing in such a way as to take into account the conditions of exposure over and above the intrinsic properties of products, which is a positive trend when it comes to assessing the impact of heavy metals.

Waste management also raises difficult questions of direct relevance to the non-ferrous metals industry. This is the case, for instance, of the proposals to limit the free movement of waste at an international level. Waste metals are used as

Table 3: Non-ferrous metals
Consumption of primary and secondary products

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Aluminium									
EC	3 766	4 048	4 323	4 356	4 889	5 094	5 605	5 862	5 959
World	18 758	20 187	20 958	21 284	21 676	22 961	24 198	24 613	25 255
EC share (%)	20.1	20.1	20.6	20.5	22.6	22.2	23.2	23.8	23.6
Copper									
EC	2 165	2 128	2 261	2 227	2 419	2 463	2 525	2 709	2 811
World	9 131	9 325	9 876	9 860	10 106	10 405	10 537	11 018	10 821
EC share (%)	23.7	22.8	22.9	22.6	23.9	23.7	24.0	24.6	26.0
Lead									
EC	1 207	1 200	1 265	1 219	1 393	1 378	1 423	1 478	1 513
World	5 207	5 265	5 393	5 429	5 530	5 647	5 765	5 844	5 609
EC share (%)	23.2	22.8	23.5	22.5	25.2	24.4	24.7	25.3	27.0
Zinc									
EC	1 212	1 301	1 337	1 312	1 477	1 491	1 570	1 585	1 653
World	5 974	6 351	6 515	6 500	6 707	6 904	7 164	7 102	6 979
EC share (%)	20.3	20.5	20.5	20.2	22.0	21.6	21.9	22.3	23.7

Source: Metallgesellschaft, European Aluminium Association

inputs by the sector. A competitive recycling industry and considerable energy-saving potential could be affected by limits on this trade.

Additional measures are under discussion concerning waste incineration and landfills. This is another area which could entail a large number of adjustments for the industry. Finally, the new directive on packaging waste will also have implications for the non-ferrous metals industry.

OUTLOOK

During the 1990's, the industry will have to face two major problems. The first is the opening-up of the economies of Central and Eastern Europe, which is giving rise to serious imbalances on the non-ferrous metals markets in so far as the products of these countries are more - and sometimes substantially - geared to the Western markets which provide currency, rather than to the domestic markets which still do not consume enough quantities.

In addition, the ratification of the Basel Convention for international movements of waste is complicating access to secondary materials (scrap and residue), which are an important supply source for the EC non-ferrous metals industry.

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Aluminium
NACE 224

Growth rates for production and consumption of primary aluminium fell in 1991. However, high growth potential still exists in certain sectors such as packaging or car-making and should help to further the growth of the aluminium industry within the EC.
A substantial rise in imports from Eastern Europe resulted in a supply surplus and a 20% drop in prices in the EC. Imports from Eastern Europe should drop off in the next few years, but they will still be high compared to 1980 levels.

INDUSTRY PROFILE

Description of the sector

The aluminium industry in the EC covers mining production (bauxite), the production of alumina (an aluminium oxide) and primary and secondary smelter aluminium (recovered from waste and scrap materials), as well as the production of semi-finished products (alloys, bars, profiles, wire, sheet metal, foil, tubes and pipes).

The aluminium industry is the largest of the non-ferrous metal industries, and is the youngest as well in that aluminium smelting only began about a century ago. Lightness, longevity, resistance to corrosion, electrical and thermal conductivity and reflectivity make aluminium a popular choice in many sectors of the economy. Its aesthetic qualities, alloy possibilities and easy recyclability, all add to this appeal.

Main indicators and recent trends

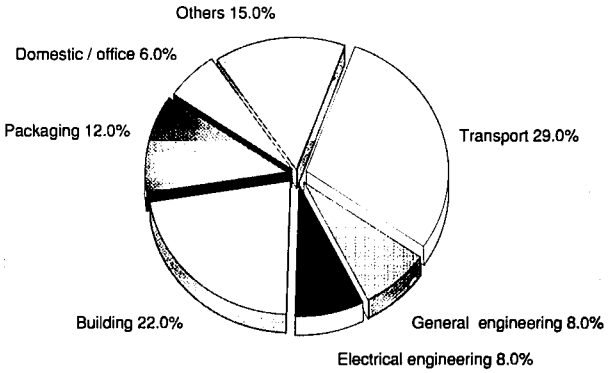
In 1991, the EC aluminium industry directly employed 200 000 people. Turnover amounted to approximately 20 billion ECU. Total aluminium consumption in the EC increased by slightly more than 2% in 1990. Consumption of primary aluminium in the EC countries increased by 2.5% compared with 1990. The production statistics of secondary aluminium indicate a further increase of the use of recycled aluminium by approximately 2% for the year 1990 compared with 1989. Secondary smelting operations produce half of total aluminium production.

International comparison

The largest producer of primary aluminium in the western world is the United States, with the EC in second place. Russia is probably the world's second largest producer overall, with a production capacity of 3 440 kt.

The EC market has become one of the most important markets worldwide. In 1991, the EC produced 2% of the western world production of bauxite (2 143 kt), 15% of the alumina (5 200 kt), 15% of the primary aluminium (2 260 kt), and 27% of the secondary aluminium (1 477 kt). In 1990, the EC was responsible for 32% of western world production of rolled and drawn products, wire, cable and castings (5 400 kt).

Figure 1: Aluminium
Total EC aluminium consumption by end use



Source: European Aluminium Association

The aluminium requirements of the EC are mainly covered by local production. Due to the dynamic growth of consumption, however, coupled with the slow growth of capacities, EC production now covers only about 60% of EC demand. The remaining unwrought metal requirements of the EC are covered by imports, especially from the EFTA countries (in particular Norway) and Africa.

Foreign trade

Intra-EC trade is highly developed, both for the unwrought metal and for semi-finished products or "semis". Overall, the EC is a net exporter of semis; however, this trade is highly dependent on monetary phenomena: trade with the USA is very much influenced by the development of the USD/ECU exchange rate.

INDUSTRY STRUCTURE

Companies

In the primary aluminium sector, which comprised 28 plants in the EC at the beginning of 1991, the major producer companies in the EC are: Pechiney (based in France), VAW (based in Germany), Inespal (based in Spain), Alusuisse (based in Switzerland), Alumix (based in Italy), Hoogovens (based in the Netherlands), and Alcan (based in Canada). Some of these companies have branches throughout the world (Alcan, VAW, Alusuisse, Pechiney).

Industry structures of the different processing sectors vary widely. The rolling sector is highly integrated. There are 40 EC sites which engage in rolling activity, many of which also work in the primary aluminium sector. The structure of the extrusion industry is more diffused, with 170 production sites, and is much less integrated.

Table 1: Aluminium semis
Main indicators (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Apparent consumption	2 743	2 990	2 887	2 960	3 190	3 359	3 730	3 865	4 160	4 176
Net exports	263	289	328	311	213	220	160	106	-65	-16
Production	3 006	3 279	3 215	3 271	3 403	3 579	3 890	3 971	4 095	4 160

(1) 1990-91 excluding Ireland and Portugal
Source: European Aluminium Association

Table 2: Aluminium
Breakdown of production, 1990-91

	Bauxite		Alumina		Primary aluminium		Aluminium semis		Secondary aluminium	
(thousand tonnes)	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991
EC (1)	2 994	2 196	4 241	N/A	2 343	2 259	4 095	4 160	1 554	1 503
Belgique/België, Luxembourg	0	0	0	N/A	0	0	349	335	0	0
Danmark	0	0	0	N/A	0	0	19	19	16	16
BR Deutschland	0	0	1 165	N/A	720	690	1 341	1 397	542	535
Hellas	2 504	2 182	585	N/A	150	152	118	123	0	0
España	0	0	1002	N/A	355	355	286	300	87	96
France	490	5	606	N/A	326	286	731	726	227	229
Italia	0	9	752	N/A	232	218	656	676	347	343
Nederland	0	0	0	N/A	270	264	153	158	134	114
United Kingdom	0	0	131	N/A	290	294	442	426	201	170

(1) Excluding Ireland and Portugal
Source: European Aluminium Association

MARKET FORCES

Demand

Researchers and engineers have been constantly improving material qualities; they have developed new alloys and production processes to open up new areas of application for aluminium.

The transport sector is by far the biggest customer of the aluminium industry, and uses 29% of aluminium production. As a light weight, durable material, aluminium is a very popular input in the motor vehicle, railway rolling stock and shipbuilding sectors. Cylinder heads, motor units, car body parts and complete frame constructions are manufactured from aluminium. The lighter weight of vehicles built with aluminium allows greater energy savings, which is attractive both economically and environmentally.

In the building sector, the second biggest purchaser market for aluminium products, is also a popular building material because of its durability and resistance to rust. It is used particularly for windows, doors and facades. This sector is a welcome raw material source for the secondary aluminium industry.

In Europe, around 12% of aluminium supplies are used for aluminium packaging applications. The protection of foodstuffs and of pharmaceuticals and cosmetics constitutes a continual demand. The recyclability of aluminium packaging materials makes aluminium particularly attractive at a time when concern about overfilled landfills is growing.

Table 3: Primary aluminium
World refined production by country, 1991

(thousand tonnes)	
BR Deutschland	690.3
Hellas	152.4
España	355.2
France	286.1
Italia	217.7
Nederland	253.6
United Kingdom	293.5
EC (1)	2 248.8
USA	4 121.2
Canada	1 821.6
Australia	1 228.6
Brazil	1 139.6
Norway	885.9
Venezuela	609.7
India	503.9

(1) Belgium, Denmark, Ireland, Luxembourg and Portugal do not produce primary aluminium
Source: World Bureau of Metal Statistics, World Metal Statistics

Supply and competition

The world aluminium market deteriorated considerably in 1991 following three years of a more-or-less perfect balance between supply and demand.

World consumption of primary aluminium firmly resisted a mediocre economic situation, recording an increase of 1.1% in 1991. However, this is a decrease in the growth rate compared to the preceding years.

Unwrought metal supplies rose considerably in 1991. Western world production increased due to the implementation of new capacity facilities which were planned in 1988 and 1989, after a seven year period during which world capacity stagnated.

Imports from the former USSR strongly increased after 1990. Unable to make use of traditional local outlets, East European producers diverted their products to the west European markets. Annual volume of exports from Eastern Europe rose from between 200 000 and 250 000 tonnes during the 1980s, to almost one million tonnes in 1991. This dramatic and unforseeable shock threw the market considerably off balance. The surplus resulted in a substantial increase in stocks.

West European producers were particularly affected by the market deterioration. Three-quarters of the Eastern European production exports is estimated to have been directed to the EC, resulting in extreme pressure on the European market. One result was a drop in price levels of more than 20%. In response, European producers took measures to adjust their production. Four factories were shut down in 1991. Furthermore, producers continued with the rationalisation efforts which they had started up several years previously.

All these movements testify to the extent of the restructuring process by means of which the industry intends to maintain its competitiveness.

ENVIRONMENT

Aluminium has properties which make it increasingly competitive in an ecology-conscious world. As previously men-

Table 4: Aluminium semis Exports and imports, 1991 (1)

	Exports	Imports
Belgique/België	314.7	141.0
Danmark	17.9	56.8
BR Deutschland	478.5	576.7
Hellas	48.6	14.3
España	65.1	57.9
France	410.8	337.5
Ireland	N/A	N/A
Italia	154.4	232.9
Nederland	162.9	167.7
Portugal	N/A	N/A
United Kingdom	190.7	292.5

(1) World
Source: European Aluminium Association

tioned, its light weight is particularly effective in increasing energy savings in transportation sectors. However, the high recyclability of aluminium is an especially important competitive advantage, particularly in packaging, but in other sectors as well. Currently, 33% of total EC aluminium consumption is supplied from scrap recovery. The proportion recycled, however, varies widely among Member States. Aluminium products for packaging will be affected by the planned "EC Directive on Packaging and Packaging Waste" which is aimed at reducing the amount of waste, and which sets certain targets for recycling used packaging materials. In cooperation with other industries which are affected by this legislation, the aluminium industry is prepared to play a leading role in minimising the impact of packaging on the environment, and is working together with the public authorities with a view to reducing the quantity of packaging waste going to landfill. At the same time, the industry would like to emphasise the contribution made by packaging to product protection, the safe transportation and distribution of goods, and consumer information, etc.

Aluminium as a mineral is available in almost unlimited quantities - 7% of the earth's crust is aluminium. In order to produce aluminium, the raw material bauxite has to be extracted in the same way as other ores, which can have negative effects on ecological systems. Reclamation of the land mined is a top priority for the industry, and experiments and continuous efforts have yielded positive results in this area.

The reduction process for producing the metal consumes electricity, and gives rise to emissions. The aluminium industry worldwide reduced its electricity consumption from 17 KWh per kg produced in 1980 to less than 16 KWh at the beginning of the 1990s. Major emissions were reduced by a factor of four or more during the same period.

OUTLOOK

In the early to mid-1990s, a drop in the export rate of Eastern Europe is expected. However, the level will still be high compared to the 1980s.

Consumption is expected to grow at about 3% per year, in conjunction with a recovery in the economy worldwide. The opening of a new electrolysis plant in France at the end of 1991 should increase demand in the near future.

The packaging industry in particular offers opportunities to the aluminium industry for the near future. Although the USA market has already been significantly penetrated, there is still room for growth. Europe and Japan also have considerable potential in this sector.

Transport will also be a challenging area. The potential of aluminium in the automobile field is well known, and may lead to significant additional growth in consumption during the latter half of the 1990's. The aluminium industry therefore sees the highest growth potential for its materials in the transport sector.

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Copper
NACE 224

The EC possesses few copper mining resources, but its copper metallurgical activities are highly significant. Refining and semis manufacturing capabilities in the EC have developed using imported primary raw materials and domestic (as well as imported) scrap, in line with the requirements of its large consumption. EC copper demand follows the slow growth pattern of a mature market. Recycling is brought to a high level as, in many of its applications, copper can be reprocessed without loss of quality.

INDUSTRY PROFILE

Description of the sector

The copper industry in the EC is characterised by poor upstream and good downstream integration: copper mining is negligible in comparison with refining and fabricating capabilities.

Since the start-up of mining at Neves Corvo in 1989, Portugal has become the only EC country with a sizeable copper mine production (165 000 mt Cu in 1991). Spain also records a copper mine output figure, but on a more modest scale, although activities go back many years. At present, with about 175 000 mt of copper extracted from domestic ores in 1991, the EC accounts for no more than 2% of total Western World copper mine output. The core of the EC copper industry in fact, is in refining and semi-manufacturing.

Refined copper production in the EC slightly annually exceeds 1.2 million tonnes. The largest facilities are located in Germany, Belgium and Spain. Refinery output arises from electrolytic processes, in the form of cathodes, which are generally melted and cast on the premises into "refinery shapes", i.e. billets, cakes and wire-rods, principally. About 60% of the feed supplies to the EC copper refineries are purchased on the international market in the form of copper blister, anodes or scrap. The remaining 40% come from the refiners' smelting operations, whose feed consists of domestic and imported copper ore concentrates and, to a lesser extent, copper-bearing residues or scrap.

Refineries' products are the major basic material for the copper semis manufacturers. The EC copper semis output exceeded 4.2 million tonnes in 1991. Germany, Italy and France accounted for about 70% of EC output in this industry segment, with the Benelux countries, the United Kingdom and Spain making up most of the balance. The range of products supplied by the semis manufacturers is very wide. They consist primarily of rods, profiles, wires, sheets, strips, tubes, etc. which the end-users integrate in the manufacture of their own products, with applications in such varied sectors as the electrical industry, the automobile industry, construction, machinery, shipbuilding, the aviation industry, the precision instrument and optics industry, the watch and clock industry, etc. With an output of three and half times that of EC refinery output, the EC copper semis manufacturers must turn to the international market to secure adequate volumes of feed supplies, together with the required alloying metals (zinc, tin and nickel for the most part). The EC semis production is in excess of demand, and the EC copper semis manufacturing industry is a net exporter by about half a million tonnes per year.

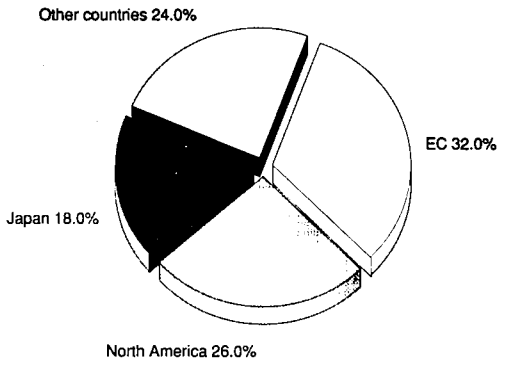
International comparison

The EC market absorbs nearly one third of the Western World's 8.8 million tonnes demand for refined copper. It is the largest copper consuming area in the Western World, ahead of both North America and Japan, with 2.8 million tonnes of copper consumed in 1991 as opposed to 2.3 million in North America and 1.6 million in Japan. Germany, France, Italy, Belgium and the United Kingdom are each among the top ten consumers in the Western World, together with the United States, Japan, South Korea, Taiwan and Canada.

In terms of production, the EC refiners account for about 15% of the Western World output. The 1.2 million tonnes produced per year is slightly ahead of Japanese production of around 1 million tonnes, but behind North American production, of 2.5 million tonnes. In the coming years, however, EC production will most probably lose its second place ranking to Chile, whose production exceeded the 1.2 million tonne mark in 1990.

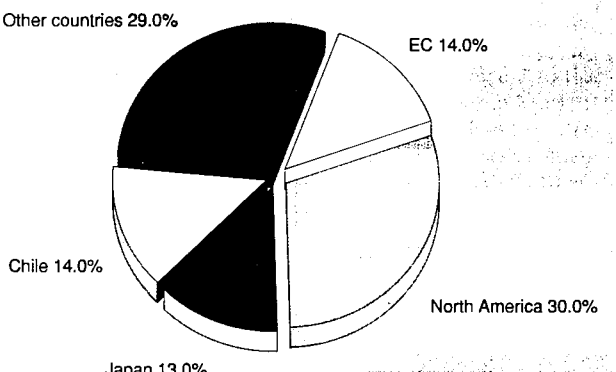
For copper semis production, the EC countries hold by far the most dominant position worldwide, accounting for 39% of the Western World's 10.8 million tonnes output in 1991, the United States and Japan each contributing 23%.

Figure 1: Refined copper Western World consumption, 1991



Source: Eurostat

Figure 2: Refined copper Western World production, 1991



Source: Eurostat

Table 1: Refined copper
Main indicators at current prices

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
Consumption	2 311	2 268	2 394	2 358	2 419	2 457	2 525	2 710	2 804	2 830	2 891
Production	1 228	1 209	1 165	1 216	1 229	1 192	1 226	1 236	1 236	1 208	1 236
Trade balance	-1 235	-1 031	-1 248	-1 236	-1 312	-1 254	-1 257	-1 354	-1 602	-1 661	-1 669

(1) Estimated
Source: WBMS

Table 2: Copper semis
Main indicators at current prices (1)

(thousand tonnes)	1988	1989	1990	1991
Consumption	3 236	3 441	3 522	3 648
Net exports	468	496	454	411
Production	3 800	4 079	4 142	4 215

(1) Excluding Denmark and Ireland
Source: International Wrought Copper Council, London

MARKET FORCES

Demand

Though lacking copper primary resources, the EC has a strong copper industry, being the largest copper consumer market in the Western World. Demand for copper mainly arises from the electrical and electronic industries, which absorb about 50% of total EC consumption. These industries use copper primarily as a conductor material to carry electricity, in the form of wires, profiles and rods made of unalloyed copper. The construction sector is the second largest client: its requirements account for approximately 25% of total EC copper demand. A wide variety of semi-finished products of both unalloyed or alloyed copper, is used in plumbing, wiring, roofing, decoration, etc. The remaining 25% of demand arises mostly from industrial machinery and equipment, transportation equipment, consumer and general products.

Copper applications are fairly well-developed and the growth pattern of copper consumption closely follows the ups and downs of industrial activity at large. Copper demand on the EC market as a whole is growing slightly, as in most industrialised areas in the world. Trends differ from country to country, however. The economic revival in the former East Germany is expected to induce higher than average copper demand in the years to come.

Supply and competition

EC copper refining activity has been able to grow primarily by securing raw materials on the international market and making use of the domestic "surface mine" consisting of copper scrap and residue generated by consumers and production facilities. Access to feed supplies has become increasingly difficult over the past few years, however, as copper mining countries have developed their own refining facilities near their mines, thereby reducing raw materials availability on the international market. Furthermore, competition by rapidly

Table 3: Refined copper
International comparison of consumption

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	% of total 1991
Western world	6 761	6 843	7 668	7 362	7 674	8 012	8 211	8 629	8 762	8 899	100.0
EC	2 311	2 268	2 394	2 358	2 419	2 457	2 525	2 710	2 804	2 830	32.0
USA	1 658	1 804	2 133	1 976	2 100	2 127	2 206	2 204	2 150	2 135	24.0
Japan	1 243	1 216	1 368	1 226	1 211	1 277	1 331	1 447	1 577	1 613	18.0
BR Deutschland	731	737	792	754	771	800	798	855	897	969	11.0
France	419	390	412	398	401	399	409	459	478	486	5.0
Italia	342	325	348	362	394	420	445	458	475	476	5.0
Taïwan	74	105	137	92	156	208	215	315	265	392	4.0
Belgique/België	277	258	299	310	303	292	318	376	390	387	4.0
South Korea	132	152	188	207	262	259	266	252	324	344	4.0
United Kingdom	355	358	353	347	340	328	328	325	317	275	3.0
Canada	159	195	231	223	226	232	236	219	185	189	2.0
España	120	231	114	116	130	131	135	146	146	156	1.8
Portugal	14	18	19	16	18	26	28	22	25	25	0.3
Other EC	N/A	N/A	N/A	73	80	87	92	91	101	87	0.9

Source: WBMS

Table 4: Refined copper
International comparison of production

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	% of total 1991
Western world	7 169	7 321	7 186	7 310	7 434	7 631	7 974	8 333	8 465	8 458	100.0
EC	1 228	1 209	1 165	1 216	1 229	1 192	1 226	1 236	1 236	1 208	15.0
USA	1 694	1 584	1 490	1 435	1 480	1 542	1 853	1 954	2 017	2 017	24.0
Chile	853	834	880	884	942	970	1 013	1 071	1 192	1 202	15.0
Japan	1 075	1 092	935	936	943	980	955	990	1 008	1 038	13.0
Canada	338	464	504	500	493	491	529	515	516	533	6.0
BR Deutschland	394	420	379	414	422	400	426	475	476	520	6.0
Zambia	587	574	522	510	487	509	448	470	479	428	5.0
Belgique/België	458	405	396	413	414	408	393	344	332	317	4.0
Australia	178	203	197	194	185	208	223	255	274	198	2.0
Peru	225	195	219	227	226	225	175	224	182	181	2.0
Zaïre	175	227	225	227	218	210	203	204	173	140	2.0
España	172	159	156	152	155	151	159	166	171	190	2.2
Italia	N/A	N/A	N/A	64	65	65	75	83	83	83	1.0
United Kingdom	N/A	N/A	N/A	125	126	122	124	119	122	70	0.8
France	N/A	N/A	N/A	44	42	40	44	49	52	56	0.7
Portugal	5	5	5	5	5	5	5	-	0.1	-	0.0

Source: WBMS

industrialising countries for copper raw materials has increased as these countries develop domestic refined output capabilities to satisfy the requirements of their consumer markets. The difficulty of access to feed supplies is inhibiting any significant expansion of EC copper refineries' capacities and no major projects in this field are due to reach completion in the short or medium term. The structural shortage of EC refined copper output versus the manufacturing industry's needs is therefore expected to continue.

EC copper semis output, on the other hand, is large enough to adequately supply the EC consumer market towards which it is primarily geared. Excess capacity should enable consumption growth to continue, while net export flows are maintained.

The London Metal Exchange (LME) quotations for copper cathodes generally govern the pricing on copper transactions made by the industry. The evolution of the LME copper price generally reflects the market balance at world level.

INDUSTRY STRUCTURE

Companies

There are ten major refineries in the EC, and it is estimated that the copper refining industry employed around 10 000 people in 1991.

Two companies have facilities of over 250.000 tonnes refined copper per year capacity: Union Minière (Belgium) and Norddeutsche Affinerie (Germany). Two others, Hüttenwerke Kayser (Germany) and Rio Tinto Minera (Spain), produce more than 100 000 tonnes per year each. Production capacity at the other facilities, in Spain, Italy, the United Kingdom, France and Belgium, ranges between 35 000 and 100 000 tonnes of copper per annum.

Downstream integration into smelting operations is minor, except in the case of Rio Tinto Minera in Spain and Nuova Samim in Italy. All the other refiners, except Metallo-Chimique in Belgium, have a deficit in copper smelting ca-

Table 5: Copper semis
Main indicators by product line, 1991 (1)

(thousand tonnes)	Production	Net exports	Consumption
Unalloyed copper, total	2 826.7	324.3	2 376.8
Wire	2 064.4	335.2	1 622.2
Rods, profiles	54.0	0.2	60.0
Rolled material	299.7	0.8	275.3
Tubes	408.6	-12.0	419.3
Copper alloys, total	1 388.1	86.9	1 271.6
Wire	68.6	4.7	71.9
Rods, profiles	826.7	15.8	802.8
Rolled material	362.9	48.7	285.6
Tubes	129.9	17.8	111.3
Total	4 214.8	411.2	3 648.4

(1) Excluding Denmark and Ireland
Source: International Wrought Copper Council, London

Table 6: Copper semis
Percentage of EC production capacity used, 1991(1)

Unalloyed copper	90
Rolled material	97
Tubes	86
Copper alloys,	84
Wire	78
Rods, profiles	86
Rolled material	81
Tubes	79
Copper and copper alloys semis	86

(1) 1990 investigation into the ""pratical machine capacity""
Source : International Wrought Copper Council, London

pacity. In the case of Metallo-Chimique, the opposite is true: its smelting capacity significantly exceeds its refining capacity.

There is much less concentration in the copper semis manufacturing industry, where about 100 companies are involved throughout the EC, employing some 75 000 people. Altogether, these enterprises have a production capacity which is not fully used at present. Activity is developed where demand develops, causing widespread presence throughout the EC. The EC copper semis manufacturers turn to the international market not only to fulfil their feed supplies requirements but also to sell their surplus output, as their production is in excess of EC consumption.

ENVIRONMENT

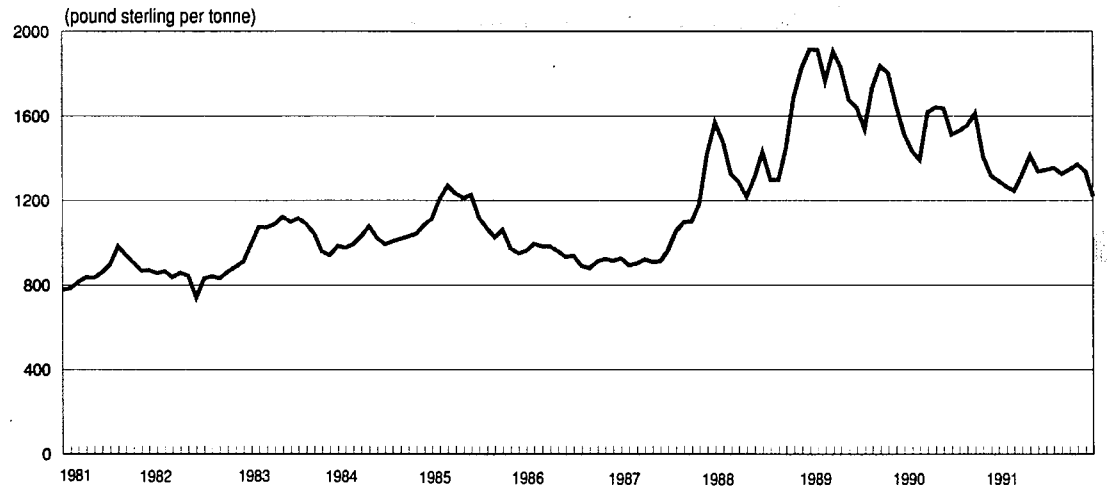
Recycling constitutes an important component of the raw material supplies of the copper refining and manufacturing facilities. Copper can be recovered from many of its applications

Table 7: Refined copper
Entreprises of the industry, 1991

Country	Company	Location	Theoretical annual capacity (tonnes)
Belgique/België	Union Minière	Olen	330 000
	Metallo-Chimique	Beerse	38 000
France	Cie Générale du Palais	Le Palais	50 000
BR Deutschland	Norddeutsche Affinerie	Hamburg	290 000
	Hüettenwerke Kayser	Lünen	115 000
	Küpfer-Silber	Hütte	60 000
Italia	Nuova Samim	Porto Marghera	60 000
España	Ercosa	Bilbao	35 000
	Rio Tinto Minera	Huelva	120 000
United Kingdom	IMI Refiners	James Bridge	80 000

Source: IWCC

Figure 3: Copper
LME quotations (settlement grade A)



Source: Eurostat

and returned to the production process without loss of quality in recycling. Having extremely limited access to domestic primary sources of copper, the EC industry has traditionally given much attention to so-called "surface mines", relying to a large extent on scrap feed to reduce the large deficit of its copper raw materials trade balance. Altogether, "secondary raw materials" account for about 40% of copper use. More than 40% of EC refined copper production arises from copper scrap recycling, and nearly 20% of copper semis output results from the direct use of scrap. In some cases, such as brass rods, for example, semis use 100% recycled copper.

The EC copper industry has developed advanced technologies and made considerable investments so as to be able to process a wide range of copper scrap, including complex, low-grade residues, and to comply at the same time with increasingly stringent environmental constraints.

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Zinc
NACE 224

EC production of refined zinc reached a record level of 1 766 thousand tonnes in 1991, a 33% share of the world total of 5 372 thousand tonnes. The closure of exhausted mines and the lack of new deposits, however, reduced EC production of zinc concentrates, at 602 thousand tonnes, to its lowest level since 1982.

INDUSTRY PROFILE

Description of the sector

Zinc production can broken down into four steps: extraction of ore, processing of ore into zinc concentrates, refining of "primary" zinc, and refining of "secondary" zinc. The best known zinc ores are zinc blende (zinc sulphide - ZnS), smithsonite (zinc carbonate - ZnCo3) and calamine (a mixture of smithsonite and zinc silicate - ZnSiO4). Blende is often found mixed with galena (lead sulphide - PbS2). Mine activity is measured according to zinc concentrates, because zinc ores contain elements and minerals other than zinc itself. Zinc concentrate is the actual amount of zinc in the ore.

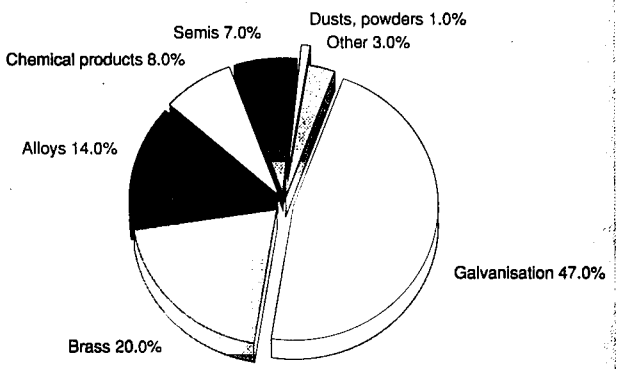
Refined zinc can be divided into two categories according to the source of the zinc inputs. Primary zinc is obtained by means of refining zinc concentrate. Secondary zinc comes from waste and similar materials, primarily from galvanising residue, which is reused after refining. It is possible to reuse some direct waste without refining. Secondary production represents a low percentage of world zinc production (4% in 1986).

The highest quality of zinc (SHG - Special High Grade) is 99.995 % pure, while the poorest quality is about 98% pure. There are four or five classifications between these two.

Zinc and its alloys are marketed in various forms:

- ingots, with various degrees of purity;
- extruded products, such as rods, bars and wire;
- rolled products (sheet and strip);
- pressure-castings;
- powders and dusts;
- chemical products, such as oxides.

Figure 1: Zinc
Breakdown of production by end product, 1990



Source: Eurométaux

Main indicators

In 1991, EC production of zinc concentrates (mine production) measured in tonnes dipped to its lowest level since 1982. Production of refined zinc, however, increased to a record level. Consumption of refined zinc also rose, as did imports. EC exports of refined zinc decreased, reflecting increased competition from foreign competitors.

International comparison

The most important world producers of zinc concentrates are Canada, Australia, Peru, the EC, and the USA. The EC share of the world total was about 11% in 1991, and covered around 34% of EC primary refiners' requirements This is a decline compared to the EC world volume share of 13% at the beginning of the 1980s, which covered 44% of the EC metal producers' requirements at that time. EC and Canadian mine production declined in 1991, while the production of the USA, Peru, and Australia all rose. European mine production was affected by the closure of exhausted mines and lack of new

Table 1: Zinc
Production of zinc concentrates

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Danmark	80	79	73	70	62	66	77	71	48	0
BR Deutschland (1)	106	113	113	118	104	99	75	64	59	54
Hellas	20	21	23	21	23	21	21	25	27	31
España	168	176	229	234	227	273	278	266	257	262
France	37	34	36	41	40	31	31	27	24	27
Ireland	167	186	206	192	182	177	177	169	166	187
Italia	39	43	42	45	26	33	38	44	42	37
Portugal	0	0	0	0	0	0	0	0	0	2
United Kingdom	10	9	5	5	6	6	5	6	6	1
EC	627	661	727	726	670	706	702	672	629	602
Canada	1 189	1 070	1 207	1 172	1 291	1 482	1 347	1 213	1 203	1 152
USA	330	293	277	252	221	233	256	288	543	547
Peru	507	553	555	583	598	612	485	598	577	623
Australia	633	663	653	713	665	738	739	811	884	1 038
Western world	4 814	4 843	5 095	5 148	5 066	5 316	5 052	5 092	5 371	5 540

(1)1991 includes the former East Germany
Source: International Lead and Zinc Study Group

Table 2: Zinc
Production of refined zinc (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	228	263	271	271	269	284	298	285	289	299
BR Deutschland (2)	334	356	356	367	371	380	356	353	338	346
España	190	198	212	216	202	224	256	257	257	274
France	243	149	259	247	257	249	274	266	264	299
Italia	158	156	167	310	230	247	242	246	248	256
Nederland	186	188	210	203	198	206	210	203	208	201
Portugal	4	4	6	6	6	6	6	5	4	0
United Kingdom	79	88	86	74	86	81	77	80	93	101
EC	1 422	1 402	1 567	1 694	1 619	1 677	1 719	1 695	1 701	1 776
Canada	512	617	683	692	571	610	703	670	592	661
USA	302	305	331	334	316	344	330	358	358	355
Japan	662	701	754	740	708	666	678	665	688	731
Australia	296	303	306	293	308	312	302	294	303	325
Western world	4 330	4 645	4 592	4 996	4 854	5 058	5 240	5 215	5 179	5 372

(1) Total production by smelters and refineries of zinc in marketables form or used directly for alloying including production on toll in the reporting country, regardless of the type of source material, i.e. whether ores, concentrates, residues, slag or scrap. Remelted zinc and zinc dust are excluded
(2) 1991 includes the former East Germany
Source: International Lead and Zinc Study Group

deposits being mined (although Ireland and the United Kingdom contain mines which could be put into operation in the near future).

World zinc metal production reached a record volume of 5 372 000 tonnes in 1991. The major contributors were the EC, Japan, Canada the USA and Australia. EC production reached a record level of 1 777 000 tonnes, representing 33% of the world total. Production rose significantly in all the primary producing countries except the US, which experienced a small decline.

MARKET FORCES

Demand

World zinc metal consumption reached a record level of 5 359 000 tonnes in 1991. The EC, which is the primary world consumer, consumed a record 1 754 000 tonnes. The USA, another major consumer, saw its tonnage drop by 9% (90 kt). East Asian consumption increased to 1 729 kt, an increase of 7%, Japan alone consuming 844 000 tonnes.

The protection of steel from corrosion is the major use of refined zinc. Galvanisation alone absorbs 50% of the tonnage consumed annually in the Western world.

Supply and competition

Zinc prices remained very low throughout 1991, at an average of 1.116 USD. The average for the period of 1964-1991 was 1.358 USD (in 1991 dollars), while the average for 1982-1991 was just under 1.263 USD.

The EC has been a net importer of zinc ores since 1984. EC production of concentrates covers only 34% of the requirements of the processing plants. The trade balance decreased even further in 1990 and 1991.

Table 3: Zinc
Consumption of refined zinc (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	126	166	156	169	172	163	175	174	178	200
Danmark	10	9	10	12	15	10	12	11	13	11
BR Deutschland (2)	368	405	425	410	434	455	450	453	484	545
Hellas	13	11	12	15	15	14	14	17	20	18
España	97	107	101	103	100	109	127	116	125	125
France	264	271	282	247	260	253	290	279	284	289
Ireland	1	2	1	1	1	1	2	2	1	1
Italia	202	208	210	218	232	245	254	262	275	283
Nederland	59	54	60	51	54	50	67	75	77	88
Portugal	16	16	11	9	10	12	10	11	14	11
United Kingdom	178	177	182	189	182	188	193	194	189	183
EC	1 334	1 426	1 450	1 424	1 475	1 500	1 594	1 594	1 660	1 754
Canada	120	144	146	156	154	158	159	148	123	120
USA	801	934	980	962	998	1 052	1 089	1 059	991	902
Japan	703	771	774	780	753	729	774	769	815	843
Australia	103	102	97	107	99	94	108	111	98	87
Western World	4 236	4 556	4 704	4 737	4 885	5 044	5 267	5 199	5 255	5 359

(1) Total production by smelters and refineries of zinc in marketables form or used directly for alloying including production on toll in the reporting country, regardless of the type of source material, i.e. whether ores, concentrates, residues, slag or scrap. Remelted zinc and zinc dust are excluded.
(2) 1991 includes the former East Germany
Source: International Lead and Zinc Study Group

Table 4: Zinc
Imports of refined zinc (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	42	51	46	47	45	38	35	37	32	43
Danmark	10	8	11	12	12	10	12	11	14	12
BR Deutschland (2)	141	144	161	152	159	156	179	185	222	269
Hellas	15	15	15	15	17	15	16	17	13	11
France	58	55	65	62	64	70	87	84	89	88
Italia	71	84	91	63	55	64	53	72	75	88
Nederland	16	14	15	14	17	19	36	36	26	25
Portugal	10	5	6	8	4	5	5	6	11	10
United Kingdom	120	115	116	131	102	114	133	126	124	120
EC	483	491	526	504	475	491	556	574	606	666
USA	456	618	639	611	665	706	749	712	601	549
Japan	45	42	57	65	93	105	113	133	141	142
Taïwan	46	48	40	39	56	65	64	57	72	126

(1) World imports
(2) 1991 includes the former East Germany
Source: International Lead and Zinc Study Group

EC exports of refined zinc dropped in 1991 compared to 1990, to the benefit of Canada and Australia. EC imports rose, resulting in a net deficit in trade in tonnes for the first time in the period of 1982-1991.

INDUSTRY STRUCTURE

The EC mining industry is primarily concentrated in Spain and Ireland. Production is concentrated in the hands of six large producers which include Asturiana de Zinc (Spain), Budelco (the Netherlands), Union Minière (France, Belgium), Ruhr-Zink (Germany).

In Europe, Union Minière closed its Overpelt plant in 1992. Nuova Samim announced the closure of its Crotone plant (with a 100kt capacity) in 1992 for renovation work and resumption of activity in 1995. Pasminco has announced its intention of selling off its zinc interests in Europe (Avonmouth, Budel (50%), ISC Alloys).

While EC production is decreasing, with plant closures underway or programmed, new plants and extensions are planned in other parts of the world, chiefly in Japan, Thailand, India and Iran.

ENVIRONMENT

Recycling plays an important role in the zinc industry. The share of recycling in zinc consumption is estimated at 32% in Europe. For the most part, waste is returned directly to the production circuit, with a small amount undergoing refining operations. This is secondary zinc production.

Production facilities currently meet current emission limits for air and water. Solid water, such as gypsum from waste water neutralisation and iron-containing residues from hydrometallurgy, is disposed of in controlled landfills. R&D efforts try to limit the volume of these residues as no viable alternative to them exist.

OUTLOOK

Very slow growth in demand is expected in the EC countries over the next several years. The major growth zones, both for supply and demand, are expected to be:

- Asia, especially East Asia, with the exception of Japan;
- the traditional consumer zones (North America, Europe) where growth in consumption will continue to be steady, although slow;

Table 5: Zinc
Exports of refined zinc (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	126	156	168	157	137	160	155	166	137	131
BR Deutschland (2)	87	115	98	94	78	79	99	92	72	74
España	96	96	106	127	94	106	146	148	137	150
France	49	51	93	69	66	71	66	71	74	77
Italia	21	32	42	44	46	58	50	45	51	40
Nederland	141	157	160	160	165	177	180	162	157	140
United Kingdom	11	20	8	8	11	4	7	9	8	15
EC	531	627	675	659	597	655	703	693	636	627
Canada	470	500	530	556	427	441	528	495	450	521
Australia	232	233	221	215	217	241	207	203	244	253
Finland	117	129	123	137	128	134	128	138	140	129

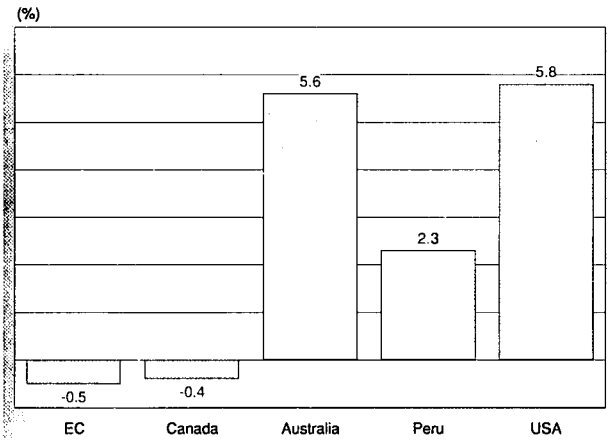
(1) World exports
(2) 1991 includes the former East Germany
Source: International Lead and Zinc Study Group

Table 6: Zinc
Top EC producers by annual capacity, 1991

Country	Company	Location	Process (1)	Theoretical annual capacity (thousand tonnes)
Belgique/België	Vieille Montagne	Balen-Wezel (Anvers)	E	190
	A division of ACEC-Union Minière	Overpelt	E	120
		Overpelt	RT	25
BR Deutschland	Ruhr-Zink GmbH	Datteln (Ruhr)	E	200
	Berzelius Metallhütten GmbH	Duisburg-Wanheim	ISF-RT	100
	Metaleurop Weser Zink GmbH	Nordenham	E	130
	Harz Zink GmbH	Harlingerode (Harz)	CV	30
España	Asturiana de Zinc S.A.	San Juan de Nieva	E	330
	Española del Zinc S.A.	Cartagena	E	60
France	Vieille Montagne France S.A.	Auby (Nord)	E	205
	Metaleurop S.A.	Noyelles Godault	ISF-RT	100
Italia	Nuova Samim S.p.A.	Porto Vesme (Sardegna)	ISF-RT	70
		Porto Vesme (Sardegna)	E	83
	Pertusola Sud S.p.A.	Crotone (Calabria)	E	100
Nederland	Budelco B.V. (Pasminco + Billiton)	Budel-Dorplein	E	210
United Kingdom	Pasminco Europe	Avonmouth	ISF-RT	105

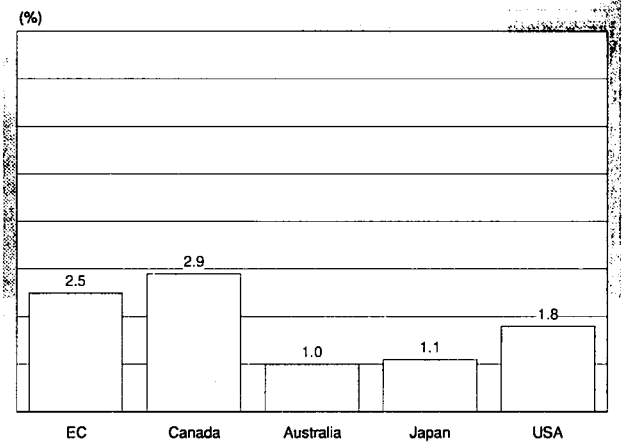
(1) E : Electrolytic plant.
Pyrometallurgical processes: ISF : Imperial Smelting Furnace; CV : Vertical retorts; RT : Fire refining
Source: 1990 Minemet Yearbook

Figure 2: Zinc concentrate production
Annual cumulative growth rate, 1982-91



Source: Eurométaux

Figure 3: Primary refined zinc production
Annual cumulative growth rate, 1982-91



Source: Eurométaux

- the countries of Eastern Europe, which could constitute a zone of potential development in terms of investments in production facilities as well as a potential market.

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Lead
NACE 224

The EC possesses few lead-mining resources, but its lead metallurgical activities are powerful and competitive. EC consumption and production have experienced only small growth, resulting in decreases in the EC's share in world markets. Secondary smelting is an increasingly important source of lead, particularly as environmental regulations become tighter. Considerable restructuring has been taking place in the lead-refining industry and in its primary client industry, batteries. The restructuring will require new relationships between suppliers and consumers.

INDUSTRY PROFILE

Description of the sector

Lead is the most abundant heavy metal in the earth's crust. It is normally found in mixed ores with zinc and small amounts of silver and copper. Lead's softness, low melting point, chemical reactivity and resistance to corrosion give it great functional value, both in its pure form and in alloys or compounds.

Mine production of lead has decreased slightly, due to the importance of recycling. Refined lead is derived from two sources: primary material in the form of mined lead ore, and secondary material in the form of scrap and recycled products. Primary production requires the smelting of lead bearing ores to produce refined lead bullion. Secondary production may also require refining facilities if the recycled products contain unwanted compounds. With the impact of environmental and governmental regulations concerning the recycling of lead-bearing scrap, the secondary refining industry now supplies more than 50% of the lead consumed in the western world. This proportion will increase as the world car population increases, because lead acid accumulators in cars are the main source of scrap for secondary refining.

Primary refining is very much linked to the economics of mining lead-zinc ore bodies. The bulk of mine production of lead comes predominantly from works in which zinc and silver (to a lesser extent) are the principal profit makers; less than a third comes from the actual lead ore mining works in which lead is the principal commodity.

The most important consumer of lead is the battery industry. Other uses for lead include petrol additives (tetraethyl lead), paint, shot, glass, ceramics and plastics.

Main indicators and recent trends

Worldwide consumption of lead rose dramatically in 1980. Since 1982 in the EEC member states, consumption has risen by some 13% to 14% at an average annual rate of 1.5%. The EC is not a major mining region - only 167 000 tonnes of lead were mined in the EC in 1990, according to Eurometaux. Metal production, however, is much higher and amounted to 1 389 000 tonnes in 1990, of which 53% was from secondary (recycled) sources. Primary production has been declining steadily. Industry is responding effectively to potential ecological problems by recovering ever-increasing amounts of lead.

MARKET FORCES

Demand

Consumption of lead generally follows general economic activity, falling during periods of recession and increasing during periods of high economic activity.

Regional trends in consumption are variable. For example the share of the EC relative to world consumption has fallen in recent years. In the USA as well, consumption in 1983 was below the 1970 level. In contrast, most other areas of the world have increased consumption in recent years. Apart from the major influence of business cycles, consumption trends are largely driven by regulatory control on lead products (e.g. gasoline additives) and the cost and availability of substitutes.

Demand from the battery industry will continue to underpin consumption, largely as a result of rising demand for lead acid batteries for the automobile industry. Between 1979 and 1989 lead consumption by the battery industry increased by almost 40%, at an average annual rate of 3.4%. The vast majority of storage batteries are employed in starting, lighting and ignition (SLI) applications in motor vehicles. Demand for such batteries depends upon the number of vehicles built and, more importantly, upon the number of batteries required to replace exhausted units. Demand has also increased for other forms of batteries, such as those used in load levelling/peak sharing applications, as well as electric-powered vehicles and standby power uses.

A combination of environmental pressures and competition from other metals and materials has resulted in a stagnation or decline of lead demand in most of its other end-uses.

Consumption rose only marginally in rolled and extruded products, pigments and other compounds and shot, and these sectors contributed little to overall growth. In applications such as cable sheathing, alloys and gasoline additives, consumption has declined markedly: between 1979 and 1989 consumption in these three sectors fell by 50%. By 1989, they accounted for only 10.6% of the total consumption, compared with 23.2% in 1979.

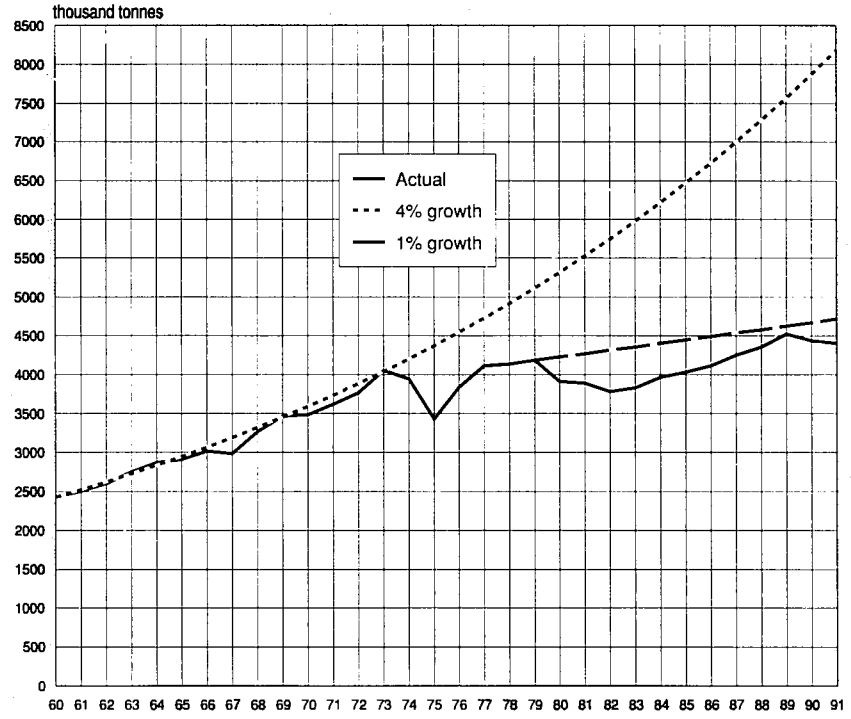
In the case of cable sheathing and alloys, lead has suffered from a combination of substitution by other materials and the introduction of new technology which has rendered the metal obsolete. Increasing awareness about the impact of noxious emissions on the environment is the main reason for the slump in lead consumption in gasoline additives. Over the period from 1979 to 1989, consumption of lead by this end-use fell by two thirds, and it only remains of any significance in the United Kingdom.

Table 1: Refined lead
Main indicators (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Consumption	1 334	1 317	1 399	1 342	1 386	1 377	1 416	1 474	1 514	1 514	1537
Net exports	N/A	-184	-161	-174	-630	-216	-244	-236	-328	-281	N/A
Production	1 292	1 321	1 384	1 370	1 339	1 374	1 453	1 422	1 389	1 395	1360

(1) Figures after 1991 include unified Germany, except net imports
(2) Estimated
Source: WBMS, Eurostat

Figure 1: Refined lead
Consumption in Western world (1)



(1) Western world only; does not include CIS, People's Republic of China or Eastern Europe
Source: Eurostat

The market for lead and lead products is international in scope. Regional consumers such as the EC are significant importers of lead ore and bullion. Generally accepted daily prices for lead are set on the London Metal Exchange, for both physical commodities and financial futures and options. Differentials can exist but may not stimulate exchange due to the expense and time of international shipping, tariffs and other trading expenses. For example, the US trade in lead takes place primarily with Canada and Mexico, due to transport expenses. Regionally, Europe is the largest importer of both lead ore and refined metal. North America (US and Canada) and Australia export large quantities of ore and refined metal.

Recently, with the breakdown of socialist economies in Eastern Europe, large volumes of refined and partly refined lead have been exported by the CIS, particularly into European countries.

Supply and competition

Primary refined lead is strategically supplied by many multinationals to parts of the world where the net return is often lower than the intrinsic lead value contained. This tends to be the policy on a proportion of production after having satisfied indigenous markets. However, secondary refined lead is predominantly supplied in the country where the scrap arisings occur and refining is carried out.

With the growing importance of secondary refining from an environmental standpoint the major companies in Europe have a vested interest to be active in both primary and secondary refining. These companies are best placed to finance the investment that will be required to conform with increasing environmental legislation.

INDUSTRY STRUCTURE

Companies

Within western Europe there are ten primary smelter/refiners, ranging in size from production of 75 000 tonnes per year to 200,000 tonnes per year. In addition, there are approximately thirty secondary smelter/refiners in western Europe producing from 5,000 to 65,000 tonnes per year.

The primary refineries are mostly multinational, and are spread throughout UK, Sweden, France, Germany, Belgium, Spain, Austria, Yugoslavia and Italy. All plants with the exception of Britannia Refined Metals (UK), smelt lead and or lead/zinc concentrates before refining lead bullion. Britannia Refined Metals refines only crude lead bullion imported from its parent company MIM in Australia.

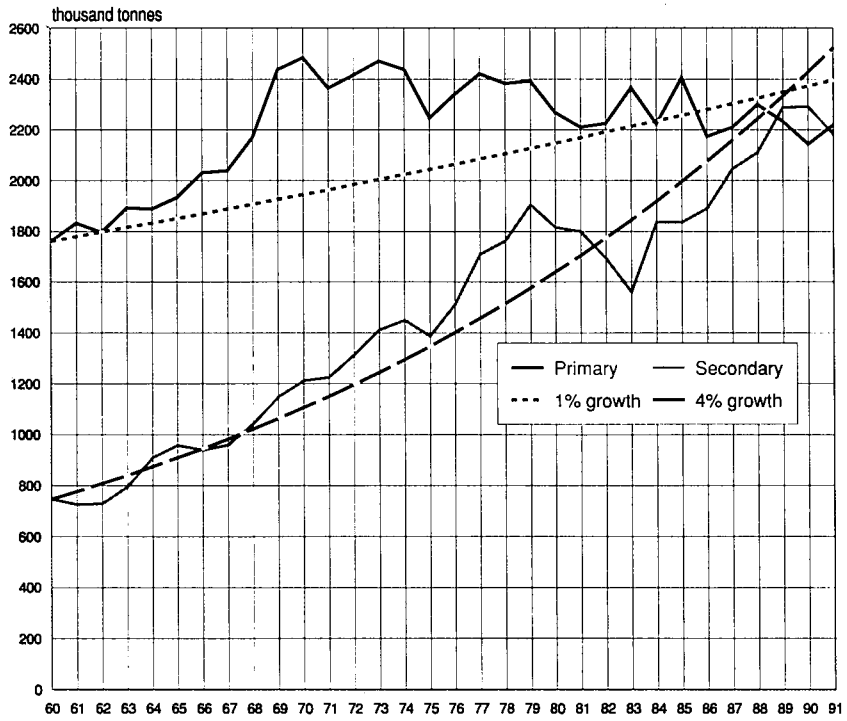
The secondary industry is characterised by a large number of smaller refineries, many of which are independent and which recycle and refine scrap generated in their local area. The number of these refineries is decreasing as the larger multinational companies, and the major battery manufacturing groups as well, acquire or set up new operations.

The largest primary smelters/refineries in western Europe include Britannia Refined Metals Ltd., Metaleurop SA (France), Metaleurop GmbH (Germany), Metallgesellschaft AG (Germany), Union Minières's Business Unit Hoboken (Belgium), Boliden Mineral AB (Sweden), Nuova Samim Spa (Italy) and Sdad Penarroya - España SA (Spain). With the exception of Union Minières's Business Unit Hoboken, all of these primary refiners are involved in secondary recycling / refining as well. Other companies include: STCM (France), CEAC (a battery producer) (France), Varta Batterie AG (Germany), Fonderie-et-Manufacture des Metaux (owned by Metaleurop) (Belgium), and H J Enthoven (part of Billiton) (UK).

Strategies

Within the overall lead refining industry and the major industry market of batteries which the industry supplies, there has within the last three years been considerable restructuring. So far this has mainly been apparent within the battery industry, with the formation in Europe of five major battery groups. These groups have become very powerful in their bargaining

Figure 2: Refined lead
Producton in Western world (1)



(1) Western world only; does not include CIS, People's Republic of China or Eastern Europe
Source: Eurostat

capabilities and some are competing with the lead refiners by building recycling/refining operations. This enables larger battery companies to process their own scrap and also operate collection schemes for waste batteries returned through their distributor networks.

For the future, secondary refiners will have to work more closely with the major battery companies, in order to maximise the recycling rate of battery scrap and to comply with governmental legislation. Government-approved collection schemes will be set up where refiners and battery customers will work closely together. Such schemes should be equivalent throughout the EC to allow fair competition on supply of lead and lead alloys between EC Member States and other European countries with similar schemes.

Environmental legislation will also require investment to reduce lead in air emissions. In recent years several new technologies - some still at the development stage - have been introduced which offer more efficient, environmentally acceptable methods of smelting lead concentrates. A major reason why the new technologies should gain ground is their ability, in most cases, to handle secondary material as feed. There are several advantages to an integrated smelting/refining complex:

- economies of scale;
- synergy of the smelting and refining processes;
- concentration of lead production in fewer areas, and closure of environmentally unacceptable plants;
- lower environmental lead levels.

It seems certain that the new pyrometallurgical technologies will further increase their share of total lead smelting capacities over the next decade at the expense of the conventional blast furnace. Ultimately, looking further ahead, there will probably be a place for the hydrometallurgical routes, although they may make inroads sooner in the treatment of battery paste. Undoubtedly, operational refining sites will decrease in Europe, and consolidation and rationalisation will occur as companies consider the investment required and returns available.

ENVIRONMENT

As lead is a toxic metal, there are concerns about losses of the metal to the environment. Most control measures are concerned principally with human exposure (humans are most affected by lead exposure) although there are certain instances in which animals can be exposed to environmental lead. The metal has relatively little impact on ecosystems. There has been much debate about the levels of lead which cause harm; general policy is normally to restrict emissions to the lowest practicable levels given the state of technology, and recycling is normally conducted whenever appropriate and economic.

The major uses of lead are increasingly recyclable. Batteries, representing 49% of lead consumption in Europe in 1990, are recycled with an efficiency greater than 90%. Indications are that the situation should become even better in the future. Among the other uses, tetraethyl lead (petrol additives), paint and shot have declined dramatically or disappeared completely over recent years. This has been partly as a result of environmental legislation (e.g. tetraethyl lead), partly as a result of voluntary reductions by industry (e.g. lead shot for fishing weights) and partly as a result of natural substitution (e.g. paint). Of the other non-recoverable uses, most lead is used in products from which it cannot be easily extracted such as glass, ceramics, plastics, so even in these cases there is minimal opportunity for ecological impact. The net result is that the uses of lead which can affect the environment are steadily disappearing.

During the production and processing of lead there are inevitably opportunities for emissions. These are kept to a minimum through the use of control technologies and legal limits

Table 2: Refined lead
Western World consumption by end use

(thousand tonnes)	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Avg yearly growth (%)
Batteries	1 797	1 605	1 711	1 710	1 828	2 081	2 131	2 164	2 303	2 395	2 511	2 543	3.2
Cable sheating	276	260	256	250	223	207	207	195	194	184	196	182	-3.7
Rolled and extuded products	300	302	287	258	288	302	280	289	290	320	323	310	0.3
Shot/ammunition	94	85	90	92	92	107	102	92	88	85	96	101	0.7
Alloys	228	193	167	177	166	158	155	143	151	147	138	133	-4.8
Pigments and other compounds	522	496	474	449	448	503	524	500	526	526	559	517	-0.1
Gasoline additives	291	239	209	212	176	166	136	110	106	96	95	87	-10.4
Other	177	162	160	133	132	151	157	154	167	172	158	153	-1.3
Total	3 685	3 342	3 354	3 281	3 353	3 675	3 692	3 647	3 825	3 925	4 045	4 026	0.8

Source: ILZSG

on the amounts which are allowed to escape. Airborne emissions are controlled through efficient filtration systems and by the employment of design and management systems to prevent uncontrolled losses to the environment. Aqueous effluents are treated before discharge to ensure compliance with limits imposed by water authorities. In addition, ambient levels of lead in the air outside plants and in receiving waters are limited to ensure suitable protection. Finally, solid wastes may not be disposed of indiscriminately. Depending on the lead content of a waste or the ease with which it dissolves into the environment, wastes are designated as safe or hazardous and disposed of in landfills designed to contain the lead.

REGULATIONS

Regulations affecting lead fall into three main categories: occupational exposure, emissions from plants, and controls on products.

Occupational exposure is addressed under EC Directive 82/605/EEC of July 28, 1992 on the protection of workers from risks related to exposure to metallic lead and its ionic compounds at work. This directive sets allowances on the level of lead in air in the workplace and on certain biological indicators which reflect the level of exposure of individual workers. The limits are supported by rules on the protection of the workforce through the use of measures such as protective clothing, respirators, washing facilities and through rules on eating, drinking, smoking, etc.

Emissions from leadworks are normally controlled by means of national regulations relating to air or water. There are no universal European limits in these areas. However, lead in the general atmosphere is limited under Directive 82/844/EEC of December 3, 1982 which sets a limit for levels of lead in air throughout the EC. Levels of lead in water are also controlled in a number of directives relating to different types and purposes of the water, e.g. water intended for human consumption, water for bathing, fishing waters, etc.

In the area of products, regulations apply to a number of non-recoverable uses of lead. The use of lead in petrol, for instance, is controlled under Council Directive 85/210/EEC of March 20,1985. Several Member States have their own regulations which impose tighter limits or which require the availability of unleaded petrol for vehicles introduced on to the market after a certain date. Another area in which legislation is applied is the use of lead in paints, which has been restricted under various pieces of national legislation for many years. Recently, lead carbonates and lead sulphates have been controlled also under EC Directive 89/667/EEC of December 21, 1989. This directive prohibits the sale or use of lead pigmented paints for use in domestic buildings.

OUTLOOK

The balance of primary output versus secondary output and the cost of conforming to environmental legislation will determine companies strategies for the future. The lead price will obviously also be a dominant factor, but this has been affected recently by the large exports of lead from the CIS. Thus, the Eastern European countries are going to play a large part in the coming years in determining the direction of the industry.

Secondary refined lead will grow in importance in the medium and long-term, and it is predicted that by the end of the century it will represent almost 60% of the supplies to the market.

The battery sector will remain the primary use of lead, and will increase its importance as a consumer. By the end of the century, it is expected that the battery sector will absorb almost 70% of all lead consumed.

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Nickel
NACE 224

In the EC, nickel is mined only in New Caledonia and Greece. Since 1976, the EC has dropped from the second largest producer of nickel products in the western world, to the third largest. The industry is concentrated, with the top four companies producing between 60% and 67% of western world output. Three companies have operations in the EC, while a fourth has production facilities in Norway. Nickel consumption is expected to grow as demand increases from NICs and Eastern Europe

INDUSTRY PROFILE

Description of the sector

The nickel industry transforms raw materials, either nickel ore (from Le Nickel-SLN and Larco mining operations located in New Caledonia and Greece, respectively) or semi-finished products, into nickel products directly used in the nickel consuming industries.

Products include:

- Ferronickel: produced by Le Nickel-SLN (New Caledonia) and Larco (Greece), used as a charge product in the fabrication of stainless steels;
- Metal: produced by Inco Europe (UK) and Eramet (France) in the form of cathodes used as an alloying element in various applications (such as the superalloy industry);
- Salts: produced by Inco Europe (UK) and Eramet (France), used mainly in the catalyst and electroplating industries.

All these products are raw materials supplied to customers which themselves produce raw materials to be further used in a wide spectrum of industries.

As reliable statistics are not yet available in most of the former Eastern bloc countries, figures refer to "western world" in most cases. This includes the former East Germany and Yugoslavia, but excludes former USSR, Cuba, China and other former COMECON countries.

Main indicators and recent trends

Since the mid-1970s, nickel consumption in the EC increased at an average annual rate of 2.7%. A record level of 239 000 metric tons was reached in 1990, but consumption fell by 9% in 1991 and is expected to continue to decrease throughout the early 1990's.

The metallurgical production of the EC also grew steadily during the 1980's, but stagnated after 1988, at an average level of 87 000 metric tons. The EC covers only 40% of intra-EC client industry needs. Mine production of nickel has expanded very quickly over the past ten years, especially in New Caledonia. The number of employees in the EC nickel industry decreased by one third between 1982 and 1991, although mine production is now 50% higher and metallurgical production 10% higher than at the beginning of the 1980's.

International comparison

Among the top four companies producing nickel in the world, one is located in the EC (Eramet), another owns a factory in the EC (INCO in the UK) and a third has production facilities in Europe (Falconbridge in Norway).

Table 3 shows the estimated share of the EC in world production of refined nickel (including former COMECON countries as well as Cuba and China). Considering now what used to be called the Western World, the share of the EC diminished considerably during the past 15 years (see Figure 2). The Canadian share decreased even more during the same period of time.

In 1991, western world consumption reached 669 000 metric tonnes, with the EC representing 33% of the total. This share of one third has been relatively stable since the 1970s. Asia, however, increased its share of consumption from 24% in the mid-1970s to 36% in 1991, primarily at the expense of the US, whose consumption decreased from 31% of nickel consumption in 1976 to 19% in the late 1980s.

MARKET FORCES

Demand

Nickel consumption in the western world grew at an annual rate of 2.2% between 1976 and 1991. EC consumption increased by 2.7% per year during this period, while Japanese consumption rose by 3.5% per year, and consumption in the US decreased by 1.8% per year. East Asia as a whole was the fastest developing area during this period of time with an average annual growth rate of 5.4% as new nickel-consuming industries were being installed, especially in Korea and Taiwan.

Among the various nickel uses, stainless steel plays the leading role. Nickel consumption in stainless steel, which represents more than 60% of total nickel consumption (65% in the EC), grew 4.5% between 1976 and 1991, while nickel consumption in the non-ferrous industry declined 0.2%. The two primary reasons for this rapid evolution of nickel demand in stainless steel are that production of nickel-bearing stainless steel (austenitic) rose at a higher rate than that of stainless steel with no nickel (ferritic) and that due to the improvement of the yield in stainless steel production, the rate of growth of primary nickel (4.5%) was higher than that of secondary nickel (2.6%).

Production of nickel-bearing stainless steel is influenced both by the overall production of capital goods (which represents more than 60% of nickel consumption) and by the intensity of use of nickel-bearing (austenitic) stainless steels in the capital and consumer goods sectors.

Over the past 15 years, the use of austenitic steel has increased at a higher rate than industrial production in the OECD countries. This increased use is mainly due to the technical qualities

Table 1: Nickel
Main indicators in volume

(thousand metric tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Apparent consumption	148.1	154.9	191.7	173.8	192.6	203.7	226.1	224.9	242.6	215.2
Mine production	65.1	59.8	74.9	89.1	75.3	68.0	86.6	115.1	103.5	127.7
Metallurgical production	47.3	62.9	73.1	77.7	83.5	75.9	88.9	87.1	83.0	86.4
Employment (number)	6 399	5 478	5 722	5 616	5 078	4 363	4 445	4 546	4 519	4 463

Source: MARKETING ERAMET

Table 2: Nickel
Mine production by nickel content

(thousand metric tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
New Caledonia (France)	60.1	46.2	58.3	72.4	64.5	58.3	71.2	96.2	85.0	108.7
Hellas	5.0	12.9	15.8	16.7	10.8	9.7	15.4	18.9	18.5	19.0
Total EC	65.1	59.1	74.1	89.1	75.3	68.0	86.6	115.1	103.5	127.7
World mine production	628.1	659.7	752.7	821.7	797.9	831.8	882.0	911.2	906.0	951.5
Share of the EC (%)	10.4	9.0	9.8	10.8	9.4	8.2	9.8	12.6	11.4	13.4

Source: MARKETING ERAMET

Table 3: Refined nickel
EC share of world production, 1991

(thousand metric tonnes)	
EC	86.4
World	921.6
EC share (%)	9.38

Source: MARKETING ERAMET

of austenitic steel, which, for many applications, has no acceptable substitute.

Recent developments in export markets show an extremely strong growth of nickel consumption in East Asia. Korea and Taiwan were the first to experience rapid growth, followed by China. The Eastern European countries might constitute the next boom area, but it is too early to be certain.

Supply and competition

Until 1970, about a dozen firms engaged in nickel production, and increases in output were the result of extending and modernising existing installations. At that time, all producers were working at near-capacity level.

At the end of the 1960's, difficulties in nickel supplies led to a boom in investments by new producers; production, however, did not start until the mid-1970's. Most of these projects were located in NICs where large nickel deposits were found. Canada and New Caledonia, which were responsible for around 75% of the western world production in the early 1970's, provided only about 45% in the early 1980's.

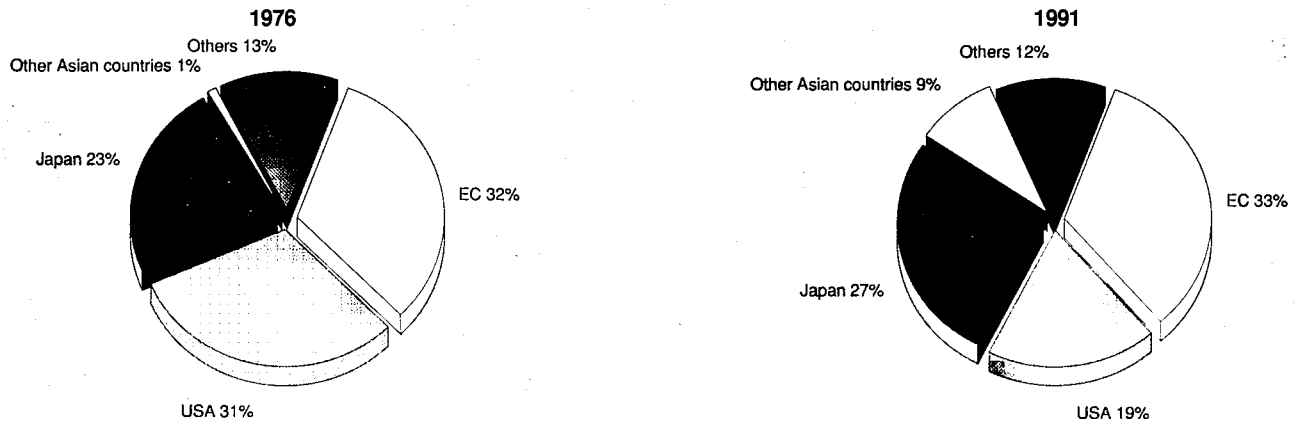
Maximum capacity was reached at the beginning of the 1980's, but because of low demand, and subsequently very low nickel prices, producers had to significantly reduce their levels of activity after 1975, bringing about a decrease in the rate of use of production capacity. Several facilities closed after 1984, due to production costs which were too high to enable firms to survive the depressed period of the first half of the 1980's. Real capacity also decreased due to lack of maintenance in most of the plants still in use.

Considerable progress in increasing productivity has been achieved since the 1980s, including a significant reduction in energy consumption. This enabled some firms to reduce production costs and overcome economic slowdowns which affect the production of capital and consumer goods, and therefore the nickel industry. Many firms still suffered heavy losses, however.

Production costs decreased in constant terms, and the average break-even price for low-cost producers, which was over 6.5 USD per kg at the end of the 1970's, decreased to a level of between 4.5 USD and 5.5 USD per kg by the mid-1980s. The most competitive producers remained the sulphide producers in Canada and Australia which were less affected by the high price of oil at that time.

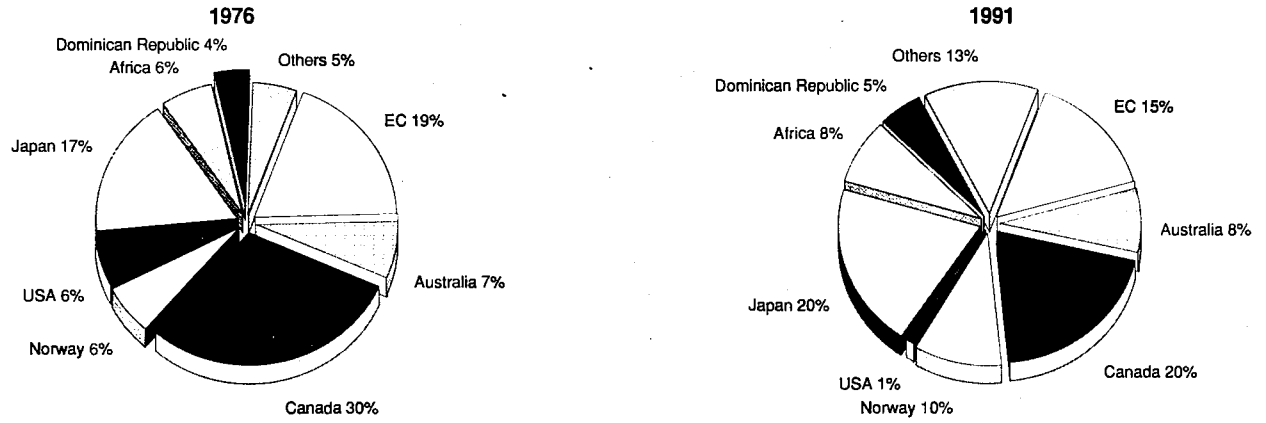
After 1985, production costs increased significantly. Producers treating sulphide ore (e.g. INCO) faced increases in wages and social benefits for their workers and lower ore content

Figure 1: Nickel
Western world nickel consumption by area



Source: MARKETING ERAMET

Figure 2: Nickel
Western world nickel production by area



Source: MARKETING ERAMET

in their mines due to the lack of renewal in mining development.

Producers processing oxidised ore , including the EC firms Larco and Le Nickel-SLN, also suffered an increase in costs, but to a lower extent. The decrease in the price of oil and the depreciation of some currencies in Indonesia, Colombia and the Dominican Republic helped these producers to reduce the gap with the sulphide producers and in some cases to take the lead in terms of costs. The break-even price of the low-cost producers was estimated at the beginning of the 1990s at 6.5 to 7.5 USD per kg, while the average for the whole industry was between 7.5 and 9 USD per kg.

As production capacity was increasing in the western world, noticeable growth in net imports from COMECON countries was also occurring, particularly from Russia, which became a very important supplier to the West and especially to the EC. As a consequence, the share of net imports from COMECON countries rose from less than 11% of EC consumption during the 1981 to 1986 period to 19% during 1987 to 1991.

The future trend of deliveries from CIS and Cuba will have a vital influence on the supply/demand balance over the coming years.

INDUSTRY STRUCTURE

Companies

Inco Europe Ltd is a subsidiary of Inco Ltd, a private Canadian Company. Inco's first factory began production in 1902 and was owned at that time by Mond Nickel Co. Inco Europe transforms its matte (an intermediary product supplied by its mother company) into pure nickel and nickel salts. Inco Europe Ltd markets its production throughout the world, although Europe is the preferred market because of its proximity. US firms are usually supplied by Inco Canada.

Eramet is a subsidiary of ERAP, which is the holding company of the state-owned company Elf-Aquitaine. ERAP owns 70% of Eramet. Other shareholders are Elf-Aquitaine (15 %) and Imetal (15 %). Eramet is the mother company of Le Nickel-SLN in New Caledonia. Its factory situated in Le Havre-Sandouville was built in 1978 to replace the former factory in Le Havre founded in 1888. Matte, which is shipped from its subsidiary in New Caledonia is processed into pure nickel and salts. Eramet's sales are world-wide: Eramet markets the ferronickel production of Le Nickel-SLN as well as the production from the factory in Le Havre. With the production from Le Nickel-SLN, Eramet produces ferronickel as well as nickel salts and metal cathodes.

Larco, a Greek company founded in 1963, extracts ore which is transformed into ferronickel. Larco is currently a state-owned company, but the government wishes to privatise it. Larco mainly sells in Europe. All production is exported, due to the small demand in the Greek domestic market.

Strategies

Growing steadily, nickel demand requires a corresponding sustained increase in nickel supply. To allow such a development, certain actions have to be taken by the nickel producers. Investment in additional capacity at the lowest possible production costs must increase, especially through extensions and improvements in productivity of existing mining and

Table 4: Nickel
Top four companies by production share (1)

(%)	1985	1986	1987	1988	1989	1990	1991
Inco (all products)	29	32	37	35	34	31	29
Falconbridge	12	12	14	15	15	15	15
Le Nickel-SLN (including ores)	9	8	9	6	7	8	7
Western Mining	9	9	7	9	9	8	9
Total	59	61	67	65	65	62	60

(1) Not including former COMECON countries
Source: MARKETING ERAMET

Table 5: Nickel
EC Producers

Country	Company	Location	Process	Products	Theoretical annual capacity (nickel content)
France	Eramet	Sandouville (Le Havre)	ER	nickel metal salts	10 000 3 000
France	Le Nickel-SLN	Doniambo (Nouvelle Caledonie)	F	ferronickel matte	50 000
United Kingdom	Inco Europe Ltd	Clydach (Wales)	VT/CO	nickel metal salts	54 000
Hellas	Larco	Larymna	F	ferronickel	25 000

ER=Electrolytic refining
F=Smelting facilities for ore
VT/CO=Carbonyl process
Source: MARKETING ERAMET

smelting capacities rather than opening and building new mines and production facilities.

Apart from economic considerations, long-term security of supply can best be provided by giving priority to investments in integrated operations. Integrated nickel producers are not dependant on an external supply of nickel ore, and also have their own refining facilities. They are therefore less dependant on cyclical market developments and are better able to withstand periods of recession.

Nickel producers must keep abreast of market developments; close cooperation between nickel producers and consumers is necessary for both industries.

REGIONAL DISTRIBUTION

The nickel market is a worldwide market and, to a large extent, nickel mining areas do not correspond to nickel consuming areas. Major nickel consuming countries are net nickel importers, either in the form of nickel ore and intermediate products or of finished products.

Nickel consumption in the EC represents approximately one-third of western world consumption but the production of refined nickel of the three EC companies accounts for only 10% of world production.

Germany is by far the main market in the EC (see Figure 3), representing 36% of total EC consumption, but has no domestic production. France is the second market, with a share of around 17% of total EC consumption. Other consuming Member States are the UK and Italy (around 14%), Belgium (9%) and Spain (8%). The remaining EC countries are not substantial consumers of nickel.

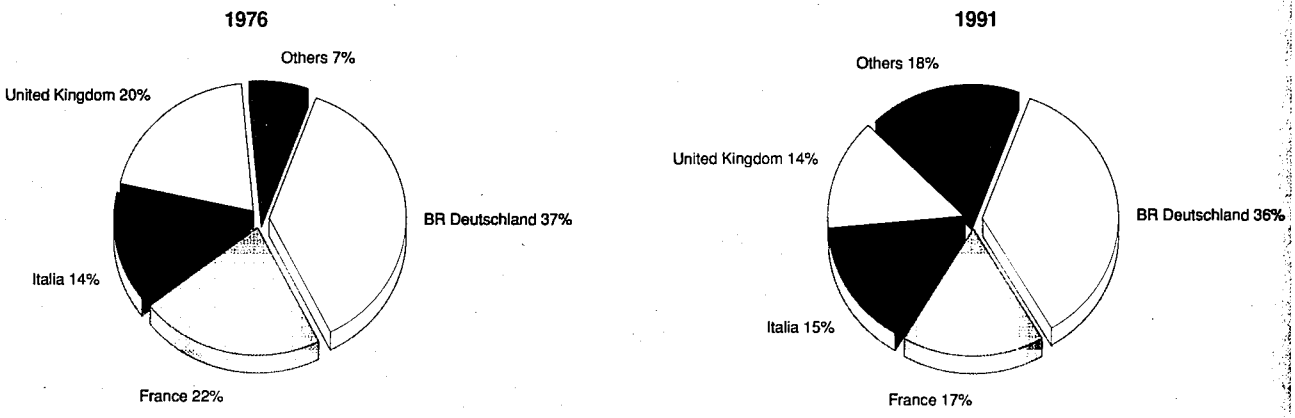
Since the mid-1970s, nickel consumption in the EC has grown by an average 2.7% per year although growth rates vary widely among Member States. Belgium (with a 16% increase per year.) and Spain (with a 6.2% increase per year) experienced the highest expansion in consumption, while consumption in France increased only 1.2% per year and in the UK by 0.4% per year.

ENVIRONMENT

Although nickel itself does not create environmental problems, some nickel compounds have ecotoxic (dangerous to the environment) and/or toxic (dangerous to humans) properties.

Most of the nickel producer and user industries have already reduced their emissions to an environmentally acceptable level. At the EC level, atmospheric emissions have been controlled and reduced through the installation of efficient filter systems.

Figure 3: Nickel
EC apparent consumption



Source: MARKETING ERAMET

Liquid effluents have been under control for many years now, and their levels comply with regulatory limit values.

Solid waste containing water-soluble compounds such as nickel-bearing metallic hydroxides is still a concern. In most cases, however, it is disposed of in controlled landfills. Nickel-bearing recyclables (stainless steel and alloy scrap, spent catalysts, etc.) are not an area of concern related to the nickel content.

REGULATIONS

In spite of minimum specific risks for the general environment, nickel and some of its compounds are facing increasing regulatory pressure at EC level.

Skin-contact allergy is a clearly established risk linked to direct and prolonged exposure to nickel in some common products. The European nickel producers support the efforts of the EC Commission to establish rules for the protection of the fraction of the population at risk.

Nickel is suspected of inducing respiratory cancer in workers in certain nickel refining processes. In addition, the classification of some nickel compounds as human carcinogens (Directive 67/548) will have a severe impact on industry and will require protective measures for workers exposed to these substances (Directive 90/548). This classification has been contested by the industry.

The nickel industry is also concerned by controls which will be applied to trans-frontier shipments of "wastes" in accordance with the Basel Convention and therefore strongly supports the approach adopted by the OECD for "wastes destined for recovery operations". In addition, it also urges the EC Authorities to model their new "Shipments of Wastes" regulation on this OECD approach.

OUTLOOK

Nickel consumption should continue to grow at a relatively sustained rate in the medium and long term, although it will fluctuate greatly in the short term due to cyclical variations in general economic activity.

The following factors could result in continued development of nickel consumption:

- growth of nickel consumption in industrialised countries in connection with the development of new applications, most of them linked with the protection of the environment: Clean Air Act in the USA, Earth Summit of Rio de Janeiro;
- a boom in demand for nickel in newly industrialised countries, especially East Asian NICs, and in some Latin America countries due to the construction of new plants and the need for durable goods;
- the reconstruction and reshaping of a civil industry in the former COMECON countries.

Production areas which show the greatest growth potential for the 1990s are located in the countries with the largest and richest mines, especially New Caledonia, Australia and Indonesia.

For the moment, some of the data for the nickel market are estimates. The recent creation of the "Groupe d'Etudes international sur le nickel" should improve the availability of information thanks to greater cooperation of the participating governments.

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Precious metals
NACE 224

The EC has the largest refining/fabricating capacity for precious metals in the world, even though its mineral resources of such metals are limited. Recovery of raw materials from scrap and industrial residues is an ever-increasingly important source of precious metals for the EC refiners and fabricators. Platinum consumption in particular will be affected by environmental regulations requiring the use of auto catalysts containing platinum group metals, which can be recovered from the auto catalyst during recycling.

INDUSTRY PROFILE

Description of the sector

Precious metals include such well-known metals as gold, silver, and platinum group metals: platinum, palladium, rhodium, iridium, ruthenium and osmium.

Precious metal activities can be grouped under five headings:

- mining;
- refining;
- trading: on a commodity basis;
- fabricating: processing, alloying, and converting the metals into wrought semi-manufactured goods, industrial components, chemical compounds, etc.;
- manufacturing: producing items for sale at retail level, i.e. jewellery, silverware.

Main indicators

Mine production

The twelve countries of the EC now possess within their borders relatively insignificant mineral sources of gold and silver and practically none for the platinum group metals. What primary precious metals are actually extracted from EC ores are mainly by-products of copper or lead and zinc mining. Spain, Greece, Italy, France and Ireland do post a figure on the list of the world silver mine producers, though their joint output is only 4% to 5% of the Western World total, i.e. 542 tonnes in 1991. Of EC Member States, only Spain, France and Portugal (to a minor extent) appear on the world producers list for gold, with less than 1% combined of the Western World output, i.e. approximately 12 tonnes altogether in 1991.

Precious metal specialist mining operations are directly affected by precious metals prices and market economics. In this respect, persistent low prices and growing environmental constraints over the last years have weakened profitability and led to closures, as was the case during 1991 for Mines de Salsigne in France. By-product precious metals output is less sensitive to precious metals prices as such: base non-ferrous metals activity trends are the leading factors in this case.

Scrap recovery

Though poor in precious mineral sources, the EC can rely on to a great extent its "above ground" precious metals sources, i.e. scrap and industrial residues. Scrap and residues make up a significant proportion of the raw material supplies of all the EC precious metals refiners and fabricators. A number of EC companies are involved in collection, sorting, pre-processing and trading of the scrap and residues. The intrinsic value of the precious metals contained in scrap or residues (such as discarded electronic circuit boards and devices, spent catalytic converters, spent plating baths, spent photographic solutions and effluents, spent films and X-ray plates) justifies the cost of recovery and recycling.

Environmental issues and concerns encourage recycling as a source of precious metals. Environmental regulations are imposing increasingly stringent limits on the tolerable metal content in discarded products, increasing the incentive to recover and recycle them. These regulations also have an effect on the production and usage of some new goods; for instance platinum-(or, rhodium-) containing auto catalyst converters, which are a significant source of secondary platinum.

Refining and fabricating

Precious metal refining occurs either at non-ferrous base metals refineries or at precious metals specialist fabricating operations. Total EC precious metals refining/fabricating capacity is the largest in the world. Refinery output arises from the treatment of copper or lead concentrates and blister copper, most of which is imported, as well as from the processing of precious metal scrap and residues, both domestic and imported. The resulting production is essentially in the form of metal which is sold on the international market. Belgium and Germany are the leaders in this segment of activity, in which all EC copper and lead refineries are involved. The number of products offered by the refineries is fairly limited, i.e. high grade intermediates such as "doré" or straight high-purity metal in the form of ingots, granules or powders.

Table 1: Gold
Breakdown of fabrication by Member State (1)

(tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC	392.2	318.4	366.5	413.3	396.9	409.2	463.5	563.6	618.1	646.5
Belgique/België,Luxembourg	2.6	2.3	2.2	2.3	2	16.2	10.5	8	4.4	2.7
Danmark	0.8	0.7	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9
BR Deutschland	61.2	56.9	56.8	57.7	54.8	57.2	65.3	69.8	77.5	80.4
Hellas	7	8	9.2	11.6	11.1	10.8	10.8	10.5	10.1	9.6
España	17.1	14.6	13.8	16.7	16.7	18.1	25.2	32.1	36.2	34.5
France	25.7	24	22.6	23.4	25.7	27	28.9	32.2	38.7	37.9
Italia	237.2	180.3	228.6	261.6	246.9	232.8	273.7	359.2	395.9	430.2
Nederland	3.8	3.7	4.2	4.9	4.8	4.2	4.4	4.3	4.7	4.7
Portugal	3.1	3.3	2.5	3.6	3.6	4.2	5	5.7	7.6	9.2
United Kingdom, Ireland	33.7	24.6	25.8	30.7	30.4	37.9	38.9	41	42.1	36.4
Total EC	392.2	318.4	366.5	413.3	396.9	409.2	463.5	563.6	618.1	646.5

(1) Including the use of scrap
Source: Gold 1992, Gold Fields Mineral Services Ltd

Table 2: Gold
Trade purchases of carat gold jewellery

(tonnes)(1)	1990	1991
BR Deutschland	41.2	46.0
France	39.1	40.4
Italia	120.0	130.0
United Kingdom	48.5	40.1

(1) Expressed as fine gold equivalent in metric tonnes
Source: World Gold Review, Spring 1992

Table 3: Silver
Industrial demand by region

(tonnes)	1990	1991
Europe	6 440	6 800
North America	3 930	3 940
Japan	3 400	3 450
Rest of world	1 020	1 060
Total	14 790	15 250

Source: Degussa

Fabricating output arises from the treatment of high grade precious metal intermediate products, either metal as such, or scrap and residues. Intermediate products can be domestic or imported. Germany, the United Kingdom and France are the leaders in this sector. The range of products supplied by fabricators is extremely diversified owing to the many end-use requirements of the electrical and electronic industries, jewellery and precious wares manufacturing, the photographic industry, the catalyst industry, etc.

Trade

The EC precious metals industry is a net importer of precious metal-bearing raw materials, both primary (of mineral origin) and secondary (scrap and residues) and of unwrought silver, gold and platinum. EC products are traded in various international markets: the high value of the metal production allows long distance movements, and exchange flows develop according to world market conditions. As regards fabricated products, the EC industry presence worldwide is ensured by the international sales networks of its enterprises and by the setting-up of production units abroad to supply local consumer markets.

MARKET FORCES

Demand

Industrial demand absorbs the major share of precious metals production, though gold and silver still play a role in coinage (mostly commemorative coinage) and gold remains the investment metal worldwide. Major outlets vary among precious metals: jewellery in the case of gold, photographic products for silver, automotive catalysts and jewellery for platinum and electronics for palladium. Consumption trends are closely linked to the outlook of the industrial consumer sectors. In this respect, automotive catalysts are certainly the most promising sector, considering the ongoing generalisation of the use of catalytic converters in the automobiles.

Gold, silver and platinum are able to rely on the jewellery sector as a constant source of demand. This is not the case for palladium, future demand for which relies on the further growth of a small number of specific industrial applications. Palladium demand is stagnant at present.

Owing to their uses, all precious metals but gold are consumed mainly in the industrialised areas - Europe, Japan and North America. These three geographical zones account for at least 95% of Western World consumption of silver, platinum and palladium, and for slightly more than 55% of gold consumption.

Gold

The EC accounts for just over 25% of total world demand for gold. In 1991, EC utilisation of gold increased by 4.6%, a small increase compared to the preceding years. Demand in Italy traditionally dominates EC demand: the Italian jewellery industry used 415 metric tonnes of fine gold in 1991, which was 72% of the total EC usage for jewellery, estimated at 575.5 metric tonnes. A considerable part of Italian jewellery production is exported to North America, the Middle East and to other EC Member States such as Germany and the United Kingdom, although Italy itself remains by far the largest jewellery market in the EC. Although demand for gold jewellery continued to rise in Germany and Italy in 1991, it remained static or fell in other EC countries, such as the United Kingdom, where there was considerable destocking by the retail trade.

There was little change in the demand for gold for other uses in 1991. Demand in the electronics industry dropped slightly but there was a small increase in demand for decorative applications. The use of gold in dentistry rose in Germany to 11.6 metric tonnes, an increase of over 20%, partly due to

Table 4: Platinum
Breakdown of demand by application in Western Europe

(kg)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Autocatalyst										
gross	620	780	1 090	2 020	3 730	7 000	7 620	9 640	11 660	15 240
recovery	0	0	0	0	0	0	0	0	-160	-470
Chemical	3 420	2 800	3 270	2 950	2 330	2 490	1 560	1 560	1 870	1 710
Electrical	1 870	1 400	1 400	1 710	1 240	1 240	1 240	1 240	1 240	1 090
Glass	780	620	780	930	930	930	930	1 090	780	620
Investment	160	1 400	3 730	2 800	3 110	2 020	1 710	1 090	1 240	1 240
Jewellery	1 240	1 400	1 400	1 560	1 710	1 400	2 180	2 330	2 490	2 640
Petroleum (1)	-310	-310	-780	-620	-160	780	160	310	1 240	930
Other	2 490	2 180	1 560	1 090	1 710	1 560	1 560	1 400	1 400	1 400
Total	10 270	10 270	12 450	12 440	14 600	17 420	16 960	18 660	21 760	24 400

(1) In the years 1982-86 the Western Europe petroleum industry sold back to the market more platinum than it purchased a new metal
Source: Platinum 1992 Johnson Matthey

Table 5: Platinum
European cars fitted with platinum catalysts, 1991

(millions)	Total car sales	% fitted with catalyst(1)
BR Deutschland	4.16	95
España	0.88	10
France	2.03	12
Italia	2.34	1
United Kingdom	1.59	17
Others	2.49	60
Total	13.49	45

(1) Johnson Matthey estimates
Source: Platinum 1992 Johnson Matthey

the temporary introduction of subsidised dental treatment for the residents of the former East Germany.

Silver

Industrial demand for silver in the EC now represents about 40% of the world total. The principal consumer sector in Europe is the photographic industry, where overall demand has remained steady in recent years. In 1991, however, some EC countries (such as Germany and Italy) experienced strong signs of a considerable increase in demand for silver in the form of jewellery, cutlery and silverware as the lower price of silver made such items popular purchases. On the other hand, utilisation of silver in the electrical engineering and electronics industries is tending to decline.

Platinum

In 1991, the EC accounted for approximately 18% of the world demand for platinum. Consumption of platinum in the EC is on a significant upward trend, primarily because of its use in auto catalysts for the car industry. By 1 January 1993, the EC directive on vehicle exhaust emissions will require all new petrol-engine cars to be fitted with auto catalysts containing platinum group metals. Many car manufacturers anticipated this date and began to offer cars fitted with catalysts in earlier years. In some countries, such as Germany or Belgium, the purchase of such cars was encouraged by the government through tax rebates.

While industrial and investment demand has tended to fluctuate from year to year, consumption of platinum in the European jewellery trade has generally been increasing, as more modestly priced platinum items have become available. Retail sales in Germany rose by 13% in volume in 1991. Demand for platinum in jewellery is especially high in Japan. In 1991, 39 tonnes of platinum were used by the Japanese jewellery manufacturers, compared with 107 tonnes of gold, whereas in the EC jewellery trade the ratio was 2 tonnes of platinum to 575 tonnes of gold.

Palladium

EC demand for palladium represents about 16% of Western World consumption. The use of dental alloys surged in 1991, primarily because of an increase in demand in Germany following reunification. There was also an increase in demand in the EC electronics industry as new ceramic capacitor production facilities began operations in Germany and the United Kingdom. The volume of palladium used in auto catalysts did not increase between 1987 and 1991, and its use in jewellery also stagnated between 1988 and 1991, according to Eurostat figures.

Supply and competition

Precious metal supplies come from the treatment of actual precious metal ores, from the recovery of precious metals contained in non-ferrous metal ores (copper, lead-zinc or nickel ores), or from the recycling of precious metal scrap and residues. The proportion of by-products to genuine output is the highest in the case of silver: between two-thirds and three-quarters of primary silver is extracted as a by-product In contrast, genuine output is dominant in the case of gold and platinum group metals. Output volumes arising from recycling are still significant, however, meeting 15% to 20% of industrial demand for platinum and gold, and at least 25% for palladium and silver.

For mine output, South Africa holds a leading position in gold and platinum, while Mexico is the leader in silver and the CIS in palladium. As mine activity and development in both the precious metal and base non-ferrous fields were fairly well sustained in the late 1980s, it is likely that currently-developed supply sources will adequately support precious metals production requirements in the short to medium term. Disturbing factors might arise, however, as a result of internal political developments in South Africa and the CIS These factors could alter the supply pattern of gold and platinum group metals.

In other respects, a prolonged price weakness would primarily affect genuine gold and silver mining concerns, eventually endangering their viability.

INDUSTRY STRUCTURE

Though few in number, the EC precious metals refiners and fabricators are world leaders in the refining, recycling, fabrication and trading of precious metals. Union Minière (B) and Norddeutsche Affinerie (D) top the EC refiners list, while prominent names on the specialist fabricators list are Degussa, Heraeus and Doduco in Germany, Comptoir Lyon Alemand in France, Johnson Matthey in the United Kingdom, and the European outfit of the US company Engelhard.

The total installed refining and fabricating capacity of the EC precious metals industry is the largest in the world and its enterprises rely strongly on imported raw materials in order to fully meet their requirements.

The EC precious metals concerns are of international stature. They are a high performance industry with a strong focus on R&D. In many activity segments, EC firms implement state-of-the-art technology ahead of US and Japanese competitors.

Table 6: Platinum
Demand by region

(tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Western Europe	10.3	10.3	12.4	12.4	14.6	17.4	17	18.7	21.8	24.4
Japan	32.7	29.5	35.5	38.9	31.4	51.3	59.1	51.9	57.5	63.8
North America	22.1	22.4	28.3	31.4	37	28	26.9	27.9	24.6	25.2
Rest of western world	7.1	5.6	5.6	5.3	5.3	5.6	9.3	8.2	11.2	12.9
Total western world	72.2	67.8	81.8	88	88.3	102.3	112.3	106.7	115.1	126.3

Source: Platinum 1992, Johnson Matthey

Table 7: Palladium
Demand by region

(tonnes)	1987	1988	1989	1990	1991
Western Europe	17.1	18.8	18.2	18.4	20.1
Japan	44.5	47.8	47.1	47.5	51.3
North America	32.2	31.7	33.3	33.6	35.4
Rest of western world	5.3	5.4	5.3	6.7	8.6
Total	99.1	103.7	103.9	106.2	115.4

(1) Western world only; does not include CIS, People's Republic of China or Eastern Europe
Source: Platinum 1992 Johnson Matthey

Table 8: Palladium
Demand by application in Western Europe

(kg)	1987	1988	1989	1990	1991
Autocatalysts	160	160	160	160	160
Dental	7 460	8 240	7 780	8 090	9 330
Electrical/electronics	6 220	6 840	6 530	6 220	7 000
Jewellery	930	1 090	1 090	1 090	1 090
Other	2 330	2 490	2 640	2 800	2 490
Total	17 100	18 820	18 200	18 360	20 070

Source: Platinum 1992 Johnson Matthey

Prices

Precious metals are internationally traded and their prices are quoted on various world commodity Exchanges such as New York, London and Tokyo. Because of their traditional image as "monetary" and "investment" metals, gold and silver prices previously were highly sensitive to the world political climate. However, this aspect of price behaviour has faded somewhat lately, especially for silver.

In the case of silver, oversupply put quotations under considerable pressure in recent years, and the downward trend of prices was only occasionally interrupted by short-lived speculative activity. Platinum and palladium prices are developing much more in line with the physical balance or imbalance between supply and demand, without any other considerations. Both platinum and palladium prices have been showing a downward trend, however, since the late 1980s. Production grew more rapidly than demand in the case of platinum while demand dropped in most applications for palladium.

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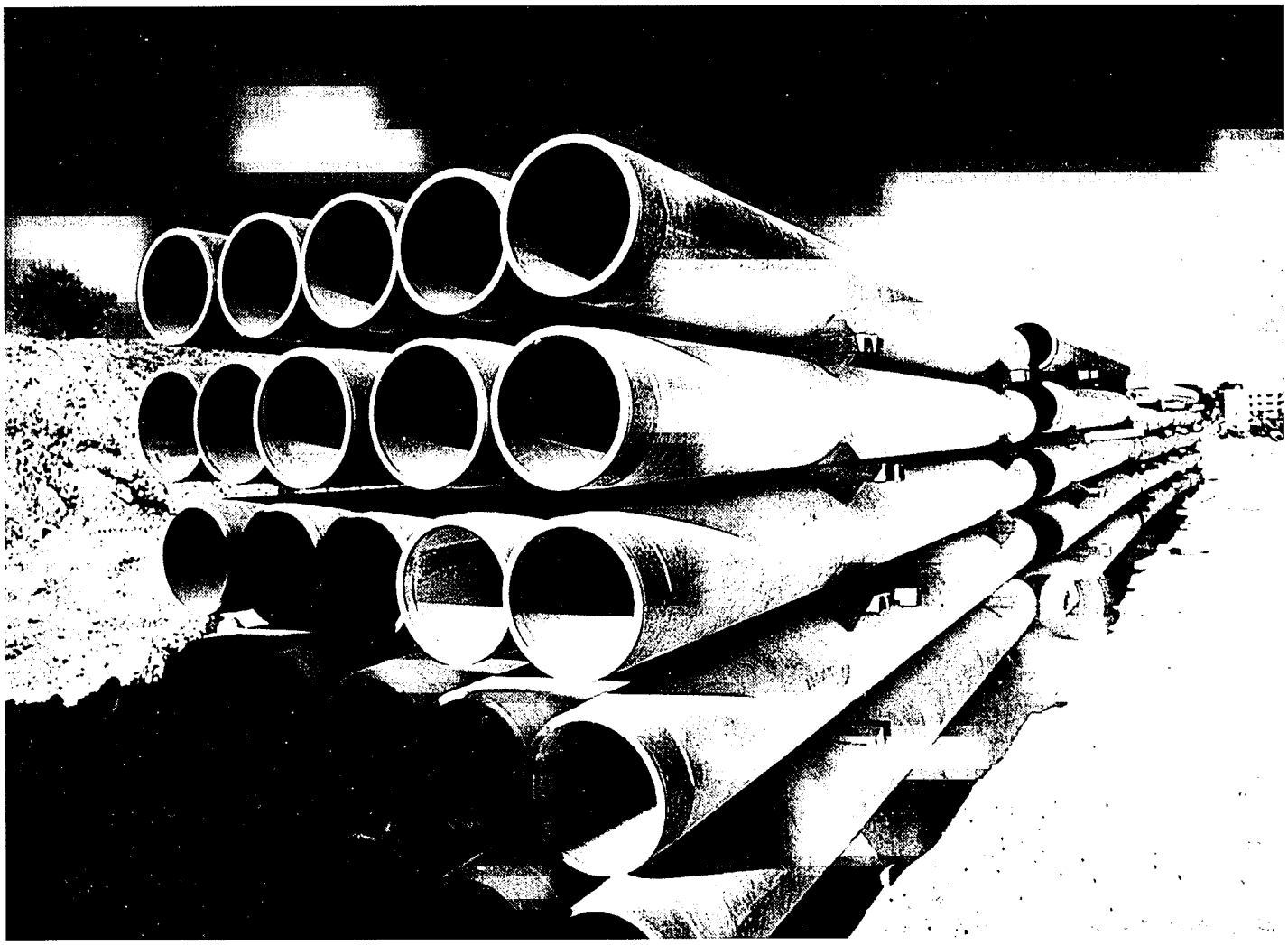
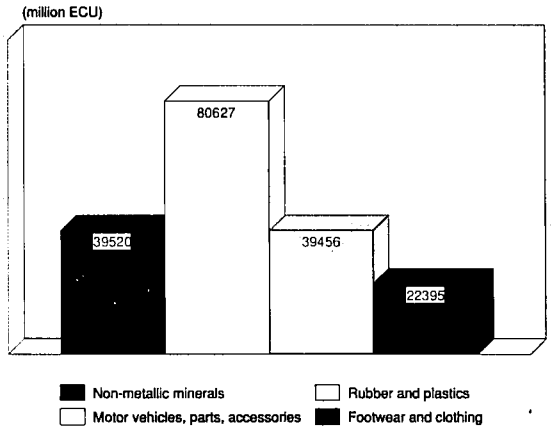


Non-metallic minerals
NACE 24

Fluctuations in the activity of this industry are primarily linked to those in the construction sector. During the crisis in the construction sector in the first half of the 1980s, real growth in the non-metallic minerals industry stagnated. After strong growth from 1987 to 1990 in line with an improvement in overall EC construction activity, the industry growth was poor in 1991. In recent years, the sector has undertaken major efforts towards rationalisation and increased productivity. The manufacture of non-metallic minerals causes a fair amount of pollution and is energy intensive. The industry's profitability will therefore also depend on the future pattern of energy prices and any tightening of EC policy on environmental matters.

Figure 1: Non-metallic minerals
Value added in comparison with other industrial sectors, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

Non-metallic minerals fall into NACE categories 241 to 248. In addition to this overview, sub-chapters appear for: clay products (NACE 241); cement, lime and plaster (NACE 242); concrete (NACE 243); glass (NACE 247); and ceramic goods (NACE 248). The working of stone (NACE 245) is discussed in Chapter 2 of the Panorama.

Clay products (bricks and rooftiles), cement and concrete are almost exclusively consumed by the construction industry. Also an important part of glass production (some 80% of flat glass production and a part of glass fibre fabrication), and of the ceramics industry (ceramic tiles and sanitary ware) is destined for construction purposes. The bulk of glass and ceramic products, however, are used in a wide variety of other sectors, such as iron and steel, non-ferrous metals, chemicals, motor vehicles, electronics, food and pharmaceuticals.

Main indicators

In 1991, the non-metallic minerals sector produced goods worth 90.6 billion ECU and employed 944 000 people. Following the upturn in 1987, the non-metallic minerals sector continued to grow from 1988 to 1989, slowing in 1990. Production declined, in real terms, in 1991 (-1.6%). Extra-EC exports declined in 1990 and 1991, with the trade balance remaining positive. While employment rose from 1988 to 1990, it resumed its downward trend in 1991.

The most important subsector of the non-metallic minerals industry is the concrete subsector, with a production of about 27 billion ECU, representing almost 30% of its output. The glass sector follows with some 25%. The cement and the ceramics sectors occupy the third and fourth place each with some 18% of non-metallic minerals output.

Germany is the largest producer of non-metallic minerals in the EC, accounting for 27% of total value added in 1991, followed by Italy (20%) and France (16%).

Recent trends

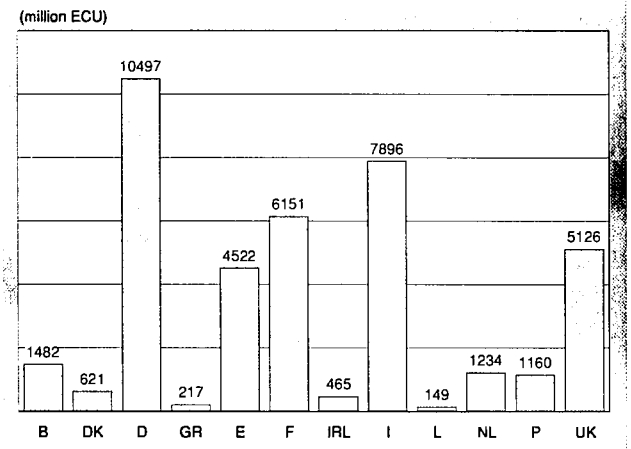
The crisis in the first half of the 1980s in the construction sector did not pass unnoticed in the non-metallic minerals sector, of which about two-thirds of its production is destined for the construction industry. Real annual production growth stagnated between 1982 and 1985. The upswing experienced in the sector in the period 1987-1989 was mainly due to the recovery in the construction sector. Consumption in real terms surged faster than production, with the difference made up by increasing imports.

EC production increased by 5.3% on average annually over the period 1982-1991. Intra-EC trade and extra-EC exports of non-metallic minerals remained stable during that period. The penetration rate of extra-EC imports in EC consumption increased, though remains small (4.1% in 1991). Important subsectors of the non-metallic minerals sector (bricks and tiles, cement and concrete) are materials which are too heavy in relation to their value to be transported economically over large distances and as a consequence trade remains limited.

International comparison

The EC is the world's leading producer of non-metallic minerals. Its production is twice the size of that of the USA and nearly 60% higher than that of Japan. The most remarkable growth during the 1982-1991 period took place in Japan, which has nearly doubled its production of non-metallic minerals, while the non-metallic minerals industry in the USA stagnated by comparison.

Figure 2: Non-metallic minerals
Value added by Member State, 1991



Source: Eurostat

Table 1: Non-metallic minerals
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	52 658	54 397	57 995	58 046	59 746	64 270	72 284	79 760	84 263	87 120	90 431
Production	56 684	59 026	62 801	62 830	63 908	68 102	76 192	84 058	88 246	90 619	93 881
Extra-EC exports	5 513	6 229	6 699	6 719	6 180	5 982	6 409	7 197	7 085	7 113	7 341
Trade balance	4 027	4 629	4 806	4 784	4 162	3 832	3 908	4 298	3 983	3 500	3 472
Employment (thousands)	1 087	1 032	1 015	960	928	928	934	951	953	944	940

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Non-metallic minerals
Breakdown by product line, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Clay products	6 231	6 421	217
Cement, lime and plaster	16 323	16 371	347
Concrete	26 789	27 046	359
Glass	21 835	22 614	2 488
Ceramic goods	13 953	15 994	3 206
Others	1 989	2 173	496

(1) Estimates are used if country data is not available
Source: Eurostat

Table 3: Non-metallic minerals
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-0.3	4.1	2.6
Production	-0.1	3.3	2.2
Extra-EC exports	2.5	-2.4	-0.8
Extra-EC imports	3.3	8.6	6.8

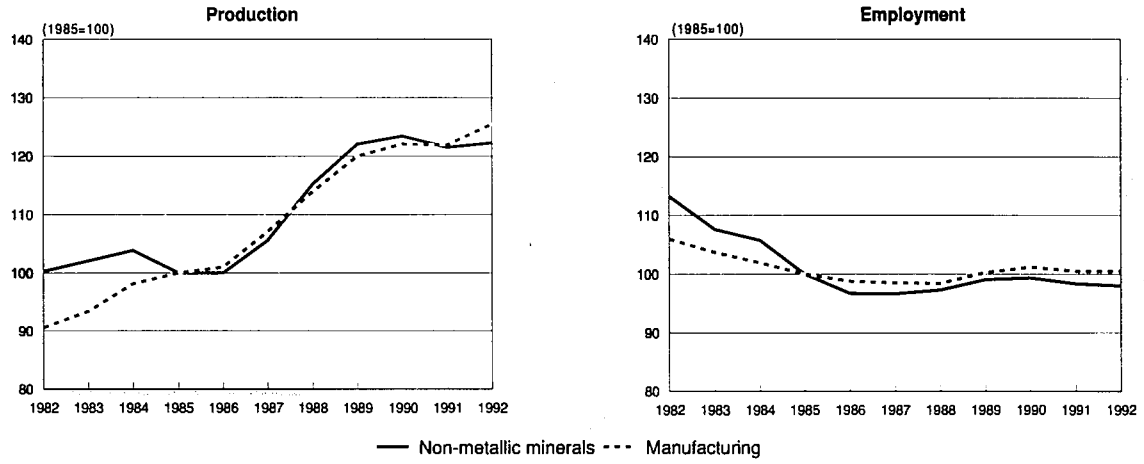
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Non-metallic minerals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	5 513	6 229	6 699	6 719	6 180	5 982	6 409	7 197	7 085	7 113
Extra-EC imports	1 486	1 600	1 893	1 935	2 019	2 150	2 501	2 899	3 102	3 613
Trade balance	4 027	4 629	4 806	4 784	4 162	3 832	3 908	4 298	3 983	3 500
Ratio exports/imports	3.71	3.89	3.54	3.47	3.06	2.78	2.56	2.48	2.28	1.97
Terms of trade index (2)	102.6	103.8	102.0	100.0	100.5	101.0	102.9	103.4	107.5	107.6
Intra-EC trade	5 734	6 167	6 816	7 213	7 905	8 623	9 796	11 050	11 895	12 180
Share of total imports (%)	79.0	78.9	77.8	78.3	79.0	79.4	79.2	78.7	78.8	76.6

(1) Estimates
(2) Includes working of stone and of non-metallic mineral products
Source: Eurostat

Figure 3: Non-metallic minerals
Production and employment indices compared to EC manufacturing



1992 are DRI Europe estimates
Source: Eurostat

In the 1988-1991 period, production growth slumped worldwide. Particularly in the EC, annual growth rates declined from about 9% in 1988 to -1.6% in 1991.

Foreign trade

Extra-EC exports decreased in volume terms over the period 1982-91. Rising imports over the period thus generated a deterioration in the trade balance. The export/import ratio steadily fell from 3.71 in 1982 to 1.97 in 1991. The hefty decrease in extra-EC exports of cement over the period 1982-86 and the surge in cement imports during the period 1988-91, causing a dramatic fall in the export/import ratio for cement (from 47.1 in 1982 to as low as 1.2 in 1991), to a large extent explain this evolution. Intra-EC trade expanded in line with extra-EC imports, so that intra-EC imports almost maintained their share of total imports over the period.

The EFTA countries became a relatively more important export market over the period 1986 to 1991, at the expense of the USA. The EFTA countries also remain the most important source of EC imports, although its share of total EC imports has declined since 1986.

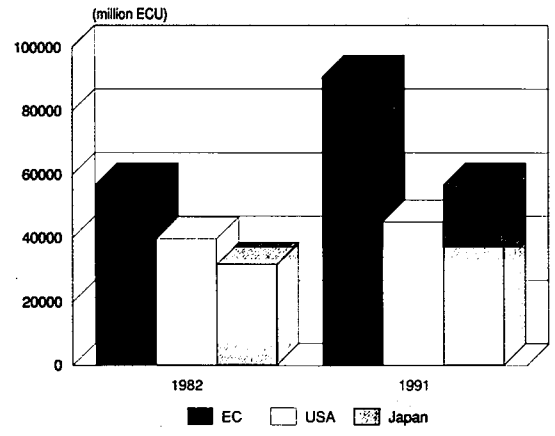
MARKET FORCES

Demand

Roughly two thirds of the industry's production is absorbed by the construction sector. The main reason for fluctuations in the major part of the sector's sales, therefore, lies in the fluctuations affecting the construction market. During the first half of the 1980s, the combination of high interest rates and low real income led to a drop in demand for the construction sector, on the part of both households and firms. From 1986 onwards, the recovery in capacity investment helped to boost the growth of non-residential construction. Demand for residential construction, on the other hand, did not really recover until 1988.

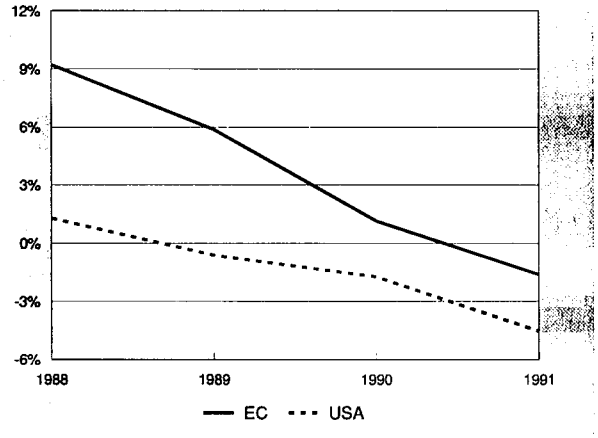
Only part of the production of the glass and ceramic subsectors is used in the construction sector, and the most important share finds a widespread application as intermediary products in several industrial sectors, or as a final product destined to households. Sales of particular product lines will then depend on the main client in question (e.g. sales of refractory products are to a large extent determined by the activity in the iron and steel industry).

Figure 4: Non-metallic minerals
International comparison of production at current prices



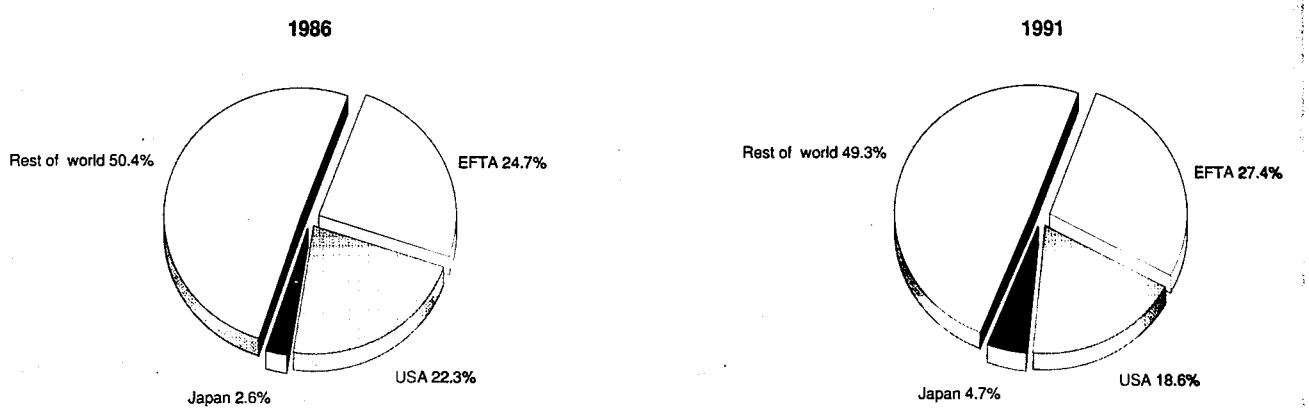
Source: Eurostat, Census of Manufacturers

Figure 5: Non-metallic minerals
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Non-metallic minerals
Destination of EC exports



Source: Eurostat

Supply and competition

The sector's production is mainly composed of intermediary goods which account for roughly 95% of its value. Most of these intermediary goods are absorbed by the construction sector, while the rest is mainly used by the industry itself (for example, purchases of cement by the concrete industry).

Even though the industry remains predominantly locally organised, due to the important transport costs, it is affected by a number of trade barriers such as standards, certification, etc. The removal of these barriers would allow the industry to lower its production costs.

Production process

The crisis in the construction industry in the early 1980s resulted in large-scale cuts in staff in most of the subsectors of non-metallic minerals. The trend was not reversed after 1986, and the employment level for the whole industry remained stable. Reductions in the workforce between 1982 and 1991 were the result of major rationalisation programmes based on the closure of unproductive units or greater reliance on automation, e.g. in the cement industry, where such efforts brought about an increase in productivity of 59% between 1982 and 1991, measured in terms of value added per person employed.

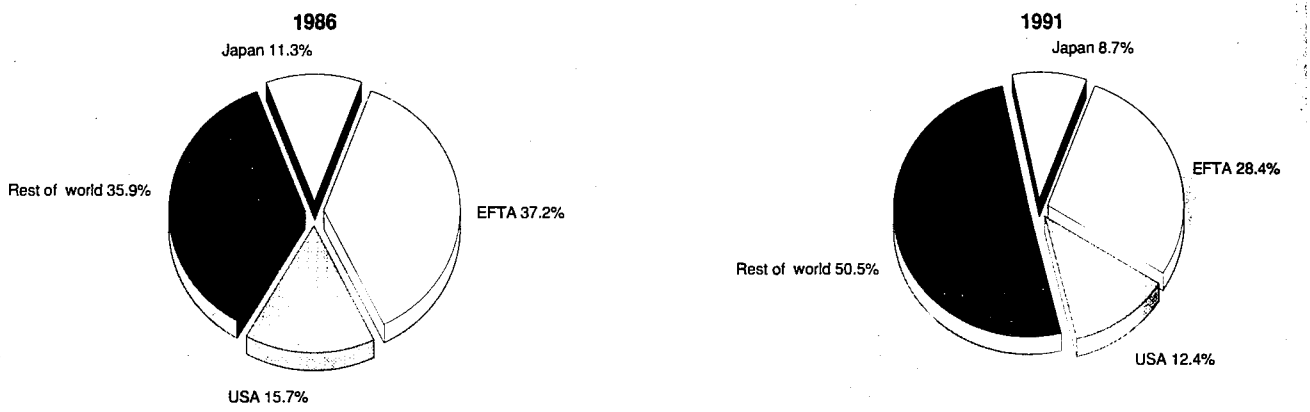
INDUSTRY STRUCTURE

Companies

With the exception of a few segments of the industry such as cement and flat glass production, the non-metallic minerals sector tends to be relatively dispersed, dominated by local monopolies, serving fairly small regions. The five leading firms in the non-metallic minerals industry barely account for 22% of total production. This compares to figures as high as 42% for the chemicals sector, or the motor vehicles industry where the top five producers account for 66% of total production. The low level of concentration in the non-metallic minerals sector is mainly due to the weight of the material in the construction materials part of the industry, which makes transport a costly matter.

Another reason for the lack of concentration is the absence of economics of scale in largest part of the industry. The cement business is an exception, a field which is increasingly becoming internationalised.

Figure 7: Non-metallic minerals
Origin of EC imports



Source: Eurostat

Table 5: Non-metallic minerals
Breakdown by size of enterprise, 1988 (1)

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	70 305	88.5	22.8	20.3
20-99	7 453	9.4	22.0	21.6
More than 99	1 680	2.1	55.2	58.1

(1) Estimates; includes working of stone and of non-metallic mineral products
Source: Eurostat

Strategies

The industry will probably become more concentrated with the creation of the EC Internal Market, in response to a higher level of concentration on the part of its main client sector, the construction industry, that will itself be influenced by the deregulation of public contracts.

REGIONAL DISTRIBUTION

All Member States produce non-metallic mineral products. Production is by far the most developed in Germany, followed by Italy, France and the United Kingdom. As far as construction materials is concerned, measured as a share of GNP, the countries in the south of the EC (Italy, Spain, Portugal and Greece) tend to specialise the most in construction materials.

ENVIRONMENT

As a major user of furnaces, the non-metallic minerals sector gives rise to gaseous emissions, mainly nitrogen oxides (NO_x), sulphur dioxide (SO_2) (which causes acid rain) or carbon monoxide (CO). Discharges of dust also pose a common problem, particular as regards the manufacture of cement or terracotta. Efforts to reduce the atmospheric pollution caused by the sector cost companies large amounts of money. By way of an example, de-dusting equipment can account for up to 15% of the value of investments in the cement industry.

The high consumption of energy and of fossil fuels in particular, is also posing an increasingly serious problem in terms of carbon dioxide emissions (CO_2) that contribute to the greenhouse effect. Although major energy savings could still be achieved by modifying or replacing production facilities, a pro-environmentalist EC policy involving the introduction of a tax on carbon emissions or on energy in order to encourage firms to switch to less harmful sources of energy and a reduction in consumption in absolute terms, would lead to a marked increase in the sector's production costs, with unavoidable repercussions on prices. Energy accounts for around 30% of the inputs used in the manufacture of cement, chalk, and plaster and 10% of the inputs for concrete.

Table 6: Non-metallic minerals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.5	2.1
Production	1.2	1.8
Extra-EC exports	0.6	0.8

Source: DRI Europe

Raw materials supply for the non-metallic minerals sector could be seriously hampered in the future. Because of environmental reasons, mining companies are facing increasing difficulties to obtain licenses to open new sites or even to extend existing sites which will reduce the availability of the raw materials for the non-metallic minerals sector in addition to increasing prices.

REGULATIONS

The coming into effect of the Building Products Directive in the framework of the European Single Market marks the onset of the design of a whole range of technical specifications for building products on a European level. This directive will increase competition on a European level.

OUTLOOK

Demand for non-metallic minerals is expected to grow steadily in the 1990s, thanks to the favourable outlook for the construction sector. On average, an annual growth rate of about 2.1% can be expected. Production will follow closely, as the possibilities for trade are limited in the largest part of the industry. Export growth will be slow as capacity will rather be directed towards serving demand in the domestic construction sector.

Written by: DRI Europe

Clay products
NACE 241

Due to local building traditions, types of bricks and rooftiles tend to vary according to country. The largest EC producers are Germany, Italy and the United Kingdom, each with value added well above 700 million ECU. Growth of the industry will be slow, as bricks and tiles face increasing competition from alternative production materials. Despite considerable rationalisation measures during the 1980s, employment will continue to decrease.

INDUSTRY PROFILE

Description of the sector

Bricks and rooftiles have formed part of the historic and cultural heritage of almost every country in the world. Local traditions have influenced standards and national building regulations (e.g. concerning brick size or construction method). In countries such as France and Germany, noticeable differences exist even between regions. In general, there are two categories of clay construction products: bricks and rooftiles.

Bricks

Brick is a construction material made from pre-formed clay which are baked in large ovens. Various brick styles are classified on the basis of national standards, but the following classification applies to all European categories:

- solid bricks contain no perforations, or at least do not have perforations exceeding a certain fixed percentage (15% to 25% of total brick volume, according to the country);
- perforated bricks contain a large number of small (generally vertical) perforations;
- hollow bricks contain large perforations which are generally horizontal (normally more than 50% of gross volume).

The type of brick used varies between countries. In Ireland, the Netherlands and the United Kingdom, solid brick is the most widely used; in Belgium and Denmark both solid brick and perforated brick are common whereas in France, Spain, Portugal and Greece, hollow and solid bricks are mainly used.

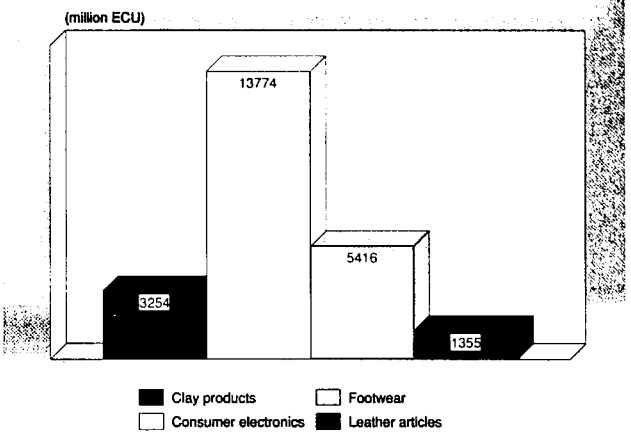
In northern Europe, facing bricks are used in cavity walls, which consists of an outer leaf (facing bricks) and an inner leaf that can be made of solid or perforated brick or of other materials. In southern Europe, the majority of buildings have hollow brick walls, which are rendered (e.g. covered with plaster). In certain areas it is customary to cover parts of the facade with facing bricks (e.g. Toulouse, Barcelona, Venice).

Rooftiles

Rooftiles have a special shape which facilitates roof covering. The production method is the same as for bricks. The clay is kneaded until the desired shape is obtained and the rooftile is then oven-baked. Rooftiles vary with each manufacturer and therefore are not interchangeable. Generally it is possible to distinguish between the Mediterranean type (the roofs with a slight slope) and the northern European type (for roofs with a steep slope).

The brick and rooftile industry's main markets are houses, multi storey buildings, and pavements. The rooftile industry covers maintenance, repair and transformation of existing buildings.

Figure 1: Clay products
Value added in comparison to other industries, 1991



Source: Eurostat

Main indicators

Following a crisis period during the first half of the 1980s, production of clay products in current prices again rose from 1987 onwards. The rising trend in recent production figures continued throughout 1991, when production amounted to 6.4 billion ECU. Extra-EC exports are small and have not shown important variations in recent years. The trade balance remained positive throughout 1991. Employment since 1982 has decreased in the sector, apart from a 4% increase in 1989. In 1991, employment stood at 71% of the level recorded in 1982.

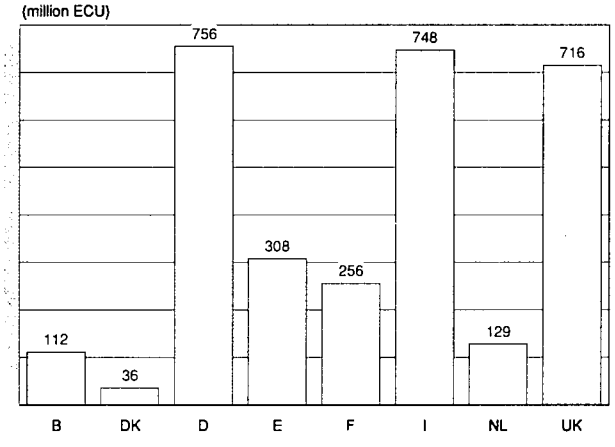
Recent trends

Apparent consumption and production reached their lowest level in 1986 and recovered between 1986 and 1989, maintaining a flat level ever since. In 1991, employment hit record low levels. Table 2 also clearly illustrates the turning point in the middle of the 1980s, showing negative production and consumption growth in the first half, followed by a highly positive growth rate afterwards.

International comparison

Japan and the USA lag far behind the EC in brick and tile production, due to the predominance of other construction

Figure 2: Clay products
Value added by Member State, 1991



Source: Eurostat

Table 1: Clay products
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	4 175	4 095	4 383	4 274	4 143	4 366	4 987	5 692	5 906	6 231	6 463
Production	4 355	4 310	4 668	4 535	4 377	4 591	5 162	5 887	6 098	6 421	6 647
Extra-EC exports	187.8	226.0	291.3	265.8	240.5	233.8	186.6	211.6	207.6	216.7	222.0
Trade balance	179.2	214.5	284.9	260.3	233.7	224.9	174.2	194.8	192.1	190.3	184.0
Employment (thousands)	117.3	104.4	102.7	94.0	87.7	85.6	84.9	88.3	86.7	84.6	83.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Clay products
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-2.5	3.2	1.3
Production	-1.9	2.8	1.2
Extra-EC exports	8.2	-5.9	-1.4
Extra-EC imports	-16.4	22.4	7.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Clay products
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	187.8	226.0	291.3	265.8	240.5	233.8	186.6	211.6	207.6	216.7
Extra-EC imports	8.54	11.5	6.44	5.46	6.82	8.86	12.4	16.8	15.5	26.3
Trade balance	179.2	214.5	284.9	260.3	233.7	224.9	174.2	194.8	192.1	190.3
Ratio exports/imports	22.0	19.7	45.2	48.7	35.3	26.4	15.0	12.6	13.4	8.23
Terms of trade index	98.0	105.7	102.8	100.0	92.2	79.3	77.0	75.5	77.7	82.2
Intra-EC trade	172.2	191.2	204.8	197.9	223.9	235.0	307.8	379.6	396.7	434.3
Share of total imports (%)	95.3	94.3	97.0	97.3	97.0	96.4	96.1	95.8	96.2	94.3

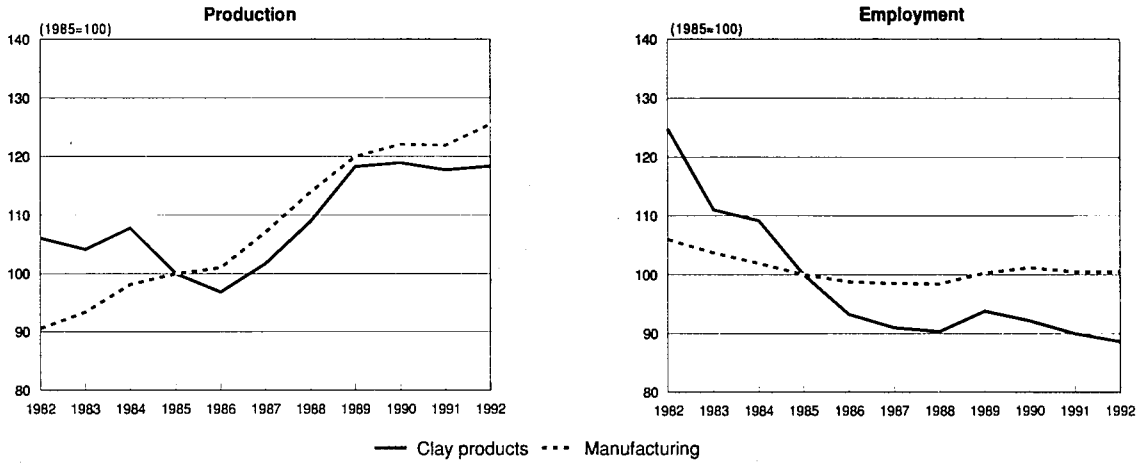
(1) Estimates
Source: Eurostat

Table 4: Clay products
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	22.5	25.3	26.3	26.9	30.5	33.7	37.3	37.3	38.1	38.5
Productivity index	83.8	94.1	97.9	100.0	113.4	125.5	138.9	138.8	141.7	143.1
Unit labour costs index (3)	82.1	86.9	93.7	100.0	102.2	108.7	118.0	122.4	127.7	N/A
Total unit costs index (4)	77.6	88.9	95.4	100.0	94.3	97.4	104.0	116.8	120.5	129.7

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Clay products
Production and employment indices compared to EC manufacturing



1992 are DRI Europe estimates
Source: Eurostat

materials such as wood, concrete and plastics. In the USA, production has been shrinking in recent years, as competing construction materials are increasingly preferred.

Foreign trade

Extra-EC trade in the clay sector is extremely small. Exports represented less than 3.5% of EC production in 1991 while imports were negligible (0.4% of apparent consumption). The EC trade balance for clay products traditionally records high surpluses. Intra-EC trade in clay products is also quite limited, accounting for only 7% of EC production in 1991.

The share of the main destinations for EC exports of clay products remained fairly stable over the period from 1986 to 1991. The EFTA countries are the largest single trading block receiving most of the EC's exports (31.8%), followed by the OPEC countries.

The EFTA countries also account for the largest share of extra-EC imports, attaining about half of total imports. Other important import sources for the EC are Turkey, Czechoslovakia and Brazil, each accounting for approximately 9% of EC imports.

MARKET FORCES

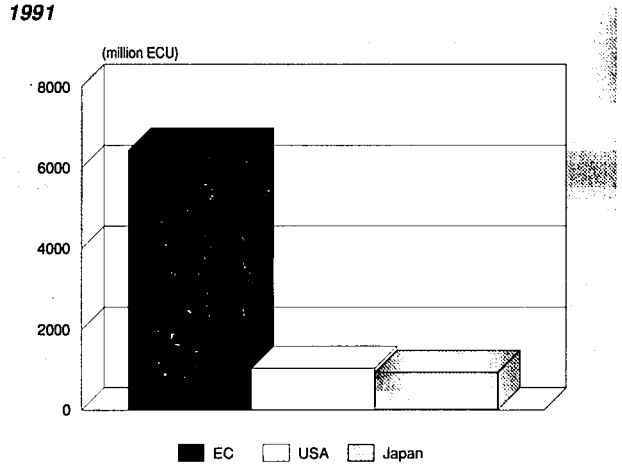
Demand

Following the Second World War, housing construction in most European countries experienced a long period of intense activity, followed by a considerable decline. The decline did not affect all countries at the same time, but generally occurred between 1980 and 1985. An increase in interest rates on mortgages, budgetary deficits and increased employment uncertainty brought about a decline in building activity that in turn created a fall in the demand for clay products.

Bricks

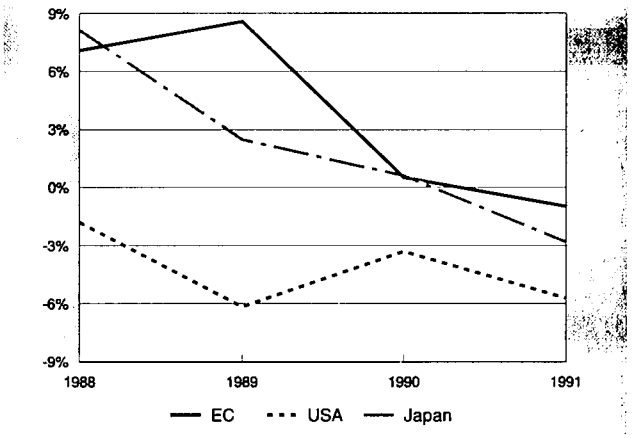
With regard to brick, fluctuations in demand are somewhat smoother than fluctuations in the activity of the housing sector. When the housing sector experiences a sharp upturn, brick manufacturing does not always follow because competing construction materials find an opportunity to increase their market share. In periods of downturn, traditional brick construction is more resilient than competing techniques and brick's relative market share increases.

Figure 4: Clay products
International comparison of production at current prices, 1991



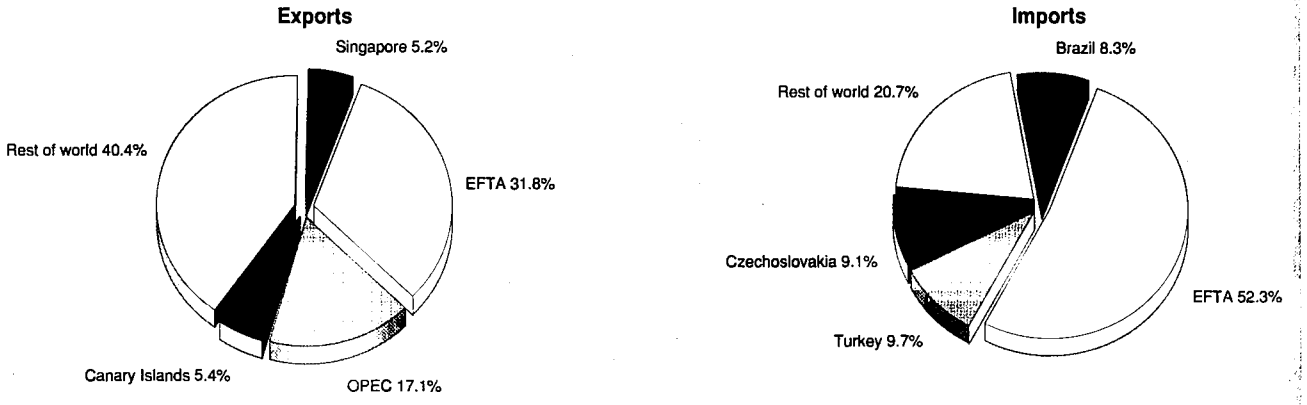
Source: Eurostat

Figure 5: Clay products
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Clay products
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

The situation of brick production varies from country to country: while some Member States (Italy and Belgium) managed to return to the 1980 production level, others (Germany, France and Denmark) are still far from that level. However, no Member State has managed to exceed the pre-crisis level.

Rooftiles

Following the Second World War, with the advent of concrete rooftiles and the diminishing demand for sloped roofs, clay tiles were abandoned everywhere, but in the last fifteen years, however, a rebound of demand has occurred. During the 1960s and 1970s, priority was given to new construction. Since 1980, the emphasis has been on renovating existing buildings. While masonry remains intact, roofs of traditionally designed houses often must be renovated.

The upturn after the crisis in the construction sector was more quickly felt in the rooftiles subsector than in bricks, and several countries (Germany, the United Kingdom and Denmark) are now even experiencing production levels that are far higher than those of the beginning of the 1980s. Over the period 1980-1985, the rooftile sector and the existing building renovation sector experienced reasonable activity levels and even modest growth in certain countries.

Supply and competition

Given that extra-EC trade is very limited in this sector, pressure from outside competition is not a major issue. Intra-EC trade is also very limited, and competition remains on a regional or even local scale, whereby most brickyards sell their products within a maximum radius of 70 kilometres around the factory. If trade occurs, it seldom crosses more than one boundary. Some small countries, nevertheless, export a sizeable percentage of their domestic production across borders, as they are not too far from their clients. In the Netherlands, exports represent up to 20% of national production and, in Belgium, they account for up to 10%.

A number of factors explain the regional character of the industry: firstly, the weight of the material makes long-distance transport relatively unprofitable; secondly, national standards and regulations form a barrier for increased trade. As national regulations generally arise from local building traditions, the opportunity to eliminate these trade barriers via EC-level harmonisation is limited. The problems of product liability that are due to the fragile nature of the product act as a hindrance to the international rooftile trade.

Production process

In older brickyards and rooftile factories, labour costs make up the largest share of production costs; in the more modern ones, it is energy and capital depreciation. Energy costs can account for as much as 25% of the total cost, making the brick industry sensitive to changes in relative energy prices. Many brickyards regularly change their fuel type (coal, fuel oil, natural gas, LPG) as prices change. However, clients tend to be very conservative and do not easily accept slight modifications caused by changes in production methods.

The number of people employed in the brick and rooftile industry has dropped over the years, owing to the closure of many old factories that employed a large number of manual workers and to the modernisation of existing firms, which now require a smaller labour input. Between 1982 and 1991, the number of people employed in the sector fell from 117 300 to 84 600. Except for Greece which registered an average annual rise of 1.5%, all EC countries experienced a sharp decrease in manpower. The countries most affected by this reduction were France (-8.6% per year between 1980 and 1988), the Netherlands (-8.3%), Italy (-8.2%) and Belgium (-7.9%). The largest employers in the EC for this sector are the United Kingdom, (16 000 people in 1988), Germany (15 500), Italy (14 500) and Spain (13 300).

Due to increased mechanisation, the clay product industry's productivity has continued to rise. For instance, average annual production expressed in m^3 per worker in the Belgian brick industry increased from $150m^3$ in 1950 to as much as $993m^3$ in 1989. Table 4 shows the marked rise in labour productivity, with the sharpest increases following the end of the crisis in the clay products sector (1985 to 1988).

INDUSTRY STRUCTURE

Companies

The typical brickyard in the EC is a family-owned firm with 10 to 50 employees, depending on the degree of technology. In most countries, there are companies which own a number of brickyards more or less concentrated in a particular region. The oldest factories mostly have a seasonal activity with employees unemployed during the winter. Even in countries where the brick industry is strongly automated (mainly northern Europe), there are still older, more traditional brickyards that have survived by specialising in the manufacture of handcrafted products, which sometimes proves to be a very profitable activity.

Table 5: Clay products
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	0.6	0.9
Production	0.5	0.8
Extra-EC exports	-0.3	-0.1

Source: DRI Europe

The modernisation of these companies has resulted in a continued trend towards concentration: in all countries, the number of brickyards has fallen considerably, dropping from 2438 to 1809 companies from 1982 to 1990. Since 1988, some companies have begun to expand beyond national borders and establish themselves as multinationals.

OUTLOOK

Following the trend in recent years, consumption and production of bricks and rooftiles are expected to grow slowly. Growth will be lower than for the non-metallic minerals in general, due to pressure from competing construction materials. The renovation of older buildings should provide some opportunities.

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Cement
NACE 242

The slowdown of economic growth in the EC since 1990 has resulted in decreasing production volumes for the cement industry in 1991. The trends in production and consumption, however, show marked differences between EC countries. Despite diminishing growth for the sector, imports have continued to increase. The prospects for the industry are mediocre, except perhaps for Germany.

INDUSTRY PROFILE

Description of the sector

The activity of the cement industry is closely linked to the general economic situation. Cement is an important basic material for buildings and civil engineering works, representing major public and private investment.

Cement production consists of two essential phases, the manufacture of semi-finished and finished products.

The manufacture of a semi-finished product, so-called "clinker" is obtained from the calcination in a high-temperature kiln (1 450°C) of raw materials (clay, limestone, etc.) previously prepared in paste or powder form depending on the production process used (wet or dry).

Cement as a finished product is manufactured by the homogeneous mixture of the ground clinker and calcium sulphate, with or without (depending on the type of cement), one or more additional components: slag, fly ash, pozzolana, filler, etc.

Main indicators

Production in EC countries in 1989 amounted to 171 million tonnes (i.e. less than 15% of the world production) compared to 21% in 1980. Production expressed in volume terms show the recession in the industry in 1991.

Italy is the largest cement producer and consumer in the EC producing 40.8 million tonnes and consuming 43 million tonnes. Germany and Spain occupy second and third places, closely followed by France.

Recent trends

After experiencing a high rate of economic growth in Western Europe from 1987 to 1989, economic activity slowed sharply in the second half of 1990 and growth virtually ceased in the first half of 1991. Consequently, 1991 marked a heavy downturn in consumption for a number of EC countries as consumption for the EC as a whole decreased by 2.7% in 1991 compared to 1990.

The trends across countries, however, vary considerably. The best performances in 1991 were recorded by Luxembourg and Portugal, with the strong performance in Portugal linked to heavy investment in the public sector and by a rising housing sector. UK consumption decreased by about 18%, Denmark and Ireland by 8%, France, Netherlands and Germany (in spite of public sector investment following reunification), 4% to 5%. No growth, or relatively weak growth, was registered in Belgium, Italy, Spain and Greece.

International comparison

World cement production was estimated at 1 153 million tonnes in 1991. The 10 major cement producing countries, in order of importance, were: China (220 million tonnes), the former Soviet Union (131 million tonnes), Japan (92.4 million tonnes), the USA (65.1 million tonnes), India (50 million tonnes), Italy (40.8 million tonnes), South Korea (38.8 million tonnes), Germany (31.1 million tonnes), Spain (28 million tonnes), Turkey (27.4 million tonnes) and Brazil (27.3 million tonnes).

For the first time ever, world production of cement (excluding China) showed a slight decrease during 1991. Overall market growth (including China) is flat, confirming the downturn initiated in 1990. After a period of sustained growth, the United States, the Western European countries and Eastern Europe alike experienced lower production and consumption, varying from a level of 2.5% in Western Europe up to 10% or more in the USA and Eastern Europe.

The geographical distribution of trade in cement is largely influenced by the nature of the product: its modest price per unit and considerable weight makes it vulnerable to the effects of transport costs, especially road transport. As a result, cement is delivered most often to the markets that are closest to the place of production.

It also explains why world trade in cement currently accounts for less than 6% of production. Moreover, it is marked by a very pronounced geographical polarisation. In 1991, 45% of imports were recorded in only seven countries: the USA, South Korea, Thailand, Germany, Spain, Italy and Hong Kong. Four countries accounted for 40% of the world's exports: China, Greece, Japan and Turkey.

Foreign trade

In spite of the general downward trend in consumption, imports by EC countries continued to grow in 1991, increasing by approximately 12%. This volume represents more than 10% of production and consumption.

The largest increase in trade was reported in Germany where imports doubled. Import growth also continued in Spain and Italy during 1991, reaching 11.6% and 7% respectively of domestic consumption.

The EC's main exporter was Greece, retaining the same level as the previous year with 43% of production.

Table 1: Cement
Main indicators in volume (1)

(million tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Apparent consumption	150.7	147.5	139.2	134.3	138.5	141.2	155.0	166.2	175.8	171.1
Production (1)	172.0	170.0	159.0	149.0	150.0	152.0	161.0	168.7	178.5	171.3
Extra-EC exports (2)	22.9	23.9	21.0	16.0	13.0	12.6	9.5	7.4	8.6	6.3
Trade balance	21.3	22.5	19.8	14.7	11.5	10.8	6.0	2.5	2.6	0.2
Employment (thousands)	77.0	75.0	72.0	69.0	65.0	63.0	N/A	N/A	N/A	N/A

(1) Including former East Germany from 1990 onwards
(2) In million tonnes; estimated and excluding special cements such as white and aluminous in 1988 and 1989
Excluding white, oil well and aluminous cements, Netherlands excludes exports to Germany in 1990
Source: Cembureau

Table 2: Cement
Production and per capita consumption by Member State, 1991

(thousand tonnes)	Production	Per capita consumption (1)
EC	171 299	491
B	7 184	549
DK	1 623	239
D (2)	31 137	408
GR	13 424	739
E	28 008	696
F	25 799	423
IRL (3)	1 510	415
I	40 806	751
L	1 282	1 079
NL	3 302	349
P	7 473	712
UK	11 600	232

(1) In kilogrammes
(2) Includes former East Germany
(3) Production estimated
Source: Cembureau

China again increased its exports by approximately 30% and export volume amounted to 10.5 million tonnes; record exports were made by Spain and Japan with 13 million and 14 million tonnes respectively in 1983. The main recipients of Chinese cement are Korea and Thailand whose total imports reach 12 million tonnes and Japan with imports of 1.8 million tonnes.

Trade to the USA continued to drop in 1991, to 7.9 million tonnes, or nearly half the amount of 1990. A decrease in imported cement from Mexico to the USA was a result of the weak US economy and the application of the ITC's (International Trade Commission) anti-dumping penalties.

MARKET FORCES

Demand

Cement consumption is linked directly to activity in the building sector and, more accurately, to investments made in residential and non-residential buildings, as well as in civil engineering works. From 1986 onwards, European countries began once again to increase their investment in building and the cement industry quickly recovered from the crisis, to reach consumption levels in 1989 that matched 1980 consumption. Following the weakness of the construction sector in 1991, demand for the industry grew at a slow pace.

Supply and competition

EC capacity is currently more than enough to cover internal demand. Nevertheless, there is continued exposure to cement imports from Eastern Europe and developing countries at artificially low prices (dumping conditions, where only variable expenses are taken into consideration), or at prices imposed by the authorities in the countries in question.

The legal resources for defence against concentrated dumping at the borders are normally inadequate. Whereas overall economic harm to the EC might appear limited, the same does not hold at regional level.

Production process

The cement industry is a capital-intensive sector: it processes large quantities of low-value raw materials in very expensive facilities, to manufacture a product with a low unit price.

Table 3: Cement
International comparison of production in volume

(thousand tonnes)	1988	1991
Europe	273 400	256 995
Former Soviet Union	139 500	130 500
Africa	50 050	55 250
America	166 550	167 600
Asia	477 800	515 800
Oceania	7 550	6 900

Source: Cembureau

Cement production requires large quantities of energy. The average energy consumption per tonne of clinker produced in the EC today amounts to less than 900kcal/kg. This value may vary widely from country to country (from 800 to 1400kcal), depending on the production method applied. Energy consumption in relation to cement manufacture also depends on the policy pursued by the different national industries as regards investment and the development of composite cements.

The second oil crisis confirmed the usefulness of the conversion of energy supplies undertaken since 1973. The industry has since continued its efforts in two directions:

- search for cheaper fuels (diversification of fuels thanks to the versatility of equipment and use of wastes as secondary fuels);
- a rational use of energy (new manufacturing processes, development of composite cements, heat recovery, etc.).

However the cost of energy (including consumption of electricity for grinding the clinker) is very important and can vary from about 25% to 35-40% of the total production cost of cement.

INDUSTRY STRUCTURE

There are no generally accepted criteria for ranking cement companies or groups, as both turnover and capacity can be defined in different ways. Published turnover in consolidated accounts may include non-cement activities, and the existence of trading affiliates can lead to different quantities of cement being produced and handled by a company. The calculation of capacity control in part-owned companies is treated differently.

Taking into account the above, several cement producing groups considered to be the largest operating companies in the world are, in alphabetical order, CEMEX (Mexico), Holderbank (Switzerland), the newly merged Italcementi (Italy)/Ciments Français (France), and Lafarge Coppée (France).

Restructuring and market positioning of the leading companies is expected to continue. Several joint ventures have been set up, particularly with Eastern Europe.

ENVIRONMENT

As public concern for the environment steadily increases, so does the activity of the EC Commission and Parliament in tackling environmental issues. EC regulatory activity is also extensive in other issues directly related to the European cement industry, such as emission control, waste classification, incineration of hazardous waste, integrated pollution control, environmental auditing and liability for damages to the environment.

The cement industry has therefore devoted much effort to environmental issues, particularly in the completion of the

European cement industry's document "Approach to the Environment". This document tackles the environmental impacts associated with the manufacture and distribution of cement.

REGULATIONS

A European pre-standard for common cements has recently been adopted by the European Committee for Standardisation (CEN). The pre-standard details composition, specifications and conformity criteria for the traditional common cements used in Europe. Cements conforming to the requirements of the pre-standard are termed "CEM" cements. The pre-standard is presently being introduced in the EC and EFTA countries.

The pre-standard will have a life of three to five years and will operate with existing national standards. During this time, further work will be carried out and the changes required prior to the adoption of a full European standard will be identified and clarified.

OUTLOOK

The overall growth in the market is expected to slacken considerably. A possible exception will be Germany, stimulated by the developments in the Eastern Länder.

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Precast concrete
NACE 243.2

After a general status quo in 1991, the sector exhibited signs of a recovery in 1992 in some countries, closely following developments in the construction sector, which is virtually its only client. Steady growth can be expected for the sector in the medium term. Though the industry is mainly made up of small to medium-sized companies, some merger and acquisition activity has been taking place in anticipation of the Single Market. Stricter EC legislation on emission norms regarding air and water will also have its influence on the precast concrete industry. The limited expansion possibilities for mining and quarrying might also pose supply problems for the industry.

INDUSTRY PROFILE

Description of the sector

The precast concrete industry is the collective name given to all enterprises that manufacture precast concrete products at specially equipped plants (at a permanent location) which operate independent of weather conditions. The products are delivered to the construction sector ready to be put in place in building and road construction projects, civil engineering works, etc.

Concrete is made from a mixture of sand, water, cement, gravel or other aggregates, and other possible additions. The concrete industry as an industrial sector is situated between the sector covering the suppliers (i.e. cement manufacturers and quarries which supply sand, gravel, and stone) on the one hand and the customers (i.e. the construction sector) on the other.

The precast concrete industry embraces a wide range of products:

- products for road construction (paving flags, stones and blocks, kerbs, safety and sound barriers, sewerage and drainage pipes and accessories, etc.);
- elements for building construction (masonry units, cladding elements in architectural concrete, floor elements, beams and columns, wall elements for industrial, commercial and agricultural buildings, etc.);
- elements for civil engineering works (bridge girders, tunnel elements, etc.);
- units for various other purposes such as flood protection, urban and garden landscaping, lighting poles, and agricultural installations.

Furthermore, the following general characteristics of the precast concrete industry can be highlighted:

- relatively low value-added content of certain mass-produced precast concrete units;
- strong dependence upon the efficiency of the business, (i.e. the degree of mechanisation of the production process and the effectiveness of management);
- a predominance of small to medium-sized businesses (often family-owned enterprises).

Main indicators

Table 2 shows that, for the EC countries (for which data are available) production at current prices has grown considerably over the last three years. In 1991, growth was not pronounced in almost all Member States, except Germany where continued growth was noted, and the UK where a strong downturn persisted.

Even though there is not complete information on EC employment in the precast concrete industry, a reasonable estimate is around 180 000 people. The number of employees is spread over nearly 5000 precast concrete plants, of which approximately 600 employ more than 50 people.

Recent trends

In the industrialised countries, the activity of the precast concrete industry depends largely on the overall economic climate and on activity in the construction sector in particular (99% of the precast concrete production goes to the construction sector), though trend differences can be observed between residential building, non-residential building and road construction (the latter absorbs roughly 30% of the precast concrete production).

The economic crisis caused a 30% to 40% drop in precast concrete production in the EC with an almost equal fall in employment from the mid-1970s to 1984. With the economic revival, production has increased, with figures varying depending upon the country considered.

An important indicator of the precast concrete industry's real strength is the percentage of the precast concrete industry in the total national cement consumption, because it illustrates the actual penetration of the precast concrete products on the construction market. It shows a rather positive trend in most countries, especially in those countries where the industry has successfully commercialised its precast concrete solutions. Indeed, by producing certain construction materials at a fixed plant instead of at the building site, construction costs may be significantly reduced.

Foreign trade

Generally, precast concrete products are heavy and bulky in relation to value. The average value of one metric tonne of precast concrete products is approximately 100 ECU (but for

Table 1: Precast concrete
Main indicators by Member State, 1991

	B	DK	D	F(1)	I	NL	UK
Turnover (million ECU)	650	318	4 771	N/A	1 980	870	2 368
Production (thousand tonnes)	8 800	2 493	47 244	31 744	36 520	N/A	21 000
Employment (thousands)	6.3	3.4	49.9	24.5	35.3	8.4	11.0
No. of precast concrete plants:							
Total	372	132	1 250	1 040	1 492	170	210
With 50 or more employees	21	10	286	60	138	55	N/A

(1) Estimates
Source: BIBM

Table 2: Precast concrete
Production at current prices by Member State

(million ECU)	1982	1990	1991	1992(1)	1993(2)
Belgique/België	248	501	516	510	480
Danmark	169	360	318	318	N/A
BR Deutschland	2 031	3 338	3 774	4 001	4 201
France (3)	1 195	1 788	1 793	1 771	N/A
Italia	1 840	2 010	1 980	1 850	1 900
Nederland	465	680	660	660	N/A
United Kingdom	1 535	2 747	2 368	N/A	N/A

(1) Estimates
(2) Forecasts
(3) 1991 estimated
Source: BIBM

some standardised non-reinforced products manufactured on a large scale, this value can be as low as 35 ECU). Consequently, long-distance transportation of precast concrete products is unusual and trade is mostly limited to a single border crossing. A typical exception is, however, the technologically highly-advanced precast concrete products such as sophisticated cladding elements in architectural concrete.

MARKET FORCES

Demand

The activity in the precast concrete industry strongly depends on the activity in the construction sector, which in turn is greatly dependent on the overall economic climate. As a consequence, periods of high activity peaks in the concrete industry are succeeded by low-activity periods leading to costly overcapacity.

A further factor causing variations in activity levels is the financial situation of the public authorities. Approximately one-third of construction activity covers public works (involving road construction and civil engineering works, etc.), a field soon afflicted by cuts when the public authorities experience financial difficulties.

Supply and competition

The concrete industry faces competition from traditional construction procedures with an intensity varying from country to country and closely related to the marketing skills of the local concrete industry.

There is indeed a wide range of substitution products offered, ranging from classical materials such as clay brick and timber, to newer materials such as PVC.

Production process

Since non-reinforced concrete began replacing natural stone, timber and cast iron in many applications, the precast concrete industry became highly mechanised. The rapid technological development of reinforced and pre-stressed concrete led to the breakthrough of various plant-manufactured structural elements for building construction projects and civil engineering works.

Lightweight concrete was first applied in the precast concrete industry for the manufacture of masonry units, wall and floor elements.

The construction boom in the 1960s and early 1970s, as well as the increase in building costs over that same period led to a further industrialisation of the precast concrete industry. Profits were reinvested in both plants and modern machinery such as semi- and fully-automated batching and manufacturing equipment. Handling, packaging and transporting techniques were equally revolutionised.

To date, the following particular technological aspects of the precast concrete manufacturing may be pointed out :

Table 3: Precast concrete
Percentage of cement production consumed by the precast concrete industry (1)

(%)	1982	1990	1991	1992(2)	1993(3)
Belgique/België	18.0	22.2	22.2	22.5	22.7
Danmark	33.0	40.0	40.0	40.0	N/A
BR Deutschland	27.0	26.0	27.0	28.0	28.0
Hellas	N/A	2.0	N/A	N/A	N/A
España	N/A	22.0	N/A	N/A	N/A
France (4)	19.0	17.0	17.0	17.0	N/A
Ireland	N/A	N/A	N/A	N/A	N/A
Italia	13.8	15.0	15.0	14.0	14.0
Luxembourg	N/A	9.9	N/A	N/A	N/A
Nederland	30.2	40.0	40.0	40.0	N/A
Portugal	5.0	10.6	N/A	N/A	N/A
United Kingdom	22.0	27.0	26.5	N/A	N/A

(1) In the total national cement consumption
(2) Estimates
(3) Forecasts
(4) 1991 estimates
Source: BIBM

Table 4: Precast concrete
Intra-EC trade at current prices

	1982	1990	1991	1992(1)	1993(2)
Belgique/België and Luxembourg					
Value (million ECU)	39.7	74.7	80.5	85.0	100.0
Quantity (thousand tonnes)	754.0	983.8	921.0	1 000.0	1 050.0
BR Deutschland					
Value (million ECU)	47.3	82.5	117.4	123.3	129.5
Quantity (thousand tonnes)	473.0	599.0	782.0	821.0	862.0
France (3)					
Value (million ECU)	29.5	104.1	107.1	N/A	N/A
Quantity (thousand tonnes)	362.0	843.7	872.4	N/A	N/A
United Kingdom					
Value (million ECU)	N/A	460.0	330.0	N/A	N/A
Quantity (thousand tonnes)	N/A	934.0	1 214.0	N/A	N/A

(1) Estimates
(2) Forecasts
(3) 1991 estimated
Source: BIBM

- the manufacture at a plant with a permanent location in controlled conditions;
- the use of a proper scientific concrete technology such as the use of 0-slump concrete, hot concrete and pretensioning techniques, particularly in moulding and compacting techniques and accelerated hardening techniques;
- advanced quality control which goes beyond the checking of the fresh concrete; quality control in the precast concrete industry includes the control of dimensional accuracy, of the properties of the hardened concrete, the position of reinforcements, all of which is done before the product is incorporated into construction;
- an advanced automation of manufacturing methods, not to mention an increasing level of industrialisation and standardisation.

Skilled manual workers constitute about 25% of employment in the precast concrete industry. These workers are involved in special production procedures such as reinforcement steel bending and netting, and the finishing of architectural concrete (e.g. polishing).

In several Western European countries the limited number of labourers in this field are in particularly high demand as younger school graduates do not appear to be strongly attracted towards this occupation. To cope with this problem, the industry has set up specific programs ranging from training courses for young adults and/or unemployed people, the publication of manuals, and campaigns designed to improve both the image of the industry and the attractiveness of jobs in precasting. For instance, in recent years the industry in Germany has regularly organised a national promotion day, offering younger people the opportunity to visit precast concrete plants.

INDUSTRY STRUCTURE

Companies

As already mentioned, the precast concrete industry is predominantly composed of small to medium-sized enterprises, that are generally family-owned businesses.

Strategies

In recent years, there has been some degree of concentration in the industry, because either one or more small businesses were bought up by major industrial groups (often a large building company, a cement factory or an aggregates supplier), or because various smaller concrete businesses have merged. The trend toward increased concentration varies in nature and intensity from country to country, and is to some extent due to anticipated market changes in view of the Single Market, either by allowing large construction companies to control supplies in the foreign market they will enter, or by creating concrete companies large enough to deal with the large construction companies on a recently internationalised market.

Besides entering into mergers and acquisitions, the industry also aims at further increasing productivity (estimated to have

Table 5: Precast concrete
Employment by Member State

(thousands)	1982	1990	1991	1992(1)	1993(2)
Belgique/België	6.2	5.9	6.3	6.2	6.1
Danmark	3.2	5.8	3.4	3.4	N/A
BR Deutschland	43.1	46.5	49.9	51.9	51.0
France (3)	28.0	24.6	24.5	N/A	N/A
Italia	24.5	38.7	35.3	32.7	33.4
Nederland	8.5	8.0	8.2	8.2	N/A
United Kingdom	N/A	12.5	11.0	N/A	N/A

(1) Estimates
(2) Forecasts
(3) 1991 estimated
Source: BIBM

Table 6: Precast concrete
Average hourly wage costs by Member State

(ECU)	1985	1990	1991	1992(1)	1993(2)
Belgique/België	13.0	16.3	17.2	18.0	18.9
Danmark	8.5	15.0	15.6	16.0	N/A
BR Deutschland	11.8	15.0	16.1	17.5	18.3
France (3)	8.4	10.4	10.7	N/A	N/A
Italia	9.7	13.3	15.2	N/A	N/A
Nederland	15.4	17.0	17.9	18.5	N/A
United Kingdom	N/A	N/A	8.5	8.8	N/A

(1) Estimates
(2) Forecasts
(3) 1991 estimated
Source: BIBM

risen by roughly 35% over the last fifteen years) and improving quality. First of all, the precast concrete industry has raised fixed investment by about 40% from 1985 to 1990. These investments, reflecting significant efforts toward innovation in the sector in recent years, involved not only replacement of older equipment and installations but also an increase in capacity, thus enhancing the competitiveness of plants in their region.

Secondly, precasters have become increasingly aware of the market advantages of guaranteeing the adequate durability of products (durability implying here both soundness and long-term appearance) and improved design.

Basically, most "new" products in the precast concrete industry are an evolution of existing elements. Nevertheless, the industry has developed (and is successfully marketing) valuable solutions in fields relative to, for instance, environmental problems such as sound barrier walls to protect residents living near highways or railways from noise hindrance.

Technological evolution constitutes a further influential factor. Indeed, the technical realisation of new types of beams or girders with, for instance, larger spans, would automatically create a higher demand for these structural elements.

REGIONAL DISTRIBUTION

The precast concrete industry is particularly important in Germany, relatively important in the Netherlands and Belgium, and to some extent, in France. In some countries, there is a higher concentration of the precast concrete industry in certain regions (e.g. the South West of the UK).

Geographical factors also played an influential role in the precast concrete industry. The more densely populated a region, the more important and developed the precast concrete industry tends to be. These regions have a higher demand for building, water and road construction and since precast concrete products are heavy, and costly to transport, production takes place near the centre of demand. An example of this is the triangle of dense population in Belgium, the Netherlands and Germany, in contrast to more sparsely populated regions in central France and Spain.

Climatic conditions also play an important role. In general, the further north a country is situated, the more developed its precast concrete industry. Traditional building activity in northern countries often has to be suspended during the winter due to bad weather conditions, while precast concrete products allow uninterrupted building activity.

Traditional use of certain construction materials has influenced the degree of development and strength of the precast concrete industry in the various Member States. In the Netherlands, for example, a boom began for precast concrete pavers when traditional clay pavers started to become too expensive. This secured the Dutch paving industry a strong position which allowed large-scale production at a favourable cost. Another result of this situation was that transportation beyond The Netherlands' borders became possible. By contrast, the British precast concrete flooring industry has encountered great difficulty in breaking into the traditional timber floor market for low-rise housing. The unequal development of the precast concrete industry in individual EC countries is illustrated in Table 3, which shows the share of the precast concrete industry in total national cement consumption for each Member State.

ENVIRONMENT

EC legislation on pollution control will also have its influence on the precast concrete industry. The German legislation concerning environmental protection aims particularly at reducing emissions from the raw materials and manufacturing industries. Hence, considerable know-how and capital investments in environmental protection are required of these industries. By means of modern techniques (such as waste water treatment installations), the pollution of air, water and soil may be controlled notwithstanding a growing production; modern techniques will thus help dissociate industrial production and economic growth more and more from environmental exploitation.

Increased restrictions on gravel extraction, anticipated in a number of Member States, could affect the concrete industry by rendering raw material supplies more difficult on the longer term. Raw material shortages might arise in some countries. In addition, the quarries supplying the precast concrete industry with sand and aggregates are either forbidden to extend further, or threatened with closure. Since about 80% of concrete is made up of sand and aggregates (1 m3 concrete requires two tonnes of these raw materials), this may cause serious short-term problems, not only for the concrete industry but also for the construction industry as a whole.

Consequently, certain research programmes are being conducted with the aim of recycling concrete debris, crushed concrete and waste concrete as raw materials. Due to requirements for high quality inputs, however, the precast concrete industry has only limited opportunities for using such recycled materials. Moreover, high-quality aggregates are also a prerequisite to meeting the stringent performances demanded as a rule of concrete products. Furthermore, they play an important role in one of the major advantages of precast concrete (i.e. smaller dimensions of the components which would reduce their weight, improving transportation costs).

In the precast concrete industry, a noise problem may occur as increasing urbanisation encroaches upon precast concrete plants. However, the industry has already recorded some success in reducing noise levels.

REGULATIONS

The advent of the Single Market and the coming into effect of the Building Products Directive (BPD) has emphasised the urgency for work on harmonisation, standardisation and certification.

Products meeting a European technical specification elaborated under an EC Commission mandate may carry the EC mark attesting their conformity with the given European technical specification. Such a European technical specification can either be a harmonised EN standard elaborated by CEN (European Committee for Standardisation) or, if no EN exists, a European Technical Approval (ETA) elaborated by EOTA (European Organisation for Technical Approvals).

Adoption of such common standards and quality certification systems at Community level is essential for the precast concrete industry. The precast concrete industry has a preference for the most stringent level of attestation of conformity, involving product certification by an approved certification body. Such certification would help to maintain client confidence in the high quality of the products, improve the quality image of the concrete products, and reduce the chances of having regulatory attestation exist next to some kind of voluntary certification system.

OUTLOOK

In general, 1992 is expected to show recovery in certain countries from the overall status quo in the industry in 1991. Steady growth perspectives can be foreseen for the medium term. The forecast is the result of steady growth in France and Italy, high growth in Germany (where the domestic market is buoyant) and negative growth in 1992 for the UK, where the construction sector is in deep recession (which will only be followed by slow positive growth). Exports - concentrated mainly, if not exclusively, on neighbouring countries - are expected to increase following the increasing trend in international trade, yet somewhat slower in the medium term, as with the expected growth in the construction industry domestic producers will concentrate somewhat more upon domestic demand.

Table 7: Concrete
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.1	1.7
Production	1.1	1.6
Extra-EC exports	2.0	1.1

Source: DRI Europe

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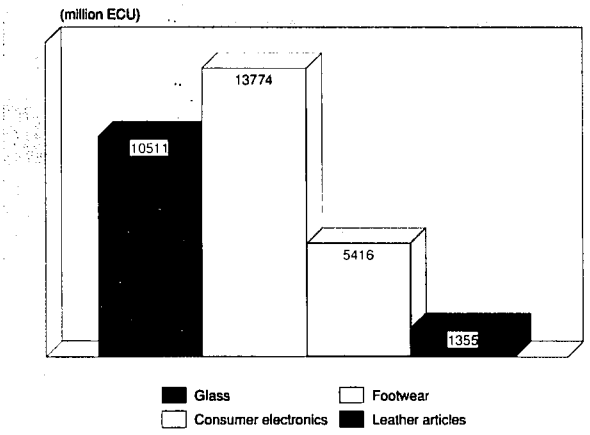
Glass
NACE 247

With a steady annual growth rate over the last few years, the glass industry has shown its ability to weather the downturn in the economy; despite the fact that two of its largest customers, the motor vehicle and construction industries, have experienced significant reductions in output.
Still maintaining its position as the world's largest producer of glass, the EC does not face intense competition from a rapidly growing Japanese industry as relatively high transport costs inhibit long distance trade. As a result, the EC's largest trading partners will remain Eastern Europe and the EFTA countries.
Emerging technologies for glass production and a growing emphasis on recycling are expected to sharply lower glass production costs, particularly by lowering the energy inputs needed.

Figure 1: Glass
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The glass industry corresponds to NACE 247 and includes four main segments. Container glass (also known as hollow glass) accounts for two-thirds of this industry. Flat glass, which is primarily used in the construction and transport equipment sectors, represents about 22% of this industry. Glass tableware accounts for another 4% of the glass industry. The remaining 8% is divided between glass fibre, special glass (high technology products), and glass products not mentioned in above.

Main indicators and recent trends

The EC glass industry produced 22.6 million tonnes of glass in 1991, with a turnover of about 23 billion ECU. 247 700 persons are employed by the glass industry. Production per employee was 91 tonnes in 1991.

During the recession of the early eighties, the EC glass industry was hit by a lowering of demand. Production fell in 1981, and did not return to its 1980 level until 1986. In 1987 and 1988, strong demand boosted production by about 7.5% per annum.

In 1989 and 1990, demand slowed, but nevertheless maintained a steady annual growth rate of 4.5%. Production followed demand and grew by 4.7% in 1989. In 1990, extra-EC export demand fell and the trade balance with the rest of the world decreased from 1 140 million ECU to 991 million ECU. As a consequence, production grew more slowly than consumption in the EC, at 3.7%

In 1991, the recession hit the glass industry and its main market: (packaging, construction, and motor vehicles) as production fell by 0.3%.

International comparison

The EC is the world's largest glass producer. In 1991, the EC glass industry produced 22.6 billion ECUs worth of glass products. Japan and US production is only about two-thirds of EC production. The Japanese glass industry, however, was the fastest growing. While European glass producers doubled their production (measured in ECU) between 1980 and 1991, Japanese producers increased production almost fourfold.

Foreign trade

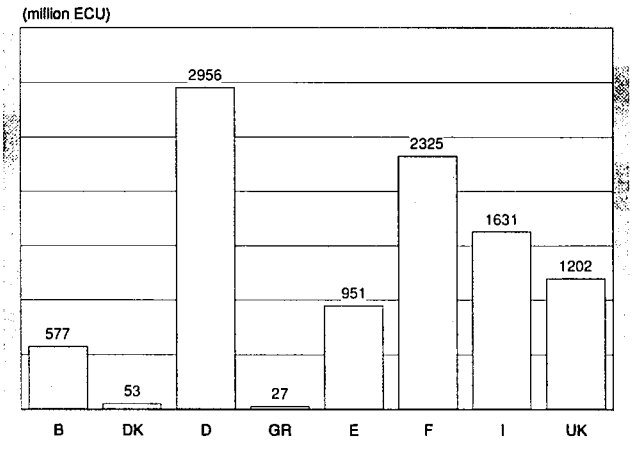
Long distance shipments of glass products are hampered by their low value/weight ratio. Transport cost is high compared to the value of the product. As a result, in 1991, intra-EC trade accounted for only a quarter of production, and only 11% of production was exported outside the EC.

The EC remains a net exporter of glass products, although its trade surplus is slowly deteriorating. It reached a peak of 1.4 billion ECU in 1985, but was only at 0.8 billion ECU in 1991. This development occurred in parallel with a deterioration of the terms of trade, which increased from 100 in 1985 to 103.2 in 1991.

About half of all extra-EC imports originate from East European countries. During the 1980's, these countries developed their cheap, low-quality glass exports to the EC in order to obtain hard currencies. This trend has continued with the opening of the East European economies. In parallel, western companies have started to expand in these countries, either by joint ventures or by acquiring local producers. Producers located in Eastern Europe will thus rapidly acquire the technology needed to upgrade their exports to the EC.

In the glass industry, the main trading partners of the EC are the EFTA countries: 31% of all imports that enter the EC have their origin in these countries, and 30% of extra-EC exports are sold in EFTA countries. Other important trading partners are the East European countries. Czechoslovakia alone accounts for 9.4% of total EC imports. Given the high

Figure 2: Glass
Value added by Member State, 1991



Source: Eurostat

Table 1: Glass
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (2)
Apparent consumption	12 153	12 783	13 667	14 260	14 833	16 294	17 956	19 393	20 988	21 835	22 670
Production	13 133	13 901	14 909	15 641	16 032	17 330	18 994	20 533	21 979	22 614	23 409
Extra-EC exports	1 675	1 893	2 178	2 352	2 210	2 116	2 265	2 566	2 475	2 488	2 601
Trade balance	980	1 118	1 242	1 381	1 199	1 036	1 037	1 140	991	779	739
Employment (thousands)	265.3	255.8	250.8	240.1	234.6	237.4	239.0	246.2	248.8	247.7	245.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI estimates
Source: Eurostat

Table 2: Glass
Breakdown by product line, 1991

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports
Container glass	15 229	14 927	349
Flat glass	5 217	5 357	545
Glass tableware	757	993	358
Glass fibres	396	354	60
Other glass	816	864	179

Source: CPIV

Table 3: Glass
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.2	5.6	4.4
Production	3.5	4.6	3.8
Extra-EC exports	6.1	-0.8	0.7
Extra-EC imports	6.3	8.3	7

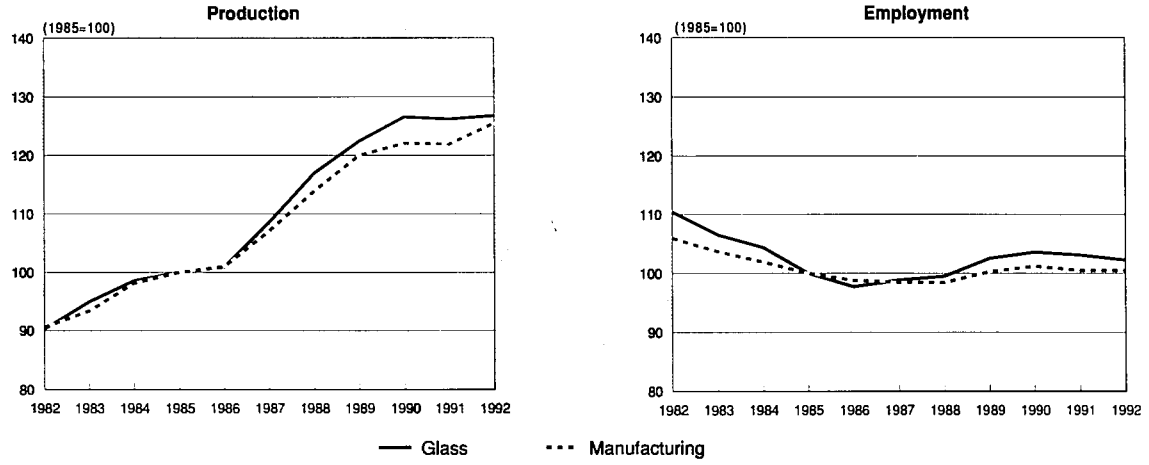
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Glass
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 675	1 893	2 178	2 352	2 210	2 116	2 265	2 566	2 475	2 488
Extra-EC imports	695	775	936	970	1 011	1 080	1 228	1 426	1 484	1 709
Trade balance	980	1 118	1 242	1 381	1 199	1 036	1 037	1 140	991	779
Ratio exports/imports	2.41	2.44	2.33	2.42	2.19	1.96	1.84	1.80	1.67	1.46
Terms of trade index	99.1	101.1	101.9	100.0	100.2	101.0	102.2	102.3	104.7	103.2
Intra-EC trade	2 403	2 666	2 985	3 241	3 567	3 923	4 413	4 945	5 303	5 368
Share of total imports (%)	77.3	77.2	75.8	76.6	77.6	78.1	77.9	77.3	77.8	75.5

(1) Estimates
Source: Eurostat

Figure 3: Glass
Production and employment indices compared to EC manufacturing



Source: Eurostat

transport costs of glass products, the proximity to the EC of these countries (most of them share a common border with a Member State) explains their large share of glass imports into the EC.

MARKET FORCES

Demand

Glass products are mostly used as intermediary inputs by other industries: this represents more than 80% of glass sales. Private consumption accounts for 10% to 15% of glass sales. Glass is mainly used for packaging (hollow glass). The food industry accounts for about 25% of glass sales. Other important glass users are the construction sector (15% of sales) and the car industry (6% of sales), which mainly use flat products.

Supply and competition

During the 1980's, the introduction of the float glass process revolutionised production methods and triggered a wave of capacity expansion, all of which led to surplus production. Such overcapacity has coincided with a strong downturn in demand from the glass industry's largest consumers, the motor vehicles industry and the construction industry.

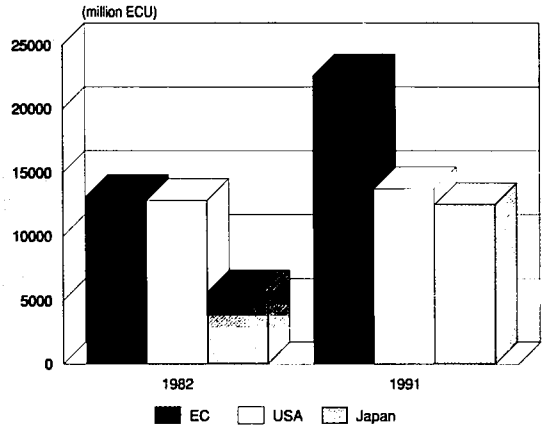
These factors in turn led to extensive restructuring of the EC industry and major job cuts, sometimes by as much as 50%. At present, investment represents over 7% of the value of production, a sign of the industry's efforts to expand and modernise its facilities. Large sums of money have also been invested in research, technology being a key factor in competitiveness.

The only major competitive threat is from East European countries which are able to produce glass (of a lower quality in general) at a lower cost. The privatisation of firms in Eastern Europe presents an opportunity for EC producers to acquire cheaper sources of glass.

Production process

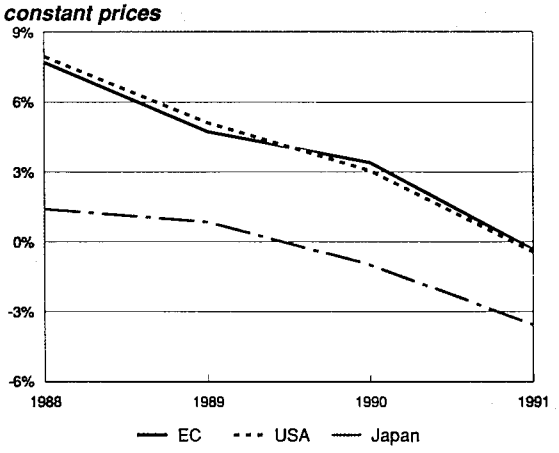
Technology in the glass industry has considerably improved in the past few years, and there is still considerable potential for improvements.

Figure 4: Glass
International comparison of production at current prices



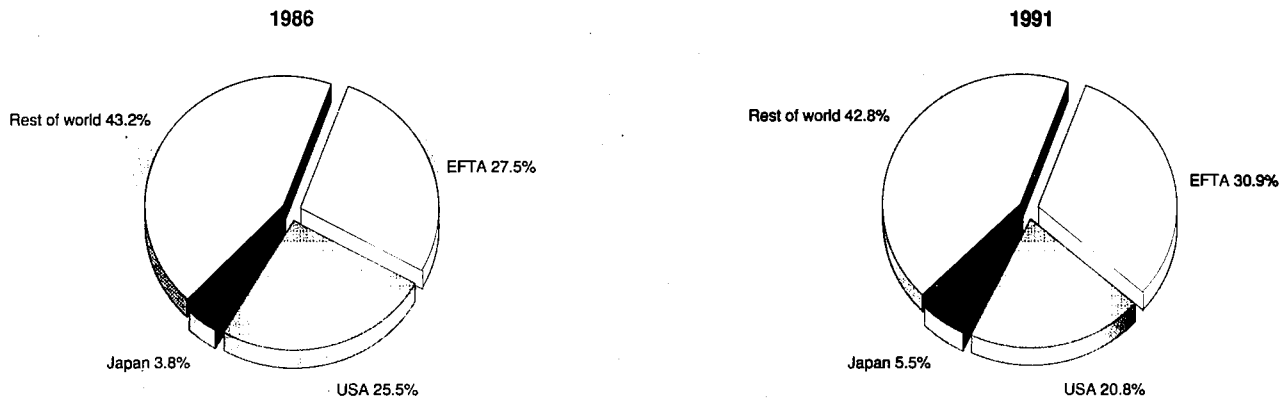
Source: Eurostat, Census of Manufacturers

Figure 5: Glass
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Glass
Destination of EC exports



Source: Eurostat

The energy efficiency of furnaces are constantly increasing, Furnaces currently use a vitrifiable mixture with more than 50% cullet (recycled material). Some glass furnaces for green glass even produce glass of very high quality with 100% cullet mixtures. The improvements in technology are such that a machine that used to produce 70 000 bottles per day in 1976 can now produce almost 300 000 bottles per day.

The average weight of a bottle is decreasing over the years thanks to improvements in the quality of glass. For example, the weight of a bottle of beer was reduced by 33% in a few years.

In the flat glass sector, the float glass process introduced during the eighties has allowed major efficiency and quality gains.

INDUSTRY STRUCTURE

Companies

Glass production by means of modern processes (flat or container glass) requires large-scale investment and considerable financial resources. This sector therefore tends to be concentrated. This tendency became more marked during the 1980s, when a major restructuring of the industry was performed (the modernisation to float glass production).

The major groups in the flat glass industry are St-Gobain in France, Pilkington in the UK, Glaverbel in Belgium (controlled by Asahi Glass of Japan). Two top North American producers are also active in Europe, PPG and Guardian.

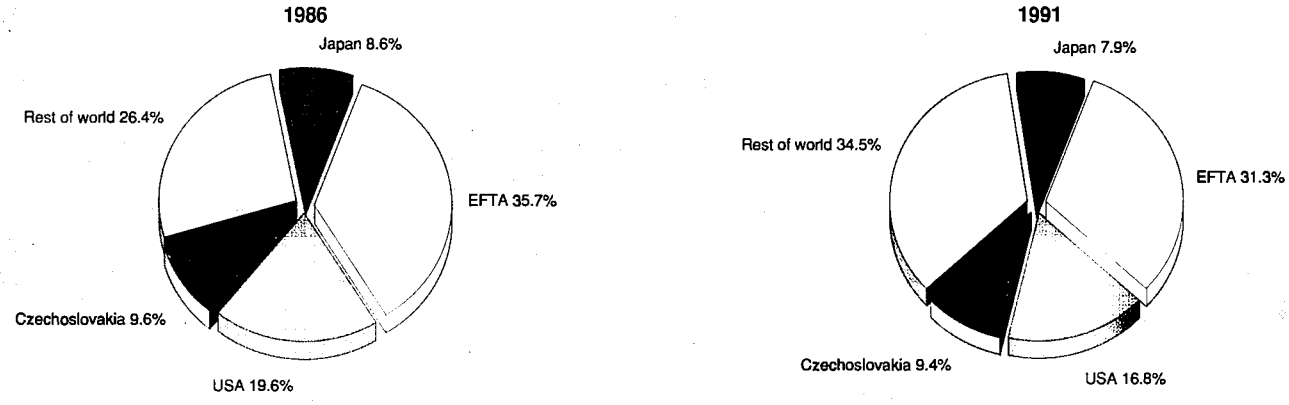
In the container glass industry, the major producers were, in 1989-1990: A.V.I.R. (Italy), Gerresheimer Glas (Germany), Hermann Heye (Germany), Nienburger Glas (Germany), Oberland Glas (Germany), PLM Group (Germany, United Kingdom, Netherlands), Rockware Glas (United Kingdom), Saint-Gobain Emballage (France), United Glass (United Kingdom), Verenigde Glasfabrieken (Netherlands), Verreries Souchon Neuvesel (France), Vetri (Italy), and Vicasa (Spain).

Strategies

During the 1980s, the introduction of the float glass production processes revolutionised flat glass production. Huge investments were launched to achieve the modernisation of the European flat glass industry. However, this led to a excess of capacity of production when demand was low in the early 1980s.

These factors led to an extensive restructuring of the EC glass industry and to major job cuts. Hitting a low point in 1986, employment was 11.6% below the 1982 figure. Since then, it has recovered slightly. In 1991, the glass industry had a

Figure 7: Glass
Origin of EC imports



Source: Eurostat

Table 5: Glass
Breakdown by product line, 1991

(thousand tonnes)	Container	Flat	Tableware	Fibres	Other
Extra-EC exports	349.4	544.9	358.0	60.2	179.0
Extra-EC imports	651.8	405.7	121.5	102.2	130.8
Trade balance	-302.4	139.2	236.5	-42.0	48.2
Ratio exports/imports	0.5	1.3	2.9	0.6	1.4
Intra-EC trade	2 076.0	1 761.0	358.1	297.5	720.0
Share of total imports (%)	76.1	81.3	74.7	74.4	84.6

Source: APFE, CPIV and FEVE

Table 6: Glass
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	28.3	29.7	30.3	32.3	35.1	37.6	41.0	40.7	42.3	42.4
Productivity index	87.5	91.8	93.9	100.0	108.7	116.5	127.1	126.0	130.9	131.4
Unit labour costs index (2)	83.8	88.7	93.6	100.0	104.2	108.9	116.0	118.7	124.9	N/A
Total unit costs index (3)	73.2	83.9	91.8	100.0	100.0	105.9	112.7	119.4	124.0	128.6

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
(3) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

workforce of 247 700 in the EC, a 5.6% improvement over 1986.

ENVIRONMENT

Glass containers can be easily recycled. In 1991, about 30% of total container glass consumption was recycled. No other packaging material has such a high rate of recycling. This gives glass packaging a competitive advantage over other materials.

This is also important in terms of energy, particularly at a time when the EC is talking of increasing energy taxes. Each ton of recycled glass saves approximately 1.2 tonnes of raw materials and 100 kg of oil. The glass industry is an energy intensive one. About 15% of all costs (raw material inputs and labour) are for energy purchases.

REGULATIONS

Several European directives play an important role in the regulatory environment of the glass industry.

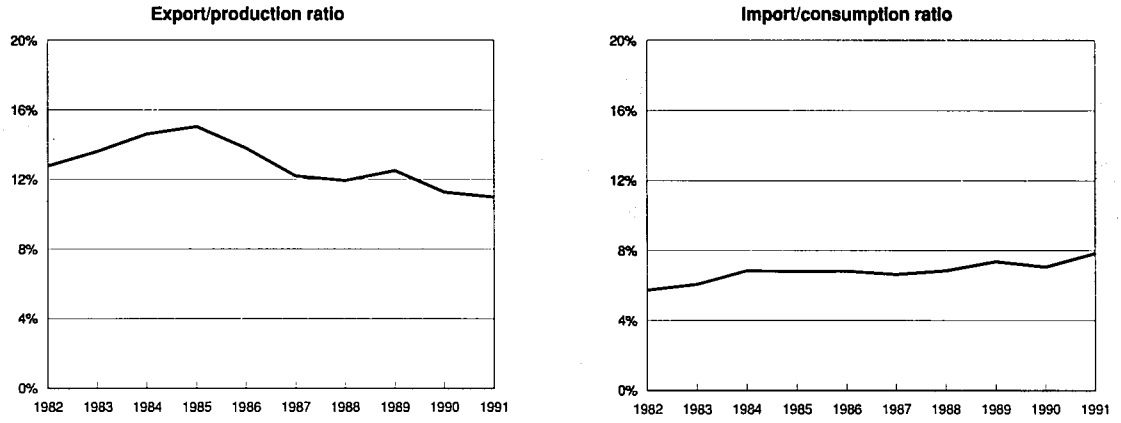
For flat glass, Directive 22/92 (Safety glazing and glazing methods on motor vehicles and trailers), sets norms for safety glasses on vehicles. Directive 89/106/EEC (Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products) sets norms for construction materials, including window glass.

Table 7: Glass
Recycling rates

(thousands)	Collected tonnes		(%) recycled	
	1988	1990	1988	1990
EC (1)	3 531	4 757	N/A	41.6
Belgique/België	166	204	50.0	59.0
Danmark	46	61	27.0	40.0
BR Deutschland	1 176	1 791	39.0	54.0
Hellas	14	18	16.0	16.0
España	278	304	23.0	27.0
France	676	906	34.0	41.0
Ireland	9	13	10.0	19.0
Italia	610	732	40.0	49.0
Nederland	261	310	53.0	66.0
Portugal	31	46	13.0	23.0
United Kingdom	264	372	15.0	21.0

(1) Excluding Luxembourg
Source: FEVE; Glass Gazette, 1990

Figure 8: Glass
Trade intensities



Source: Eurostat

In the hollow glass industry, several directives are under study. They will deal with recycling and the rate of recycling of packaging materials. Another directive in preparation will set technical norms.

OUTLOOK

The outlook for the glass industry depends mainly on its European domestic market, as international trade is limited in this sector.

In the flat glass industry, demand from the motor vehicle industry and the construction sector is not expected to grow rapidly. It will, however, recover from the downturn experienced in 1991. In the container glass industry, demand is steadily growing, as it linked to consumer products which have non-cyclical demand (food, etc.).

Other sectors have a smaller impact on the outlook, as they have a smaller share of this sector. Glass fibres and special products should, however, see their demand grow more rapidly than the rest of the sector.

Table 8: Glass
Expected real annual growth rates

(%)	1992-93	1992-95
Apparent consumption	3.3	3.8
Production	2.7	3.2
Extra-EC exports	1.0	1.0

Source: DRI Europe

As a result, production of glass is expected to grow by 2.5% per year on average between 1992 and 1995. In 1992, production will grow more slowly as the economy progressively recovers from the 1991 slowdown. In the medium run, production will grow at about 3.5% per year.

Written by: DRI Europe
The industry is represented at the EC level by: Comité permanent des industries du verre de la CE (CPIV). Address: Avenue Louise 89, B-1050 Brussels; tel: (32 2) 538 4446; fax: (32 2) 537 8469.

Ceramic goods
NACE 248

The ceramics industry, including the production of construction materials such as tiles and sanitary ware, tableware and ornamental ware, and special ceramics for industrial use, experienced steady growth from 1984 to 1990. 1991 was marked by a standstill in EC production of ceramic goods, and by a sharp increase in import penetration.
The prospects the sector are weak. The market for tableware and ornamental ware will continue to be unfavourable and although the market for ceramic tiles and sanitary ware has stabilised, no real improvement is expected in the short-term.

INDUSTRY PROFILE

Description of the sector

Ceramic products are classified under NACE 248, which includes a number of heterogeneous industries. This chapter will focus on the following main subsectors: tiles for floors and walls (248.3); sanitary ware (248.5); tableware and ornamental ware (248.6, 248.7); industrial ceramics (248.8); refractory products (248.1). Although bricks and roofing tiles are a type of ceramic good, they are classified separately in NACE 241.

In its broadest sense, the ceramic industry encompasses any industry which manufactures products based primarily on clay minerals which, after forming and drying, are subjected to high-temperature firing. Classified according to use, the main products are: materials for construction (tiles, sanitary ware, bricks and roofing tiles); tableware and household goods (tableware, household articles and ornamental ware); products for electrical, electronic, mechanical and other uses (insulators and electrical insulating parts, products for chemical use, specialised and advanced technical ceramics); refractories and heat-resistant products; products for drainage and channelling (stoneware pipes).

Main indicators

In 1991 all the main indicators for ceramic goods showed a standstill, compared to 1990. This slowdown was mainly due to the weak growth of the building sector, which is the main client of the ceramic goods industry. Ceramic tiles, tableware and ornamental ware are the most important product lines in the sector.

Recent trends

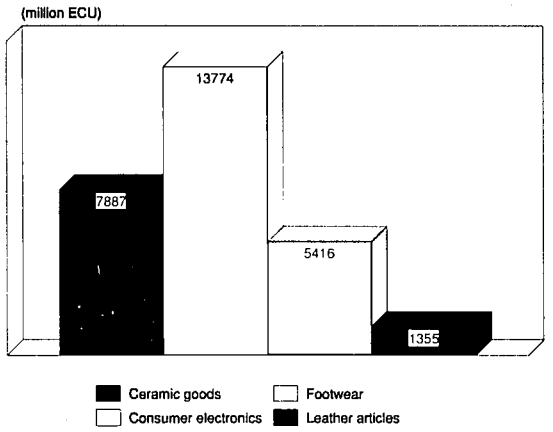
After a period marked by stagnation, which affected in particular those sectors dependant on the construction industry (tiles, sanitary ware), sales picked up from 1984 and continued to grow steadily until 1990. 1991 saw a decrease of real production. Average real annual production growth from 1985 to 1991 was weak (2.2%), while the correspondent figure for consumption was 3.2%. The faster development of consumption was accounted for both by growing extra-EC imports and by an EC industry that was primarily concentrating on its domestic market. The decrease of extra-EC exports in real prices was 0.6% on average annually for the period 1985 to 1991, while imports increased by 7.3%.

The number of people employed by the industry remained almost stable since 1986, yet reached its lowest level for the last decade in 1991, with 250 600 people employed.

International comparison

The EC is the world's largest ceramics producer. Over the last decade, Japan recorded a spectacular production growth. The international comparison differs according to product line.

Figure 1: Ceramic goods
Value added in comparison with other industries, 1991



Source: Eurostat

Japan is the world's leading producer of tableware and ornamental ware, followed by China, South-Korea, Central and Eastern Europe. In the tiles market, a rapid growth in production capacity is taking place in South-East Asia and in the East European countries, while Brazil claims to be the second world's largest producer.

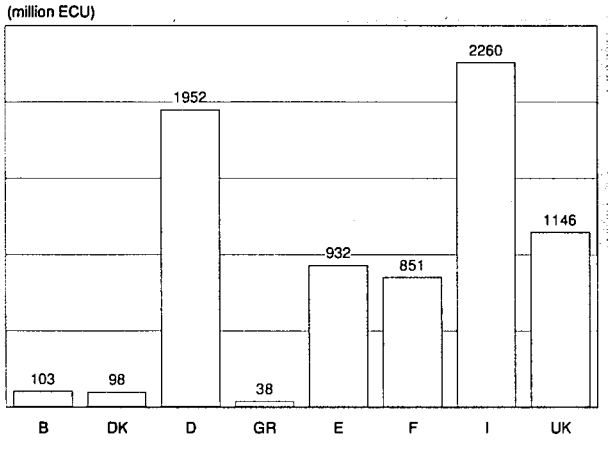
Foreign trade

The external balance of trade in the EC was positive throughout the 1980s and after a record year in 1989, declined by 1991 to 2.04 billion ECU. While extra-EC exports stagnated in 1991, extra-EC imports surged, resulting in a sudden drop of the export/import ratio, which had so far remained stable.

EC exports of ceramic goods are mostly destined to the EFTA countries (22.6% in 1991), closely followed by the USA (19.6%). Exports to the OPEC countries are not negligible. Imports increasingly originate from China (15.8% in 1991 compared to 3.5% in 1986), while the share of the EFTA countries remained the highest (22.1%).

Extra-EC exports as a share of production remained particularly stable between 1982 and 1991, at 19.1% in 1982, increasing to 20% in 1991. The share of extra-EC imports in

Figure 2: Ceramic goods
Value added by Member State, 1991



Source: Eurostat

Table 1: Ceramic goods
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	8 659	8 346	9 851	9 902	10 379	11 088	11 921	12 943	13 769	13 953	14 573
Production	9 995	9 953	11 607	11 799	12 131	12 810	13 882	15 236	16 012	15 994	16 638
Extra-EC exports	1 907	2 185	2 439	2 569	2 458	2 467	2 793	3 216	3 218	3 206	3 269
Trade balance	1 336	1 607	1 756	1 898	1 751	1 722	1 962	2 294	2 243	2 041	2 065
Employment (thousands)	281.0	262.6	267.2	258.1	255.9	254.6	252.0	254.0	255.5	250.6	250.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Ceramic goods
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.0	3.2	2.5
Production	1.8	2.2	2.0
Extra-EC exports	4.3	-0.6	1.0
Extra-EC imports	-1.2	7.3	4.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Ceramic goods
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 907	2 185	2 439	2 569	2 458	2 467	2 793	3 216	3 218	3 206
Extra-EC imports	571	578	683	672	707	746	831	922	975	1 165
Trade balance	1 336	1 607	1 756	1 898	1 751	1 722	1 962	2 294	2 243	2 041
Ratio exports/imports	3.34	3.78	3.57	3.82	3.48	3.31	3.36	3.49	3.30	2.75
Terms of trade index	102.8	103.4	101.3	100.0	105.2	107.2	109.2	107.5	115.0	114.3
Intra-EC trade	2 065	2 104	2 307	2 416	2 616	2 853	3 146	3 534	3 863	4 021
Share of total imports (%)	78.3	78.4	77.1	78.2	78.7	79.2	79.1	79.3	79.8	77.5

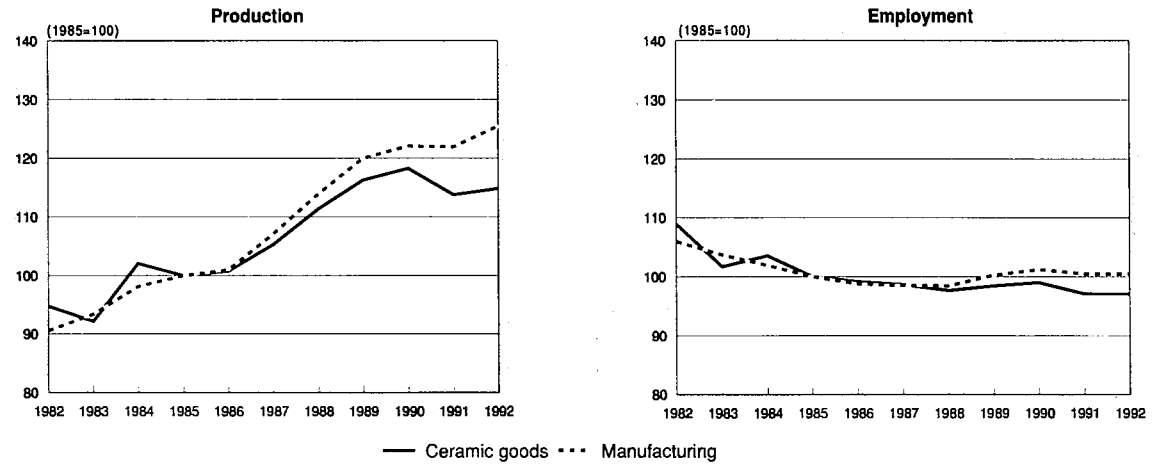
(1) Estimates
Source: Eurostat

Table 4: Ceramic goods
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	23.2	24.3	25.7	25.8	27.5	29.2	30.8	31.0	31.9	31.5
Productivity index	89.7	94.0	99.6	100.0	106.7	113.3	119.3	119.9	123.7	121.9
Unit labour costs index (3)	83.3	88.8	94.9	100.0	104.8	110.7	116.2	123.8	129.8	N/A
Total unit costs index (4)	76.3	80.6	95.5	100.0	99.3	104.0	114.3	125.7	131.2	135.9

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Ceramic goods
Production and employment indices compared to EC manufacturing



Source: Eurostat

EC consumption increased from 6.6% to 7.1% between 1982 and 1990, and sharply increased to 8.4% in 1991.

MARKET FORCES

Demand

The products of the ceramics industry find their uses in a large number of different sectors and applications.

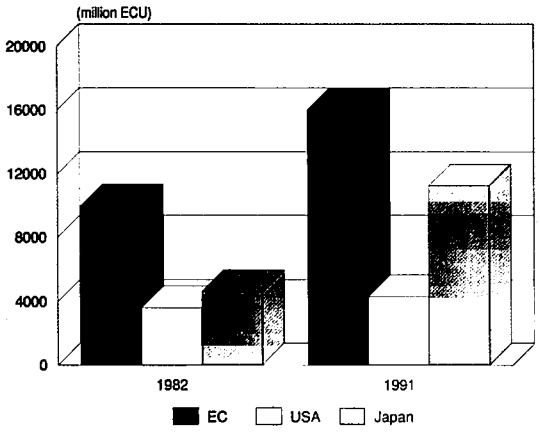
Ceramic tiles are used in both private, public and industrial structures and buildings. Demand for the tile industry is largely dependent upon the activity in the construction sector. The renovation of older buildings is still providing market opportunities for the sector, even if the general situation in the building sector is not too bright at present.

The tableware and ornamental ware subsector encompasses a broad range of equipment and decorative articles for households, hotels and public institutions. The subsector was better able to resist the economic depression of the crisis years than many other subsectors of the ceramics industry. The excellent market penetration of extra-EC exports during the 1980s was due to a large extent to the exporting of products in the top-quality range.

The demand for the ceramic sanitary ware industry, which produces for both private and public use (hospitals, hotels, etc.), is to a large extent determined by the construction sector. Besides the general situation in the building sector, the changing lifestyle whereby increasing importance is attached to bathrooms is an important factor for the sanitary ware subsector.

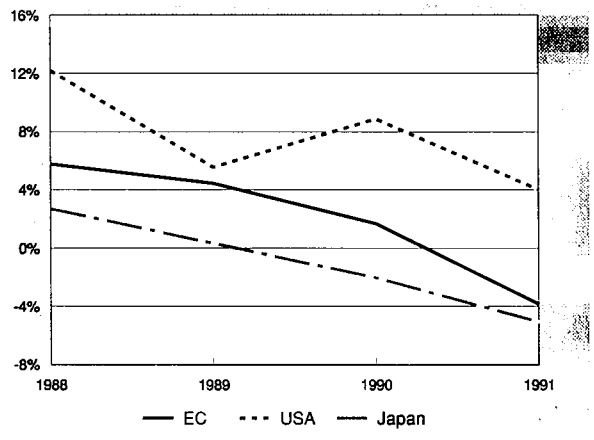
The products of the industrial ceramics subsector are used for electricity distribution networks (ceramic insulators), electronics, motor vehicles, telecommunications and mechanical construction (advanced ceramics). The cut-backs, especially in the nuclear energy field, of planned extensions to the electrical distribution networks led to a considerable reduction in the EC insulator industry's activity. The market for advanced ceramics, on the contrary, covers a growing number of applications, with an estimated 75% of activity in the electronics sector in 1989.

Figure 4: Ceramic goods
International comparison of production at current prices



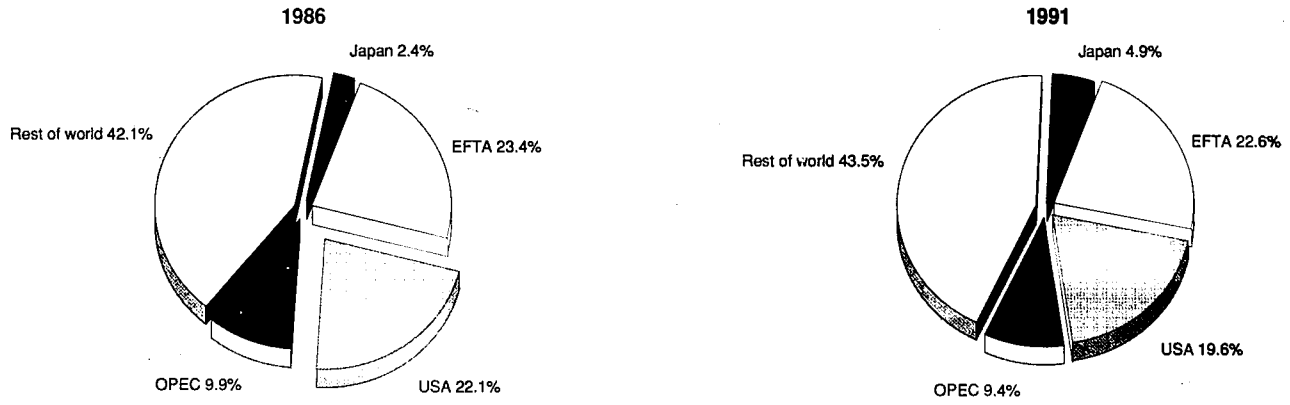
Source: Eurostat, Census of Manufacturers

Figure 5: Ceramic goods
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Ceramic goods
Destination of EC exports



Source: Eurostat

Refractory products which can withstand high temperatures and hot or cold physical or chemical action, are mainly consumed by the steel, ceramics, non-metallic minerals, chemicals, petrochemicals, non-ferrous metals, and energy sectors. The technological advances in the iron and steel industry (i.e. the increased use of the continuous casting process, which uses less refractory bricks) will bring about a gradual reduction in the amount of refractory products consumed.

Supply and competition

To improve their competitiveness, EC enterprises have in recent years shifted towards increased specialisation in the high value-added product range and in highly technical products, which require greater research and development resources. EC enterprises progressively gave up the lower end of the market to external competition. On the whole, imports from third countries increased sharply in 1991, with an average penetration rate of 8.3%..

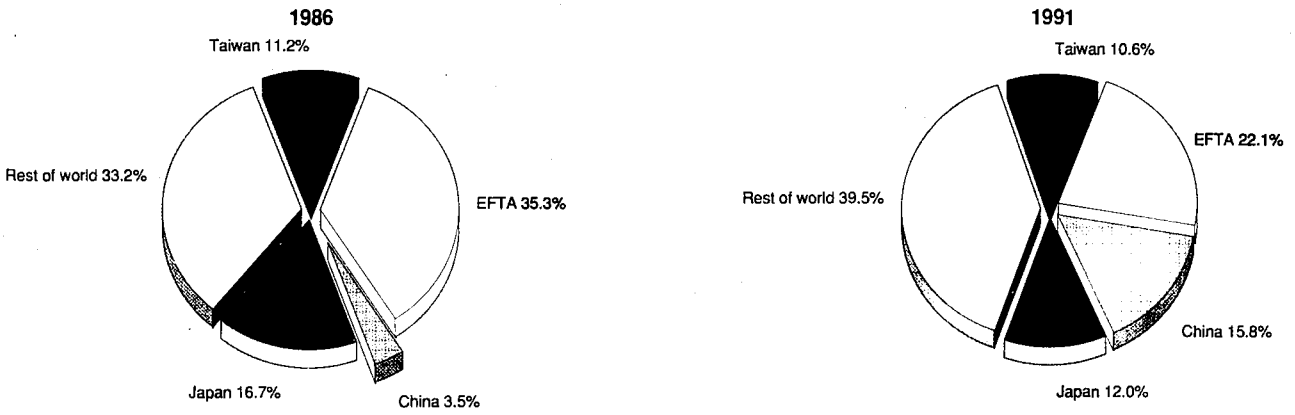
The EC is the world leader in the subsector of ceramic tiles, and has gained new export markets in recent years. Although imports from Brazil, Asia and Eastern Europe have increased, the export/import ratio for tiles remains very high (about 9.5 in 1989).

The tableware and ornamental ware subsectors have been subject to growing competition from non-EC manufacturers since 1986. On the other hand, exports of tableware and ornamental ware strongly increased during the 1980s, with excellent market penetration of top-of-the-range products, particularly in the USA. Competition of alternative products such as glass and plastics continues to be limited to specific outlets.

In the sanitary ware subsector, competition from substitute materials (plastics, stainless steel) has hindered the further development of the market share of the ceramic products. Also, external trade has declined because EC producers have concentrated on the internal market, responding to competition by developing top-of-the-range products, while developing countries are acquiring competitive industrial units and developing an export-oriented policy.

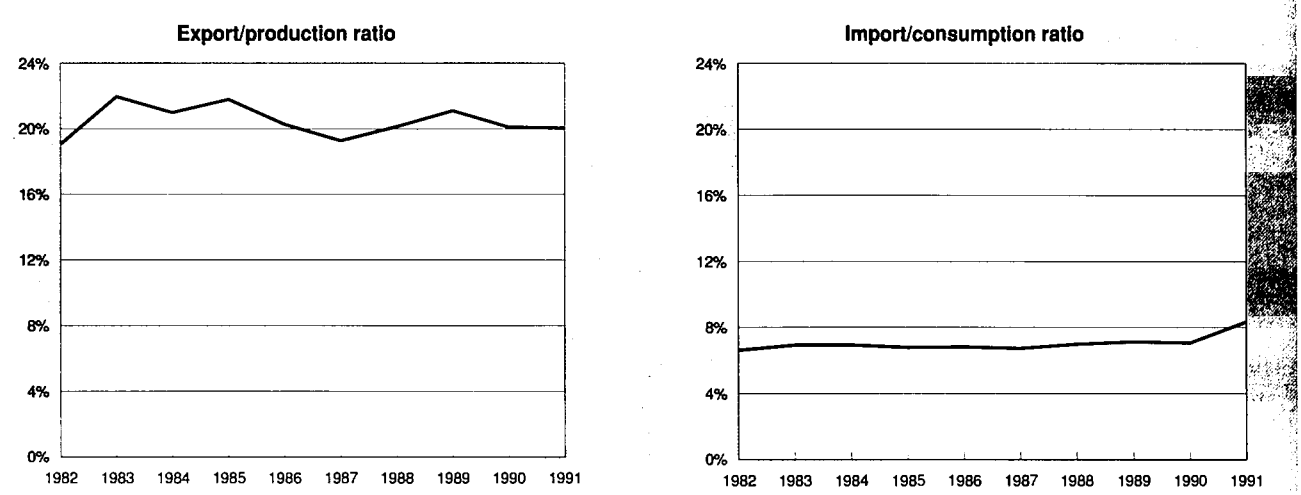
The ceramic insulators sector suffers from the development of capacity in other countries such as Japan which is presently the world leader in production. The industry also faces growing competition from substitute materials (toughened glass, composites and synthetic materials). The advanced industrial ceramics sector on the other hand is a rapidly growing industry, where an increasing number of new enterprises is entering the market and where existing producers are stepping up their capacity.

Figure 7: Ceramic goods
Origin of EC imports



Source: Eurostat

Figure 8: Ceramic goods
Trade intensities



Source: Eurostat

Production process

The industry consists of a wide range of activities, which are carried out by firms of all sizes. Consequently, productivity levels vary considerably across subsectors. Technologically advanced firms co-exist with traditional labour-intensive enterprises.

Overall, the ceramic industry is highly labour-intensive, with labour costs accounting for 35% to 60% of production costs, depending on the subsector concerned. Labour productivity increased slower than unit labour costs over the period 1982 to 1991, yet total unit costs have increased even faster than labour costs.

In both the tiles and sanitary ware subsectors, standardisation, the introduction of new technologies and of automated lines have modernised production and increased competitiveness in recent years. In the tableware and ornamental ware sector, mechanisation been implemented for certain steps of the production process.

INDUSTRY STRUCTURE

Companies

The ceramic industry is composed of a large number of small and medium-sized companies, particularly in the tableware and ornamental ware subsector. Technological change and the depressed economic situation during the last decade brought about a reduction of the number of enterprises and employment. While in 1982 the EC industry comprised some 2 800 companies in 1980 with about 320 000 employees, it is estimated that 1989 there were approximately 2 300 companies employing about 254 600 people.

A few enterprises operating at the EC level are:

- Sanitary ware: Ideal Standard (F) and Sphinx (NL);
- Bricks: Redland (UK);
- Refractories: Didier-Werke (D) and Hepworth (UK);
- Technical ceramics: Morgan (UK), Atochem (F) and Hoechst Ceramtec (D);
- Tableware: Villeroy & Boch (D), Royal Doulton (UK) and Hutschenreuther (D);
- Ornamental ware: Royal Doulton (UK);
- Wall/floor tiles: Villeroy & Boch (D), Riwal Ceramiche (I), Marazzi Ceramiche (I), Sphinx (NL) and Fabresa (E).

Strategies

Thanks to intense research and development activity and considerable investment during the last two decades, the ceramics industry has achieved a high degree of modernisation. New user requirements have led to new higher performance compositions being produced with new technologies.

Community tile products have achieved a worldwide reputation thanks to large investment in research and development and to their intrinsic quality and design.

Mechanisation of some steps in the production process of tableware and ornamental ware has led to considerable improvements in product quality, and at the same time has resulted in an increased concentration in the sector. Companies in the tableware and ornamental ware subsector, however, remain mostly small and medium-sized.

In the sanitary ware subsector, small and medium-sized firms have practically disappeared, having been taken over by large EC or non-EC companies. The trend towards concentration and internationalisation is expected to continue in the years ahead. Over the past few years, several leading companies have set up plants in countries with cheaper labour (Portugal, Spain and North Africa). All of the major firms are seeking to establish themselves in a wide range of product lines and markets, so as to offer wholesalers a extensive choice of products in keeping with the colour schemes for ceramic tiles or bathroom and kitchen furniture.

The EC ceramic insulator industry has declined and undergone sweeping restructuring since the early 1980s. Contrary to the insulator industry, the number of companies in the sector of advanced ceramics has grown at a pace matching the increasing number of highly technical applications. The tendency towards horizontal and vertical concentration continues at the EC level, particularly by the inclusion in large industrial groups of both producers and users of ceramic materials and products.

Regarding refractory products, rationalisation has pushed smaller companies out of the market and has lead to greater concentration.

REGIONAL DISTRIBUTION

Ceramic enterprises are scattered throughout the EC with strong regional concentrations for some products, particularly tiles, tableware and ornamental ware.

Though present throughout the EC, the tile industry (about 910 companies in 1989), is regionally concentrated in the Italian region of Sassuolo in the provinces of Modena and Reggio Emilia, where about 55% of EC production is located, and in the Spanish region of Onda (Castellon), which accounts for 27% of total EC production.

EC production of tableware and ornamental ware is dominated by two countries, Germany and Italy with 29% and 27% of EC production, respectively.

ENVIRONMENT

The ceramics industry is an energy intensive sector and, compared to the other sectors of the non-metallic minerals, relatively open to foreign competition. The application of an EC-wide tax on energy inputs for environmental reasons could have an important impact on the industry.

OUTLOOK

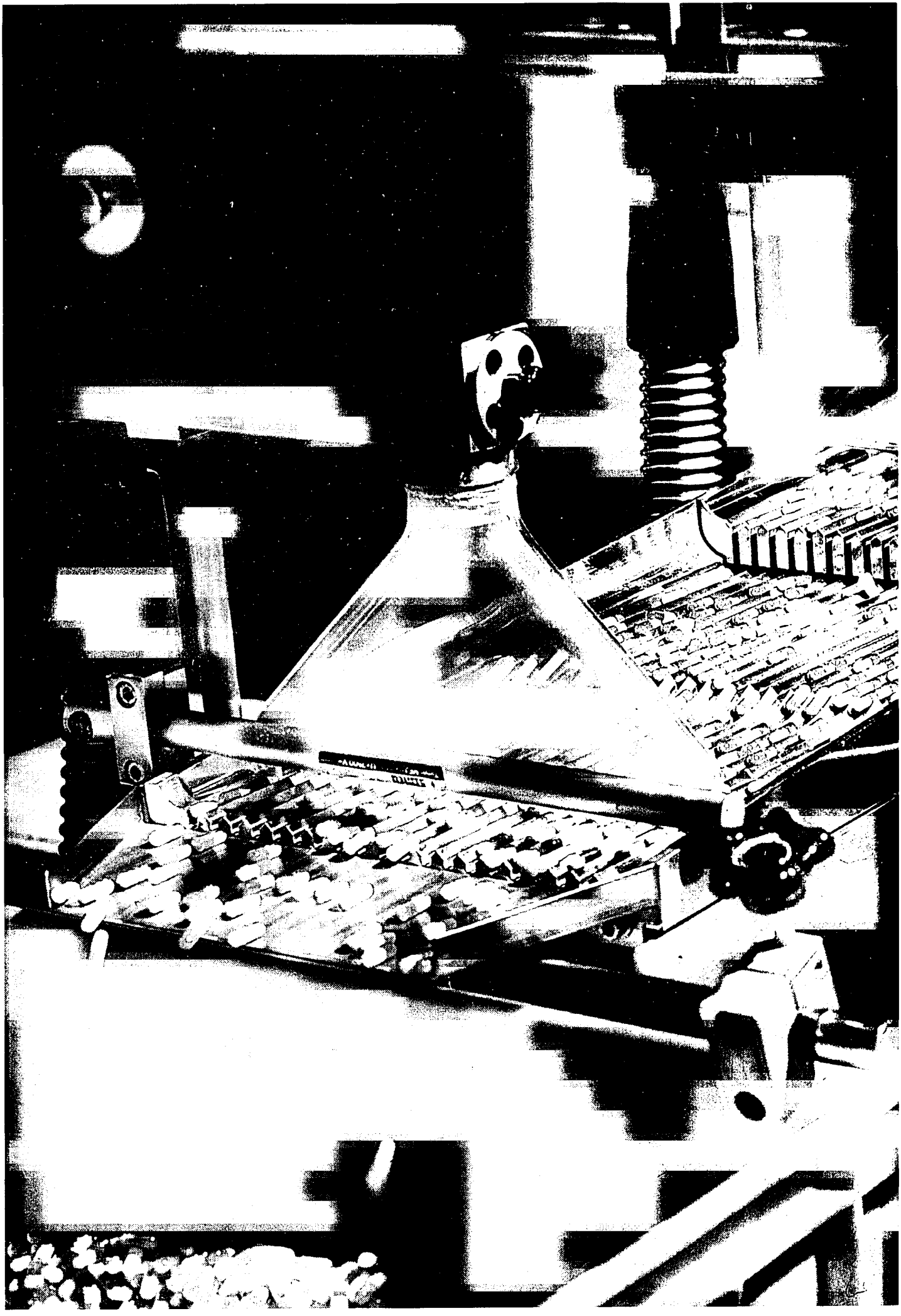
Modest growth rates are expected in the short and medium term. Demand for tableware and ornamental ware is stagnating and no improvement is expected in the short term. Sales of ceramic tiles will improve slightly due to renovation activity in the building sector. The economic development in the Länder of former East Germany will increase sales in this product line, although more pronounced on the medium term. The sanitary ware sector in particular will benefit from the same factors. On the whole, the industry is expected to grow at 1.2% annually in 1992 and 1993 with stronger growth anticipated thereafter.

Table 5: Ceramic goods
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.7	2.1
Production	1.2	1.4
Extra-EC exports	0.0	0.6

Source: DRI Europe

Written by: DRI Europe
The industry is represented at the EC level by: Liaison Office of the European Ceramic Industry (Cerame-Unie). Address: Rue des Colonies, 18-24 Bte. 17, B-1000 Brussels; tel: (32 2) 511 3012; fax: (32 2) 511 5174.



Chemicals

NACE 25

The EC is the world leader in chemical sales, well ahead of its main competitors, the USA and Japan. After several years of solid growth, depressed prices and overcapacity characterised the performance of the industry in 1990 and 1991, against the background of a sluggish world economy. Current overcapacity (not only in Western Europe, but also in East Asia and elsewhere) will continue to depress profits for the next few years. Major opportunities exist for acquisitions and for the creation of strategic alliances.

INDUSTRY PROFILE

Description of the sector

The chemical industry is an industrial branch of very heterogeneous character in which the main activities consist of chemically transforming materials into diverse substances, giving them new physical and chemical properties. For these activities, the chemical industry employs raw materials from the petroleum, mining and extractive industries such as oil, minerals, metals, but also certain agricultural products. The main activities of the chemical industry correspond to the following product groups: basic chemical products; fertilisers and nitrogen compounds; plastic in primary form and synthetic rubber; pesticides and other agrochemical products; paints, varnishes, and other similar coating products; pharmaceutical and medical products; soaps and detergents, cleaning and polishing preparations, perfumes, toilet preparations; and man-made fibres.

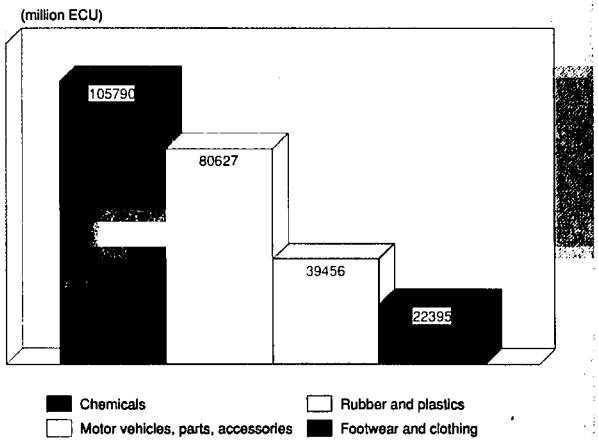
The industry comprises two upstream branches constituting basic chemicals (basic inorganic chemicals and basic organic or petrochemicals) and a series of downstream branches such as pharmaceutical products, agrochemicals, detergents, etc. The upstream sectors' outlets are almost exclusively the downstream sectors, which themselves supply either other industries (agriculture for agrochemicals, the plastics transformation industry for plastics in primary form), or the end-user (soaps and detergents, for example). Figure 9 gives a schematic overview of the chemical industry's production process.

Main indicators

Compared to the foregoing years, growth in all the main indicators in current prices was marginal in 1990 and 1991. 1991 was a particularly tough year, since the economic slowdown in many industrialised countries was compounded by the business distortions resulting from the Gulf crisis. With the key North American export market depressed, sales and profits in Europe were weak. Only pharmaceuticals lived up to its recession-proof reputation with a continuing strong performance: pharmaceutical companies net earnings and profits increased by 20% or more during 1991.

British, Italian and French companies were the first in Europe to resort to severe job cuts worldwide. The German economy only came to a standstill during 1992, much later than other EC economies, as until then, German companies were able to profit from increasing domestic demand. The German "big three" (BASF, Bayer, Hoechst) all started, though to a lesser extent, to shed labour in the latter half of 1991 and during 1992, in response to the weakness in their domestic and export markets.

Figure 1: Chemicals
Value added in comparison with other industrial sectors, 1991



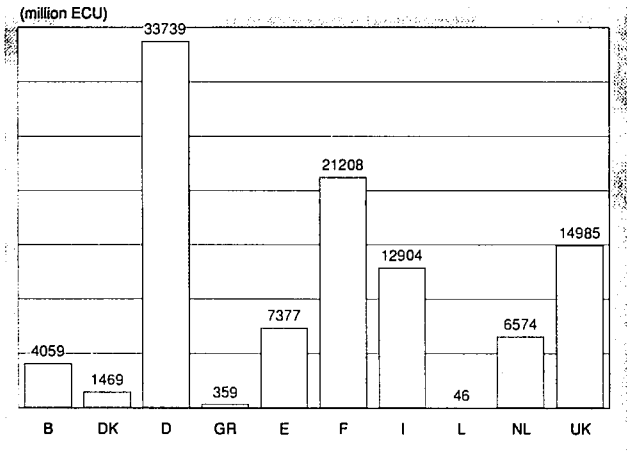
Source: Eurostat

Recent trends

After a rapid expansion over the 1960s and 1970s, the first half of the 1980s was rather grim, with stagnant production and overcapacity which led to a drastic restructuring of the industry. The restructuring, accompanied by huge redundancies and cutbacks in capacity, enabled the chemical sector to start off from a much stronger base when the economic environment improved from 1983 onwards. The years from 1986 to 1989 were associated with high profits and strong expansion.

Prospects changed in 1990 with the economic slowdown in Europe and North America. Demand from the main clients weakened. The fall of the dollar and the yen led to losses in competitiveness on foreign markets. Imports grew, but exports stagnated. High energy costs also contributed to squeeze margins. With the exception of the pharmaceutical industry, profits started weakening in the first half of 1990. Since then, significant losses have been reported by many of the EC companies, as well as by their EFTA and American competitors.

Figure 2: Chemicals
Value added by Member State, 1991



Source: Eurostat

Table 1: Chemicals
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	168 770	182 057	210 196	225 376	210 551	222 121	246 592	269 265	278 074	282 539	296 254
Production	180 528	196 545	227 699	244 054	226 017	237 170	261 874	282 907	289 232	294 723	309 029
Extra-EC exports	28 407	32 820	39 690	43 596	39 042	38 968	42 854	46 309	45 029	47 780	51 182
Trade balance	11 758	14 487	17 503	18 678	15 466	15 049	15 283	13 643	11 158	12 184	12 775
Employment (thousands)	1 800	1 743	1 751	1 755	1 748	1 748	1 732	1 784	1 789	1 787	1 787

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Chemicals
Breakdown by major sectors, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Basic industrial chemicals	115 035	114 445	4 911
Pharmaceuticals	60 819	65 188	9 113
Cleaning agents, perfumes and toiletries	34 623	37 516	3 631
Paints, varnishes and ink	11 165	12 408	1 803

(1) Estimates are used if country data is not available
Source: Eurostat, CEPE

Table 3: Chemicals
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	8.4	3.6	5.2
Production	8.4	2.7	4.5
Extra-EC exports	7.8	-0.4	2.3
Extra-EC imports	7.5	6.4	6.7

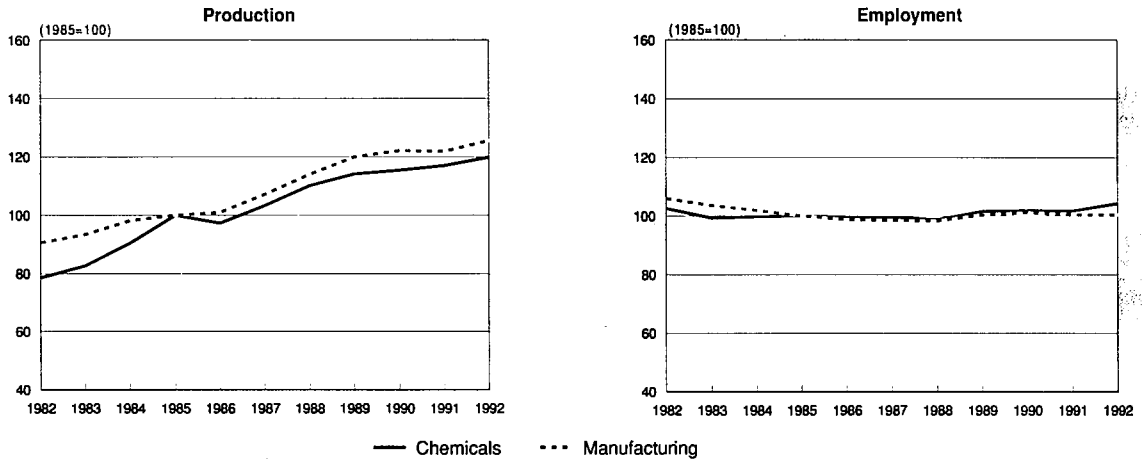
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Chemicals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	28 407	32 820	39 690	43 596	39 042	38 968	42 854	46 309	45 029	47 780
Extra-EC imports	16 649	18 333	22 187	24 918	23 577	23 919	27 571	32 666	33 870	35 596
Trade balance	11 758	14 487	17 503	18 678	15 466	15 049	15 283	13 643	11 158	12 184
Ratio exports/imports	1.71	1.79	1.79	1.75	1.66	1.63	1.55	1.42	1.33	1.34
Terms of trade index	98.3	99.4	99.5	100.0	106.5	110.7	111.5	111.0	114.0	114.1
Intra-EC trade	41 562	46 767	55 486	61 324	60 090	63 012	71 217	80 320	84 405	87 124
Share of total imports (%)	70.7	71.0	70.6	70.1	70.7	71.2	70.7	69.8	70.4	70.1

(1) Estimates
Source: Eurostat

Figure 3: Chemicals
Production and employment indices compared to EC manufacturing



Source: Eurostat

International comparison

US production in 1991 stood at 85% of EC production, and Japanese production amounted to almost half of EC production.

US companies suffered declining sales and profits during 1991, with 60% of the companies showing sales and net profits lower than in 1990. On a weighted average basis, sales were down 2.4% and profits 13.5%, compared to 1990. Just as in Europe, the core of the problem was the overcapacity and the consequent falling prices of commodity chemicals, along with the specialties experiencing sliding demand, linked to the recession.

The development of the US chemical industry differs slightly from that of the EC. American companies have experienced high growth rates during the second half of the 1980s, not only thanks to an increase in domestic demand, but also due to increased exports. Thanks to the weak dollar, American competitiveness in basic chemicals was noticeably improved between 1985 and 1989. Consequently, American companies did not experience the same incentives as their EC counterparts to develop downstream in sectors less sensitive to exchange rate movements. One other reason why such diversification was not forthcoming in the USA, was the presence of important oil resources, one of the primary raw materials of basic chemicals.

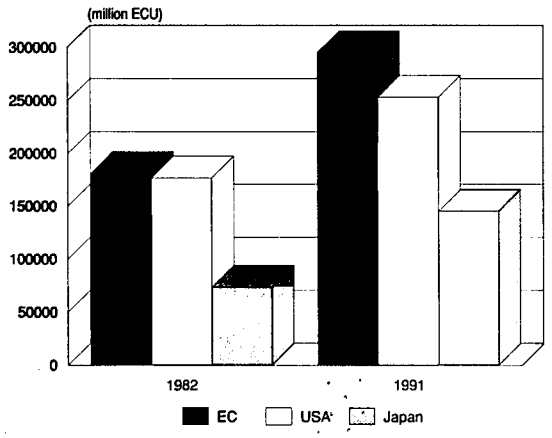
Markets for chemical products have developed fast, particularly in East Asia, but also in Brazil and the Middle East. Although the opportunities for the EC chemical industry are clear, new producers have appeared in these regions. The major share of world production, however, by far remains in the hands of European and American groups.

Foreign trade

The EC is the world's leading exporter of chemical products, with exports more than twice the size of those of North America. In 1991, EC companies exported more than 16% of their production outside of the EC. Traditionally, the EC has a trade balance surplus (along with the EFTA countries). The surplus, however, has been deteriorating since 1986, following the fall in the US dollar.

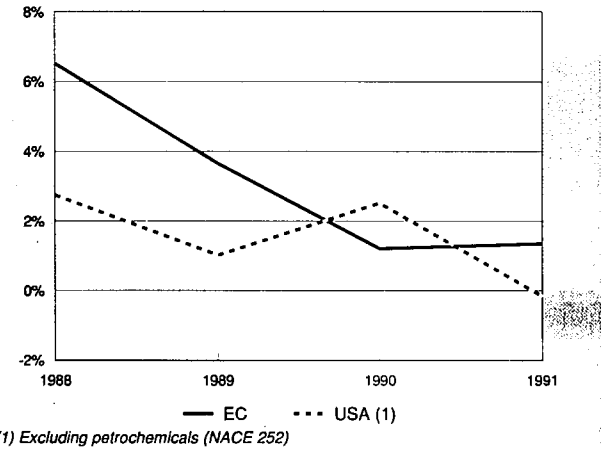
Overall, EC exports are specialised in refined chemicals, while imports are in basic chemicals. To a certain extent, the EC imports basic chemicals in order to export refined chemicals.

Figure 4: Chemicals
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers, US Chemical Industry Associations

Figure 5: Chemicals
International comparison of production growth at current prices



(1) Excluding petrochemicals (NACE 252)
Source: Eurostat, Census of Manufacturers, US Chemical Industry Associations

Competitive discipline created by imports is therefore higher for basic chemicals than for refined chemicals.

The main destination for EC chemicals exports are the EFTA countries, the USA, the developing countries, and to a lesser extent the Pacific region, including Japan, Australia and New Zealand. Compared to the average EC trend, it appears that Germany and Denmark are more oriented towards Western Europe. The United Kingdom and Ireland export more towards North America, while the proportion of exports towards developing countries is higher in France, Spain and Portugal than in the other EC countries.

MARKET FORCES

Demand

About 70% of chemical product demand stems from industry in the form of intermediate consumption. The principal client sectors of the chemical industry are the plastics transformation industry, the textiles industry, agriculture, and the chemical industry itself, which represents more than 30% of its own demand. This considerable self-consumption is explained by the high degree of industrial vertical integration in which the downstream elements, refined chemicals or specialty chemicals, are the almost exclusive outlets for components situated upstream, i.e. the basic chemicals.

The strong expansion of the chemicals sector over the last two decades can be explained in part by factors such as innovation and the replacement of traditional materials such as steel, wood, paper and glass by new materials derived from chemical processes. This substitution factor has enabled the chemical industry to experience premium growth rates, at a level much higher than the average manufacturing growth rates (10% compared to 2% over the period 1970-90). More recently, the contribution of this factor in the growth rate of the chemical industry has diminished, marking the industry's progressive evolution towards maturity.

In 1991, weakening demand accompanied by the cyclical slowdown in the European economies led to a decline in bulk chemicals' production. Similarly, the recession in North America hampered further export growth. Some industry analysts believe that the recession can be traced back to as far as 1988 when growth in the chemical industry outstripped both GDP at 2.3% and other manufacturing industry at 1.8% (average industry growth over 1980-90 was 3.4%). In 1988 the difference was much larger, with second-half production almost 7% higher than the preceding year's, while GDP was up near 3% from the second half of 1987. The result of the explosive growth was the build-up of large stocks in the chemicals chain. Sizeable destocking occurred during the first half of 1990, and then again in the first half of 1991.

Demand in other sub-sectors of the chemical industry continues to be high, such as in pharmaceuticals and in some of the specialty chemicals, which showed steady production growth.

Many EC producers that have established operations within the USA, in response to the unfavourable exchange rates during the 1980s, have now pinned their hopes on the recovery of demand on this market, as the two engines of growth for the USA industry - the automotive and construction industries - have shown signs of encouragement early in 1992. Yet industries' expectations remain cautious because consumer lead recovery is doubtful, with consumer spending not rising despite lower interest rates. Another reason for the lack of optimism, despite early signs of recovery of the US economy, is the presence of sizeable overcapacity in the basic chemicals and polymers sectors.

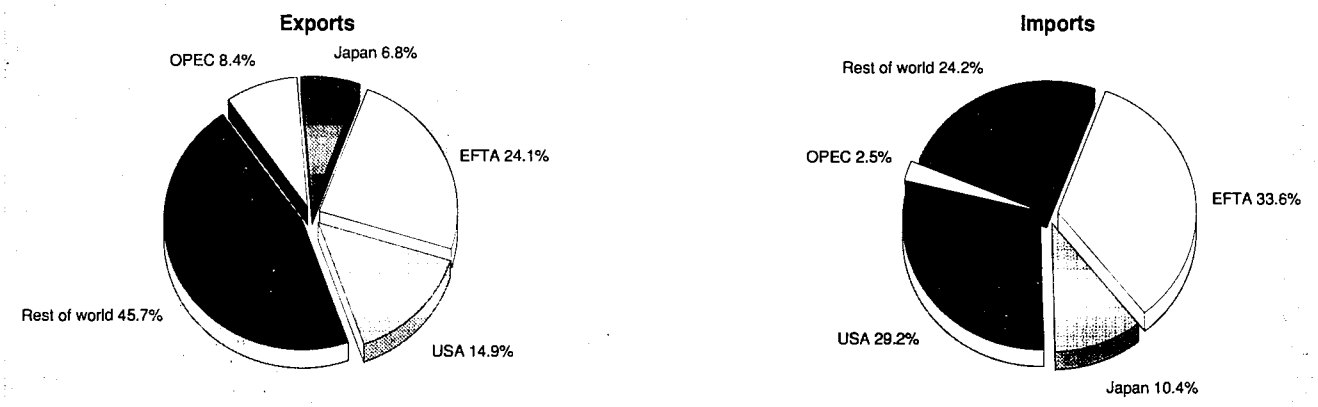
Another important factor in the creation of demand is the continuous effort towards product innovation. EC companies spent around 4.8% of their turnover on R&D in 1990. In specific sectors of the pharmaceutical and agrochemical industry, this percentage can amount to more than the double of that figure. The most innovative fields of R&D include bio-technology and new materials (advanced composite materials, polymers, plastics and ceramics). As a general tendency, R&D efforts are more and more focusing on transformations of existing products rather than on true discoveries.

Supply and competition

The future of both bulk and specialty chemicals is clouded by mounting competition. These sectors will increasingly have to focus on higher value-added and more specialised market segments in order to maintain margins. The pharmaceutical industry will continue to benefit from rising standards of living and growing concerns for health.

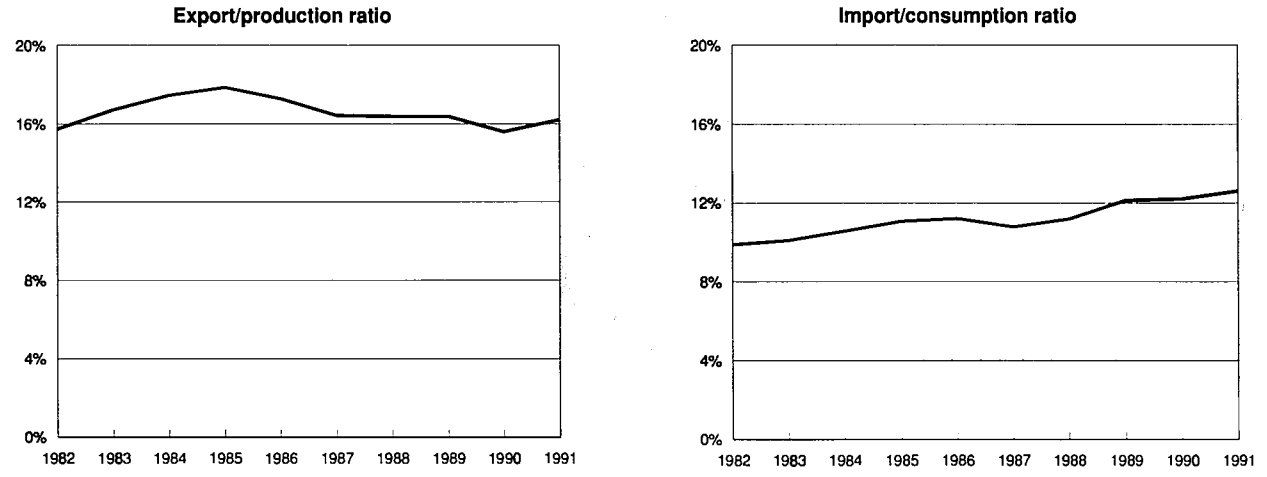
In basic chemicals, a remarkable part of demand is directed to foreign markets. Export intensities amount to 50% in Germany and the United Kingdom, and around 60% in France. Export markets were hit by the fall of the dollar that increased US competitiveness on markets with low or no product differentiation and high competition. The squeeze in profit margins was emphasised by the upward pressure on oil prices during the Gulf War, although these came down shortly afterwards. Also pharmaceuticals have been losing market share

Figure 6: Chemicals
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Figure 7: Chemicals
Trade intensities



Source: Eurostat

on export markets since 1987. In terms of competitiveness, the specialty chemicals sector is in better shape than the basic chemicals sector. Profit margins, however, shrank in 1991, as a result of growing input and unit labour costs.

Oil and other raw material prices are expected to rise at most only moderately, yet chemical producer's prices are expected to be weak in some sectors and in some countries, leading to unsatisfactory margins.

Production process

The EC chemical industry employs almost 1.8 million people, i.e. about 7% of the EC's manufacturing industry employment. The majority of employees in the sector has a high level of qualification and training. Since 1974, the sector has had a diminishing labour force, but the upturn in production levels since 1984 has led to a stable employment number. Productivity shows only an average annual growth rate of 3.5%, while in the past this rate was usually above 5%. This phenomenon probably relates to the maturing of the industry and its greater portion of higher value-added production, characterised by lower production volumes.

The greatest proportion of investment expenditure is at present directed towards productivity improvement, new product introduction, improvement of production processes and environment. In contrast to investment level growth in nominal terms of about 10% over the 1985-89 period, investments have declined in 1991. The level of improvement expected by CEFIC is not enough to halt the decline in investments in 1992.

The sector is also a big energy user. The energy use is rather concentrated in the upstream basic chemicals sub-sector. The biggest energy user is the petrochemical sector, with electricity and hydrocarbon consumption, including the use as raw material, of 35% to 40% of production costs. Other sectors with high energy contents are plastics (20% to 25%), inorganic chemicals and fertilisers (each about 15%). The refined chemicals sector is a relatively small energy consumer, but since the basic industry is its main supplier, it is bound to be affected indirectly by energy price rises. Profitability of basic chemicals is more vulnerable to oil price increases than that of specialty chemicals, since the first one can only with more difficulty pass price rises to consumers, being subject to relatively harsher competition.

INDUSTRY STRUCTURE

Companies

Seven of the world's top ten chemical companies are EC based. With about 46 000 enterprises (including small enterprises, with less than 20 employees) in 1988, the chemical industry remains a concentrated sector, with 5.3% of the enterprises representing 83.4% of turnover. The top ten leading EC companies represented 48.6% of total turnover of the industry in 1990, with the top 5 companies taking 32.6% of turnover.

Strategies

During the 1980s, larger companies were moving into specialty chemicals in order to improve margins and profitability. Merger and acquisition (M&A) activity leading up to the Single Market has been intense, concentrating almost exclusively on downstream chemicals (plastic containers and film, specialty chemicals, pharmaceuticals, cosmetics, fertilisers) with the objective

Table 5: Chemicals
Breakdown by size of enterprise, 1988 (1)

employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	38 918	84.2	8.2	8.4
20-99	4 881	10.5	11.5	8.2
More than 99	2 502	5.3	80.3	83.4

(1) Estimates
Source: Eurostat

Table 6: Chemicals
The 10 leading European companies, 1991

	Country	Turnover (million ECU)	Employees	Net profit (million ECU)
Hoechst	D	22 995	179 332	535
BASF	D	21 831	129 434	513
Bayer	D	20 663	164 200	853
ICI	UK	17 796	123 600	772
Rhône-Poulenc	F	12 013	89 051	152
Ciba-Geigy	CH	11 879	91 665	721
Enichem (ex Enimont) (1)	I	9 897	49 000	-58
Norsk Hydro	N	7 656	34 957	-143
Akzo	NL	7 288	65 200	299
Henkel	D	6 289	41 475	194

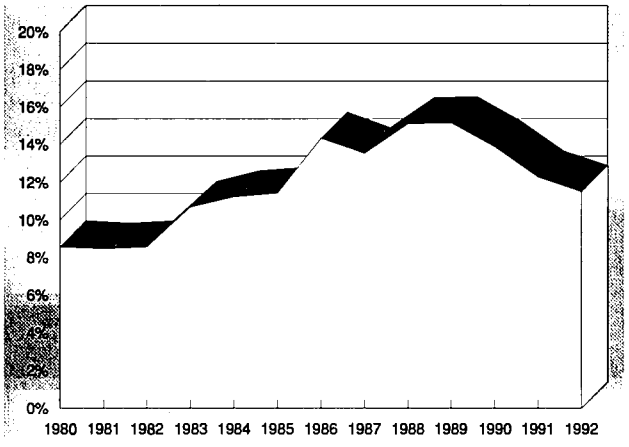
(1) 1990
Source: DABLE

of strengthening and expanding market share. Also, the fall in the dollar exchange rate has encouraged EC companies to undertake major investments in the USA during the second half of the eighties.

In 1990, M&A activity subsided as a result of the uncertainty caused by the Gulf War, the fall in profit margins and the higher interest rates that made funding more expensive. Also 1991, which was influenced by cost reductions and rationalisations, was a quiet year for M&A activity. Fewer big deals were signed than for instance in 1989, for the same number of transactions. A lot of businesses were for sale, however, because chemicals groups considered refocusing their activity upon their core businesses, and selling off of long established acquired businesses that never or no longer fulfilled their promise in terms of profitability. These companies were facing the problem of insufficient buyer interest.

In terms of sectors, pharmaceuticals and specialty chemicals led the M&A scene in 1991. Geographical patterns in M&A still show a preference for Western Europe in terms of chemical acquisitions, which represented 57% of the total in 1991. Transactions in Eastern Europe increased slightly in number to 3% of the total in 1991, and still focus interest from Western countries thanks to the ongoing privatisation process. With a view to investments in Eastern and central Europe especially, which at first sight look like bargain opportunities, companies have realised that successful acquisitions must be based on true economic value, pointing to the importance of starting to take into account environmental expenditures required by national governments.

Figure 8: Chemicals
Pre-tax profits (1) to turnover of the industry (2)



(1) Profitability is measured by the % share of the industry's operating surplus divided by the value of production
(2) For BR Deutschland, France, Italia and United Kingdom only
Source: DRI Europe

REGIONAL DISTRIBUTION

Proportionally to GDP, Spain, Belgium, Luxembourg, the Netherlands and Ireland have chemical industries bigger than that of other EC countries. With regard to product segmentation, the German, Dutch and French industries are more oriented towards basic chemicals and plastic materials, while the United Kingdom and Italy have a greater share of pharmaceutical and a few other every day consumer products.

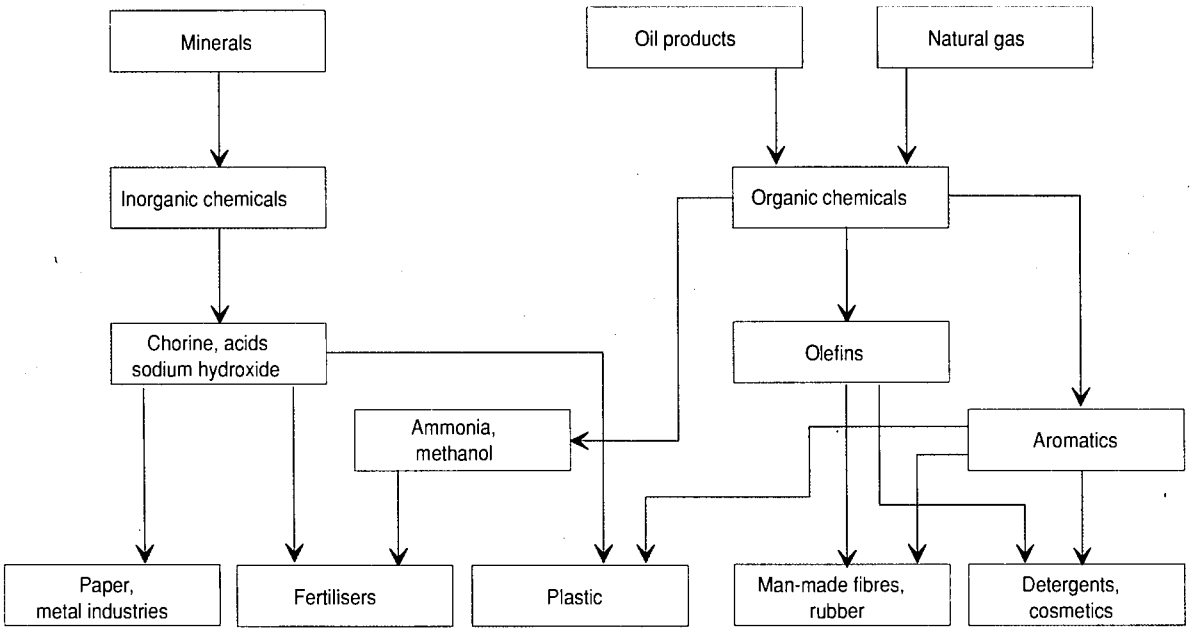
Figure 2 shows that Germany is by far the largest EC producer in terms of value added, representing one third of EC value added. France takes the second place, followed in that order by the United Kingdom and Italy.

ENVIRONMENT

Environmental problems are particularly noteworthy in the case of the chemical industry. Environmental costs represent some 3.5% of turnover for major European chemical companies, and 15% of new investments. This latter percentage will increase to 20% or more in the decade to come.

The problems raised by the chemical industry with regard to the environment can be separated into the pollution caused during the production process, and the downstream pollution occurring during consumption and disposal of the industry's final products. In the first area the industry is emitting harmful substances into water bodies and into the air, for example NOx and SO2, causing acid rain. The industry is also confronted with the scarcity of tipping sites to deposit solid waste. With respect to global environmental pollution, as a big energy user, the industry is a big emitter of CO2, one of the gases contributing to the greenhouse effect. The industry has solidly opposed a tax on energy use or on the carbon contents of the fuels used, proposed by the EC Commission as a means to achieve stabilisation of CO2 emissions at the turn of the century. Industry resistance has shifted to acceptance that a tax might be necessary, but under the condition that it should be implemented internationally. In the area of the environmental auditing of industrial installations, the industry has largely accepted the core principles of an EC Commission

Figure 9: Chemicals
Production process



Source: Eurostat

proposal on eco-audit, according to which industry would voluntarily allow such audits, checked by accredited auditors.

Pollution linked to the use of chemical products can happen either at the time of actual use or at the time of disposal of solid waste. In the first case, examples relate to the use of solvents in paints and adhesives, and to the contamination of water tables by nitrates in fertilisers. In the area of solid waste disposal, the industry is faced with the successful implementation of plastics recycling infrastructure within 10 years, according to the EC proposal on packaging waste. This will stretch the plastics industry, as the recycling of plastics is generally less advanced than that of other materials used for packaging, such as paper and board, glass or aluminium.

REGULATIONS

The main legislative measures by which the chemical industry hopes for rapid progress on the road to harmonisation cover the following areas: standards, bio-technology, environment, energy, indirect taxation, fewer administrative constraints, transport de-regulation, R&D, competition, and trade policies.

Concerning trade regulations, in the framework of the Uruguay round of the GATT negotiations, much work was devoted to the tariff negotiations. CEFIC, in a joint initiative with its US and Canadian counterparts, advocates the harmonisation of chemical trade tariffs at 5.5 or 6.5% and the allowance of up to 15 years to bring existing tariffs down to this level. Other trade issues include export controls in extra and intra Community trade, the treatment of anti-dumping complaints, and the generalised system of preferences.

Internal market issues include the support of CEFIC for the EC Commission DG XXI proposal on indirect taxation in order to arrive at a truly harmonised system throughout Member States, minimising bureaucracy.

OUTLOOK

Prospects for 1992, although perhaps showing some improvement over 1991, are not too bright: a low increase in production is expected together with limited growth in the world economy. Signs that the US economy will pick up remain mixed. High real interest rates are a constraint in western Europe, where both consumer and industrial confidence remain weak. Demand could start to revive in 1993 as interest rates are reduced and confidence is regained, leading to a pick-up in consumer spending. Any small increase in output will be driven by advances in pharmaceuticals and in cosmetics/perfumes activities. Production is likely to be flat in other areas, and continues to decline further in fertilisers. Prospects in the medium term are somewhat brighter, based upon a revival of world economic activity.

Table 7: Chemicals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.4	3.1
Production	2.4	3.1
Extra-EC exports	4.5	6.0

Source: DRI Europe

Written by: DRI Europe
The sector is represented at the EC level by: European Chemical Industry Council / Conseil Européen de l'Industrie Chimique (CEFIC). Address: Avenue E. Van Nieuwenhuyse 4, B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

Basic industrial chemicals
NACE 251, 252, 253

The basic chemicals sector has recently been suffering from weakening demand and stiff competition from both North America and the newly industrialised countries. During the second half of the 1980s, export markets for basic chemicals were hit as the fall of the US dollar increased the competitiveness of North American producers. This squeezed profit margins, which was later emphasised by the upward pressure on oil prices during the Gulf war.

INDUSTRY PROFILE

Description of the sector

The basic industrial chemicals sector includes units exclusively or primarily engaged in the manufacture of inorganic chemicals (including fertilisers), electrochemical products, organic chemicals (including those obtained from petroleum and coal), synthetic rubber and plastics materials, mineral pigments and organic dyestuffs, isotopes etc., and in the distillation of tar and benzole. In this classification are considered not only the units producing such basic chemicals but also those units which both produce them and process them into finished products.

The data presented in this monograph correspond to the three NACE classes 251, (the manufacture of basic industrial chemicals and further processing of these products), 252 (the manufacture of chemicals obtained from petroleum and coal) and 253 (the manufacture of other basic industrial chemicals). Given the high degree of vertical integration of the chemical industry, it is difficult to provide separate data for each subcategory.

Given the relative importance of the petrochemical sector (it accounts for more than the half of the basic industrial chemicals turnover), a specific monograph based on data provided by the relevant association follows.

Finally, in this monograph particular attention is given to the plastics manufacturing sector, which accounts alone for about a quarter of total basic industrial chemicals employment.

Main indicators

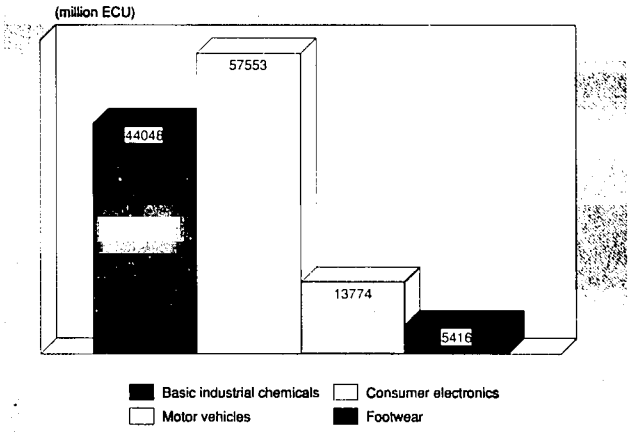
After steady growth in the first half of the 1980s, all the main indicators were affected by a sharp decline in 1986. Due to the fall in crude oil price and a weakening of the exchange rate of the US dollar, production and consumption decreased by about 4.2% and 2.5% in volume terms respectively. The continuing slowdown of the European economies in 1990 and 1991, as well as the recession in the USA and Canada, depressed demand of basic chemicals. During the 1990-1991 period, production in volume terms decreased of 3.2% and consumption of 1.4%.

The reduction in basic chemicals employment, which started in the early 1980s is still going on. During the 1982-1991 period employment in the sector decreased of about 45 000 units.

International comparison

The EC is the world's largest basic chemicals producer although it is by a narrow margin. In 1991, EC production was about 2% higher than that of the USA, a margin that has more or less remained steady throughout the 1980s. Japan ranks third in the world basic chemicals market, but its production is half the size than the EC and US ones. The importance of the newly industrialised countries (NICs) is steadily growing, and their competition is affecting the position of the EC industry on the world market.

Figure 1: Basic industrial chemicals
Value added in comparison with other industries, 1991



Source: Eurostat

In the period 1988-1991, production growth slowed in the EC, the USA and in Japan. Among the three main producers, the EC basic chemicals industry was the most badly affected, due to weakening demand at home. The US industry was also hit by the recession, while Japan was able to maintain a positive, although decelerating, growth rate in production.

Foreign trade

The EC trade balance in the basic chemicals sector steadily decreased during the 1980s because of rising imports and weak exports; in the period 1982-1991, extra-EC imports doubled, whereas extra-EC exports increased by about 55%. Moreover, all of these gains in export markets were made in the period 1982-1985, after which time exports have stagnated. The export/production ratio slightly decreased from 1985 to 1991, while during the same period the import/consumption ratio increased by 28%.

Export markets for the EC basic chemicals industry are well spread. The EFTA countries and the USA together account for about 42% of total extra-EC exports, and Japan for 7% only, while the remaining 51% is scattered around the rest of the world. As for extra-EC imports, they are more concentrated: about 57% of them comes from the EFTA countries and the USA and 8% from Japan.

MARKET FORCES

Demand

Industry demand represents about two thirds of basic chemicals sales, and more than 45% of this intermediate demand come from the speciality chemicals sector. Indeed, basic chemical products are mainly used as inputs in other chemical processes. The basic chemicals sector itself accounts for another 13% of its own sales, and the rubber and plastics sector for about 11%.

Plastics

The wide range of these properties and the tailoring of these properties for specific applications have led to a vast and diversified demand for plastic materials. The main outlets are to be found in the following industries: packaging, construction and civil engineering, transport equipment, household equipment, electronics, textiles, agriculture, health and medical applications, paper and wood, photography and armaments.

Table 1: Basic industrial chemicals & petrochemicals
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	79 930	86 118	102 656	110 008	94 545	100 392	110 974	120 685	116 937	113 049	114 632
Production	83 823	91 498	109 359	116 562	99 163	104 828	115 812	123 231	117 506	114 445	115 361
Extra-EC exports	13 493	16 018	19 807	21 468	18 055	18 027	20 627	21 597	19 889	20 968	21 597
Trade balance	3 892	5 380	6 703	6 553	4 618	4 436	4 838	2 545	568	1 396	729
Employment (thousands)	678.5	642.7	653.7	660.2	655.1	654.0	645.6	644.6	641.5	632.8	621.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Basic industrial chemicals & petrochemicals
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	6.8	2.5	3.9
Production	7.1	1.2	3.2
Extra-EC exports	10.0	1.7	2.1
Extra-EC imports	9.4	6.1	7.2

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Basic industrial chemicals & petrochemicals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	13 493	16 018	19 807	21 468	18 055	18 027	20 627	21 597	19 889	20 968
Extra-EC imports	9 600	10 638	13 104	14 915	13 437	13 591	15 789	19 052	19 320	19 572
Trade balance	3 892	5 380	6 703	6 553	4 618	4 436	4 838	2 545	568	1 396
Ratio exports/imports	1.41	1.51	1.51	1.44	1.34	1.33	1.31	1.13	1.03	1.07
Terms of trade index (2)	98.6	98.8	97.7	100.0	103.4	110.3	114.0	112.1	119.1	122.2
Intra-EC trade	24 722	27 868	33 185	36 477	34 505	36 026	41 754	46 852	47 790	47 408
Share of total imports (%)	72.0	72.4	71.7	71.0	72.0	72.6	72.6	71.1	71.2	70.8

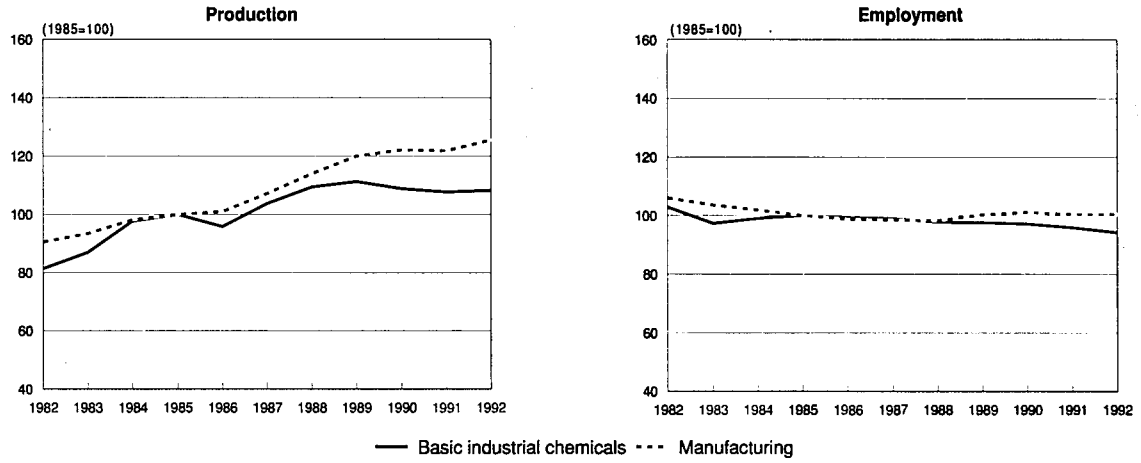
(1) Estimates
(2) Excluding petrochemicals
Source: Eurostat

Table 4: Basic industrial chemicals & petrochemicals
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	33.1	39.7	44.7	44.7	52.5	59.1	66.9	66.0	67.0	69.6
Productivity index	74.1	88.7	100.0	100.0	117.4	132.1	149.5	147.6	149.8	155.7
Unit labour costs index (3)	79.2	87.2	92.5	100.0	103.6	110.9	116.9	123.5	131.4	N/A
Total unit costs index (4)	72.0	82.9	96.8	100.0	78.1	81.9	87.6	94.8	92.3	91.6

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 2: Basic industrial chemicals
Production and employment indices compared to EC manufacturing



Source: Eurostat

The sustained growth in demand for plastics is attributable to the improvement of the economic environment, and particularly to the favourable conditions prevailing in the end-user sectors such as the automobile and construction industries. Plastic materials usage to replace other materials in industrial and household goods production remains an important growth factor, although it is no longer the major one: often, plastic materials replace traditional ones such as glass or steel, as they are lighter and energy-saving.

Supply and competition

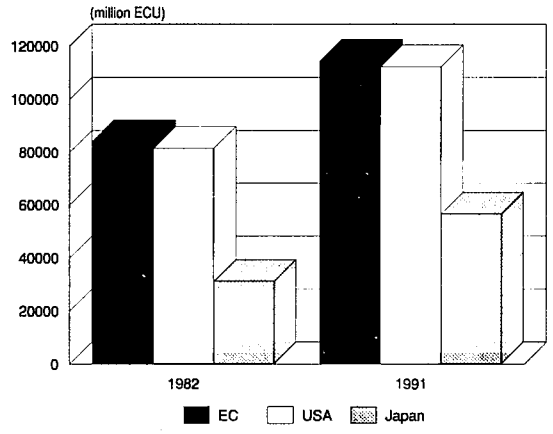
The European basic chemicals industry has a strong technological base, and it compares favourably with the US and Japanese industry from the point of view of research and development. This represents an important strategic condition for a modern industry which depends on the use of more and more sophisticated materials and technologies.

Plastics

Plastics manufacturers produce polymers and synthetic resins mixed with additives to form plastic materials. The main thermoplastic products are: low density polyethylene (LDPE), high density polyethylene (HDPE), polypropylene (PP), polystyrene (PS) and polyvinyl chloride (PVC). Thermoplastics represent about two thirds of total plastics production in Western Europe. By way of comparison, European production of these plastic materials is equivalent in volume terms to that of the USA and more than double that of Japanese production.

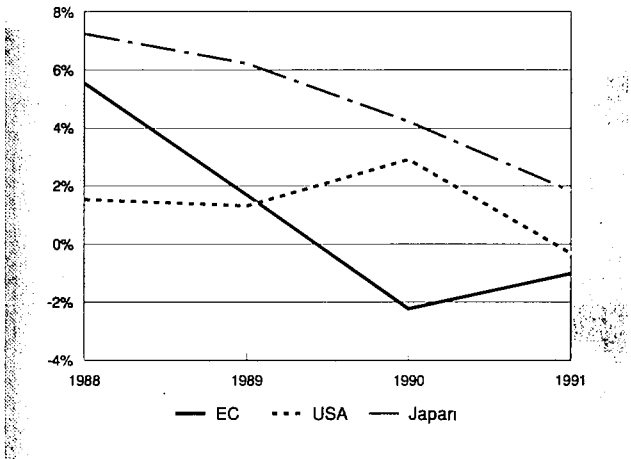
Plastic material manufacturers are not only raw materials manufacturers: they also help the entire plastic products sector by contributing to the technical and commercial development of plastics applications. Mass market plastics, which represent more than two thirds of total plastics production, have played a vital role in the plastics industry since the Second World War. However, they have been hit by sharp oil price rises and by the economic downturn during the period from 1975 to 1983, which led to production overcapacity. The mass market plastics industry has actively rationalised and restructured over the past years, notably between 1982 and 1984, adjusting production capacities and obtaining cost reductions. The more recent years have brought an upturn in demand and profits, but 1990 and 1991 have again seen problems.

Figure 3: Basic industrial chemicals
International comparison of production at current prices



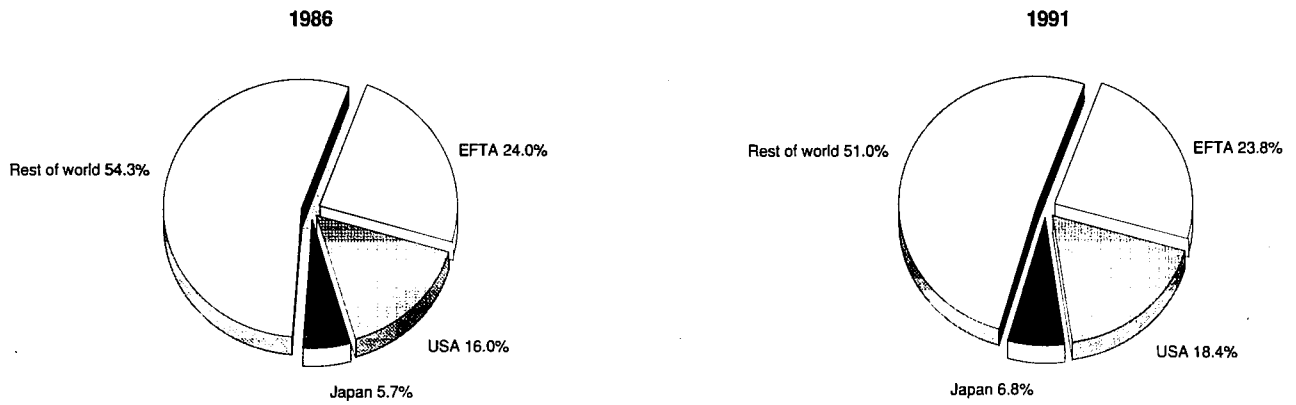
Source: Eurostat, Census of Manufacturers

Figure 4: Basic industrial chemicals
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 5: Basic industrial chemicals
Destination of EC exports



Source: Eurostat

Production process

Petroleum products and first oil derivatives are used both as raw materials and as an energy source by the basic chemical sector. Fuel and power products represent the major input costs for the basic chemical industry. Therefore, profits in the industry depend to a large extent on oil prices. Figure 8 shows the slump in profits which followed the Gulf crisis.

High capital investments in machinery and technology are essential in this industry and represent, along with the availability of raw materials, a significant entry barrier. High competition, low product differentiation and heavy environmental constraints also increase the difficulties of the basic chemicals activity.

Any further increase in capacity will probably be cautious, taking account of the experience of the last decade; investment plans are mainly directed towards new processes and product development, as well as towards productivity improvements in order to maintain the industry's competitiveness. Finally, factors determining investment seem to be linked more and more to the environment, notably in areas such as waste management, and public acceptance of chemical products and chemical industry activities.

INDUSTRY STRUCTURE

Companies

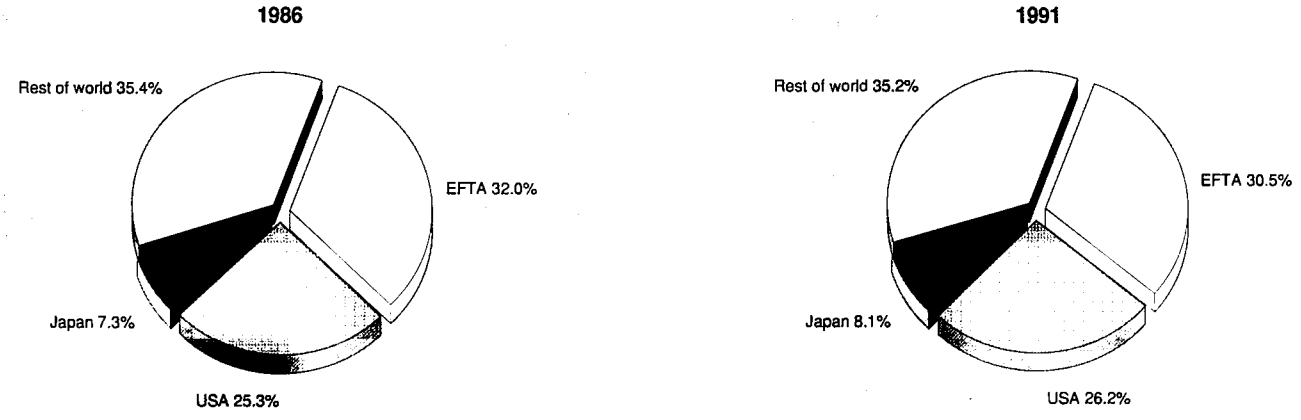
Concentration is clearly higher in the basic chemicals sector, the exclusive domain of large companies, as opposed to refined chemicals. For example, in Germany, six producers share 80% of inorganic chemical production. Competition is however much more intense than might be believed from the strong concentration. The industry experiences a high potential for competition among the present producers on the market and the threat of the arrival of new competitors (e.g. from the oil-producing countries and South-East Asia).

Among the leading EC producers in the field of basic chemicals are six firms: BASF, Hoechst and Bayer (D), ICI (UK), Rhône Poulenc (F) and Enichem (I). Other main European basic chemicals companies are the Swiss Ciba-Geigy, Sandoz and Roche, the Finnish Neste, the Swedish Dyno Industrier and the Norwegian Norsk Hydro.

Strategies

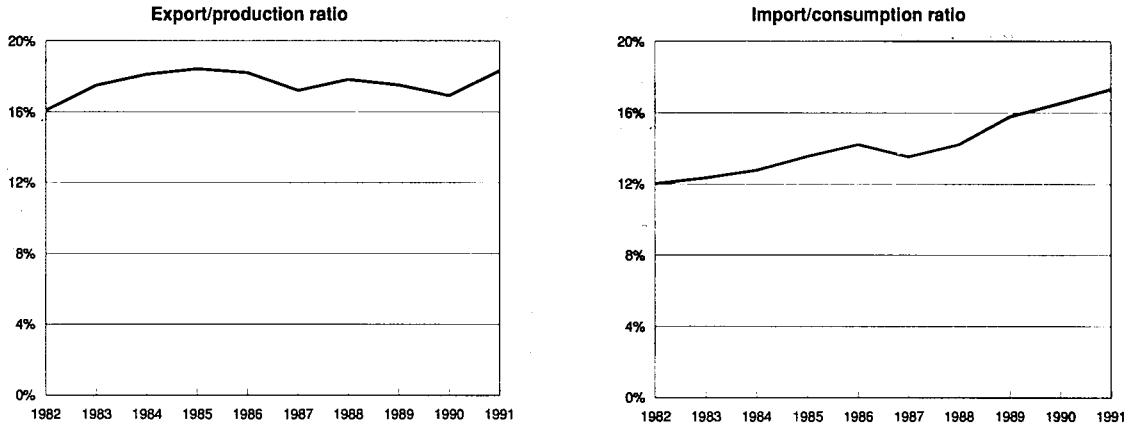
During the 1960s and up to the middle of the 1970s, the basic chemicals groups strategy aimed at increasing output and capacity. The 1970s economic crisis highlighted the need to restructure the industry. Company strategies were consequently modified along three main lines: first, product ra-

Figure 6: Basic industrial chemicals
Origin of EC imports



Source: Eurostat

Figure 7: Basic industrial chemicals
Trade intensities



Source: Eurostat

tionalisation, which led to major redundancies; second, increasing installation size, in order to benefit from economies of scale; third, merger and acquisition (M&A) activity in Europe and the establishment of joint-ventures in the rapidly growing Asian markets.

In 1991, the main M&A operations were the following: Hoechst (D) acquired Colorplast (D), a manufacturer of pigments for colouring plastics; LVM (NL) acquired Cousin Tessier (F), which operates in plastic and thermoplastic rubber compounds; Metallgesellschaft (D) acquired Dynamit Nobel (D), a plastic manufacturer.

On the joint ventures side, in 1991 Courtaulds (UK) and Formosa Plastics (Taiwan) agreed on a polypropylene packaging film technology and marketing deal; Hoechst (D) and Mitsubishi Kasei (J), started common manufacture and sale in Germany of polyethylene terephtalate (PET) film for magnetic tape applications; finally, Repsol Quimica (E) and the Algerian Enip established a joint-venture for the construction of a HDPE plant at Skikda, Algeria.

ENVIRONMENT

Environmental problems are of particular importance to the basic chemicals industry. The industry itself is well aware of the pollution problems of which it is directly or indirectly responsible and has already undertaken important efforts, often ahead of legislation. For the moment, the investment expenditure aimed at fighting various forms of pollution linked to production processes represents up to 10% of the sector's total investment. It is expected that this percentage will double during this decade.

As far as plastics are concerned, the main environmental issues are the consequences of plastic contact in the case of medical or food applications, plastic safety with regard to fire and the ecological consequences of plastic usage. The recycling of used plastics is being developed, although this process still remains relatively expensive when the extra cost of waste sorting and the plastic recycling itself is taken into account.

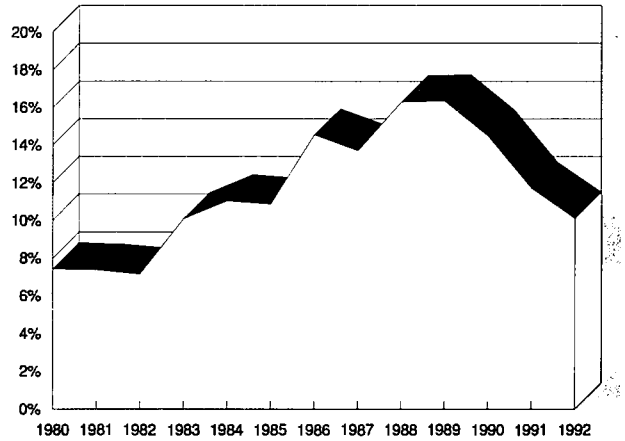
Finally, battles continue to be fought over proposed EC legislation concerning the movement of toxic waste inside and outside Member States. The Environmental Council which took place in May 1992 again failed to reach a consensus. The aim is for EC Member States to ratify the international Basle Convention on the control of cross-border movements of hazardous wastes and their disposal, which has five broad goals:

- to minimise the generation of hazardous waste;
- to keep cross-border movements of hazardous waste to a minimum;
- to achieve national self-sufficiency in disposal;
- to ensure the informed consent of the receiving country before shipping hazardous waste;
- to end trade of hazardous waste with countries which have not agreed to the Convention.

REGULATIONS

Trade regulations are of vital importance to the basic chemicals industry given its dependence on foreign trade as a source of income. Recent years have seen the active participation of the EC basic chemicals industry in all GATT trade negotiations. The main issues under current debate are the following: improved market access for EC firms which might

Figure 8: Basic industrial chemicals
Pre-tax profits to turnover



(1) Profitability is measured by the % share of the industry's operating surplus divided by the value of production
(2) For BR Deutschland, France, Italia and United Kingdom only
Source: DRI Europe

be obtained with the harmonisation of chemical tariffs; stronger intellectual property protection through GATT; and prohibition of the most trade distorting practices. However, an important focus of the negotiations has been devoted to tariffs. A joint framework agreement for tariff harmonisation in the Uruguay Round has been reached, which provides for tariff harmonisation at 5.5% or 6.5% and allows up to 15 years to bring tariffs down to the harmonised level.

OUTLOOK

The future of the basic chemicals industry is clouded by rising competition from producers in other parts of the world, particularly in developing countries. EC companies will continue focusing on higher value-added activities, progressively abandoning the less specialised market segments. A renewal of the sector with rapid growth rates is not likely in the near future.

Table 5: Basic industrial chemicals & petrochemicals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.0	1.9
Production	1.2	1.2
Extra-EC exports	3.3	3.1

Source: DRI Europe

Written by: DRI Europe
The industry is represented at the EC level by: European Chemical Industry Council/Conseil Européen de l'Industrie Chimique (CEFIC). Address: Avenue van Nieuwenhuyse 4, Box 1, B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

Petrochemicals
NACE 252

The petrochemical industry represents more than one half of the basic chemical sector and a quarter of the total chemical industry turnover.
The sector is suffering from reduced profitability after the buoyant growth experienced during the 1987-1989 period. Although the industry is facing depressed demand and is threatened by global overcapacity, petrochemical companies are pursuing their modernisation efforts.

INDUSTRY PROFILE

Description of the sector

Petrochemicals is defined as the industry which uses raw materials derived from oil or natural gas to manufacture the following products:

- primary petrochemicals: unsaturates (i.e. ethylene, propylene, butylene, butadiene, acetylene), aromatics (i.e. benzene, toluene, xylenes, naphtalene), methanol, ammonia, carbon black;
- petrochemical intermediates: ethylene, vinyl chloride, acrylonitrile, cyclohexane, ethyl benzene, styrene, phenol, etc.;
- petrochemical products: plastics, synthetic fibres, solvents, surface active agents, additives, synthetic rubber, fertilisers and agricultural chemicals.

The last category is not dealt with in this monograph, but its elements are the subject of separate monographs in this and other sectoral chapters. The lack of a common data base for petrochemical products is the main reason for the absence of complete statistical data.

Main indicators

In terms of basic and intermediate products, the petrochemical sector accounts for approximately one quarter of the total value added of the chemicals industry, that is 26 billion ECU in 1991. Total employment in the basic chemical sector (e.g. including NACE 251 and 253) reached the level of 633 000 units in 1991, with a decrease of nearly 20% from 1980.

An analysis of the primary petrochemical products shows weak growth for the main products. It is estimated that in 1991 ethylene production in the EC rose 2%, reaching 13.1 million tonnes, while consumption attained a level of 13.2 million tonnes. As for propylene, its production, which is largely dictated by ethylene demand, increased by 4.6%, reaching 8.4 million tonnes, while consumption reached 8.6 million tonnes.

Recent trends

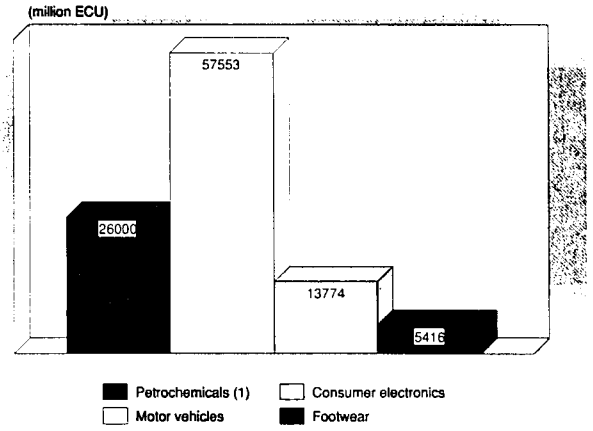
Within the EC, the supply and demand of primary petrochemical products was reasonably well balanced during the 1983-1990 period.

Both extra-EC exports and imports have grown steadily from 1982 to 1991, while the trade balance has decreased from 1988 onwards.

International comparison

The EC is a major player in the world market for primary petrochemicals, being the largest producer of butadiene and benzene and the runner-up, after the USA, for ethylene and propylene. EC production, in volume terms, is about double that of Japan. New producers have recently emerged on the world scene, particularly in Southeast Asia (e.g. Korea), Brazil and the Middle East.

Figure 1: Petrochemicals
Value added in comparison with other industries, 1991



(1) DRI Europe estimate
Source: Eurostat

Foreign trade

The EC's trade balance with the rest of the world is positive (about 2 000 million ECU in 1991), although it has been sharply decreasing from 1988 due to a strong rise in extra-EC imports. The exports/imports ratio has also fallen from its peak of 1.73 in 1983 to 1.14 in 1991.

The breakdown for Member States shows the predominance of Germany, which is both the major exporting and importing country in the EC, accounting for 41% of extra-EC exports and 23% of extra-EC imports. In this respect, other relevant countries within the EC are the Netherlands, whose figures are respectively 12% and 13%, the United Kingdom (11% and 13%), France (11% and 13%), Italy (10% and 14%) and Belgium (6% and 12%).

The EFTA countries and the USA are the main end markets for extra-EC exports as well as the main source of EC imports: in fact, together they make up for 43% of total extra-EC exports and 60% of extra-EC imports. The developing countries also represent an important market for the EC, accounting for nearly 20% of total EC exports.

MARKET FORCES

Demand

The different products of the petrochemical industry are used in a variety of downstream industries such as construction, electrical industry, packaging, transport, metal working mining, agriculture, rubber and petroleum refining.

The demand for primary and intermediate petrochemicals depends on several factors. First, the economic environment and the growth in end markets; second, inter-product competition (e.g. between different sorts of plastics or between plastics and other materials like steel); third, the emergence of new products; finally, the influence of environmental restrictions.

Product innovation plays a fundamental role in the petrochemical industry. The development of new fuels, such as unleaded fuel, is opening up new perspectives for the industry, particularly for the valorisation of aromatics. For example, several companies are heavily investing in products based on methane, such as the MTBE, an additive used for the production of unleaded fuel.

Table 1: Petrochemicals
EC supply of and demand for the primary petrochemical products

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
ETHYLENE									
Actual capacity	13 985	13 443	13 074	12 878	13 230	13 830	13 925	14 350	15 895
Production	10 846	11 194	11 161	11 636	12 375	13 338	13 050	12 820	13 507
Consumption	10 923	11 421	11 393	11 813	12 572	13 377	13 122	13 022	13 527
PROPYLENE (2)									
Actual capacity	7 982	7 751	7 400	7 536	7 885	8 363	8 838	7 255	7 963
Production	6 067	6 617	6 243	6 632	7 097	7 755	7 734	8 005	8 518
Consumption	6 281	6 821	6 801	7 151	7 374	7 993	8 057	8 320	8 574
BUTADIENE									
Actual capacity	2 059	2 051	2 083	1 905	1 983	2 015	2 129	2 159	2 258
Production	1 653	1 710	1 623	1 552	1 679	1 819	1 815	1 847	1 753
Consumption	1 167	1 227	1 238	1 208	1 286	1 411	1 405	1 509	1 460
BENZENE									
Actual capacity	6 586	6 559	6 381	6 611	6 750	6 481	6 861	6 885	7 412
Production	4 599	4 834	4 796	4 740	5 150	5 475	5 446	5 400	5 494
Consumption	4 711	5 124	5 077	5 083	5 356	5 956	5 769	5 840	5 636

(1) Butadiene and benzene production data estimated; consumption estimated
(2) Capacity from 1990 onwards is based on non-refinery production (i.e. steam cracking), whereas production figures cover the whole industry
Source: CEFIC, Eurostat

Table 2: Petrochemicals & carbo-chemicals (1)
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	9 847	11 911	14 666	15 771	13 580	13 648	15 749	16 643	15 378	16 057
Extra-EC imports	6 317	6 892	8 748	9 974	9 028	9 179	10 939	13 357	13 859	14 071
Trade balance	3 530	5 020	5 917	5 797	4 552	4 469	4 811	3 286	1 520	1 986
Ratio exports/imports	1.56	1.73	1.68	1.58	1.50	1.49	1.44	1.25	1.11	1.14
Terms of trade	99.6	99.3	101.0	100.0	106.3	108.6	107.2	109.0	111.9	114.1
Intra-EC trade	19 448	22 090	26 314	28 848	27 276	28 696	33 654	37 678	38 562	38 256
Share of total imports (%)	74.8	75.1	73.9	73.3	73.8	74.1	73.7	72.1	72.3	72.0

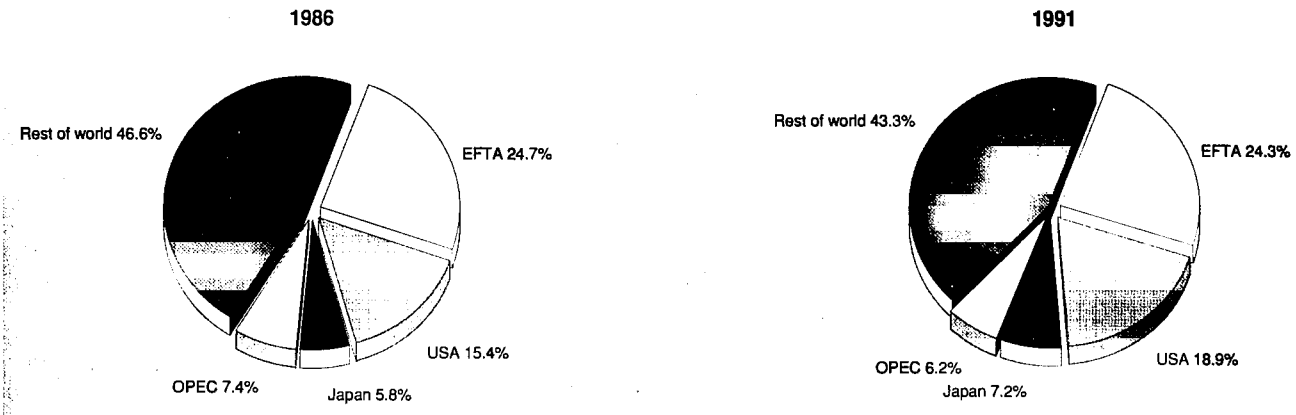
(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals
(2) Estimates
Source: Eurostat

Table 3: Petrochemicals & carbo-chemicals (1)
Extra-EC exports at current prices, by country

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
EC	9 847	11 911	14 666	15 771	13 580	13 648	15 749	16 643	15 378	16 057
Belgique/België, Luxembourg	583	666	859	808	692	643	911	1 051	955	1 043
Danmark	48	58	74	82	81	78	135	97	92	72
BR Deutschland	4 323	5 199	6 154	6 485	6 055	6 142	6 566	6 921	6 417	6 662
Hellas	18	18	19	21	21	33	24	38	37	40
España	227	322	614	683	537	538	626	592	606	613
France	1 113	1 292	1 588	2 084	1 426	1 389	1 618	1 739	1 618	1 718
Ireland	186	294	426	421	338	304	374	485	455	584
Italia	929	1 193	1 535	1 619	1 375	1 399	1 755	1 770	1 504	1 587
Nederland	1 256	1 573	1 885	1 835	1 499	1 581	1 839	1 967	1 834	1 867
Portugal	12	18	44	65	49	60	93	73	103	70
United Kingdom	1 154	1 278	1 468	1 669	1 507	1 482	1 808	1 911	1 757	1 800

(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals
(2) Estimates
Source: Eurostat

Figure 2: Petrochemicals and carbo-chemicals (1)
Destination of EC exports



(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals
Source: Eurostat

Supply and competition

The petrochemical sector is currently threatened with the prospect of severe overcapacity. In fact, during the period 1987-1991, the industry invested heavily in plant modernisation and the development of new technologies, thus greatly increasing its overall competitive position. Today, however, the slowdown of economic growth in the industrialised countries, and the competition of new plants in some developing countries have put the need for this EC capacity in doubt.

During the 1980s, expansion in capacity outside the traditional EC, US and Japanese producers progressively reduced the EC's position as a net exporter of olefin derivatives. The overcapacity problem that has developed in the EC has equally arisen in all the main regions the world, which thus suffers a global overcapacity problem which will take several years to resolve.

An interesting feature of the innovation of the petrochemical industry is given by the growing presence of the oil refining industry in the production of intermediate petrochemical products, which is mainly due to the process by which fuels are reformulated. The progress of the unleaded fuel and of the reformulated fuels implies the rejection of some components, such as benzene, which can therefore be found in larger quantities on the market.

Production process

The petrochemical sector is a heavy consumer of oil products: energy-producing materials account for most of the production cost of a cracker. The major input for the production of intermediate petrochemicals is naphtha, a product of oil refining, which accounts alone for about 65% of total petrochemical production in Europe.

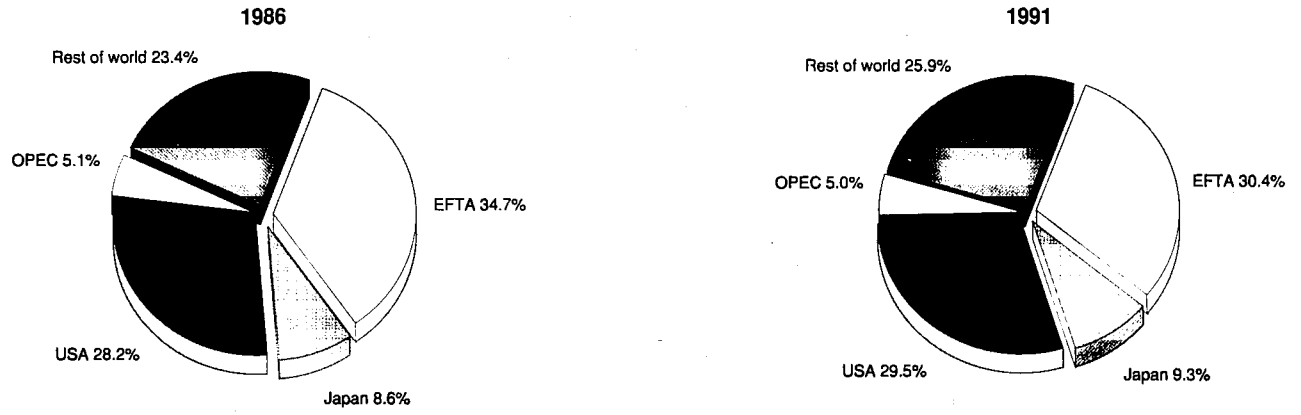
The cost of raw materials used by the industry remains at rather elevated levels, notwithstanding the decrease in the price of oil that took place after the Gulf war. Cracker operators depend largely on OPEC decisions for the price of naphtha. The price of naphtha, which follows the price of oil, reached a level of 156 ECU per tonne in May 1992, a price which is substantially higher than the 115 ECU of July 1990. Moreover, since oil prices are fixed in USD, variations in the USA currency deeply affect the activity of the industry. In the 1990-1991 period, for example, the relative weakness of the dollar has given an important comparative advantage to USA producers vis-à-vis their European competitors. However, it must be recognised that negative effects from the variations in the exchange rate of the USD have been offset for the EC petrochemicals industry since 1983, by causing a fall in supply costs, a fall in the dollar-quoted borrowings, and producing positive side-effects on sales prices.

Table 4: Petrochemicals & carbo-chemicals (1)
Extra-EC imports at current prices, by country

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
EC	6 317	6 892	8 748	9 974	9 028	9 179	10 939	13 357	13 859	14 071
Belgique/België, Luxembourg	443	448	585	747	683	716	1 181	1 481	1 593	1 661
Danmark	171	203	245	252	243	247	283	286	273	261
BR Deutschland	1 566	1 633	1 917	2 224	2 066	2 086	2 349	2 905	3 060	3 276
Hellas	45	59	73	82	97	102	107	142	151	175
España	387	369	497	515	571	576	691	787	809	883
France	1 045	1 096	1 280	1 409	1 362	1 369	1 634	1 839	1 951	1 795
Ireland	79	85	133	158	96	120	144	191	224	270
Italia	903	1 132	1 420	1 652	1 450	1 438	1 642	2 115	2 072	2 004
Nederland	818	799	1 267	1 625	1 301	1 370	1 453	1 885	1 832	1 812
Portugal	75	107	114	105	91	108	145	128	139	156
United Kingdom	784	961	1 217	1 205	1 066	1 047	1 310	1 598	1 757	1 778

(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals
(2) Estimates
Source: Eurostat

Figure 3: Petrochemicals and carbo-chemicals (1)
Origin of EC imports



(1) Data includes monomers, intermediate petrochemicals, plastic resins and intermediate inorganic chemicals
Source: Eurostat

In the longer term, more fundamental feedstock problems than the tightness of naphtha supply might arise. There is no alternative feedstock that appears capable of cost-effectively replacing naphtha over a long period of time, despite the fact that naphtha will probably become more and more scarce and expensive. Recently, major European petrochemical companies are seeking to take advantage of rapid growth and a stable profit performance in the industrial gases market, by setting up pipelines which transport gases to feed petrochemical sites. While liquefied petroleum gas (LPG) can and will be an attractive alternative to naphtha from time to time, LPG prices tend to be volatile and very expensive for extended periods. Therefore the addition of LPG cracking flexibility is attractive only close to indigenous sources of supply, where it can be selectively used during periods of intense price competition.

Another relevant cost factor in the petrochemical industry is given by R&D activity, which is estimated to reach a level of 1.6 billion ECU each year, i.e. around 4% of total turnover. This compares with the average 2% of GNP devoted to research by all European industries and governments.

INDUSTRY STRUCTURE

Companies

Activity in the petrochemical field is performed by large-scale European and international groups, which have undergone extensive restructuring following the oil crises and the slowdowns in the economic growth which characterised the end of the 1970s and the beginning of the 1980s. The restructuring has prompted a reduction in the number of producers and sites as well as a shift in emphasis with regard to certain products. For example, in 1991, there were only 19 producers of ethylene in the EC, compared with 25 in 1985.

Among the five leading EC chemicals firms, four of them are involved in the production of basic and intermediate petrochemicals, excluding Rhône Poulenc (F), which has intentionally withdrawn from the field of basic chemicals. Nevertheless, the proportion of activities involving basic chemicals varies among the remaining four: Hoechst (D) can ascribe a share of 12% of its turnover to petrochemicals, Bayer (D) 14%, BASF (D) 20% and ICI (UK) 19%. Among the ten non-EC leaders, Dow Chemical (USA) and Exxon (USA) are firmly installed in the European petrochemical sector.

The petrochemical sector is closely related to the oil refining industry for its supply of raw materials. This has engendered the development of petrochemical activities on its own from the refining industry, as part of a strategy of downstream integration. It is worthwhile to note that among the top 15 chemicals groups at the world level, four of them are petrochemical subsidiaries of larger oil companies: Shell Chemical (NL/UK), Enichem (I), Elf Atochem (F) and Exxon Chemical (USA). As for the remaining 11 companies, petrochemicals account for only a small part of their activity.

The industry is not however exclusively dominated by large firms. There are about 10 000 chemical and petrochemical companies in Western Europe, generating an annual turnover of around 160 billion ECU. They employ two million people and form the third largest European industry.

Strategies

The response of petrochemical firms to the challenges they confront in the market is threefold: to improve the production process and optimise costs; increase specialisation in some particular product areas; and implement a dynamic strategy of joint ventures and alliances.

Apart from the traditional elaboration of new products, R&D activity in the industry is principally aimed at developing processes that can increase the flexibility of petrochemical sites in order to better answer to the fluctuations of feedstock of raw materials and of demand.

In the years to come, growth rates in petrochemicals will vary significantly according to the different products. Firms are pursuing a strategy of specialisation, trying to better respond to the exact needs of customers. Producers are concentrating commercialisation efforts on some specific end markets, such as the car industry, glues and adhesives, fuel additives, etc.

The third main strategy pursued by firms of the sector is to build up joint ventures and strategic alliances. In 1991, EC firms frequently used the instrument of joint venture to open up markets abroad. Within the EC, in 1991 the main operation has been the joint venture between Repsol Quimica (E) and Atochem to start common polystyrene production in Spain. Other examples are the joint venture between Enichem, Atochem and the Qatar General Petrochem Corporation for the expansion of ethylene and polyethylene production at Umm Said and the venture between Enichem, the Algerian Sonatrach and Total (F) for the construction of an Algerian MTBE plant. China has also been the favoured target for Total, Shell and Tecnimont (I) for several joint ventures with the Chinese authorities to build refineries and petrochemical plants.

As for alliances, the driving force behind this choice is the heavy investment expenditures that nowadays are often too costly to be undertaken by a single company. BP's (UK) associating with Atochem to commonly exploit a cracker in Lavéra (F), Exxon and Shell alliance in Gravenchon (F) and Fina (B) and Neste (SF) in Antwerp (B) are examples of such strategies.

ENVIRONMENT

Pollution by the petrochemical industry has greatly diminished over the last two decades because of four main factors. First, the closure of plants whose environmental performance was not satisfactory and their replacement with units using clean technologies; second, modifications to the production process to make it less polluting; third, the set-up of effluent processing plants downstream of the polluting units; fourth, the Responsible Care programme aimed at progressive improvement in environmental performance.

Another main concern for the industry is represented by VOCs (Volatile Organic Compounds). Fuels and natural gas evaporate quickly, thereby polluting the atmosphere and damaging workers' health. These problems must be resolved by equipping loading/unloading/storage plants with steam recovery systems.

OUTLOOK

The factor that will influence the petrochemicals industry in the near future is most certainly overcapacity, not only in the EC but globally.

The dangerous situation of overcapacity will be alleviated by the following remedies: first, an improvement in the European cost structure; second, a reduction in the number and ownership of crackers; third, the rise of flexible crackers able to receive propane and butane. Without significant further restructuring of the industry, this problem is unlikely to be solved until the late 1990s.

Table 5: Petrochemicals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.0	1.9
Production	1.2	1.2
Extra-EC exports	3.3	3.1

Source: DRI Europe

Another influence will be that investment in environmental protection is steadily increasing, and is expected to rise by about 15% between 1991 and 1994. Legislative requirements, such as the Integrated Pollution Control in the United Kingdom or the Clean Air Act in the USA, are the main driving force behind this increase.

Finally, a third important factor are feedstock problems. The long-term solution to raw material shortfalls lies in having a broad diversity of feedstocks, which will also offer cost advantages.

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Paints, varnishes and printing inks
NACE 255

The EC is the world's second biggest producer of paints, varnishes and inks after the USA and well ahead of Japan. Germany alone accounts for about one third of total EC production in volume which totalled about 5 million tonnes in 1991 and was valued at 15.8 billion ECU.
Given the structure of the industry (paints and varnishes is highly concentrated) and the importance of service linked to sales (repair work, rapid supply to the ink industry), export levels are relatively low.

INDUSTRY PROFILE

Description of the sector

NACE 255 includes paints, paint fillers, varnishes and printing inks. The sector encompasses a full range of products with various applications, of which four main categories are:

- architectural coatings, including exterior and interior house paint, primers, finishing coats, pore fillers, varnish and dyes;
- coatings used for a whole series of industrial products and consumer products (e.g. wood or metal furnishing, automotive industry, aircraft industry, machinery and equipment, domestic appliances, electrical insulation, film, paper and foil, toys and sporting goods);
- special coatings designed for specific applications or for use in special conditions, including products for the repainting of cars and machines, high-performance maintenance, road markings, bridge maintenance and metallic coatings;
- printing inks used for a series of printing processes (e.g. letter pressing, offset/litho, gravure, flexography, screen printing, etc.)

The statistics provided in this monograph do not take into account Greece, Ireland and Luxembourg, for which no reliable data exist.

Main indicators

Paints and varnishes account for nearly 90% of production in measured in volume and 85% of production in value of the paints, varnishes and printing inks sector.

In 1991, production of paints and varnishes reached approximately 4.4 million tonnes or 13.4 billion ECU. Germany accounted for nearly 27% of production in volume, followed by the United Kingdom (17%), Italy (16%) and France (15%). Extra-EC exports continued to rise, reaching a value of 1 800 million ECU, as did the trade balance, which showed a surplus of about 1 250 million ECU.

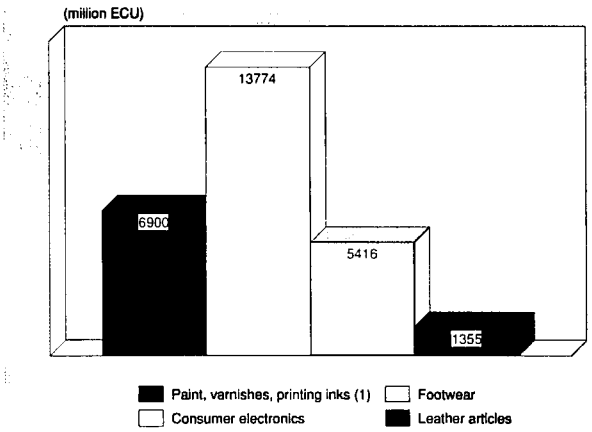
As for printing inks, production totalled about 2.4 billion ECU in 1991, that is nearly 590 thousand tonnes. Germany again dominates the sector in the EC, accounting for more than 40% of production in volume and one third of the total EC workforce, which stands at a level of about 14 000 workers.

Recent trends

Production of paints, varnishes and inks grew at an average yearly rate of 4.2% during the period 1982-91, thus outpacing consumption which rose 3.9% per year.

Extra-EC imports rose at a yearly rate of 6% during the same period, while export growth has been sluggish, particularly in the years from 1985 to 1991. Employment in the sector has recently started to recover after falling to its lowest level in 1988.

Figure 1: Paints, varnishes and printing inks
Value added in comparison with other Industries, 1991



(1) DRI Europe estimate
Source: Eurostat

International comparison

The USA is the world market leader in paints, varnishes and inks although its production has been decreasing in recent years. In fact, a comparison of production measured in constant prices shows that in 1991, US production actually decreased by about 5%, while EC and Japanese production increased by 19.4% and 14.3% respectively. Nevertheless, the USA held onto its position as the world's largest manufacturer of paints, varnishes and printing inks with production of nearly 14.5 billion ECU, that is 8% more than the EC and nearly the double that of Japan.

Foreign trade

In general, paints, varnishes and inks are not highly traded. However, this depends very much on the application of the product: while common house paint is sold within a few hundred kilometres of the factory, special aeroplane coatings are internationally traded. The same applies for specialised printing inks. In all the countries with large production capacities, firms chiefly serve their domestic markets. Consequently, because of their proximity, EFTA countries are the main trading partners for the EC, accounting for about one third of total extra-EC exports and 60% of extra-EC imports.

MARKET FORCES

Demand

Although they are grouped in one common NACE category, paints and varnishes have different characteristics than printing inks.

Paints and coatings are widely used in manufacturing industries such as motor vehicles, building and construction, metal products, steelworks, wood, electric appliances, and marine equipment. As for printing inks, they are used to produce newspapers, books, advertising material, packaging and wall coverings.

Paints and coatings are quite vulnerable to developments in the demand for the products of the industry's main industrial clients. This is particularly true with regard to construction, marine equipment and car manufacturing. An exception to this general rule is given by the vehicle refinishing market: when fewer cars are produced or sold, consumers hold onto old models and refurbish them. Production of printing ink is generally less affected by fluctuations in the level of industrial

Table 1: Paints, varnishes and printing inks
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)	1992(3)
Apparent consumption	6 458	6 303	6 780	6 889	7 600	8 005	8 466	9 272	11 399	12 136	12 427
Production	7 247	7 197	7 822	7 979	8 637	9 075	9 540	10 450	12 647	13 378	13 672
Extra-EC exports	993	1 119	1 306	1 373	1 338	1 390	1 460	1 651	1 734	1 803	1 870
Trade balance	789	894	1 042	1 090	1 037	1 070	1 074	1 178	1 248	1 242	1 245
Employment (thousand)(4)	98.1	93.6	90.9	88.8	88.1	89.1	88.0	95.7	96.8	98.6	98.4

(1) Excluding Greece, Ireland and Luxembourg
(2) Eurostat estimates for trade data
(3) DRI estimates
(4) Excluding the printing ink industry
Source: CEPE, Eurostat

Table 2: Paints, varnishes and printing inks
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.0	5.4	4.3
Production	2.3	4.7	3.9
Extra-EC exports (1)	4.2	1.1	2.2
Extra-EC imports (1)	3.3	7.3	6.0

(1) Eurostat estimates for 1991
Source: CEPE, Eurostat

Table 3: Paints, varnishes and printing inks
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	993	1 119	1 306	1 373	1 338	1 390	1 460	1 651	1 734	1 803
Extra-EC imports	204	225	264	284	300	320	386	473	486	561
Trade balance	789	894	1 042	1 090	1 037	1 070	1 074	1 178	1 248	1 242
Ratio exports/imports	4.87	4.97	4.95	4.84	4.45	4.34	3.79	3.49	3.57	3.22
Terms of trade	103.3	101.2	100.0	100.0	106.2	103.7	106.0	100.3	95.9	94.8
Intra-EC trade	978	1 094	1 253	1 366	1 529	1 687	1 917	2 194	2 389	2 568
Share of total imports (%)	82.7	82.9	82.6	82.8	83.6	84.0	83.3	82.2	83.1	82.0

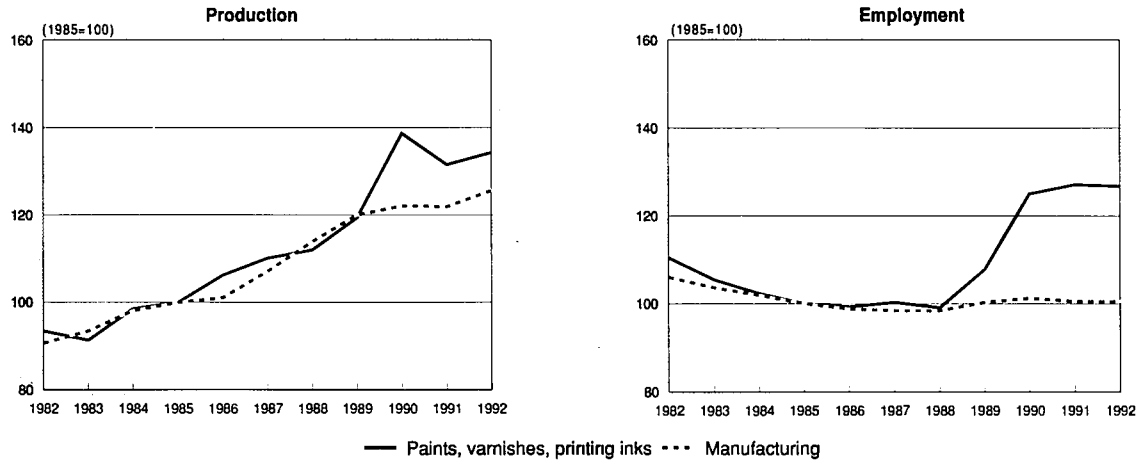
(1) Excluding Greece, Ireland and Luxembourg
(2) Estimates
Source: Eurostat

Table 4: Paints, varnishes and printing inks
Labour productivity (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	38.2	39.6	41.2	41.3	42.8	45.9	49.1	45.4	46.9	46.3
Productivity index	92.4	95.8	99.8	100.0	103.5	111.0	118.9	109.9	113.4	112.1

(1) Excluding Germany, Luxembourg and the Netherlands
(2) Value added per person employed (1991 prices)
Source: Eurostat

Figure 2: Paints, varnishes and printing inks
Production and employment indices compared to EC manufacturing



Source: CEPE, Eurostat

activity and the demand for durables and investment than in the paints and varnish sector.

Some clear trends in buyers' preferences have emerged in the recent past. Wood care products are taking an increasing share of the decorative coating market, at the expense of paints. Powder coating is estimated to be the fastest growing paint market in the world, with volume increases averaging about 15% a year during the 1980s; powders contain no solvent and therefore there are less emission problems. Finally, high demand for high solid paints (i.e. products with a high concentration of pigments), has produced a corresponding reduction in the use of non-aqueous solvents.

Supply and competition

Client industries require quite a long period of time before they accept new coatings. In the automotive industry, for example, where the importance of consumer tastes and the need for high quality products, to satisfy requirements of resistance and functionality are particularly important, it is normal to wait at least one year for acceptance, followed by up to two years of trials. The demanding requirements of the client explain why the paints and varnishes industry is spending large amounts of money on R&D activity and advanced technologies.

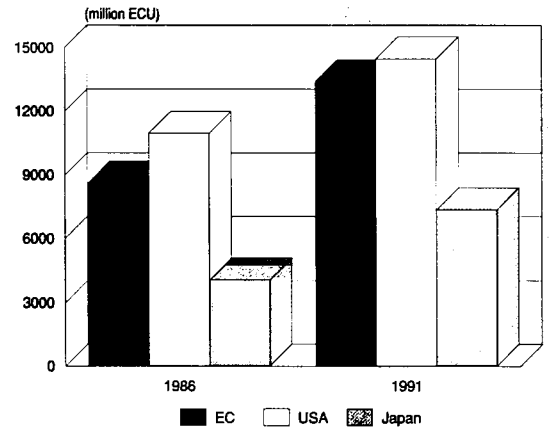
The market power of the industry's major industrial customers is strong. An extreme example is provided by the EC market of coil coating, (i.e. a decorative or protective coating on freshly produced metal before the main manufacturing step or construction process), which is dominated by major metal producers such as British Steel.

Production process

During the 1980s, the paint and varnish industry developed new products and adopted new applications driven by rationalisation in its client industries and environmental problems. "High solid" paint and powder fillers (which reduce the losses caused by overspray and allows recycling) are just two noteworthy examples.

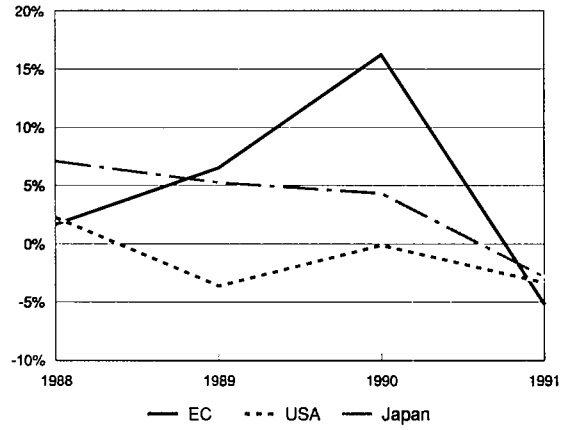
In the recent past, production in the EC has been hampered by a technical shortage of raw materials. The recent shortage and sharp rise in the price of titanium dioxide, which peaked at 2.56 ECU/kg in late 1989, has been followed by a situation of overcapacity that has caused prices to decrease to a level

Figure 3: Paints, varnishes and printing inks
International comparison of production at current prices



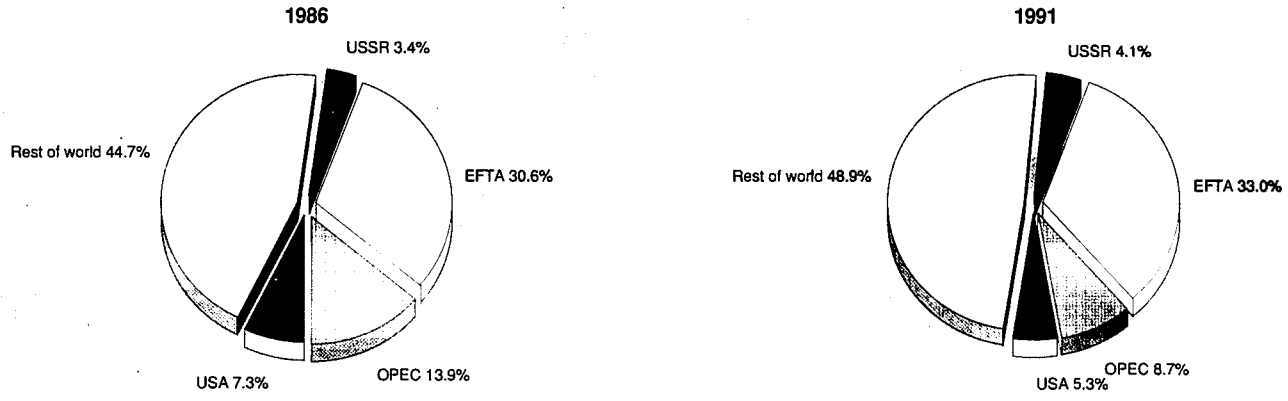
Source: CEPE, Census of Manufacturers

Figure 4: Paints, varnishes and printing inks
International comparison of production growth at constant prices



Source: CEPE, Census of Manufacturers

Figure 5: Paints, varnishes and printing inks
Destination of EC exports



Source: Eurostat

of 1.75 ECU/kg in 1992. This substance is at present the most widely used pigment, not only in white paint, but also in the lightening of most other shades.

Companies are also increasingly suffering from a lack of experienced technical staff, resulting from a mounting degree of complexity in the production process and the fall in the number of training facilities.

INDUSTRY STRUCTURE

Companies

All Member States have paint production plants, although a considerable number of these are to be found in the major EC countries. In 1989, the ten biggest paint and varnish companies held about one third of the world market.

Within the EC market, the leaders are ICI (UK) which is also the world's leading producer, BASF (D), Herberts (D, a Hoechst group company), Akzo (NL) and Courtaulds (UK). Another major European player is Nobel Industries (S).

Apart from major companies, there is still a large number of small and medium-size companies which survive through specialisation and a high quality of service.

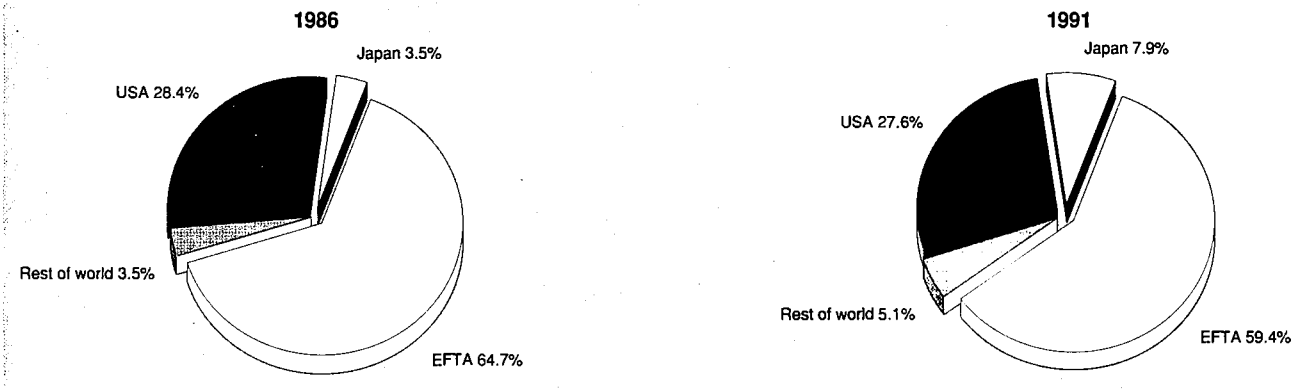
Unlike the paint and varnish sector, there is only a limited number of multinational firms in the printing ink industry. In general, production units in southern EC countries are considerably smaller (and often family-run) than in the northern Member States.

Strategies

On the world market, there are four true world players: ICI (UK), PPG (USA), BASF (D), and Courtaulds (UK), while other major companies such as Akzo (NL) and particularly Sherwin-Williams (USA) operate mostly at home.

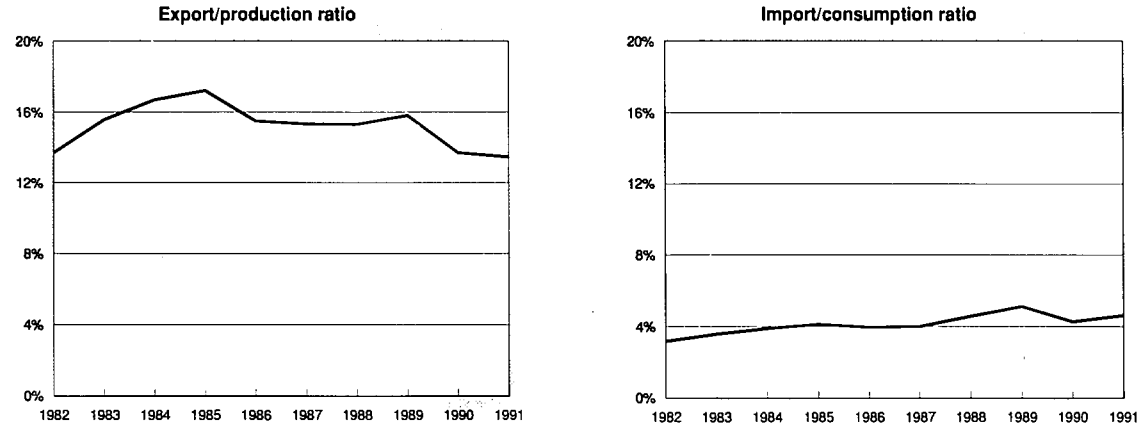
The sector has been characterised by an increasing number of acquisitions, which reflect the need to reach an adequate size to confront the concentration of distribution networks. The most important acquisitions in 1991 were Akzo's acquisition of MacPhersons' (UK) decorative business and Herberts' acquisition of Becker Powders (UK). However, paint and varnish companies are also frequently using joint ventures in order to gain access to new markets. In 1991, for example, Courtaulds and PPG set up a joint venture for aerospace and defence coating businesses in the United Kingdom and Italy, BASF and Nippon (J) did the same in the automotive coating business and ICI and Ferro (USA) followed suit in powder coatings.

Figure 6: Paints, varnishes and printing inks
Origin of EC imports



Source: Eurostat

Figure 7: Paints, varnishes and printing inks
Trade intensities



Source: CEPE, Eurostat

ENVIRONMENT

The main environmental issue affecting the sector is the emissions of volatile organic solvents which are used extensively in paints. Legislation in this area varies widely across the EC. German legislation calls for limits of 150 mg/cubic metre of carbon derived from organic vapours leaving the factory, while in the United Kingdom the limit is set at 50 mg/cubic metre. Although water-based paints are an alternative, they are more expensive and less durable than solvent-based varieties.

The industry is currently devoting a considerable share of its R&D expenditure to solve this problem and has already put forward some successful waterborne coatings. Another environmental concern is titanium dioxide, or white oxide. Paints, lacquer and inks represent around 60% of titanium dioxide consumption in the EC; in its natural state, it damages neither health nor the environment, but its refining is polluting.

As for printing inks, the use of non-aqueous solvents may pose problems similar to those encountered by the paint and varnish industry, even if the more limited number of professional users means that emissions can be controlled more effectively.

REGULATIONS

The EC Commission has put forward several directives on environmental pollution which concern the paint and varnish sector, all of them concerning titanium dioxide. As for solvents, they are not yet the subject of an EC directive.

In 1978, a Commission directive (78/176/EEC) was adopted with the aims of reducing pollution caused by waste and encouraging recycling. A second directive was adopted in 1982 (82/883/EEC) to ensure extensive prevention and to define procedures to control and monitor waste emissions into the environment, including the sea. Finally, in 1983 the Commission submitted a draft directive to harmonise programmes to reduce pollution caused by titanium dioxide using industries; however, in the absence of any consensus, the directive has not yet been adopted.

Table 5: Paints, varnishes and printing inks
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.2	3.2
Production	3.3	3.1
Extra-EC exports	4.3	3.0

Source: DRI Europe

OUTLOOK

Although the paints, varnishes and inks industry is not recession-proof, it is certainly recession-resistant: the steady need of these products by industrial users and by private consumers (professionals or households) means that there are always returns in good and bad times. At the moment, the main concern for the sector are the environmental protection regulations and the reliance of some raw materials upon the price of crude oil: both these elements can disrupt any increase in volume. Taking into account these factors, the growth rate for production in the paints, varnishes and inks sector as a whole is expected to reach around 3.1% per year in the period 1992-96.

Written by: DRI Europe
The industry is represented at the EC level by: European Confederation of Paint, Printing Ink and Artists' Colours Manufacturers' Associations / Confédération Européenne des Associations de Fabricants de Peintures, d'Encres d'Imprimerie et de Couleurs d'Art (CEPE). Address: Avenue Van Nieuwenhuysen 4, B-1160 Brussels; tel: (32 2) 676 7480; fax: (32 2) 676 7490.

Other specialty chemicals

NACE 256.1-256.7

Specialty chemicals are sold on a large number of small or niche markets, for a wide range of applications. Higher value-added, larger profit margins and growth characterise the sector, if compared to the basic chemicals. Competition is not only on price, but foremost on the ability to effectively render service to the client industries, through improving their production processes or products. Environmental concerns form another major drive for innovation in the sector. Partly because of this, the present performance and the prospects of the industry are less bleak than for many other parts of the chemical sector.

INDUSTRY PROFILE

Description of the sector

The manufacture of other specialty chemicals includes a number of products mainly destined for industrial purposes which are described below.

The manufacture of compressed gases (NACE 256.1) includes air gases, acetylene, propane, and carbon dioxide, as well as gas mixtures and various specialty gases (such as argon and other rare gases) that are supplied in smaller quantities in steel cylinders to customers primarily in the engineering industry. Applications in the medical sector include the supply of liquid nitrogen for the conservation of blood, cell cultures, bone marrow and organ transplants. It does not include the delivery of large volumes of primarily the air gases oxygen and nitrogen supplied by pipeline to the steel, chemical and glass industries, nor the gases in liquid form in medium quantities delivered to customers in road tankers.

The manufacture of glues and gelatine (NACE 256.2) includes gelatine, peptone, modified starches and glues. Glues can be subdivided in two types, liquid and solid glues. Liquid glues consist of a glue-based material liquefied with a solvent, which evaporates after gluing. Solid glues have to be activated by water, solvent or air before they can be used.

The chemical treatment of oil and fats (NACE 256.3) includes the processing of animal and vegetable fats and waxes into a wide range of applications. Their use as culture media and tabletting aids in pharmaceuticals, in cosmetics, as emulsifiers in food, as wire insulation in electronics, and for the removal of printing ink in paper recycling are just a few examples to demonstrate the variety of the application range. Other client sectors include animal feed, industrial lubricants, leather, mining, paints and coating, plastics and rubber production.

The manufacture of essential oils and of natural and artificial flavouring and perfume materials (NACE 256.4) includes essential oils such as lemon, orange and lime oils, geranium, jasmine, lavender and peppermint oils; flavourings, anti-oxidants, colourings, emulsifiers and stabilisers, and enzymes, all to be used as food additives.

The manufacture of explosives, pyrotechnic articles and matches (NACE 256.5) includes propellant powders, detonators, fuses, matches, flares and liquid gas fuels.

The manufacture of auxiliary products for the treatment of leather and textiles and the manufacture of tanning agents (NACE 256.6) includes surface agents (not soaps), lubricants, leather and skin treatments.

The manufacture of miscellaneous chemical products for industrial purposes (NACE 256.7) concerns the production of active carbons and activated earths: abrasive compounds, auxiliary products for use in mechanical engineering and metallurgy, natural resins and their derivatives, etc.

This chapter includes a wide variety of heterogeneous products, for application in a tremendous number of industrial and household uses. These chemical products differ considerably from other chemical products, in the way they are produced and marketed: production is often on a small scale, and more and more according to the specifications of one particular client; which is why specialty chemicals is a very service oriented sector and intricate understanding of the clients' products or production process is a prerequisite for successful marketing of the specialty products. R&D is not so much oriented towards new discoveries, rather towards the application of existing substances in new applications. Specialty chemicals are also characterised by profit margins which are often markedly higher than in the commodity chemicals business.

Main indicators

A general overview of the main indicators for the group of industries included in this chapter is not available. As a general remark, it can be observed that some specialty sales have inevitably felt the repercussions during recent years of the recession in their clients' business. On the other hand, many companies active in specialty chemicals have managed to boost sales in some segments, sometimes offsetting sales volume reductions that they underwent on larger volume markets.

International comparison

Specialty chemicals, with their relatively high value-added and high margins, seem to have attracted the Japanese producers into the market, until recently rather absent in the chemicals field. In the flavour industry, for example, the most significant recent growth has been in the Japanese industry

Table 1: Other specialty chemicals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	3 899	4 452	5 302	5 767	5 396	5 442	5 822	6 462	6 480	6 611
Extra-EC imports	2 012	2 192	2 662	2 835	2 788	2 733	3 074	3 408	3 587	4 072
Trade balance	1 888	2 261	2 640	2 932	2 609	2 709	2 748	3 054	2 893	2 538
Ratio exports/imports	1.94	2.03	1.99	2.03	1.94	1.99	1.89	1.90	1.81	1.62
Terms of trade	95.3	99.9	97.9	100.0	95.2	97.9	93.1	93.2	88.8	79.8
Intra-EC trade	4 945	5 622	6 744	7 323	7 194	7 589	8 070	9 129	9 813	10 384
Share of total imports (%)	70.7	71.6	70.9	69.6	69.9	70.5	70.0	71.0	72.3	71.1

(1) Estimates
Source: Eurostat

Table 2: Other specialty chemicals
Extra-EC exports at current prices by country

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
EC	3 899	4 452	5 302	5 767	5 396	5 442	5 822	6 462	6 480	6 611
Belgique/België, Luxembourg	214	259	313	347	320	308	321	359	379	364
Danmark	76	90	98	98	99	107	74	129	88	82
BR Deutschland	1 413	1 668	1 960	2 102	2 142	2 236	2 439	2 675	2 668	2 706
Hellas	30	27	35	41	17	9	6	9	7	9
España	N/A	N/A	132	151	105	96	107	111	113	125
France	636	683	821	965	864	851	864	958	964	1 008
Ireland	48	55	64	72	72	64	75	91	105	111
Italia	312	395	523	479	413	418	482	537	559	559
Nederland	292	358	437	503	485	459	462	556	512	521
Portugal	N/A	N/A	43	19	11	11	12	17	15	13
United Kingdom	759	789	876	990	868	882	980	1 018	1 073	1 112

(1) Estimates
Source: Eurostat

that is expanding into the international market as a global player.

Foreign trade

Extra-EC exports of specialty chemicals increased annually by 6% over the period 1982-91. Imports into the EC even rose faster, at 8.1%, in current terms, which was almost as fast as the increase in internal trade, which rose by 8.6% annually over the same period. The evolution of trade figures for the different countries do not show striking deviations from the general EC trend, although Germany experienced slightly higher than average import growth. Most of the exports of specialty chemicals are destined to the rest of the world and to the EFTA countries, whereas imports mostly originate from the USA and EFTA.

MARKET FORCES

Demand

Compressed gases

Though the weak economic growth in 1991 affected demand for industrial gases in general (including large volumes not part of this NACE) on the EC market, some specialty uses have fared better. Hoechst was able to profit from the favourable economic situation in Germany, which is the largest industrial gas market in Europe. The German company managed in 1991 to increase the quantities of oxygen and nitrogen sold for applications in the chemical industry, the electrical engineering sector, the food industry and environmental protection. This more than compensated for decreased volume sold in the steel sector.

Glues and adhesives

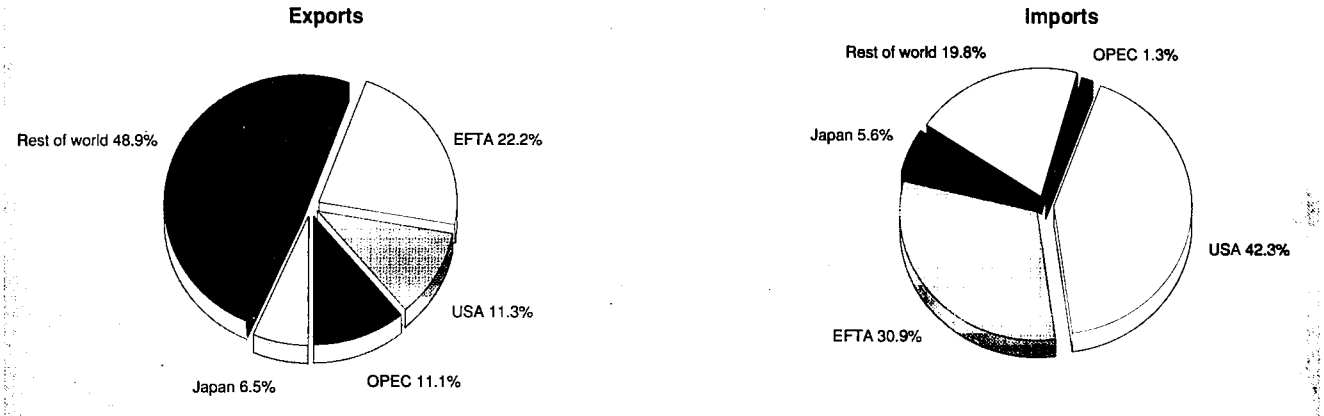
The industry sells to clients in four main customer groups: the construction industry, the furniture industry, the paper and packaging industry, and miscellaneous, which includes the automotive, electronic, shoe and cigarette industries. The manufacture of glues for office and household uses is included in NACE 259 (see the chapter on other chemical products). The sector experienced strong sales growth up to 1989, generated by the favourable economic situation worldwide. Other factors influencing the sales of glues are the development of new products, such as highly specialised metal and plastic glues, sold on niche markets where they replace common methods of connecting like nailing, screwing and welding. The application of glues in these sectors does not merely constitute a substitute material, but often becomes the starting point of technical innovation in the client sector; for instance, since gluing allows the usage of lighter and thinner materials, the construction of cars and aeroplanes with lighter materials becomes a possibility. Such increasingly targeted markets, in which customer needs are well understood, offer large sales potential and good growth prospects, even in periods of economic weakness.

Table 3: Other specialty chemicals
Extra-EC imports at current prices by country

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
EC	2 012	2 192	2 662	2 835	2 788	2 733	3 074	3 408	3 587	4 072
Belgique/België, Luxembourg	153	165	190	186	177	181	196	224	249	307
Danmark	58	67	82	78	78	74	74	76	79	76
BR Deutschland	434	506	661	815	766	797	873	957	992	1 157
Hellas	16	18	21	22	28	22	26	30	31	38
España	N/A	N/A	126	135	141	142	172	203	213	245
France	338	365	465	516	465	475	500	572	574	580
Ireland	28	29	34	55	63	47	46	72	68	111
Italia	182	212	237	268	267	319	423	434	439	537
Nederland	246	264	349	329	436	324	326	324	339	386
Portugal	N/A	N/A	22	20	21	27	30	31	34	39
United Kingdom	405	407	474	412	345	324	410	483	570	596

(1) Estimates
Source: Eurostat

Figure 1: Other specialty chemicals
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Chemical treatment of oils and fats

According to APAG, worldwide consumption of basic oleochemicals (fatty acids, fatty alcohols, glycerine) is estimated to be over 3.5 million tons. More than one third of this is produced in Western Europe. Basic oleochemicals are only an intermediate step in the total oleochemicals industry, a provider of jobs for over 10 000 people in Western Europe alone.

The diversity of markets for the oleochemicals is an important factor in the stability of the industry. The chemical possibilities of renewable oils and fats are rapidly being more and more exploited to take advantage of their ecologically safe properties. One example of current development includes ecologically safe lubricating and hydraulic oils (natural fatty acid esters which will replace non-biological base oils in important applications such as in agricultural machinery, forestry saws, outboard motors, etc.).

A great deal of research is going on to produce new ecologically acceptable surfactants for the detergents industry, such as new non-ionics, combining oleochemicals with other natural molecules. In this way markets are created for oleochemicals through technological advances and sometimes through surfactant substitution. Given the environmental pressure on several varieties of surfactants, specifically related to the toxicology and biodegradability of the product, there is a growing trend to use more natural feedstocks based on plant derivatives rather than petrochemicals. Such products are believed to be less environmentally damaging and are said to lead to milder consumer products for the domestic and personal care sectors.

In 1990, for Europe, the market for specialty surfactants was estimated at 840 million ECU, out of a total surfactant market of 1.82 billion ECU. Although growth in the overall surfactant market is steady, generally matching that of GDP of 1% to 2% per year, speciality surfactants average growth rates of 6% per year on average, with some sectors registering growth of up to 10% per year. Of the total surfactant demand in Western Europe, about one third (500 000 tons) goes into industrial applications, many of which can be classified as specialty. End-use sectors include textiles, polymers, petroleum additives, metal working fluids, agrochemicals and food.

Essential oils, flavouring and perfume materials

Company results show growing demand in this area, deviating from the weaker results of the commodity chemicals divisions in 1990 and 1991. Since the 1960s, the sociological revolution in the kitchen for convenience and speed has driven food flavourings industry growth. In 1990, the worldwide flavour market was valued at some 2.4 billion ECU. Demand, and the industry itself, is fragmented, taking into account the large variety of flavour profiles and their parameters for technologically efficient application (standardisation, purity, ease of handling, life time, etc.).

Auxiliary products for the treatment of leather and textiles

Dyes for the textiles industry have recently faced decreasing sales; sales of colourings to other industries show a mixed and sometimes more positive picture (printing inks, paints, plastics, etc.). The business in chrome chemicals, especially tanning agents for leather, is suffering from intense competition.

Supply and competition

The characteristics of the specialty market are the high functionality and specification of the product and lower volumes. On the whole, the specialty end of the market is not feeling the same degree of competitive pressure as the commodity end of the business. Product costs and sales prices are typically higher in specialty chemical business, as are value-added and margins. Purchases of specialty chemicals are often based on performance rather than on price. Technical development, especially product quality and consistency, is becoming one of the leading factors influencing competition on the market at present.

Specialty chemicals are manufactured according to precise specifications related to their final use. The products are constantly evolving to follow innovation in the client industries' products and processes. Detailed knowledge of the client's business, anticipation of the development of his market segment, and fast reaction to his needs are the clues to successful marketing in the specialties segment. For instance, the development by specialty chemical manufacturers of new stabilisers, that substantially increased the fluidity of plastics, have enabled plastics manufacturers to increase their production rhythm. In the same way, the formulation of liquid ultraviolet absorbers has enabled paint manufacturers to simplify production and to reduce costs.

Innovation in the specialty chemicals industry is characterised by minor transformations to existing products rather than by new inventions or breakthroughs. Another important driving force of innovation in the specialty chemical industry, is the urge towards the controlling of the toxic characteristics of the products, with clients increasingly eager to create a green image for their products.

When the product cycle reaches maturity, even the most performant additives eventually see their prices drop on the market. This may open new markets for the product. This has happened for the ultraviolet stabilisers, that, originally developed for the plastics industry, have now diversified into the rubber industry.

INDUSTRY STRUCTURE

Companies

Both fully integrated, large companies as well as small niche players are present on the specialty chemicals markets. By means of example, some of the larger companies present include ICI (UK) and Henkel (D) (specialty surfactants), Rhône-Poulenc (F) (flavourings), Atochem (F) (polymers for leather and textiles), Elf Aquitaine (F) (elastomers), Bayer (D) (dyes, pigments, optical brighteners), Hoechst (D) (food additives, pigments, industrial gases), and Tessenderlo Chemie (B) (food additives, gelatine).

Strategies

Marketing strategies differ across companies. Some companies follow a product-based approach whereby they try to use their chemical expertise to sell the product in an as wide range of end-products as possible. Another strategy is to focus on end markets, such as agrochemicals or textiles, rather than on products. This has the advantage of a closer rapport with the client industry, which is important given the service orientation of much of the specialties business.

Product innovation strategies are directed towards minor transformations of existing products, rather than on true discoveries. The research is often oriented in the direction of a better controlling of the toxic consequences of the products and their adaptation to automated production processes. To remain profitable, the companies have to decline/reject the possible development of a lot of products and extend the possible application range of those they do develop.

ENVIRONMENT

In the industry of specialty chemicals, environmental protection constitutes one of the foremost lines of action to steer research and development of new products. Minimising toxicity has become a criteria for innovation that is as important as efficiency. The industry is bound to follow and even anticipate EC and national environmental regulations that are ever becoming stricter under pressure of the public opinion.

A lot of products containing solvents (e.g. adhesives, paint) have already been abandoned, and pigments based on heavy metals are undergoing the same fate. The strict legislation in these areas has become a real stimulus for researchers to find substitutes/alternatives for lead, cadmium and molybdenum. The same holds for additives for paint, varnish and plastics. The use of plant-based surface agents instead of petrochemicals is another example of the use of a renewable raw materials leading to a less toxic end product.

REGULATIONS

Developments on regulatory matters at the EC level concerning the industry included work on the control of movements of waste (e.g. the transport of spent carbon for activated carbon producers), the harmonisation of food additive regulation developed by the EC Commission (flavourings, gases for use in the food industry), and the EC directive on plastic materials which come into contact with foodstuffs (fatty acids). The explosives industry has advised the EC Commission on a harmonised base for approval by the EC Commission for release on the market of explosives for civil use, including an effective system of transborder control after abolition of current border controls. Legislation affecting the industrial gases subsector includes the pressure equipment directive (industrial gases), the standardisation of gas cylinders by the technical committee CEN TC 23 (industrial gases), and the drafting of guidelines by EIGA to comply with EC classification and labelling directives.

OUTLOOK

Specialty chemicals face a bright future. The industry is expected to realise high growth and profit margins, rather comparable to the pharmaceuticals industry, and unlike the commodity chemicals. One factor at play in the success of the industry is the general tendency towards more technologically oriented products which is believed to be maintained in the future. Public demand for more environmentally friendly products is a second factor that tends to favour specialty production growth. Lastly, the industry has not fully exploited the excellent possibilities in product development, which is a major factor in the expansion of existing markets and in the development of new markets.

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The industry is represented at the EC level by: European Industrial Gases Association (EIGA). Address: Avenue des Arts 3-4-5, B-1040 Brussels; tel: (32 2) 217 7098; fax: (32 2 219 8514); and,

Federation of European Adhesives Manufacturers / Fédération Européenne des Industries de Colles et Adhésifs (FEICA). Address: Ivo Beucker Straße 43, Postfach 230169, D-4000 Düsseldorf 1; tel: (49 211) 679 3130; fax: (49 211) 679 3188; and,

European Association of Fatty Acid Producing Companies / Association Européenne des Producteurs d'Acides Gras (APAG); and European Fragrance and Flavour Association (EFFA); and Federation of European Explosives Manufacturers (FEEM). Address: c/o CEFIC, Avenue E. Van Nieuwenhuyse 4; B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

Agrochemicals
NACE 256.8

The EC is the world leading producer of agrochemicals for crop protection. The EC also maintains a favourable balance in world agrochemical trade, with exports almost twice imports. Growth is forecast in the European crop protection market, driven in particular by a continuing increase in demand from the developing nations.
The prospects are rather different in the field of fertilizers where the EC is confronted by stiff competition from East European and North African countries. The depressed market, along with the crisis of overcapacity continue to affect the performance of the European fertilizer industry. It is committed to further restructuring in order to improve profitability.

INDUSTRY PROFILE

Description of the sector

According to NACE 256.8, the agrochemical industry can be defined as the manufacture of chemical products for agricultural purposes. There are two major branches within agrochemicals: fertilizers and chemical products for crop protection.

The fertilizer industry produces and markets both single nutrient fertilizers (comprising either nitrogen, potash, and phosphate processed from imported mineral rock) and various compound fertilizers (containing mixtures of nitrogen, potash and phosphate).

Chemicals designated for crop protection include pesticides, fungicides, herbicides, and plant growth regulators, and many new biotechnological products used to protect plants against disease and pests, currently under development.

Main indicators

Crop protection

The EC is the largest producer of agrochemicals designated for crop protection, with France constituting the major EC market and the third biggest market in the world, after the United States and Japan. In 1990, the West European plant protection market was estimated at around 7 916 million USD, that is 30% of the world market. In comparison, the US market accounts for 7 050 million USD.

Fertilizers

The market for fertilizers has been particularly depressed over the last several years, suffering from problems of overcapacity combined with weak demand. Consumption of fertilizer has been static or declining in the EC throughout the 1980s. Since 1986, consumption has been on a slow downwards path taking it below 10 million tonnes per year. 1992 is likely to see an acceleration of this decline as farmers use less in response to CAP reforms. The fertilizers industry is also suffering from an increasing trade deficit. Extra-EC imports which have grown steadily throughout the eighties, reached 1.26 billion ECU in 1991 and are about two and a half times the level of extra-EC exports. As a result, since 1988, production of fertilizers has fallen steadily in the EC, both in real terms and in current prices, and the decline has been sharper than for consumption. Nitrogen production peaked in 1984 with output of 10 million tonnes. In 1990 output was well below 9 million tonnes. Nitrogen production is the largest of the three main fertilizers, followed by potash and phosphate with respectively 4.8 million tonnes and 3.2 million tonnes output in 1990.

International comparison

Crop protection

The EC is the leader in the market of agrochemicals for crop protection. France, Italy, the United Kingdom, Spain, West Germany, Denmark and the Netherlands constitute the major markets in the Community. In terms of real growth, EC countries accounted for five of the top six agrochemical markets in 1990. Overall, the EC is the world's largest market for agrochemicals, with about 30% of the total, with the USA in second place with nearly 24% of the world market. Assuming that volumes and prices in the world market remain more or less stable and proportional to crop acreage, the EC should continue to be the world leader in the crop protection market in the 1990s.

Fertilizers

The European fertilizer industry accounts for 12% of world fertilizer production and is the fourth largest world producer after the former Soviet Union, the USA and China.

Foreign trade

Crop protection

The EC is a net exporter of crop protection products, and the European trade surplus kept on increasing until 1985. Since that peak, the EC has been losing market shares abroad, causing the trade surplus to decline. Extra-EC exports are indeed growing only slightly (by less than 4% in 1991, compared to much higher growth in the early eighties). Import growth has been consistently stronger than export growth throughout the 1980s.

While in 1986, the USSR was the EC's most important export market, this region's share of total EC exports had almost halved to 11% by 1991. The OPEC and EFTA countries are now at the top of the list of EC export markets. The "rest of the world", however, remains the biggest destination of EC exports.

Concerning imports, the most important competitors for EC agrochemical firms are the EFTA countries (with more than 50% of total extra-EC imports), followed by the USA.

The share of intra-EC imports in the total remains important (over 75%) although slightly lower than its peak recorded in 1986.

Fertilizers

The scheme is rather different in the field of fertilizers. A trade deficit has been existing since the early 1980s but it has widened in the past few years, reaching 790 million ECU in 1991. The worsening trade balance is due both to rising imports and falling exports. In 1991, extra-EC imports exceeded 18% of demand while the share of extra-EC exports in production fell to 7%. Both trends look set to continue with particular pressure on the import side as the EC producers have to compete with CIS producers that benefit from considerably lower gas prices.

MARKET FORCES

Demand

Demand for agrochemicals is directly linked to the dynamism of the agriculture sector, which represents almost its only end-market. Demand will thus benefit from any implementation of new techniques in the farm industry, which are aimed at improving the acreage yield. Economic and regulatory factors represent other important parameters influencing demand for agrochemicals. Indeed, demand will be constrained by measures exerted on the farm industry, like the removal of Monetary Compensatory Amounts (MCA) or the reform of the Common Agricultural Policy, which have direct effects on the volume of agricultural production. Economic factors

Table 1: Fertilizers
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Apparent consumption	6 543	6 493	7 355	8 199	8 088	7 012	7 150	7 323	7 087	6 900
Production (2)	6 500	6 400	7 300	8 100	7 600	6 500	6 700	6 600	6 300	6 015
Extra-EC exports	586	667	856	935	549	520	579	489	437	475
Trade balance	-43	-93	-55	-99	-488	-512	-450	-723	-787	-790

(1) Eurostat estimates for trade, DRI Europe estimates for production and consumption
(2) Manufactures made from imported semi-finished products are not included in Community production
Source: EFMA, Eurostat

Table 2: Fertilizers
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	586	667	856	935	549	520	579	489	437	475
Extra-EC imports	629	759	910	1 034	1 037	1 032	1 029	1 212	1 224	1 265
Trade balance	-43	-93	-55	-99	-488	-512	-450	-723	-787	-790
Ratio exports/imports	0.93	0.88	0.94	0.90	0.53	0.50	0.56	0.40	0.36	0.38
Terms of trade	103.1	97.2	104.0	100.0	58.6	55.7	62.3	44.6	39.5	41.6
Intra-EC trade	1 425	1 598	1 801	1 903	1 730	1 643	1 655	1 879	1 888	1 679
Share of total imports (%)	68.9	67.6	66.4	64.8	62.5	61.0	60.6	60.0	60.6	56.9

(1) Estimates
Source: Eurostat

Table 3: Agrochemicals for crop protection
Sales by area and product, 1990

(million ECU)	Herbicides	Insecticides	Fungicides	Other	Total
USA	3 683	1 132	365	344	5 525
W. Europe	2 361	1 289	2 047	506	6 204
Far East	1 342	1 806	1 234	165	4 547
Latin America	799	556	261	63	1 679
E. Europe	776	447	306	90	1 618
Rest	149	768	132	67	1 033
World total	9 111	5 999	4 346	1 234	20 690

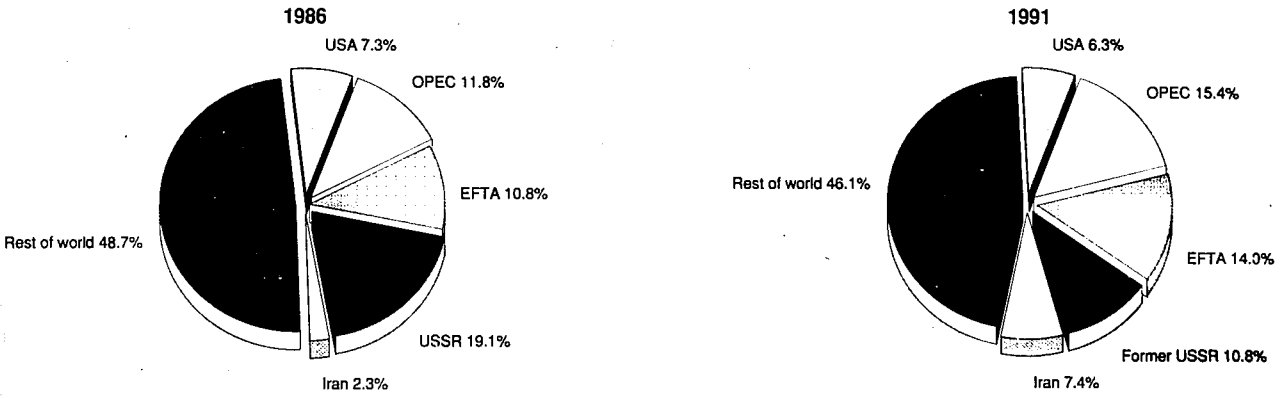
Source: County NatWest WoodMac and DRI Europe

Table 4: Agrochemicals for crop protection
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 074.7	1 242.6	1 527.1	1 732.9	1 599.9	1 380.0	1 342.9	1 404.2	1423.0	1 478.7
Extra-EC imports	257.1	301.3	374.2	426.3	378.5	392.0	461.2	571.0	593.6	633.2
Trade balance	817.6	941.3	1 152.9	1 306.6	1 221.5	988.1	881.7	833.2	829.5	845.5
Ratio exports/imports	4.18	4.12	4.08	4.07	4.23	3.52	2.91	2.46	2.40	2.34
Terms of trade	102.8	101.5	100.4	100.0	104.0	86.6	71.6	60.5	59.0	57.4
Intra-EC trade	979.6	1 091.9	1 412.9	1 518.3	1 521.9	1 476.9	1 628.4	1 932.5	2 162.0	2 211.0
Share of total imports (%)	79.2	78.4	79.0	78.0	80.0	79.0	77.8	77.1	78.1	76.8

(1) Estimates
Source: Eurostat

Figure 1: Agrochemicals for crop protection
Destination of EC exports



Source: Eurostat

such as labour costs in the farm industry may contribute to a varying picture of demand across countries: for example, herbicides, which are the largest product group and also the most rapidly growing market segment in Europe, are particularly useful (and largely used) in developed countries where labour is expensive. Indirectly, population growth constitutes a major factor influencing demand for agrochemicals, which provide a certain guarantee to maintain sufficient food resources for the growing world population. Climatic conditions have also a significant effect on demand for agrochemicals. Indeed, insecticides for example are more used in southern EC Member States such as Spain and Greece than in the northern countries (especially orchards). On the contrary, fungicides which are used to control fungal diseases mainly in high value crops, are increasingly used in the northern Europe experiencing high rainfall and a cool climate.

Supply and competition

Crop protection

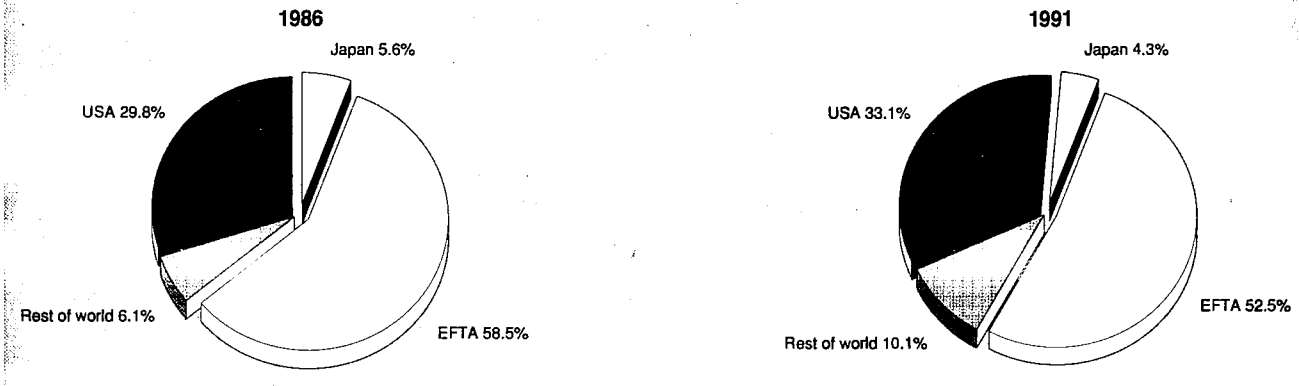
Competition between companies is particularly tough in the crop protection industry. The EC manufacturers hold a strong advance in terms of research and development, thanks to important investments in this activity. Numerous take-overs occurred over the recent years, through acquisitions and mergers, with plant biotechnologies as main targets.

Fertilizers

The fertilizer industry is very sensitive to the vagaries of world supply and demand and to global competition. Competition is mainly coming from developing countries, which enjoy large resources of natural gas and natural phosphates. Eastern countries have also been important competitors as they are looking for foreign exchange earnings through the marketing of fertilizers. As the sector is not high-technology intensive, the EC does not have any particular competitive advantage in the field of fertilizers and is hardly hit by these countries' competition.

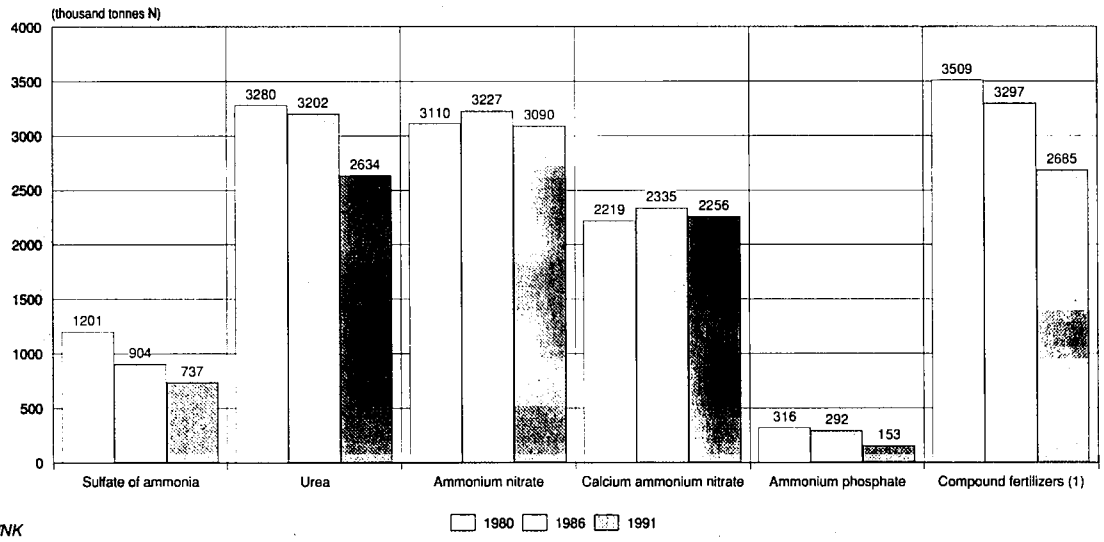
Profitability has been very low for EC manufacturers since 1980. Massive restructuring and downsizing has already taken place. Employment in the EC stood at 110 000 in 1983. By 1991 this had been reduced to 40 000, a fall of almost two third. EC production capacities have fallen since 1980; very sharply for mixtures of nitrates and phosphates, much less so for ammonium nitrate. On the other hand, capacity has increased in the rest of the world although ammonium nitrates has seen much less growth. The EC has retained its share of the world capacity for the latter product but seen a large decline for urea, sulfate of ammonia and compound fertilizers.

Figure 2: Agrochemicals for crop protection
Origin of EC imports



Source: Eurostat

Figure 3: Fertilizers
Nominal capacity in the EC



(1) NP/NPK/NK
Source:CMC-Engrais, Eurostat

Production processes

Crop protection

The main feature which characterises recent trends in the crop protection industry is the increasing share of research and development in total sales. On average, the top twenty companies committed 9.7% of total sales to R&D in 1990. Biotechnology has emerged as a key area of research. The main thrust of this research is in the area of plant genetics and the development of biopesticides. Genetic engineering techniques have made traditional plant breeding far more efficient and sophisticated. New plant varieties are being developed with features such as: resistance to pests and disease; resistance to herbicides; resistance to frost or drought; and improved product quality.

Research in biotechnologies will not noticeably reduce total agrochemicals sales, but will cause modifications to the type of products and to the competitiveness of those involved. The products distributed will be safer for the environment and give stronger pest control, whilst the first results of biotechnology research should appear on the European market early this decade.

Fertilizers

Fertilizer plants are often large, integrated operations that process raw materials into inputs for other industrial sectors. These inputs include ammonia, nitric acid, urea, ammonium nitrate, sulphuric acid and phosphoric acid.

The industry is highly dependant on its supplies of raw materials, hydrocarbons (particularly natural gas) and natural phosphates. The sector manufactures heavy and low value added products, for which the production process is quite simple. Fixed costs are an important element of the cost structure as the industry is highly capital intensive. On average, they account for about two-thirds of total costs.

Table 5: Agrochemicals for crop protection
Breakdown of external trade at current prices, by product

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports										
Insecticides	502.7	608.0	768.7	761.6	629.2	541.3	529.0	544.1	500.5	541.6
Herbicides	303.8	289.3	362.0	433.3	383.3	355.6	350.5	351.5	384.8	427.3
Fungicides	177.8	232.4	260.9	396.9	448.5	328.3	328.0	385.7	395.7	374.2
Plant growth regulators	90.4	112.9	135.5	141.2	139.0	154.8	135.5	122.9	142.0	135.7
Extra-EC imports										
Insecticides	53.1	68.6	94.7	96.4	89.9	76.4	96.1	120.6	133.9	128.3
Herbicides	110.7	131.0	168.9	152.4	132.5	168.2	191.2	246.4	252.3	282.5
Fungicides	78.4	80.2	87.4	151.9	120.0	106.9	137.2	180.0	177.7	197.6
Plant growth regulators	14.9	21.5	23.2	25.5	36.0	40.5	36.7	24.0	29.7	24.7
Intra-EC trade										
Insecticides	181.5	239.1	291.2	265.0	260.2	281.3	315.6	357.7	410.4	410.6
Herbicides	464.4	447.9	562.8	640.6	688.9	678.0	761.6	863.4	954.6	1 035.4
Fungicides	254.1	317.5	430.2	483.7	439.0	382.2	442.5	574.7	680.7	619.7
Plant growth regulators	79.5	87.3	128.8	129.0	133.8	135.3	108.6	136.7	116.3	145.3

(1) Estimates
Source: Eurostat

Table 6: Agrochemical industry
World's leading companies

(million ECU)	Agrochemical sales	as % of total sales
Ciba Geigy (CH)	2 216	18.2
ICI (UK)	1 799	9.2
Bayer (D)	1 754	12.9
Rhône Poulenc (F)	1 570	8.0
Du Pont (USA)	1 386	4.4
Dow Elanco (USA)	1 194	100.0
Monsanto (USA)	1 182	16.8
Hoechst (D)	1 122	4.8
BASF (D)	1 039	4.2
Schering (CH)	7442	3.9

Source: Financial Times, June 1992 and Statistical Supplement to the Panorama of EC Industry 1991/92

In terms of research, the fertilizer industry is looking at methods of fertilizer application that ensure usage is more efficient and environmentally friendly.

INDUSTRY STRUCTURE

Companies

Crop protection

Taking into account the research and development capacity and the production levels or distribution network, the number of companies of importance in the agrochemical industry was estimated to about 40 world-wide in 1985. The majority of agrochemical manufacturers are located either in the USA, Japan or Western Europe. Nearly all these firms are multinational chemical companies whose agrochemical segments represent a relatively small part of the total sales of the group to which they belong.

Ciba-Geigy (CH) is considered as the leading producer of herbicides with an estimated world market share of 13%. Monsanto (USA) is the second largest herbicides producer, with 8%, followed by Bayer (D) and BASF (D) with 7% each. In the field of insecticides, Bayer and Rhône-Poulenc (F) are the leaders, followed by FMC and Hoechst (D). In fungicides, the main companies are Bayer (18% of the world market), Ciba-Geigy, Rhône-Poulenc, Du Pont (USA), BASF and Sandoz (CH).

Fertilizers

The fertilizer industry is also concentrated. Between 1980 and 1991, the wave of mergers and acquisitions has lead to the industry seeing seven companies responsible for more than 80% of production. These seven are: Norsk Hydro (Norway), Kemira Oy (Finland), BASF (D), Grande Paroisse (F), Enimont (I), DSM (NL) and FESA (E). Norsk Hydro and Kemira Oy have the largest capacities in the EC.

Strategies

As farmers demand more and more environment-friendly chemicals to treat their crops, agrochemical industrials are committed to ensure they meet new higher regulations. As this constraint is particularly costly in terms of R&D, not all of the industrials are keen at investing in this field. As a result, restructuring is most likely to take place, mainly in the form of joint-ventures, at least for the largest groups. Restructuring has, actually, already begun, like Schering which tried (but finally failed) to set up a venture with Sandoz; other significant groups are looking at the possibility of building up niches either in particular product area or geographical.

The EC fertilizer industry is committed to a huge restructuring and rationalisation process both within national borders and at EC level. Sales networks have been developed in all countries. Plants have been shut down and production concentrated at the most favourable locations in terms of supply and outlets. Investments have been made in order to improve efficiency and productivity (especially to optimise the use of energy) to produce the best fertilizers and market them in the best way.

REGIONAL DISTRIBUTION

The EC represents about 31% of the total agrochemical market value. France, Italy, the United Kingdom, Spain and Germany are the largest producers in the EC, and are also the largest consumers of plant protection chemicals, using about 95% of the herbicides, 97% of the fungicides and 77% of total pesticides consumed in Europe.

France, together with the US and Japan, is one of three countries representing half the world herbicides market, and accounted for 10% of the world herbicides sales in 1990. Today, the largest EC market is herbicides, except in of Italy, where fungicides sales exceeded herbicides in 1990.

ENVIRONMENT

Whilst respecting environmental needs, the industry must also balance its role of crop protection and the maintenance of reliable food supplies. Advances in the agrochemical industry are critical in order to limit the risk of agricultural disasters but also to limit the already important losses recorded in potential food production world-wide, due to pests diseases and weeds (about 30% of the total). The big challenge facing the industry now is thus to find an adequate balance between the respect of green policies and the production needs of modern agriculture. Major resources are invested by the industry each year in this objective. As a matter of fact, for every new product tested, only one in 15 000-20 000 is marketed.

The chemical origin of fertilizers, along with the fact that they are spread on the majority of cultivated land also raises questions as to their effects on the environment and the food chain. If spread in the right amount and at the right time, the fertilizers cover the plant's nutritive needs and are absorbed nearly completely. The presence of nitrates in water and of cadmium in the soil are matters of particular care and although their levels currently recorded do not constitute a health hazard, the fertilizer industry is committed to preventing their increase and, if possible, to reduce them.

REGULATIONS

The most important concern facing the agrochemical industry is the recently signed Common Agricultural Policy reform. The core of the reform is a shift away from price support mechanisms, in favour of direct compensatory payments to farmers. This measure, which covers about 75% of total farm production under CAP regulation, entail full compensation of farmers for reduction in prices. To further limit supply, it will be accompanied by a compulsory land set-aside scheme for cereals, oilseeds and protein crops. Indeed, invoking the fact that compensatory payments could give less incentive to raise production than high output prices, reform of the CAP could cut agrochemical sales by about 20%, according to industry sources. Nevertheless, Agra Europe, an independent agency, is casting some doubts on this conclusion. According to Agra Europe, the reform is unlikely to bring about steep falls in EC production of cereals, and thus to have such a dramatic effect on agrochemical sales.

Anyway, this reform, along with the establishment of the single European market is going to increase competition in the ag-

rochemical field. As a result, the number of participants is likely to decrease. Also, it is hoped that some cost gains can be achieved by the industry through regulatory harmonisation and efficiencies to offset the expected lowering of prices foreseen in some Member States.

The EC's agrochemicals registration directive, adopted by the Council in July 1991 (another directive set up in the view of the single European market), is expected to bring about significant changes in the regulatory control of crop protection products. This measure is aiming at harmonising approval procedures across Europe, setting a European system for active ingredient registration and encouraging mutual recognition of national product approvals by the remaining Member States. So far, the diversity of national product registration requirements have represented important costs for the industry when launching new products.

OUTLOOK

Lower growth of agrochemicals is expected in the European countries, as a result of the CAP reform. Competition between companies will continue to increase, all the more so as R&D costs are becoming increasingly important. Further concentration will occur through mergers and acquisitions, principally in the field of biotechnologies.

The European fertilizer players will have to cut capacities further in order to improve their profitability. Further changes in the ownership structure are to be expected also, with more consolidation.

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European Fertilizers Manufacturers Association (EFMA). Address: Avenue E. Van Nieuwenhuyse 4, B-1160 Brussels; tel (32 2) 675 3550; fax: (32 2) 675 3961.

Soaps and detergents, perfumes and toiletries
NACE 258

The combined sector of soaps and detergents, and perfumes and toiletries was characterised by steady growth during the 1980s. From 1989 onwards there has been an acceleration in real output growth of the sector due to the introduction of some innovative products (e.g. liquid laundry detergents, enhanced skin care products). The consumption of the industry's products is closely linked to the standard of living, but also to individual tastes and fashion, hence the relative importance of marketing and R&D activity.

INDUSTRY PROFILE

Description of the sector

NACE 258 is divided into two product categories:

- the manufacture of soap and synthetic detergents (NACE 258.1) which covers toilet, household and industrial soaps and washing products, surface cleaners and washing powders; and,
- the manufacture of perfumes and toilet preparations (NACE 258.2) which covers hair products, beauty products, toiletries for men and women and alcohol-based products.

Although being grouped in a common NACE, the two subsectors differ substantially in terms of industry structure and recent trends and will therefore be considered separately when possible.

Main indicators

Production in the soaps and detergents sector is dominated by laundry and surface cleaning products which together account for nearly 90% of NACE 258.1. Among surface and scouring products, liquid products and laundry washing powders together represent more than 90% of total production. The five main EC countries (respectively, by share of production, Germany, the United Kingdom, Spain, France and Italy) account together for more than three quarters of total production of soaps and detergents.

The breakdown by country reveals that Germany, France and Italy (in this order) are the largest producers of perfumes and toiletries, together accounting for two thirds of total ex-factory sales. The breakdown by product line shows that beauty and care products account for nearly 30% of ex-factory sales, followed by hair products (about 25%) and toiletries (around 20%).

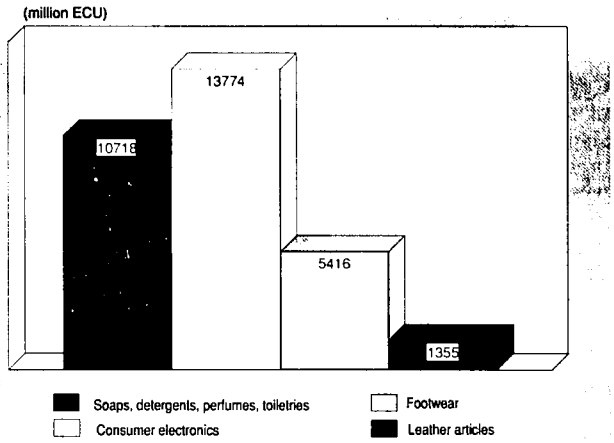
Recent trends

During the 1980s, the combined sector of soaps and detergents, perfumes and toiletries performed well: all the main indicators increased steadily, with the exception of employment. The workforce dipped to its lowest level in 1986 although it has since recovered such that by 1991, employment was 13 000 people more than in 1986, an overall increase of 6.3%.

International comparison

The EC is the world's largest producer of soaps and detergents, perfumes and toiletries. In 1991, EC production was some 40% higher than that of the USA and nearly four time the size than that of Japan. Figure 5 shows that, during the 1988-1991 period, EC production grew at fairly strong rates of growth of more than 4% per year in volume, while production growth in both the USA and Japan was more variable.

Figure 1: Soaps and detergents, perfumes and toiletries Value added in comparison with other industries, 1991



Source: Eurostat

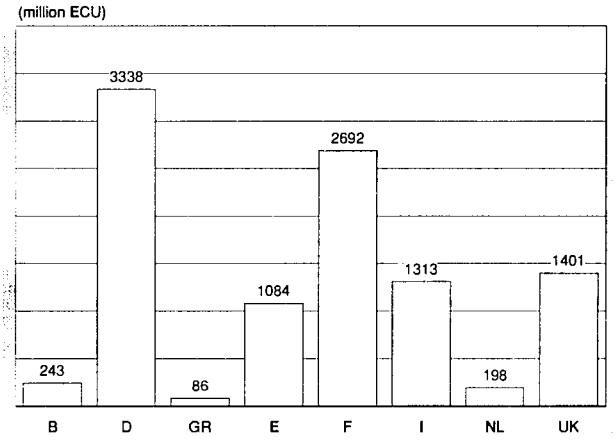
Foreign trade

The EC industry has widespread export markets for soaps, detergents, perfumes and toiletries. Among the most important export markets are the developing countries (which absorbed about 40% of total extra-EC exports in 1991) and the EFTA countries (about 30% in the same reference year). As for extra-EC imports, the EC's main external suppliers in 1991 were again the EFTA countries (nearly 50% of total imports) and the USA (about 30%).

In the soaps and detergents segment, the level of foreign trade is relatively unimportant, although the exports/imports ratio is positive (about 4.9): in 1991 for a total export value of 978 million ECU, the EC imported soaps and detergents to the value of 199 million ECU. Intra-EC trade grew sharply in 1991 compared to 1990, reaching a level of 1 529 million ECU, an increase of 12.5% over the previous year.

The internal structure of trade has remained unchanged in the last two decades: the EC mainly exports washing, surface cleaning and scouring products and toilet articles, but very few domestic and industrial cleaning products. With regard to imports, washing, surface cleaning and scouring products account for about 60% of the total.

Figure 2: Soaps and detergents, perfumes and toiletries Value added by Member State, 1991



Source: Eurostat

Table 1: Soaps and detergents, perfumes and toiletries
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	16 842	18 695	20 852	21 657	22 489	24 104	26 053	28 570	31 626	34 623	35 454
Production	18 188	20 175	22 601	23 678	24 441	26 085	28 185	31 199	34 457	37 516	38 378
Extra-EC exports	1 533	1 690	1 992	2 311	2 250	2 342	2 590	3 164	3 415	3 631	3 762
Trade balance	1 346	1 480	1 749	2 021	1 952	1 981	2 133	2 629	2 831	2 893	2 924
Employment (thousands)	194.8	194.0	195.5	190.2	190.9	196.0	197.9	202.6	203.4	203.0	203.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Soaps and detergents, perfumes and toiletries
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.2	5.2	4.8
Production	4.4	4.9	4.8
Extra-EC exports	6.6	3.9	4.8
Extra-EC imports	7.1	12.8	10.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Soaps and detergents, perfumes and tolletries
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 533	1 690	1 992	2 311	2 250	2 342	2 590	3 164	3 415	3 631
Extra-EC imports	187	210	243	290	298	361	457	535	584	738
Trade balance	1 346	1 480	1 749	2 021	1 952	1 981	2 133	2 629	2 831	2 893
Ratio exports/imports	8.21	8.06	8.19	7.97	7.55	6.49	5.67	5.91	5.84	4.92
Terms of trade index	101.8	100.6	101.3	100.0	104.2	106.6	100.4	101.0	100.1	100.7
Intra-EC trade	1 427	1 623	1 920	2 183	2 369	2 676	3 056	3 398	3 926	4 552
Share of total imports (%)	88.4	88.5	88.7	88.2	88.8	88.1	87.0	86.4	87.0	86.0

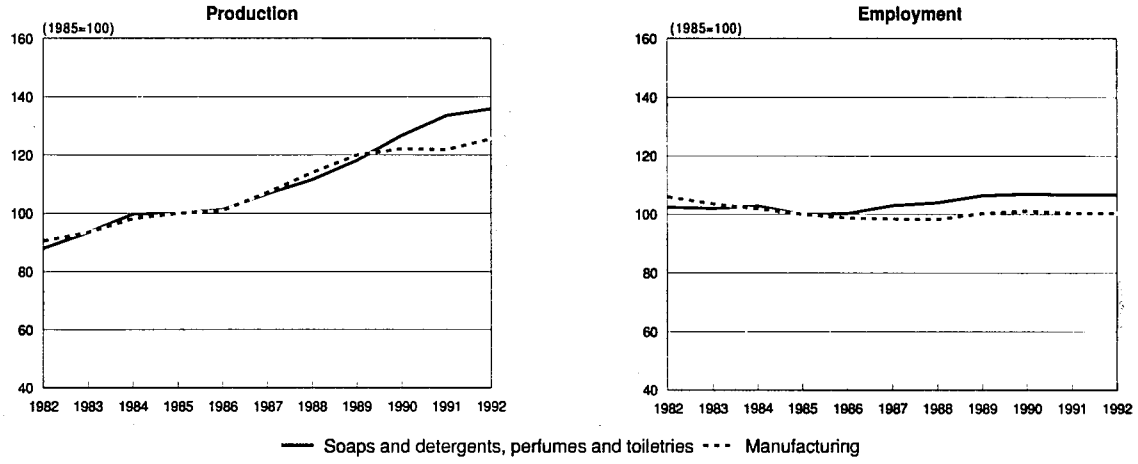
(1) Estimates
Source: Eurostat

Table 4: Soaps and detergents, perfumes and toiletries
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	39.1	41.4	42.1	44.3	46.9	48.6	49.2	46.4	51.2	52.8
Productivity index	88.3	93.5	95.1	100.0	105.9	109.7	111.0	104.7	115.4	119.1
Total unit costs index (4)	74.5	86.3	95.2	100.0	101.9	104.9	113.3	125.0	136.4	148.4

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Soaps and detergents, perfumes and toiletries
Production and employment indices compared to EC manufacturing



Source: Eurostat

By contrast, the perfumes and toiletries segment is more export-oriented, and in 1991 it accounted alone for nearly 75% of the sector's total extra-EC exports. Although its export/import ratio is the same as the soaps and detergents segment (4.9 in 1991), extra-EC exports totalled around 2 600 million ECU in 1991, while extra-EC imports reached 540 million ECU.

Overall, the combined sector of soaps, detergents, perfumes and toiletries is much more export intensive than import intensive; close to 10% of EC production is exported, a share that has remained fairly steady throughout the 1980s while the share of imports in consumption is less than 3%.

MARKET FORCES

Demand

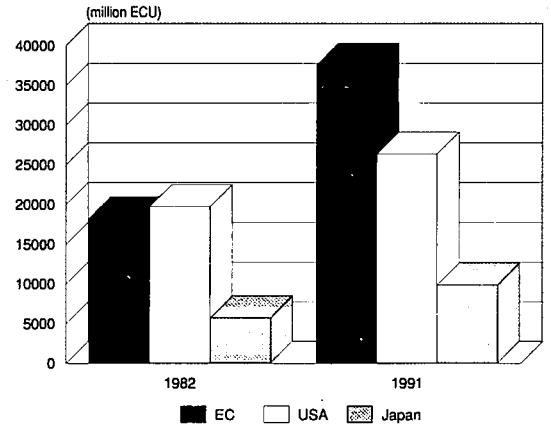
The great majority of soaps, detergents, perfumes and toilet products is sold to households and individual consumers, although for the soap and detergent industry hotels, restaurants and institutional outlets are also important end markets. For both subsectors, marketing and sales promotion play an important role in defining consumer needs and account for a substantial part of total investment.

Soaps and detergents

Soap and detergent consumption is closely linked to the standard of living, but is also influenced by the introduction of new products. During the last few years emphasis on energy conservation combined with the need to take great care of delicate materials has produced a marked trend towards washing laundry at lower temperatures. The introduction of products operating at lower temperatures has reinforced this evolution in demand; liquid detergents in particular, which are easy to use, provide such an example. On average, they represent 18% (by value) of the EC market of detergents.

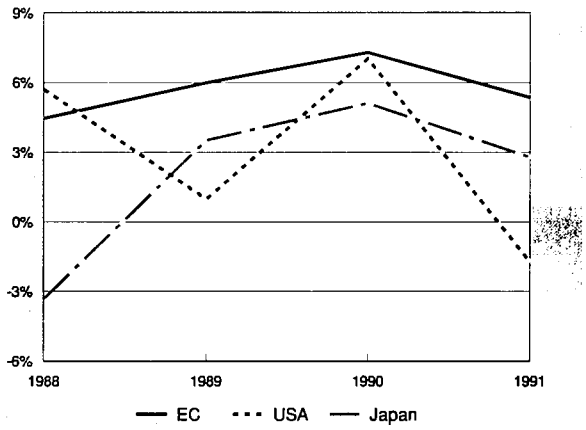
In addition to changes in consumer tastes over time, EC manufacturers must deal with wide differences in habits depending on the country in which they are selling. History and climate conditions can considerably influence consumer needs and demand.

Figure 4: Soaps and detergents, perfumes and toiletries
International comparison of production at current prices



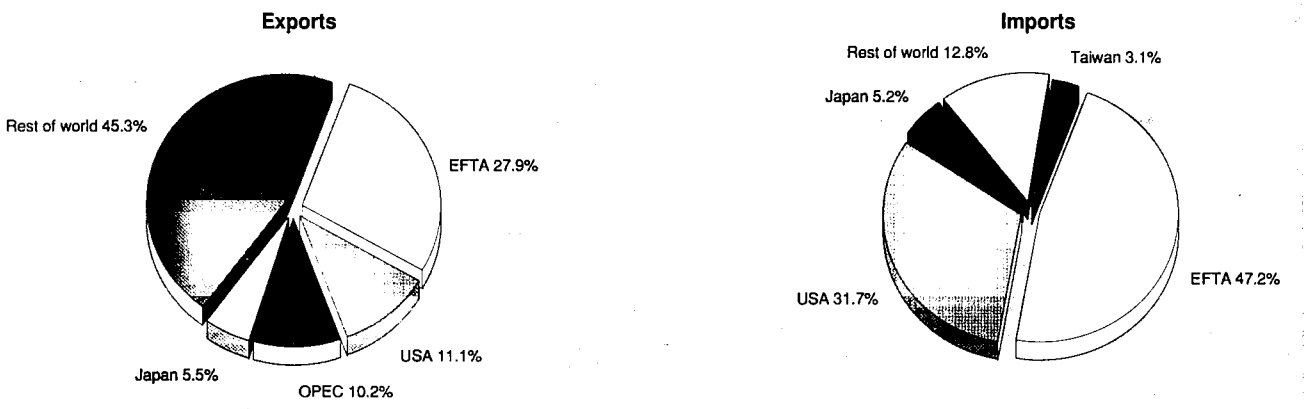
Source: Eurostat, Census of Manufacturers

Figure 5: Soaps and detergents, perfumes and toiletries
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Soaps and detergents, perfumes and toiletries
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Perfumes and toiletries

The sector of perfumes and toiletries is characterised by a strong link between individual product consumption trends and living standards. Fashion and advertising also have a considerable influence on sales. The main consumer trends which became apparent during the 1980s led to greater product diversification. For example, the promotion of a more natural look for women, together with the introduction of products such as gels and fixing mousses, explains in part the increased popularity of these products. The initial changes in product patterns in the hair care market influenced the make-up market during recent years.

Supply and competition

Apart from inter-industry competition, which is common to both subsectors in the EC, external competition is of a different nature: in the soaps and detergents sector it comes from distributors, while in the perfumes and toiletries industry the threat comes from foreign competitors.

Soaps and detergents

The EC soap and detergent industry operates in a very competitive environment but benefits from considerable potential in developing countries. While the supply of raw materials is widespread, the finished product is dominated by a few northern multinational companies. Within the EC, there is a relatively mature market in the northern Member States, while a sharp growth in the use of cleaning products is taking place in the southern countries.

Over the last twenty years the emergence of hypermarkets has considerably modified the distribution system of the industry. Manufacturers in the soaps and detergents sector have now to face more powerful buying groups. Furthermore, over the last few years, distributors have launched their own products (own label brands) onto the market, thus heightening existing competition.

Perfumes and toiletries

During the last few years, the growth in products for men has risen sharply, with as yet no indication of any decline. Although such growth is mainly the result of the attracting of a group of new consumers, the successful promotion of product "loyalty" has stabilised sales. Fashion dictates the trend in new products, demand for which is generated by the general concern for improved grooming and care. Marketing, which focuses more and more on skin hygiene and the protection of the environment, is also responsible for these developments.

The industry has been affected by foreign competition, with products manufactured by Japanese companies (e.g. Shisheido) becoming increasingly available on the EC market. The Japanese firm has recently set up a cosmetics factory in the Loire Valley, which reflects the internationalisation of the perfumes and toiletries industry.

Production process

Within both sectors, research and development and marketing represent an important part of the operating process, given the importance of anticipating future demand on the part of the consumers.

Soaps and detergents

In this very competitive environment, considerable funds are allocated to R&D activity. On average, a company dedicates 2.5% of turnover to R&D. This investment provides a better understanding of future demand, encourages the development of new products and the improvement of existing products to respond to, among other issues, environmental problems. In the production process, the use of enzymes in laundry washing powders is increasing as the effectiveness of these biological powders on stains, blood and eggs, for example, is widely recognised. The appearance of liquid formulas, particularly effective at low temperatures, also consists a recent evolution. Innovation is driving the industry forward with increased concentration of liquids and powders and the introduction of "fat busting" enzymes.

Perfumes and toiletries

Irrespective of age, European consumers are becoming increasingly aware of their appearance, personal hygiene and health. Campaigns launched to combat skin cancer, for example, have resulted in a greater use of sun creams. Following a clear consumer trend, an ever growing range of natural products is now available. Bath, shower and hair mousses and gels have replaced the more conventional products, as have skin products, especially those designed to reduce signs of ageing.

NDUSTRY STRUCTURE

Companies

Both subsectors are characterised by the presence of major multinational companies, which are often active both in the soaps/detergents and the perfumes/toiletries segments. Another common characteristic is the strong interest shown by companies for the east European market.

Soaps and detergents

In Europe, the soaps and detergents sector accounts for about a thousand manufacturing and distribution companies, which vary from those who only supply the local market to large international companies who serve the world market. The European and American multinational companies possess a large number of production units within the Community.

The world market for cleaning products is dominated by five major multinational groups, of which three are EC-based: Unilever (NL/UK), Henkel (D), Benckiser (D), Colgate Palmolive (USA) and Procter & Gamble (USA). At present many of these companies are intensifying their efforts to penetrate other markets, notably by buying out or buying shares in companies often placed downstream of their production process. In 1991, the main M&A operations in the industry were Benckiser's acquisitions in the USA of Quintessence Holdings, and of the Germaine Montell and Lancaster cosmetic product lines from Revlon.

Heavy investment is being made by the major manufacturers in Eastern Europe: in 1991, Henkel established joint ventures in Czechoslovakia and in the former Soviet Union, Procter & Gamble was active in Poland, Hungary and Czechoslovakia and Unilever acquired Pollena Bydgoszcz, a Polish detergent manufacturer.

Perfumes and toiletries

The following five firms dominate the world market: L'Oréal (F), Unilever (NL/UK), Shisheido (J), Avon (USA) and Procter & Gamble (USA). Among the other important EC firms are Wella (D), LVMH (F), Schwarzkopf (D) and Sanofi (F). Although the major groups grew in strength over the past few years, smaller companies have also begun to appear on the market, particularly at the national level, operating in niche markets.

The sector has been characterised by some major acquisitions in the period 1988-1990 (e.g. LVMH and L'Oréal took control of Lanvin, Unilever bought out Fabergé/Elizabeth Arden). In 1991, the main M&A operations were undertaken by L'Oréal, which acquired Dralle, a German hair care firm and by Sanofi, which acquired the French Quest International France, Unilever's essential oils subsidiary. The major multinationals operated on the east European market as well: for example, Procter & Gamble established joint ventures in Poland and Hungary in the field of hair and personal care products.

ENVIRONMENT

Soaps and detergents

The use of soaps and detergents has at times been associated with water eutrophication, i.e. a decrease in oxygen which engenders an abnormally high level of aquatic vegetation. Water eutrophication continues to be a cause of public concern. It is however generally appreciated that detergent ingredients form only a minor fraction of this form of pollution, which mainly originates in industrial, agricultural and human waste. The view on phosphates has moved significantly and this well researched ingredient is now preferred by a number of respected authorities.

Plastic packaging of detergents is another environmental issue characterising the industry. For this reason, recycled paper and cardboard usage is increasing. Similarly, several companies now use a minimum of 25% recycled plastic in detergent bottles and are actually supporting collection and recycling schemes for plastic.

Perfumes and toiletries

In the last few years, environmental problems have become an important issue both for producers and consumers. All manufacturers within the sector are investigating ways of reducing the effects of their products on the environment. At present, attention is being focused on two specific possibilities: the biodegradable properties of toiletries and cosmetics, and the incorporation of preservatives in their manufacture.

Problems relating to aerosols which contain ozone layer damaging CFC (chlorofluorocarbons), particularly deodorants and hair fixing products, are currently being solved by replacing CFCs with environment-friendly components.

Finally, there is a great industry concern about the current debate on animal testing. The harmlessness of perfumes and toiletries needs to be tested before they are sold to consumers, and so far the only legal way of doing so is animal testing. The perfumes and toiletries industry refuses a prohibition of such practices until new testing methods are introduced, and at the same time supports R&D efforts to discover alternative methods.

OUTLOOK

In the medium to long term, growth in the soap and detergent sector depends to a great extent on consumer behaviour and the development of other sectors such as textiles and household equipment. At the same time, protection of the environment and product safety will play an ever increasing role in industrial development. Expansion in sales volumes may be expected with the growing economic prosperity of former Eastern bloc countries, where heavy investment is being made by the major manufacturers. Finally, within the EC, there still remains a considerable growth potential, notably in the Southern countries.

Table 5: Soaps and detergents, perfumes and toiletries
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.3	3.3
Production	3.3	3.2
Extra-EC exports	5.1	4.2

Source: DRI Europe

As for perfumes and toiletries, the prospects for growth vary in accordance with the wide range of products within this industry. Market saturation is likely to slow the sharp growth in hair care products that took place in the EC market during recent years. On the other hand, growth in beauty and skin care products is set to continue, as well as for men's toiletries.

Written by: DRI Europe
The industry is represented at the EC level by: International Association of the Soap and Detergent Industry / Association Internationale de la Savonnerie et de la Détergence (AIS). Address: Square Marie-Louise 49, B-1040 Brussels; tel: (32 2) 230 8371; fax: (32 2) 230 8288; and, Comité de Liaison des Associations Européennes de l'Industrie de la Parfumerie, des Produits Cosmétiques et de Toilette (COLIPA). Address: Rue de la Loi 223, Bte. 2, B-1040 Brussels; tel: (32 2) 230 9179; fax: (32 2) 231 1587.

Pharmaceuticals
NACE 257

The EC is the world leader in terms of pharmaceuticals production and exports. Total EC output amounted to 60 billion ECU in 1991, of which non-prescription pharmaceuticals accounted for a share of 20%. The sector is also characterised by a constant trade surplus, as well as by a rapid growth of intra-EC trade.
R&D accounts for a large part of investments in the pharmaceutical sector, and its R&D/turnover ratio is one of the highest in the EC industry. The pharmaceutical industry is adapting itself to meet the new challenges presented by new technological developments (biotechnology), politics (upheaval in Eastern Europe), economics (emergence of new competitors) and demography (ageing population).

INDUSTRY PROFILE

Description of the sector

Within the EC, medicinal products are defined according to Article 1 of Council Directive 65/65/EEC (see Official Journal L 22. of 9.2.65 for more details):

- Proprietary medicinal products: Any ready prepared medicinal product placed on the market under a special name and in a special pack;
- Medicinal product: any substance presented for treating or preventing disease in human beings or animals;
- Substance: any matter irrespective of origin (i.e. human, animal, vegetable, chemical).

Medicinal products can be divided into two main groups according to the selling pattern: the first is prescription pharmaceuticals, which need to be prescribed by a medical doctor to be purchased; the second is over the counter (OTC) pharmaceuticals, which can either be prescribed by doctors or bought by the consumer without a prescription, or bought spontaneously by the consumer (the true self-medication market).

It is not easy to translate the concept of medicinal products into economic terms; until recently, each Member State had its own classification. To avoid confusion, the sector has adopted a grouping of data based on the Standard International Trade Classification (SITC), heading 54 of the OECD, i.e. the entire "medicines" section, as well as the sections covering specific active substances.

The key figures are based on this definition. Missing data have been completed, wherever possible, with Eurostat data drawn from a NACE 257 base. The data reported are approximate and therefore should be considered as trend indicators, providing an acceptable basis for comparison.

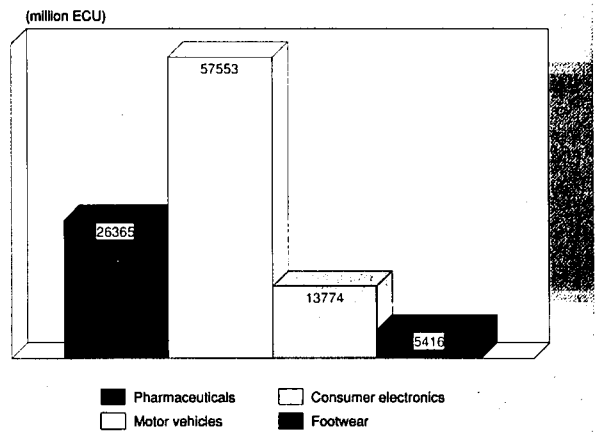
Main indicators

The production of pharmaceuticals in the EC grew by 9.9% in 1991, with all Member States enjoying an increase. Most notable were the rises registered in Germany (14.9%), Italy (9.3%) and France (7%): these three countries together account for two thirds of total EC production.

Total EC consumption of pharmaceuticals increased by 10% in 1991; this strong performance was common to all Member States, with the exception of Belgium and the Netherlands.

During the same period, employment increased by 2.3% in the EC as a whole. All Member States have recorded growing or stable employment figures except the United Kingdom (-5.8%) and Portugal (-2.2%).

Figure 1: Pharmaceuticals
Value added in comparison with other industries, 1991



Source: Eurostat

As far as extra-EC trade is concerned, exports grew during 1991 in all Member States except Portugal (-15.6%) and France (unchanged). Extra-EC imports grew all over the EC, with the most noticeable increases in Germany (29.3%), Spain (25.8%) and France (25.3%).

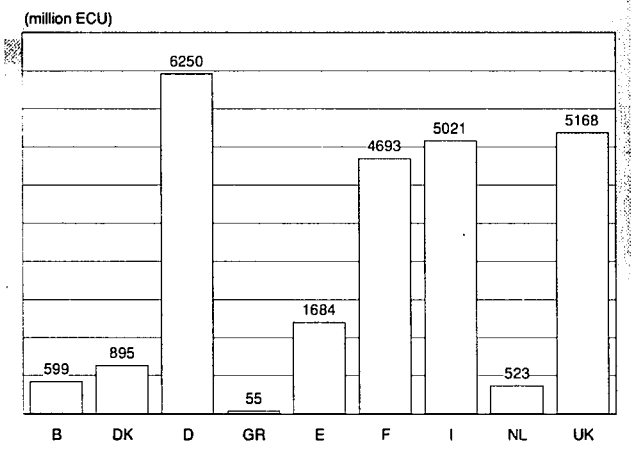
Recent trends

Production and consumption in the pharmaceutical sector increased rapidly during the 1980s, both at a rate of more than 6% per year. As for trade, growth in extra-EC exports has been quite weak, particularly in the period 1985-1991, while growth in extra-EC imports has been more stable. Altogether, the pharmaceutical sector has been characterised by higher rates of growth than those of overall manufacturing activity in the EC during the period 1982-1991.

International comparison

In the world pharmaceutical market, the EC is the leading producer. In 1991, the value of production was about one third higher than that of the USA, and more than the double that of Japan. Moreover, during the period 1987-1991, the EC recorded an increase in production of 36.1% (measured in constant prices) compared with a rate of 15.9% in the USA and 29.5% in Japan.

Figure 2: Pharmaceuticals
Value added by Member State, 1991



Source: Eurostat

Table 1: Pharmaceuticals
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	27 311	30 018	33 250	34 922	36 572	39 496	45 492	50 683	55 255	60 819	63 441
Production	30 122	32 997	36 679	38 766	40 357	43 289	49 460	54 826	59 293	65 188	68 056
Extra-EC exports	4 334	4 799	5 508	6 193	6 246	6 302	6 817	7 621	7 974	9 113	9 559
Trade balance	2 811	2 979	3 428	3 843	3 785	3 793	3 968	4 143	4 038	4 369	4 615
Employment (thousands)	370.2	368.6	372.0	365.5	369.5	376.6	385.5	402.1	416.0	425.7	425.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Pharmaceuticals
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.8	8.1	6.7
Production	3.6	7.4	6.1
Extra-EC exports	3.1	1.4	2.0
Extra-EC imports	6.1	5.3	5.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Pharmaceuticals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	4 334	4 799	5 508	6 193	6 246	6 302	6 817	7 621	7 974	9 113
Extra-EC imports	1 524	1 819	2 080	2 350	2 461	2 509	2 848	3 479	3 937	4 745
Trade balance	2 811	2 979	3 428	3 843	3 785	3 793	3 968	4 143	4 038	4 369
Ratio exports/imports	2.84	2.64	2.65	2.64	2.54	2.51	2.39	2.19	2.03	1.92
Terms of trade index	99.0	99.5	97.5	100.0	101.5	102.4	102.6	101.5	97.9	91.5
Intra-EC trade	2 774	3 176	3 776	4 281	4 534	4 813	5 489	6 440	7 287	8 725
Share of total imports (%)	64.5	63.6	64.4	64.5	64.7	65.6	65.7	64.7	64.7	64.6

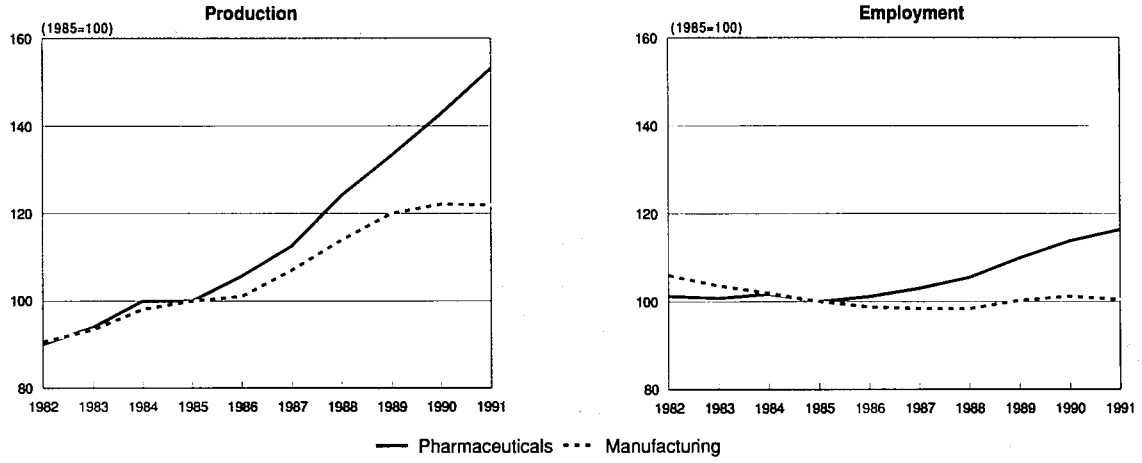
(1) Estimates
Source: Eurostat

Table 4: Pharmaceuticals
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	44.1	45.4	47.3	47.8	50.3	53.4	57.8	56.2	59.2	61.9
Productivity index	92.3	95.1	98.9	100.0	105.3	111.7	121.0	117.7	124.0	129.7
Unit labour costs index (3)	80.4	86.8	93.3	100.0	104.9	111.7	119.7	127.2	135.6	N/A
Total unit costs index (4)	77.3	86.8	93.2	100.0	102.7	105.6	118.1	130.0	137.9	149.6

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Pharmaceuticals
Production and employment indices compared to EC manufacturing



Source: Eurostat

The Japanese pharmaceutical industry has long been focused on the domestic market, an attitude encouraged by the national health insurance system which has provided the entire population with access to low-cost health care. This has prompted patients to see their physicians frequently, resulting in growing demand for medicinal products and steady expansion for the pharmaceutical industry. The government is now trying to control spending on the national health system and has reduced its official drug reimbursement prices. This policy is progressively reducing profits on any drug. As a reaction to slumping domestic product prices, the Japanese industry is developing new markets in the USA and Europe and acquiring foreign firms. Nevertheless, when it comes to medical research, Japanese manufacturers remain far behind their counterparts in the USA and Europe. Well aware of this problem, Japanese companies are investing heavily in R&D in a bid to catch up with their foreign competitors.

Foreign trade

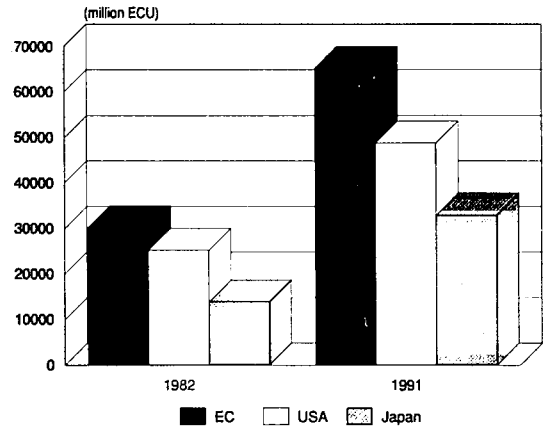
The EC as a whole is a net exporter of pharmaceuticals in the world market. Nevertheless, Greece, Portugal and Italy are net importers of pharmaceuticals; the small size of national industries in Greece and Portugal helps explain the importance of imports to these economies. The negative trade balance of Italy dates back to the early 1980s. Due to a strong growth in internal demand in Italy, imports grew by 12% per year during the 1989-1991 period compared to an increase of 10% in production and of 5% in exports.

The export/import ratio of the industry has declined steadily during the period 1982-1991, going from a value of 2.8 in 1982 to 1.9 in 1991. These figures indicate that, although the European pharmaceutical industry remains the world leader, it has been losing ground on foreign markets.

Extra-EC imports come overwhelmingly from western industrialised countries, with the USA and EFTA countries accounting together for 85% of total imports in 1991. On the contrary, export markets for the EC pharmaceutical industry are more dispersed. Developing countries, together with the category "others" (e.g. mainly Middle East and South and Central America), account for more than half of extra-EC exports.

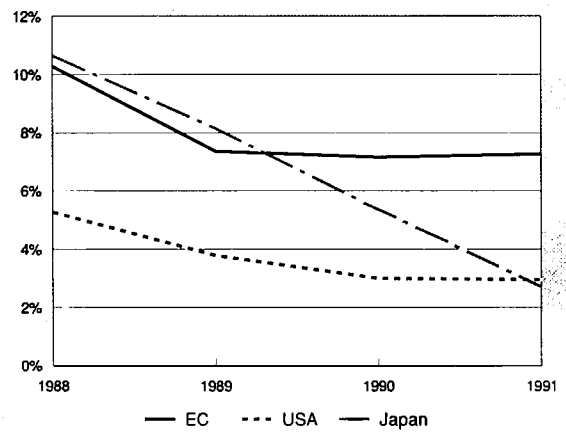
As far as intra-EC trade is concerned, figures measured in constant 1985 prices show that it has nearly doubled in size,

Figure 4: Pharmaceuticals
International comparison of production at current prices



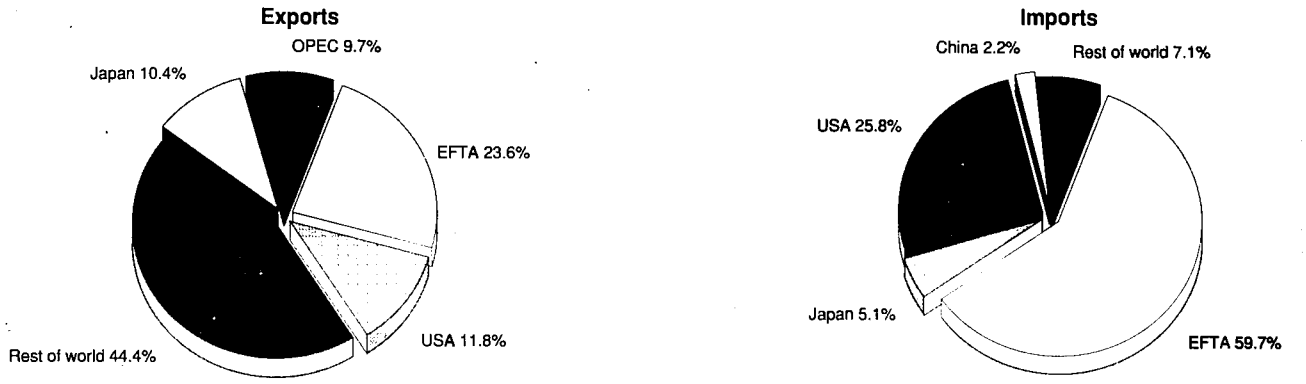
Source: Eurostat, Census of Manufacturers

Figure 5: Pharmaceuticals
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Pharmaceuticals
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

rising from 3 511 million ECU in 1982 to 6 337 million ECU in 1991.

The trends in demand and production, and structural changes that are taking place in the prescription and non-prescription pharmaceuticals markets are analysed separately after the next sections.

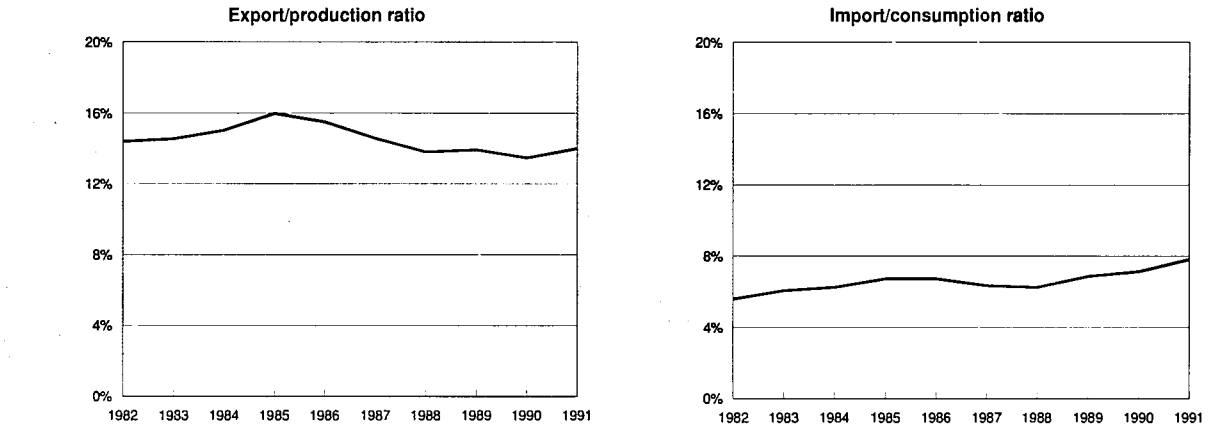
REGULATIONS

The legislative framework for pharmaceutical products was definitively changed with the adoption, in March 1992, of four directives related to pharmaceutical advertising (92/28/CEE), to the classification of the supply of medicinal products (92/26/CEE), to pharmaceutical label/leaflets (92/27/CEE) and to the wholesale distribution of pharmaceuticals (92/25/CEE). The Council Directive 92/26 defines a set of criteria that allow to classify a given product as a prescription or non-prescription pharmaceutical, whereas the other three directives apply to both prescription and non-prescription pharmaceuticals. The four directives, which will come into force on 1 January 1993, guarantee that all manufacturers will be able to operate under the same conditions in the whole Community.

The criteria for the registration of pharmaceutical products are identical in all Member States, but the registration procedures are not always the same. The application of the registration process to each product in each country constitutes a waste of time and is the main legislative barrier to the free circulation of products since manufacturers have to obtain a separate marketing authorisation for each country.

Manufacturers have the possibility of coordinating national registration decisions under the "multi-state" procedure improved by Council Directive 83/570/EEC. This procedure has, however, not been utilised to its full potential. The Commission has made a proposal for a future marketing authorisation system for medicinal products, which is still under discussion. This system would include the establishment of a European Agency for the Evaluation of Medicinal Products and of a centralised Community procedure for new and high-technology products and for products issued from biotechnological processes; the creation of a new decentralised Community procedure based on the principle of mutual recognition, with important safeguards to ensure that there is no dilution of the strict standards of quality, safety and efficacy; and the maintenance of national marketing authorisations for products of local importance.

Figure 7: Pharmaceuticals
Trade intensities



Source: Eurostat

In 1992, a survey was carried out at the request of the Commission's Directorate General for the Internal Market and Industrial Affairs (DG III) about the efficiency of the current marketing authorisation system. This survey has once again demonstrated that the periods of time within which the authorities must process an application for a marketing authorisation (maximum 210 days, according to directives 65/65/EEC and 81/851/EEC) are in practice respected by only a few Member States. It is hoped that the adoption of the future marketing authorisation system will bring some improvement to this unsound situation.

Finally, a regulation establishing the Supplementary Protection Certificate (SPC) was adopted in June 1992 which will come into force on the 1st January 1993. This measure applies to all products subject to an authorisation in any Member State, i.e. both to prescription and non-prescription pharmaceuticals. The main aim of the SPC is to compensate for the period of effective patent protection lost while a medicinal product undergoes research and development (it takes over 10 years from the time a patent is applied until a marketing authorisation is granted, leaving only a short exclusivity period to the innovator to recoup its investment in R&D before imitations appear on the market). The SPC itself may not under any circumstances exceed five years.

ENVIRONMENT

The current discussions on the reduction of packaging and packaging waste can not be separated from the need to provide the consumer with comprehensive information and the need to protect the product.

Since the product information is contained either on the label or in the patient leaflet, it is essential that product and packaging are kept together until the final disposal of the product. Any measures in the area of packaging recycling or packaging waste reduction must therefore be balanced against these two requirements.

As far as the debate on the reduction of the use of ozone-depleting substances is concerned, account must be taken of the benefit to the consumer of certain medical products containing ozone-depleting substances as a means of delivery of the product.

Prescription pharmaceuticals

MARKET FORCES

Demand

Pharmaceuticals are bought mostly via a doctor's prescription, although a distinction has to be drawn between prescription pharmaceuticals and OTC products: prescription pharmaceuticals can be sold only in pharmacies, while OTC products may be sold in some countries in pharmacies only, in others in drugstores and sometimes even in food stores. Apart from consumers, other categories of purchasers are medical doctors, hospitals, and other institutions operating in the health care system.

The demand for pharmaceutical products has recently been greatly influenced by two main factors. First, the ageing of the population, which partly originates in improved medical care and products, is slowly changing the pattern of production to adapt to the growth of importance of the elderly as a share of the total population. Second, the opening up of Eastern Europe has created new market opportunities for the EC industry. Production traditionally oriented towards less sophisticated medicines combined with severe distribution problems have led to a situation in which there is urgent need for a reliable supply of advanced medicinal products.

Supply and competition

Production is very diversified as it meets specific and very diverse demand. It varies in its degree of integration (from the synthesis of basic chemicals to the preparation of finished products) as well as in the type of dosage formulation produced (tablets, pills, injectable ampoules, or capsules).

Production must meet the demand for both widely prescribed medicines for the treatment of common illnesses, as well as for medicinal products to treat certain rare conditions. In both cases the legislative framework is the same; production standards are very strict and high quality is essential.

Domestically, the EC pharmaceutical industry faces problems of various regulatory environments, pricing policy and patent laws which differ from country to country in the EC. Internationally, it faces strong competition from the United States and Japan.

Production process

Medicinal products depend heavily on research for progress. Research and development (R&D) accounts for a huge part of investments in the industry. EC pharmaceutical companies invest nearly 5 billion ECU a year in R&D, which répresents about 15% of this turnover, and is among the highest R&D/turnover ratios in industry. Depending on the size of the national industries, investment varies between 3% and 24% of turnover. As a result of this investment, six EC companies are among the ten biggest R&D investors world-wide. Research costs are rising and there is the need to invest simultaneously in new fields such as biotechnology.

Another problem area is the long development time of a product. It takes over ten years from the time a patent is applied for until marketing authorisation is obtained. This process uses up more than half the patent protection granted to the innovator. A special regulation establishing a Supplementary Protection Certificate (SPC) was thus adopted (see the section on Regulations) to give EC manufacturers an extension of the patent-protection period, similarly to what has been the case in Japan and in the US.

INDUSTRY STRUCTURE

Companies

Three EC companies are among the ten world-wide pharmaceutical leaders: Glaxo (UK), Hoechst (D) and Bayer (D). SmithKline-Beecham, which is the result of the merger of Beecham (UK) and SmithKline Beckman (USA), can be added to this group. Of the remaining six, two are Swiss and four USA-based companies. Within Western Europe, the leading companies are from the United Kingdom (Glaxo, Wellcome, ICI, Beecham), Germany (Hoechst, Bayer) and France (Rhône Poulenc).

Strong competition exists both in Europe and world-wide and no single company has a dominant position: the ten largest companies represent only 25% of the world market.

Strategies

In order to face new challenges in terms of R&D costs, increasing competition and market diversity, new groupings of major companies have emerged through mergers and acquisitions. The trend was initiated with the merger of SmithKline Beckman (USA) and Beecham (UK), giving SmithKline-Beecham, Bristol Myers (USA) and Squibb (USA) giving Bristol Myers-Squibb and the acquisition of Rorer (USA) by Rhône Poulenc (F). In 1991, the major acquisition operation was pursued by SmithKline-Beecham which acquired Sächsisches SerumWerke, an East German manufacturer of vaccines and the largest producer of influenza vaccine in Germany. As for the Japanese M&A activity, in 1991 Yamanouchi (J) acquired the pharmaceutical division of Royal Gist-Brocades (NL).

Table 5: Non-prescription pharmaceuticals
Turnover and share of the pharmaceutical market at public price level

(million ECU)	Turnover					Total market share (%)				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Belgique/België	500	500	460	490	492	30	29	30	30	29
BR Deutschland	4 700	5 100	5 480	5 800	6 015	37	36	36	35	34
España	450	500	550	631	593	15	13	13	14	13
France	3 700	4 100	4 220	4 700	5 031	35	35	35	37	34
Italia	900	900	990	1 196	1 261	13	11	10	10	10
Nederland	78	81	106	126	146	9	9	11	11	12
Portugal	N/A	N/A	N/A	N/A	45	N/A	N/A	N/A	N/A	5
United Kingdom	900	1 000	1 090	1 311	1 455	22	22	22	20	19

Source: Institute for Medicinal Statistics

The European Single Market has also had an impact on pharmaceutical wholesalers. While this segment is quite concentrated in the northern European countries, there is still some scope for further M&A activity in the southern European countries. Thus, Alliance Santé (F), formed with the merger of French ERPI and the Italian Alleanza Farmaceutica, is set to merge with Cofares (E), the largest Spanish company in this sector.

OUTLOOK

The last years have been particularly euphoric for the pharmaceutical industry, thanks to rapid economic expansion and the consumer boom in the late 1980s and the German reunification. The pharmaceutical sector will remain among the fastest growing sectors over the 1990s; however, production growth is expected to return to its rates of the early 1980s, that is, about 4.5% per year. Exports and imports will grow at rates of about 5% per year, thus significantly lower than in the recent past.

Non-prescription pharmaceuticals

MARKET FORCES

Demand

OTC products can be purchased directly by the consumer without being prescribed by a doctor. The products are generally used preventively and for benign disorders. OTC purchasing is a well established practice which brings the following advantages: it reduces the financial burden on the state health care system; it reduces the doctor's workload in taking care of health problems which do not require medical treatment; it promotes personal responsibility on issues which affect a person's own health.

There is a certain degree of confusion in the determination of market size for OTC products. The rules governing these products' classification, reimbursement and sales outlets, vary considerably from country to country. The same product is sometimes supplied only on medical prescription in one country and over the counter in another. There are also several products which may be sold without a prescription but are nevertheless reimbursed or partially reimbursed if prescribed by a doctor.

The Institute for Medicinal Statistics has estimated that the total market for non-prescription medicines in 1991 was about 15 billion ECU, while the size of the self-medication market reached 8.6 billion ECU, i.e. 57.2% of the total OTC market. The latter is dominated by cough and cold products and analgesics, and grew at an average rate of 8.2% since 1987. This compares with an average growth of the total market for non-prescription pharmaceuticals of 7.5% in the years 1987-91.

The importance of the non-prescription potential and the self-medication turnover varies greatly from country to country. The practice of self-medication is well established in the northern Member States including France, while it is quite underdeveloped in the southern Member States. Until recently, OTC products were, at least officially, an unknown phenomenon in Greece.

INDUSTRY STRUCTURE

Companies

OTC products are manufactured both by large companies, which in general also manufacture prescription-only medicines, and by smaller more specialised enterprises. Until recently, the majority of companies in the sector were national companies supplying their respective domestic markets because of differences in Member States' legal requirements and consumer habits. This explains why the market is still fragmented and that there are only very few "Euro-brands" (i.e. OTC products sold under the same name all over Europe).

Table 6: Self-medication products
Turnover of the principal products at public price level, 1991

(million ECU)	B	D	E	F	I	NL	P	UK
Cough and cold remedies	68.7	439.8	92.2	510.8	211.8	31.3	8.8	219.7
Analgesics	68.4	488.1	135.3	359.5	169.2	30.8	5.2	212.6
Digestives and intestinal remedies	64.2	341.8	72.4	375.2	240.4	19.8	6.8	131.2
Skin treatment	29.2	257.4	89.9	352.7	114.6	18.3	8.7	139.8
Vitamins and mineral supplements	39.6	300.3	59.1	236.3	145.2	24.2	2.6	91.3

Source: Institute for Medicinal Statistics

The top three companies are Sanofi/Sterling Health (F/USA), with a share of 5.4% of OTC world market, Rhône-Poulenc Rorer (F/USA) with a share of 3.6% and Bayer (D) with a share of 3.4%.

Strategies

With a view to obtaining the necessary critical mass to operate effectively in the Single Market and on exports markets, the OTC products industry has also been affected by a certain number of M&A operations. In fact, among the first six companies world-wide, five of them acquired their position as a result of mergers and acquisitions at the end of the 1980s. The most important mergers have been the one between Sanofi (F) and Sterling (USA) in 1990, and the acquisition of Rorer (USA) by Rhône Poulenc (F) in 1990. Nowadays, international companies are responsible for almost 60% of total turnover of the OTC industry.

Table 7: Pharmaceuticals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	4.5	4.1
Production	4.6	4.1
Extra-EC exports	5.0	4.6

Source: DRI Europe

OUTLOOK

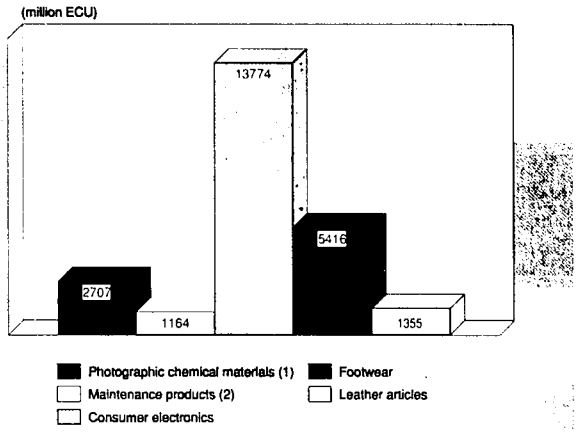
The demand for OTC products is likely to go on growing apace in the following years. This is confirmed by the fact that many pharmaceutical companies are developing their OTC segments.

Written by: DRI Europe, based on information provided by EFPIA and AESGP.
The industry is represented at the EC level by: European Federation of Pharmaceuticals Industries Associations (EFPIA). Address: Avenue Louise 250, Bte 91, B-1050 Brussels; tel: (32 2) 640 6815; fax: (32 2) 647 6049; and,
European Proprietary Medicines Manufacturers' Association / Association Européenne des Specialités Pharmaceutiques Grand-Public (AESGP). Address: Avenue de Tervuren 7, B-1040 Brussels; tel: (32 2) 735 5130; fax: (32 2) 735 5222.

Other chemicals
NACE 259

Other chemicals include the manufacture of a number of chemical products for non-industrial use, of which photographic chemical materials and household and industrial maintenance products are the most important. Demand for photographic chemical products has been strong in recent years and prospects for the future remain good. Producers have made efforts to improve the quality of existing products and to bring out new ones. Although the demand for household and industrial maintenance products has seen some consolidation during recent years, its sales are not as vulnerable to the economic downturn as those of basic chemicals. The market has become more consumer oriented, where competitive factors such as new product development, ease of use of products and product distribution reign.

Figure 1: Photographic chemicals and maintenance products
Value added in comparison with other industries, 1991



(1) NACE 259.1
(2) NACE 259.2
Source: Eurostat

INDUSTRY PROFILE

Description of the sector

NACE 259 includes the manufacture of a number of chemical products, chiefly for household and office use:

- photographic chemical materials, including photographic film and paper, and auxiliary products (NACE 259.1);
- polishes for household use, including (shoe, furniture and floor care products, metal polishes, car polishes, etc. (NACE 259.2);
- chemical products for office use, including pencils, writing inks, office glues, stencils and carbon paper (NACE 259.3);
- other chemical products not intended for industrial use (NACE 259.4).

The analysis which follows focuses primarily on the two most important subsectors among the "other chemicals" sector: photographic chemicals (NACE 259.2) and household and industrial maintenance products (NACE 259.2 and 259.4) of which the most important product types are cleaning products, disinfectants, polishes and deodorisers.

Main indicators and recent trends

Photographic chemicals

Photographic chemicals production is more than twice that of maintenance products. Photographic chemical products have shown strong growth over the 1989-90 period. Growth was flat in 1991. Compared to maintenance products, the industry is much less labour intensive, employing close to 40 000 people in 1991. Since 1992, however, the sector's workforce has shrunk by 8 000 people.

Maintenance products

The rise in demand for maintenance products over the last decade was not entirely paralleled with a comparative rise in production; instead, imports have increased their share of EC consumption. Over the last decade, imports were booming at around 10% in real terms on average per year, while exports stagnated during the second half of the eighties (Table 3). Employment in the industry has been almost constant over the last decade.

Foreign trade

Globally, over the entire product range within the other chemicals grouping, the EC is a net importer. The export/import ratio decreased over the second half of the eighties. The EC maintenance products industry, however, is a net exporter, although the industry's export/import ratio has gradually decreased from 5.7 in 1984 to 3.3 in 1991.

More than half of the exports of other chemicals are directed towards the EFTA and the USA. Imports are dominated by Japan, accounting for one third of EC imports.

Intra-EC trade is on the increase. Between 1982 and 1991, the total value of other chemical products traded within the EC more than doubled, in current prices.

MARKET FORCES

Demand

Photographic chemicals

Swift demand increases for photographic chemicals are linked to factors such as increased household income and more time

Table 1: Photographic chemicals (1)
Main indicators at current prices (2)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(3)
Production	3 385	3 589	4 315	4 627	4 584	4 721	4 991	5 505	5 929	6 095	6 497
Employment (thousands)	48.0	46.0	43.9	44.1	43.3	41.3	41.1	40.8	39.7	40.1	39.7

(1) NACE 259.1
(2) Estimates are used if country data is not available, especially from 1989 onwards
(3) DRI Europe estimates
Source: Eurostat

Table 2: Maintenance products (1)
Main indicators at current prices (2)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(3)
Apparent consumption	1 393	1 397	1 692	1 688	1 755	1 946	2 275	2 396	2 599	2 653	2 719
Production	2 017	2 154	2 630	2 721	2 745	2 765	3 036	3 185	3 368	3 431	3 629
Extra-EC exports	772	935	1 138	1 274	1 204	1 035	996	1 054	1 037	1 115	1 143
Trade balance	624	757	937	1 033	990	819	761	788	769	778	910
Employment (thousands)	32.3	31.1	33.3	31.7	32.0	31.5	32.3	32.2	33.0	31.5	31.4

(1) NACE 259.2
(2) Estimates are used if country data is not available, especially from 1989 onwards.
However for trade, only 1991 has had to be estimated
Excluding Belgium, Greece, Ireland, the Netherlands, and Portugal
(3) DRI Europe estimates
Source: Eurostat

Table 3: Maintenance products (1)
Average real annual growth rates (2)

(%)	1982-85	1986-91	1982-91
Apparent consumption	0.8	5.6	4.0
Production	5.0	2.5	3.4
Extra-EC exports	13.7	-0.9	3.7
Extra-EC imports	13.8	8.2	10.1

(1) NACE 259.2
(2) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated; also excludes Belgique/België, Hellas, Ireland, Nederland, and Portugal
Source: Eurostat

Table 4: Other chemicals (1)
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	1 863	2 015	2 475	2 866	2 549	2 574	2 759	3 023	2 925	2 965
Extra-EC imports	2 091	2 137	2 469	2 661	2 723	2 839	3 195	3 540	3 771	3 784
Trade balance	-228	-122	6	204	-174	-265	-436	-517	-846	-819
Ratio exports/imports	0.89	0.94	1.00	1.08	0.94	0.91	0.86	0.85	0.78	0.78
Terms of trade	82.8	87.6	93.1	100.0	86.9	84.2	80.2	79.3	72.0	72.8
Intra-EC trade	3 037	3 335	3 846	4 476	4 612	4 947	5 328	5 878	6 408	6 661
Share of total imports (%)	59.2	60.9	60.8	62.5	62.7	63.5	62.5	62.4	62.4	63.3

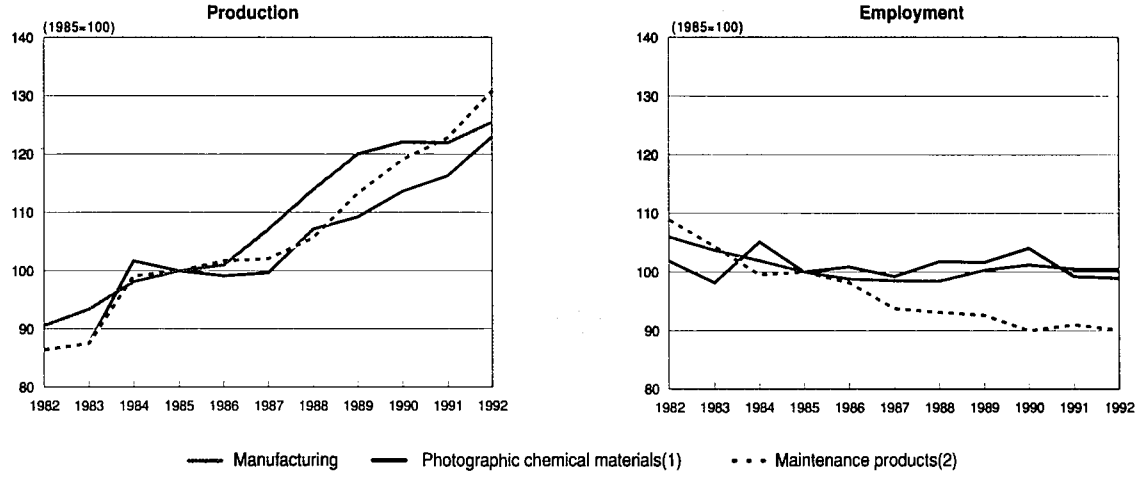
(1) NACE 259
(2) Estimates
Source: Eurostat

Table 5: Maintenance products (1)
External trade at current prices (2)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(3)
Extra-EC exports	772	935	1 138	1 274	1 204	1 035	996	1 054	1 037	1 115
Extra-EC imports	148	178	200	241	214	216	235	266	268	337
Trade balance	624	757	937	1 033	990	819	761	788	769	778
Ratio exports/imports	5.21	5.25	5.68	5.28	5.62	4.78	4.24	3.96	3.87	3.31
Terms of trade	98.6	99.4	107.4	100.0	106.5	90.5	80.2	75.0	73.3	62.6
Intra-EC trade	507	597	762	810	784	746	785	977	1 128	1 099
Share of total imports (%)	77.4	77.0	79.2	77.0	78.5	77.5	76.9	78.5	80.3	75.1

(1) NACE 259.2
(2) Excluding Belgique/België, Hellas, Ireland, Nederland, and Portugal
(3) Estimates
Source: Eurostat

Figure 2: Other chemicals
Production and employment indices compared to EC manufacturing



(1) NACE 259.1
(2) NACE 259.2; excluding Belgium, Greece, Ireland, the Netherlands and Portugal
1992 are DRI Europe estimates
Source: Eurostat

available for leisure activities and travel. This development has been paralleled, during the eighties, by the appearance on the market of cameras suitable to everyone's needs: increased sophistication of cameras on the higher end of the market was complemented by the introduction of easy-to-use automatic cameras, and even of throw-away cameras.

Maintenance products

The long term development of the demand for maintenance products is linked to a number of demographic factors. The ageing of the population brings with it the need for more intensive use of space and thus more frequent maintenance. The number of households is increasing, with more smaller (e.g. single person) households, pushing up demand. The increasing number of women working outside the home has changed the nature of demand: more practical products are demanded, designed to help save time. Consumption of maintenance products also varies regionally, from one Member State to the other, according to climate and local customs.

Supply and competition

Photographic chemicals

In the photographic chemicals industry, producers have brought new products on the market, including special purpose films or films with slightly different colour effects.

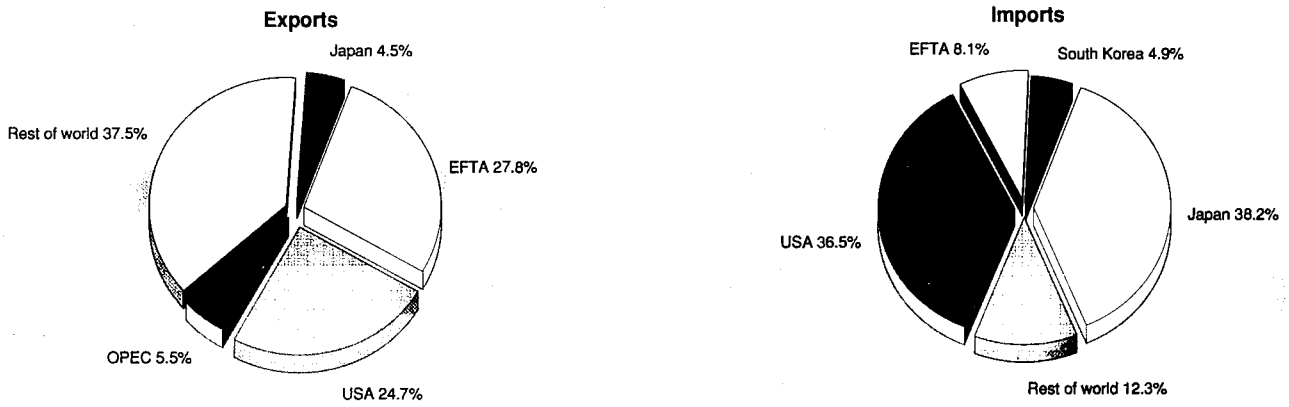
Maintenance products

Competition on the market for maintenance products is not only on the quality of the products, but more and more also on ease of use, which is linked to packaging and preparation of the product (e.g. ready to use products rather than products that still need to be diluted with water). Research and development in the sector is often geared towards exactly these aspects of product marketing.

Production process

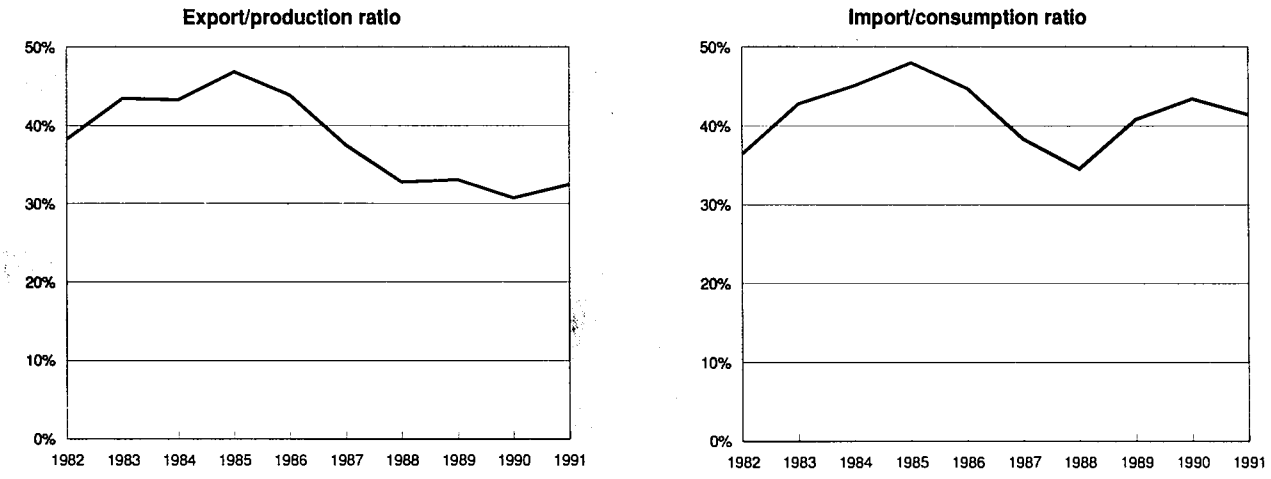
Investment in the other chemicals subsectors is geared towards product development. Rapid changes in consumer tastes and in government regulations mean that constant efforts are

Figure 3: Other chemicals
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Figure 4: Maintenance products
Trade intensities



Source: Eurostat

needed in R&D in order to maintain market shares. Packaging and production processes are constantly being improved and altered. In the maintenance products subsector, consumer safety and environmental considerations are determining factors when it comes to product development. Packaging and labelling must ensure that the product is both easy and safe to use.

Photographic chemicals

In the photographic chemicals subsector, increasing automation of production processes has lead to production increases over the last decade, despite shrinking employment. The number of people employed was diminished by 16%, to an estimated 40 100 in 1991.

Maintenance products

Employment in the maintenance products subsector has been stable over the last decade, at around 32 000 people. Productivity increases enabled the industry to fuel increasing demand.

INDUSTRY STRUCTURE

Companies and strategies

Companies in the industry include large multinational companies besides smaller companies serving national or regional markets. These companies are often not only active in the chemical consumer products sector, but in other consumer product sectors as well. Statistics are therefore difficult to obtain.

In 1990 the number of companies active in the maintenance products sector was estimated at 560 within the EC, including the former Eastern Germany.

ENVIRONMENT

Photographic chemicals

Environmental issues concerning the EC photographic chemical industry include the discharge of silver thiosulphate in photographic waste into water bodies, in connection with the EC Directive on pollution caused by dangerous substances into the aqueous environment, and the classification, packaging and labelling of photographic processing chemicals in accordance to the EC Directives on dangerous preparations and dangerous substances.

Maintenance products

In the maintenance products subsector, major efforts have been made to develop new types of propellant for aerosols and containers that do not involve the use of pressure. Better labelling, in accordance with EC regulations, should assure consumer safety.

OUTLOOK

Photographic chemicals

The photographic chemicals industry has seen slow growth in 1991, but the sector is expected to return to higher growth rates, linked to overall improvement in the EC economy and increased consumer confidence.

Maintenance products

The market for maintenance products is expected to be stable, with growth rates slightly below that of GNP. It is unlikely that the use of maintenance products would be reduced, given their strong integration into many aspects of daily life, and, therefore, the sector's relative insulation from the vagaries of the economy. The opportunities for growth are somewhat higher in the southern Member States, where the use of maintenance products is less developed.

Table 6: Other chemicals
Expected real annual growth rates

(%)	1992-93	1992-96
Maintenance products:		
Production	6.2	6.5
Employment	-0.3	-0.3
Photographic chemical materials:		
Production	7.2	7.6
Employment	-1.0	-1.0

Source: DRI Europe

Written by: DRI Europe
The industry is represented at the EC level by: International Federation of Associations of Maintenance Products Manufacturers / Fédération Internationale des Associations de Fabricants de Produits d'Entretien (FIFE). Address: Square Marie-Louise, 49, B-1040 Brussels; tel: (32 2) 230 4090; fax: (32 2) 230 8288; and,
European Photographic Chemical Industry (EPI). Address: c/o CEFIC, Av. E. Van Nieuwenhuyse 4, Box 1, B-1160 Brussels; tel: (32 2) 676 7211; fax: (32 2) 676 7300.

Man-made fibres
NACE 26

The manufacture of man-made fibres in the EC is confronted with intense competition particularly from developing and industrialised countries. The European industry is thus turning its attention to higher value added products, while pursuing an investment policy aimed at rationalisation and research and development.
The crisis in the textiles industry, along with the economic gloom which has characterised recent years, brought about a marked slowdown in the growth of demand in 1991. The European industry will grow at a slow pace in 1992, and will record a low level of growth in the first half of the 1990s.

INDUSTRY PROFILE

Description of the sector

The chemical fibres (or man-made fibres) industry covers three different types of fibres: synthetic fibres, cellulosic fibres, and mineral fibres.

Chemical fibres mainly consist of synthetic fibres which accounted for 84% of world chemical fibre production in 1991. The main synthetic fibres are polyester, polyamide (nylon), acrylic and polypropylene fibres. Cellulose-based fibres include acetates, rayon, rayon staple fibre and viscose. These artificial fibres, which are derived from natural sources such as cellulose, account for the remaining 16% of world chemical fibres production. Although mineral fibres are also part of the chemical fibre sector, they are excluded from the statistics presented in this chapter.

All of these fibres are divided up into sub-categories according to their physical form. Filament is a continuous polymer which is remilled in its molten state via a fine strainer and then solidified by cooling. It is then spun in a variety of ways, depending on how it is to be sold. It can also be cut up into short fibres for use in the manufacture of fabric using traditional machines designed for natural fibres. These short fibres often have very similar characteristics to those of natural fibres.

The preponderance of synthetic fibres over cellulosic products is becoming more and more pronounced. Among synthetic fibres, short fibres represent the bulk of EC production, with more than 50% of the total. Synthetic filaments also comprise an important share of EC production. Alternatively, cellulosic fibres, which represented about 22% of total chemical fibres in 1980, now represent a mere 16%.

Main indicators

Since 1980, EC production of man-made fibres has grown at an average annual rate of 1.6%. In 1990, production in volume grew 2.6% in the EC, after a strong 4% gain recorded in 1989. This production performance was driven by strong home demand which was influenced by demographic factors and increased earnings and which produced a 4.6% increase in consumption in 1990. This output growth is significant when compared to world production which grew only 1% in 1990.

The downturn in the textiles and automotive industries in 1991, however, led to a sharp decline in the production of man-made fibres in Western Europe. Production fell 6% in 1991 from 1990, the decrease being particularly strong for cellulose fibres and polyamide.

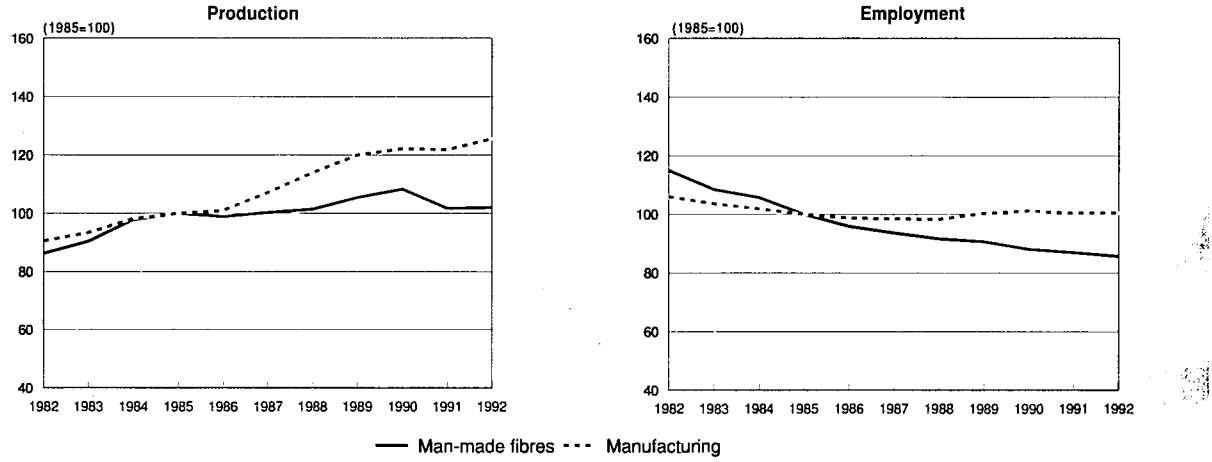
Extra-EC exports collapsed in 1989 and 1990 before stabilising in 1991. The trade deficit, which appeared in 1988, improved in 1991.

In 1991, the EC man-made fibres industry employed 77 400 workers, an apparent 7.7% increase from 1990. This is, however, due to the inclusion of eastern Germany in the 1991 statistics. The general trend in employment continues to be downward; as figures for all of the other EC man-made fibres industries showed further shrinkages in their staff in 1991.

Recent trends

The EC chemical fibres industry has undergone extensive restructuring since the late 1970s. The low rate of increase in European textile consumption during the 1970s (following the first oil crisis) contributed to this structural change. Among the other motives for this restructuring were the growing deficit on the EC's textile and clothing trade balance and the development of chemical fibre production capabilities in the rest of the world, not to mention the numerous investments made by EC firms in other parts of the world.

Figure 1: Man-made fibres
Production and employment compared to EC manufacturing



Source: Eurostat

Table 1: Man-made fibres
Main indicators in volume

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	2 388	2 430	2 659	2 745	2 839	2 860	3 003	3 230	3 378	3 199	3 267
Production	2 514	2 636	2 856	2 917	2 883	2 924	2 958	3 076	3 111	3 044	3 100
Extra-EC exports	401	492	561	588	516	565	569	496	430	438	451
Trade balance	126	206	197	172	44	64	-45	-154	-223	-154	-167
Employment(thousands)(2)	92.5	87.3	85.1	80.5	77.2	75.4	73.8	73.0	71.0	77.4	76.8

(1) DRI Europe estimates
(2) 1991 and 1992: including Eastern Germany
Source: CIRFS, Eurostat

Table 2: Man-made fibres
Average real annual growth rates

(%)	1982-85	1985-90	1982-90
Apparent consumption	4.8	3.5	4.4
Production	5.1	1.3	2.9
Extra-EC exports	13.6	-5.1	0.9
Extra-EC imports	14.8	7.8	11.4

Source: CIRFS, Eurostat

Table 3: Man-made fibres
External trade in volume

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	401	492	561	588	516	565	569	496	430	438
Extra-EC imports	275	286	364	416	472	501	614	650	653	592
Trade balance	126	206	197	172	44	64	-45	-154	-223	-154
Ratio exports/imports	1.46	1.72	1.54	1.41	1.09	1.13	0.93	0.76	0.66	0.74
Terms of trade	103.2	121.7	109.0	100.0	77.3	79.8	65.6	54.0	46.6	39.6
Intra-EC trade	869	953	1 069	1 154	1 140	1 203	1 359	1 431	1 467	1 454
Share of total (%)	76.0	76.9	74.6	73.5	70.7	70.6	68.9	68.8	69.2	71.0

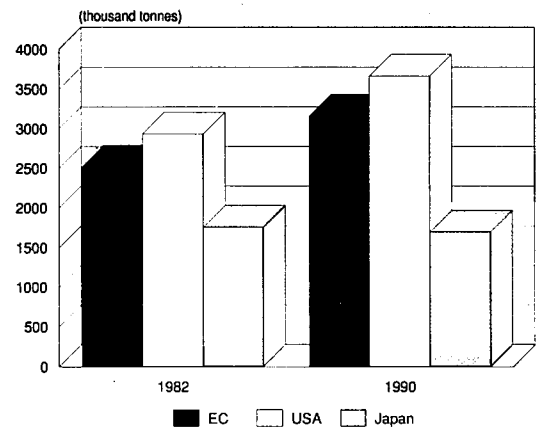
(1) DRI Europe estimates
Source: Eurostat

Table 4: Man-made fibres
EC production by product

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Synthetic filaments	789	802	879	919	916	927	962	1017	1025	1076
Short synthetic fibres	1262	1384	1511	1579	1568	1595	1570	1625	1692	1724
Filaments and short cellulosic fibres	463	450	466	419	399	402	426	434	394	370
Total	2514	2636	2856	2917	2883	2924	2958	3076	3111	3170

Source: CIRFS

Figure 2: Man-made fibres
International comparison of production volume



Source: Eurostat

In fact, two waves of production capacity reduction have occurred since 1978. Between 1978 and 1985, over 900 000 tonnes or one-third of the total European capacity, was cut. Another prominent development has been technological changes which reduced manpower requirements. As a result, employment levels in the chemicals fibres sector collapsed, recording a 38% cut from 1980, a decline accompanied by a significant upgrade of apparent labour productivity.

International comparison

Compared to 1977, the EC man-made fibres industry has been losing ground in the production of all kinds of fibres. This is particularly the case in the field of synthetic filaments, where the EC represented less than 14.0% of world production in 1991, down from 20.6% in 1977.

The Japanese man-made fibres industry represents only 9% of world production, while the USA remains the world's leading producer with about 19% of world output, although its position is weakening. Production of the newly industrialised countries (NICs) accounts for an increasing share of world output, displacing the former pre-eminence of both the USA and some EC Member States.

Indeed, the newly industrialised countries are becoming crucial actors in the man-made fibres industry: the most dynamic countries are South-East Asia, among which are Taiwan, South Korea and China. For example, while the East Asian countries represented only 22% of world production of polyester in 1980, this share jumped to 45% in 1989 and could rise to 60% of world production of polyester by 1999. Overall, the South-East Asian industry produces five times as much as it did during the 1970s, and three times as much as the industrialised countries.

In 1991, Japan's production of man-made fibres stagnated while the USA recorded a marginal increase (+1.6%) in production in spite of its weak economy. Production in the newly industrialised countries continues to rise strongly, although at lower rates than those recorded in recent years.

Foreign trade

The EC has a strong rate of import penetration, while the share of its exports in production remains weak. The EC trade balance on man-made fibres has declined steadily since 1983, falling into deficit in 1988 when imports jumped 18% and exports fell 3.7%.

In 1990 and 1991, extra-EC imports decreased slightly (-1% and -6%, respectively), while export performance actually improved in 1991 (+1.9%) compared to the collapse recorded in 1990. Declining demand, along with increasing supply coming from other regions of the world, put pressure on prices as the weakness of the dollar negatively affected extra-EC exports.

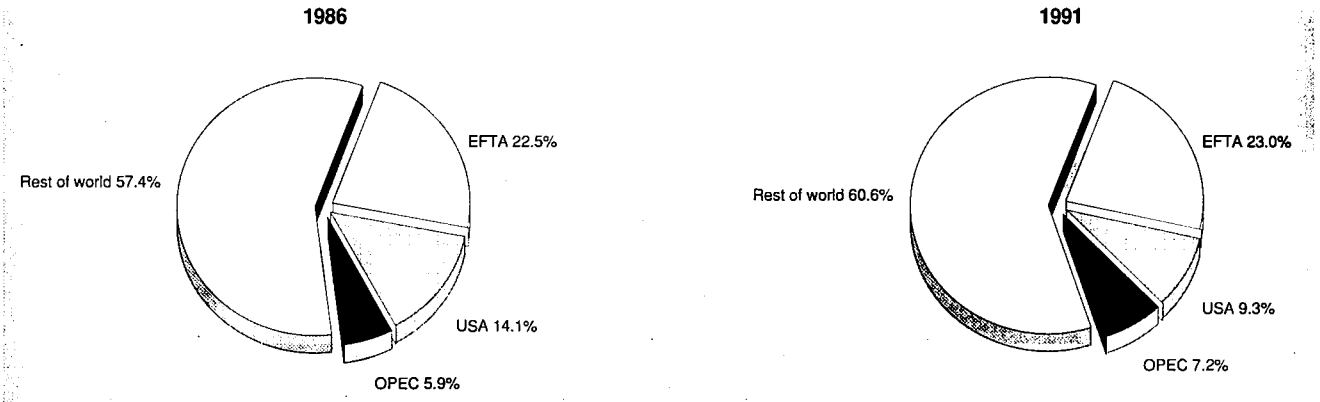
Turning to developments within the Member States, Germany is by far the largest exporter of man-made fibres, accounting for 41% of EC exports. Germany is both the largest producer and the leading importer within the EC, with 18% of total imports, followed by Italy and the United Kingdom. Only Germany and Ireland recorded trade surpluses for the EC in 1991.

The USA is the EC's foremost national trading partner. Although imports from the USA increased between 1986 and 1991, EC man-made fibres exports lost ground in the US market.

Eastern Europe has been an important EC export market. Until 1990, this region had been more important in terms of exports (with about 25% of total extra-EC exports in 1986) than the EFTA countries. Since 1990, however, EC exports to Eastern Europe have fallen drastically.

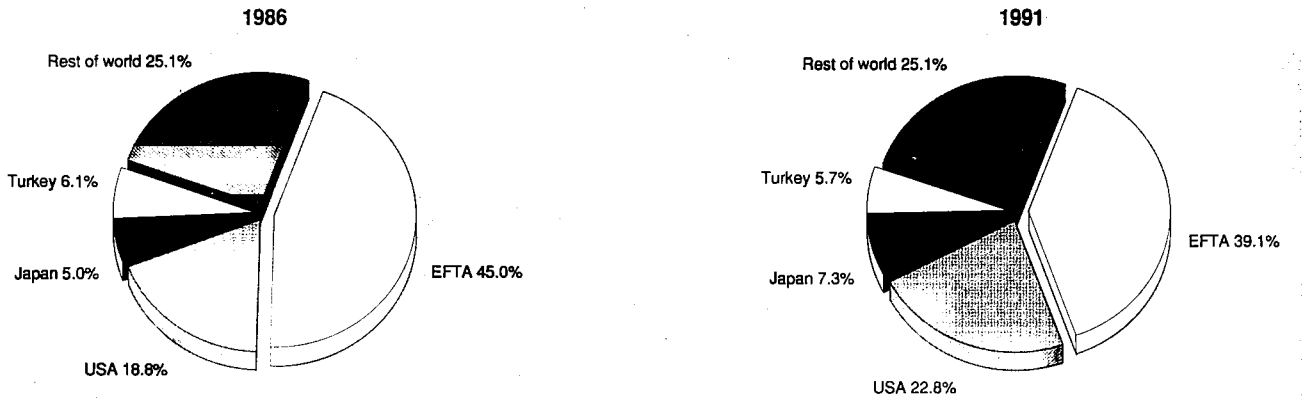
Although EC manufacturers export less than 15% of their production on average to non-EC markets, extra-EC imports

Figure 3: Man-made fibres
Destination of EC exports



Source: Eurostat

Figure 4: Man-made fibres
Origin of EC imports



Source: Eurostat

are gaining an increasing share of consumption in Europe, a share which rose to more than 40% in 1991.

On the other hand, extra-EC imports are mainly coming from EFTA countries, followed by the USA. Imports from developing countries are becoming more and more important and have risen five fold (in current terms) between 1980 and 1991.

Intra-EC trade represents about 71% of total EC imports, which illustrates the high degree of trade between the Member States. Intra-EC trade has however been slowing in the recent past.

MARKET FORCES

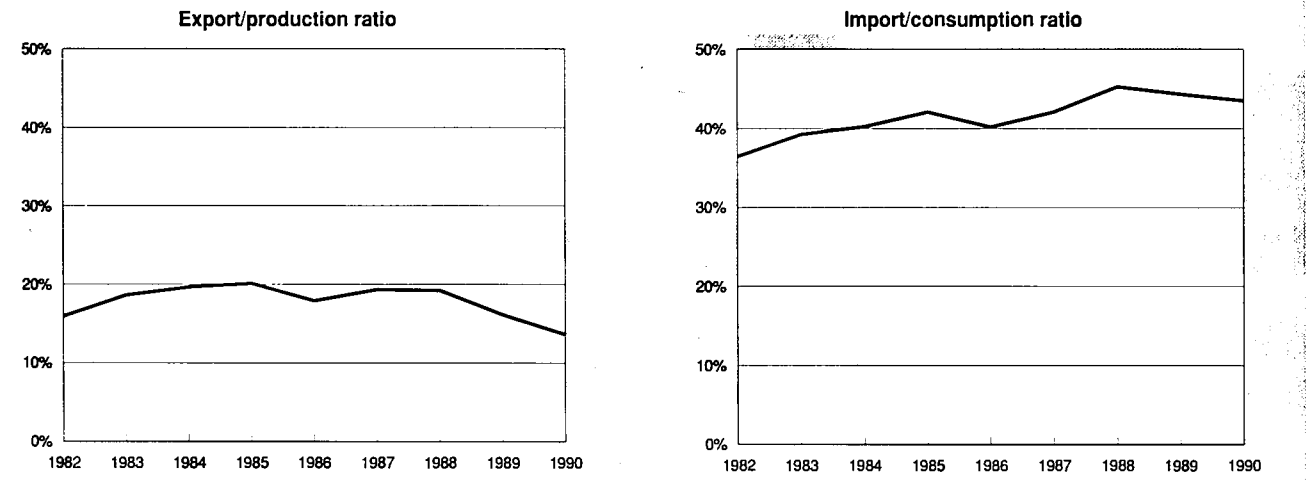
Demand

Chemical fibres represent an important share (approximately 65%) of total fibres consumption in the EC. The main end-market for these fibres is the clothing industry, with 42% of total consumption, while fabric for interior furnishings represent another 36% and industrial applications 22%. As consumers account for an important share of demand, overall economic activity and personal disposable income are overriding factors in the dynamics of the man-made fibres. The situation downstream also has a significant influence on the man-made fibres industry. Since 1986, the large increase in imports of textile and clothing products (which has more than doubled in the last 6 years) has hampered the activity of the textile processing industry, thereby reducing EC market shares for textile products.

Looking at consumption of man-made fibres compared to textiles and clothing demand, similar trends emerge. The growth recorded throughout the 1980s in the textiles sector mirrored the overall increasing trend in the consumption of man-made fibres. The relative downturn registered since 1990 in the textiles industry is also noticeable in the fibres sector as consumption growth has decreased during the same period. The reduction of the European market for man-made fibres has indeed been driven by the disappearance of several of its European clients which have shifted operations to developing countries.

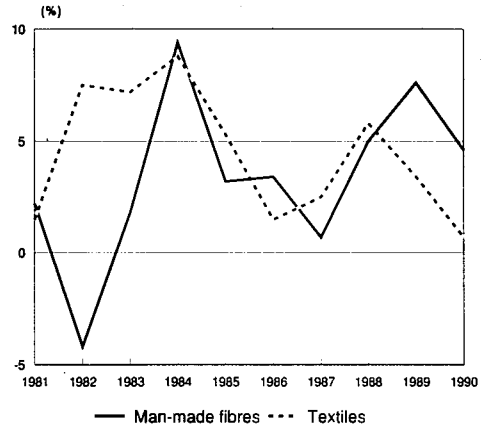
The upturn recorded in European consumption throughout the 1980s has also been a positive factor for the man-made fibres industry. Demand for these products has been driven not only by demographic factors, but also by increased earnings which directly influence the main markets for man-made fibres.

Figure 5: Man-made fibres
Trade intensities



Source: Eurostat

Figure 6: Man-made fibres
Consumption growth of man-made fibres versus textiles in the EC



Source: Eurostat

Supply and competition

In the few countries for which statistical information is available, the EC industry's competitiveness is jeopardised by stagnating productivity growth. Despite the continuing fall of employment levels, unit labour costs have continued to increase in all the Member States, driving down the industry's competitiveness.

Since 1990, exchange rates have also been a factor in the industry's declining performance in Europe. The weak US dollar continues to benefit US exports to the EC, which remains an open market. In contrast, not only have European producers suffered from the dollar weakness, but production for external markets is often lost when a local producer is established.

The resulting decline in output and the under-utilisation of production capacities has led to a significant fall in EC industry earnings.

Production process

Enhancements in the technology of yarn and fabric formation have been a major factor of the increasing dominance of synthetic fibres over natural fibres. Some processes, such as tufting for carpet manufacture, were initially made possible by developments in synthetic fibres technology. Given their particular suitability for a variety of end-uses, man-made fibres, and in particular synthetic fibres, have been able to capture a significant part of the fibres market.

The production process is increasingly capital intensive, following the need for higher technology products. This feature is the main factor that drives up labour unit costs in the sector, as the industry requires a highly skilled workforce.

INDUSTRY STRUCTURE

Companies

The man-made fibres industry is dominated by a small number of big companies. Companies are specialised in particular fibres, concentrating on speciality fibres in order to avoid competition from developing countries.

With a production capacity of 1.1 million tonnes, Hoechst AG (D) is the world's largest producer of polyester. Its turnover in chemical fibres amounted to 7161 million DM in 1991. Akzo Fibres and Polymer Division (NL) is the second largest EC producer of chemical fibres, followed by Rhône Poulenc Fibres, SA (F). ICI Fibres Ltd (UK) has been the leading European producer of polyamide (nylon).

Among the other main actors in the sector are Courtaulds Fibres Limited (UK), followed by Enimont SpA (I), SNIA Fibre SpA (I), and Bayer AG (D).

The main foreign producers, such as the American Du Pont de Nemours (the world's leading producer of nylon) or the Japanese Asashi, also have production facilities in Europe.

Strategies

The major firms in the man-made fibres industry operate with a very global perspective. Not only do non-EC companies have activities in Europe, but EC companies are present throughout the world. A good example is Hoechst which has a tyre cord capacity of 110 000 tonnes in North America. Meanwhile, the company is also present in the Far East and in China. In terms of sales, Hoechst obtains about 85% of its turnover from outside Germany.

Over the past 15 years, EC producers of man-made fibres have focused research on high value added specialities, such as technical yarn and carbon fibres. The bulk of research and practical applications is directed to high-tech fibres intended for the car, space and defence industries. Technical applications are increasing their share of the European man-made fibres market, while the clothing market is constantly shrinking in Europe. Today, technical applications represent more than 20% of EC consumption, from 11% in 1980. By contrast, production of low-technology fibres has gradually shifted from the developed world to the newly industrialised countries.

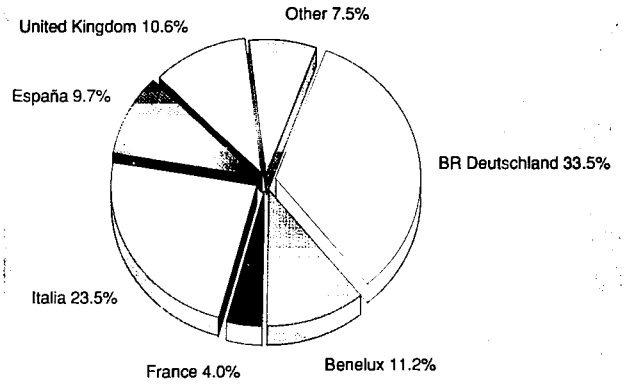
REGIONAL DISTRIBUTION

Among the EC member states, the largest producer of man-made fibres is Germany (34% of EC production in 1991), followed by Italy (24%). Benelux and the United Kingdom are also important producers, each accounting for 11% of EC man-made fibres production.

REGULATIONS

The European Commission has recently taken a decision on the code limiting state subsidies for the synthetic fibres industry. The code's previous extension expired in July 1992, and the decision made by the EC will extend it to the end of 1992. Given that the market for man-made fibres is presently suffering from oversupply, the code's discouragement of increasing production capacity is welcome by the industry.

Figure 7: Man-made fibres
EC production in volume, 1991



Source: Eurostat

OUTLOOK

The EC man-made fibres industry is expected to perform slightly better in the near future. The bulk of the growth will be accounted for by synthetic fibres, especially polyester. Demand for cellulosic fibres will show marginal growth.

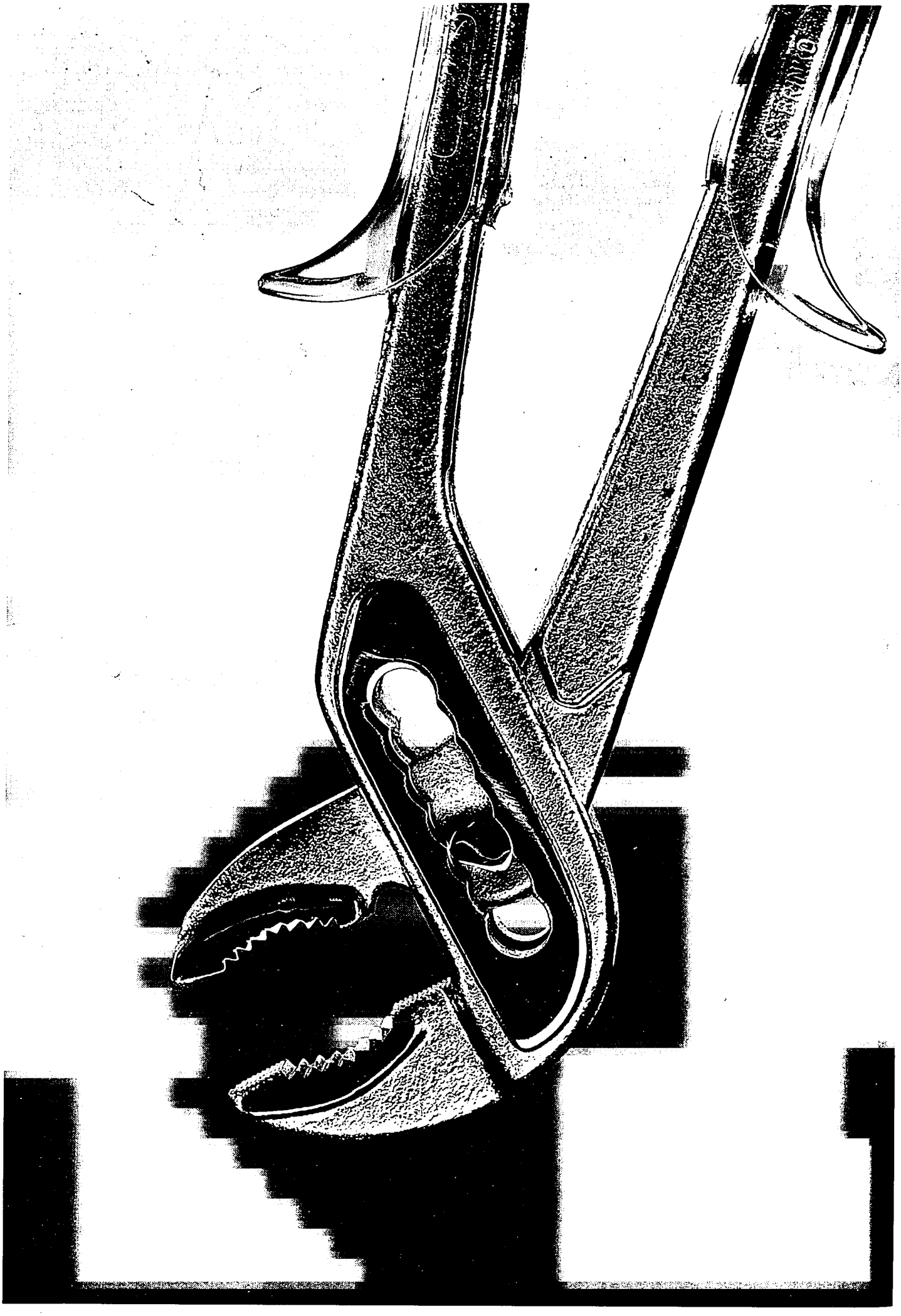
Table 5: Man-made fibres
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.2	3.2
Production	2.7	2.4
Extra-EC exports	1.5	1.0

Source: DRI Europe

Demand from the industry's main clients is expected to improve. The textiles industry will witness a slight increase in production while import growth will lose momentum. The automotive industry is also expected to improve in 1992, thus contributing to a stronger production performance in the man-made fibres industry.

Written by: DRI Europe
The industry is represented at the EC level by: Comité International de la Rayonne et des Fibres Synthétiques (CIRFS) Address: Avenue Van Nieuwenhuyse 4, B-1160 Bruxelles; tel (32 2) 676 7455; fax (32 2) 676 7454.



Metal products
NACE 31

The EC metal products industry is the largest in the world, producing 36% more than the USA and 67% more than Japan in 1991. Metal products experienced rapid growth in the mid to late 1980s following downturns caused by the industrial crisis in the earlier part of the decade. The industry's products serve mainly as intermediate commodities for other industries such as motor vehicles and construction. Despite recessionary slowdowns in these industries, metal products suffered only a minor slowdown in growth in 1991. Production and consumption are expected to virtually stagnate in real terms in 1992 and the prospects for the first half of 1993 are not brighter.
Although comprised of many small firms, the metal products industry is actually one of the largest employers in the EC, with a workforce of over 2.1 million.
Recent efforts to diversify product lines in recent years have helped the metal products industry become less dependent on the heavy industrial markets they traditionally supply.

INDUSTRY PROFILE

Description of the sector

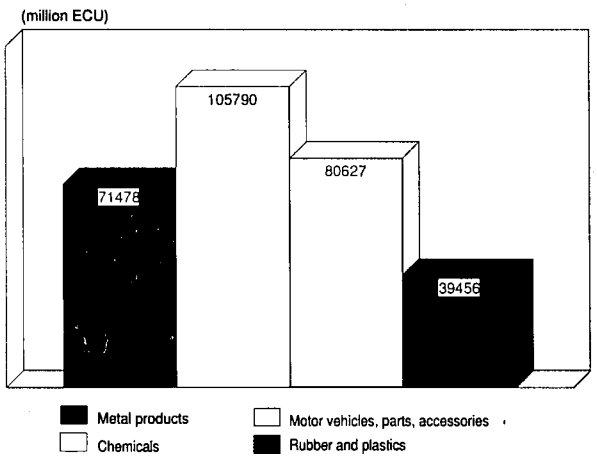
The metal products industry as defined by NACE 31 includes the following sectors:

- Foundries (NACE 311), includes iron and steel foundries which produce cast iron, ductile cast iron, etc., and non-ferrous foundries which produce copper cast, aluminium cast, etc.;
- Forging (NACE 312), includes transforming semi-finished metal into forged metal products through the use of a die;
- Secondary transformation of metals (NACE 313), involves the production of articles such as lathes, nuts, bolts, springs (excluding furniture and watch springs) and chains (excluding articulated link chains). The sector also includes such processes as galvanising, anodising and enamelling of metals and general mechanical engineering on a sub-contract basis;
- Structural metal products (NACE 314), includes the production of metal bridges, frames, doors, windows, railway tracks, etc.;
- Boilers and metal containers (NACE 315), includes the manufacture of various boilers, fittings, water tanks, and pipework, etc.;
- Tools (NACE 316), includes hand tools, tools for joinery, fixing tools for construction and metal saws, cutlery, metal packaging;
- Other metal workshops (NACE 319).

Main indicators

The EC remains the world's largest producer of metal products. Of the Member States, Germany is by far the largest manufacturer with value added output of nearly 29 million ECU in 1991. France is also a major producer with about 13 million ECU; the contributions by Italy and the United Kingdom reach 8.7 and 8.5 million ECU, respectively. These four Member States accounted for 83.5% of value added within the EC in 1991. Italy in particular has shown considerable improvement over the past decade, surpassing value added from the United Kingdom for the first time.

Figure 1: Metal products
Value added in comparison with other industrial sectors, 1991



Source: Eurostat

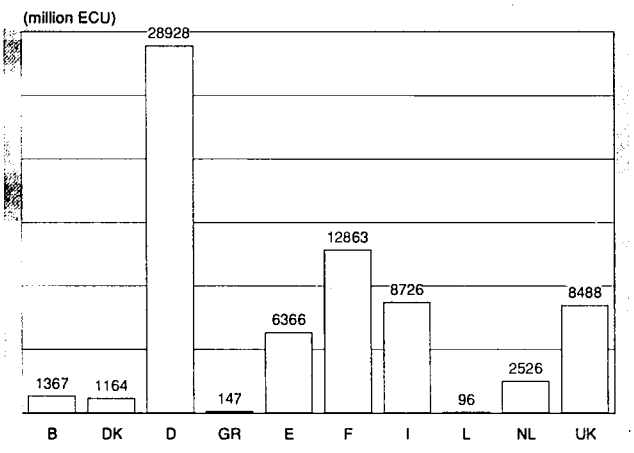
Of the sectors of the industry listed above, hand tools is the largest with an output of 70.4 billion ECU, followed by secondary transformation of metals with 24.7 billion ECU of output.

Recent trends

The metal products industry in 1991 continued to grow in terms of production and apparent consumption, albeit at a slower rate than in 1989 and 1990. Given that most of the industry's products are basically intermediate commodities for other industries, (products for final consumption account for only 10% of output), demand is heavily dependent upon the industry's main markets (mechanical and electrical engineering, transportation equipment and construction). Recessionary conditions in these downstream markets have reversed the booming demand which characterised the industry at the end of the 1980s. While production and consumption growth have remained positive, employment growth has halted and the trade balance diminished.

In real terms, production in 1991 did drop slightly; however, it remained above its 1989 level. Since 1988, production of

Figure 2: Metal products
Value added by Member State, 1991



Source: Eurostat

Table 1: Metal products
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	94 451	99 190	105 749	112 718	117 462	123 298	139 584	157 668	167 481	172 842	174 000
Production	103 493	107 589	114 369	121 216	124 559	129 530	145 075	163 689	173 246	177 685	179 000
Extra-EC exports	12 511	12 082	12 789	12 944	11 739	11 321	11 503	13 138	13 362	13 756	13 650
Trade balance	9 042	8 399	8 621	8 498	7 097	6 232	5 491	6 020	5 766	4 843	5 000
Employment (thousands)	2 214	2 167	2 105	2 061	2 032	2 029	2 055	2 140	2 185	2 185	2 145

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Orgalime estimates
Source: Eurostat

Table 2: Metal products
Breakdown by major sector, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Foundries	19 454	19 844	976
Forging, pressing and stamping	13 495	13 695	554
Secondary transformation	24 665	24 682	1 126
Boilermaking	17 546	18 410	1 252
Manufacture of tools and finished metal goods	68 570	70 392	7 442

(1) Estimates are used of country data is not available
Source: Eurostat

Table 3: Metal products
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.3	4.4	2.6
Production	0.6	3.7	3.4
Extra-EC exports	-4.7	-1.7	-2.7
Extra-EC imports	0.4	9.5	6.4

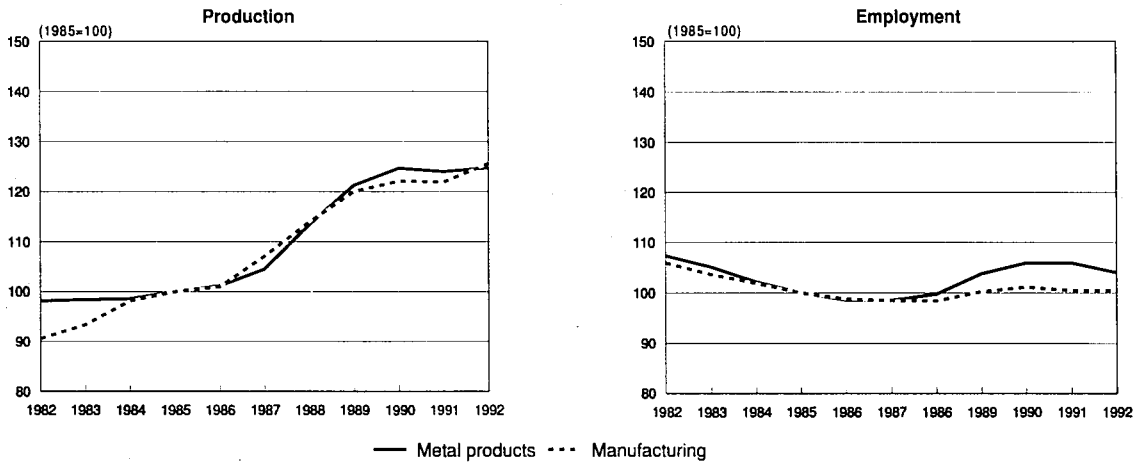
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Metal products
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	12 511	12 082	12 789	12 944	11 739	11 321	11 503	13 138	13 362	13 756
Extra-EC imports	3 469	3 683	4 168	4 446	4 642	5 089	6 012	7 118	7 596	8 913
Trade balance	9 042	8 399	8 621	8 498	7 097	6 232	5 491	6 020	5 766	4 843
Ratio exports/imports	3.61	3.28	3.07	2.91	2.53	2.22	1.91	1.85	1.76	1.54
Terms of trade index	105.9	104.3	101.8	100.0	102.6	104.1	103.8	101.5	102.1	101.3
Intra-EC trade	8 949	9 391	10 422	11 667	12 763	13 729	15 918	18 548	20 812	22 599
Share of total imports (%)	72.0	71.7	71.3	72.2	73.2	72.8	71.7	71.3	72.5	71.1

(1) Estimates
Source: Eurostat

Figure 3: Metal products
Production and employment indices compared to EC manufacturing



1992 are Orgalime estimates
Source: Eurostat

metal products has outpaced growth experienced in EC manufacturing as a whole. Regarding real growth in the industry, production and consumption experienced sluggish growth between 1982 and 1985. After 1985, however, real growth rates more than tripled, resulting in healthy growth figures for the entire period 1982 to 1991. Given the high demand by booming transportation and construction industries for metal products, it is not surprising to find a rapid growth in imports between 1985 and 1991.

International comparison

Apart from being the world's largest producer of metal products, the EC has been able to maintain better growth rates than its closest competitors, the USA and Japan. In recent years, however, competition from East Asian countries such as Hong Kong, Singapore, and South Korea in sectors such as hand tools have been intensifying.

Foreign trade

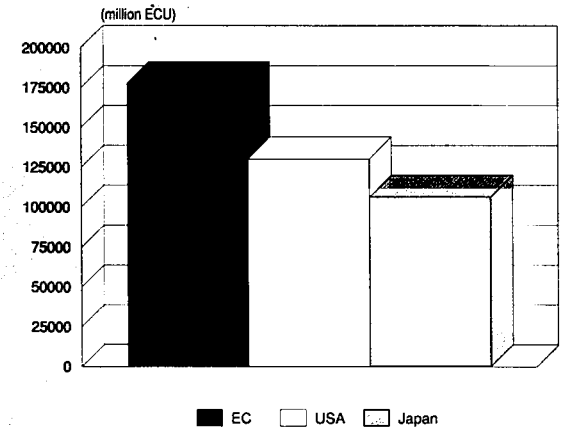
Although the metal products industry is a net exporter, external trade accounts for only 7.8% total production. Of the percentage that is exported, however, over 35% was exported to the EFTA countries in 1991, an improvement of 6% from 1986. While exports to the EFTA countries rose, the EFTA share of EC imports actually dropped as competition from Taiwan and other relatively small trading partners gained market share.

MARKET FORCES

Demand

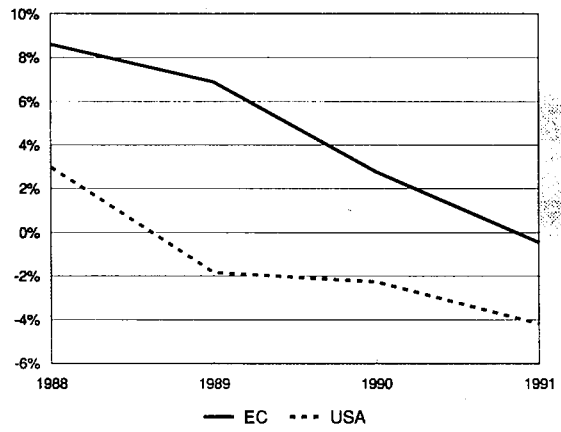
Almost all sectors of the metal products industry are linked to very cyclical downstream industries (i.e. mechanical engineering, motor vehicles and construction). For example, the motor vehicle industry consumes more than 70% of all aluminium based castings (foundries sector), and as much as 45% of all ferrous metal castings The recent recession in these industries has had a negative effect on metal products, particularly in the United Kingdom. In Germany, demand for metal products had been given an added boost after reunification. Although this extra demand has abated, German productivity in particular has improved enough to increase its price competitiveness in foreign markets.

Figure 4: Metal products
International comparison of production at current prices, 1991



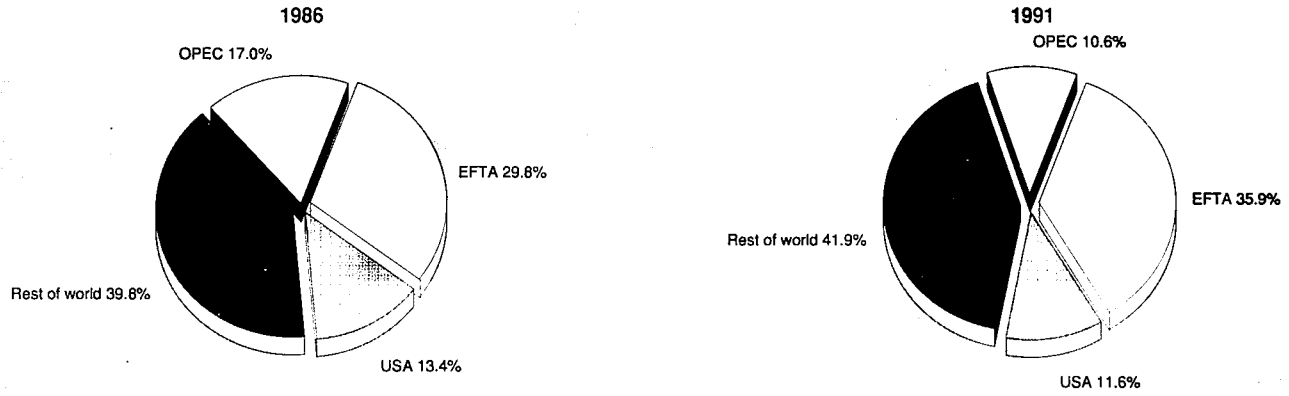
Source: Eurostat

Figure 5: Metal products
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Metal products
Destination of EC exports



Source: Eurostat

Table 5: Metal products
Breakdown by size of enterprise, 1988

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	219 630	89.9	28.1	16.4
20-99	20 666	8.5	27.7	18.0
More than 99	3 849	1.6	44.2	65.6

Source: Eurostat

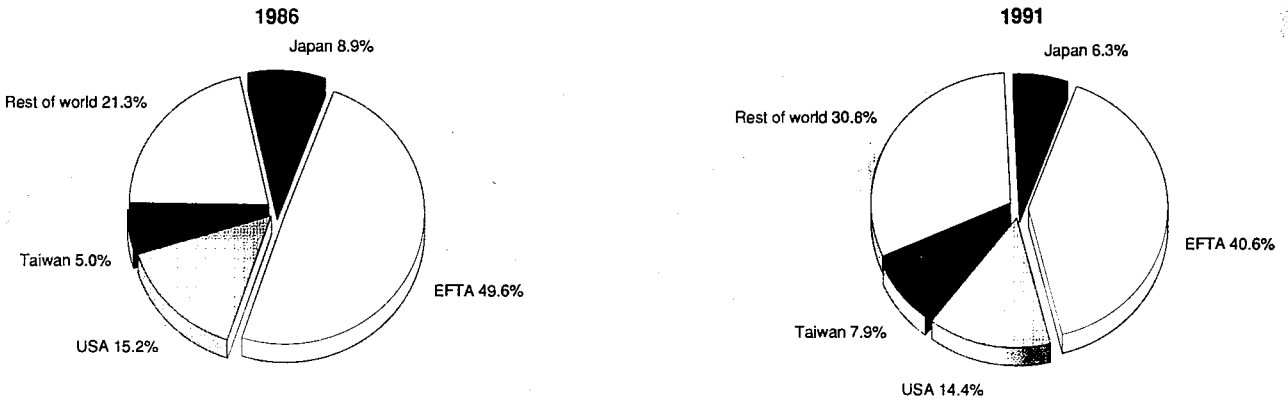
Supply and competition

Companies tend to supply national markets as a large share of firms are simply too small to service customers throughout the Single Market. Production is particularly specialised in Germany, while Spain, the Netherlands and Belgium are also noted for serving very specific markets.

Production process

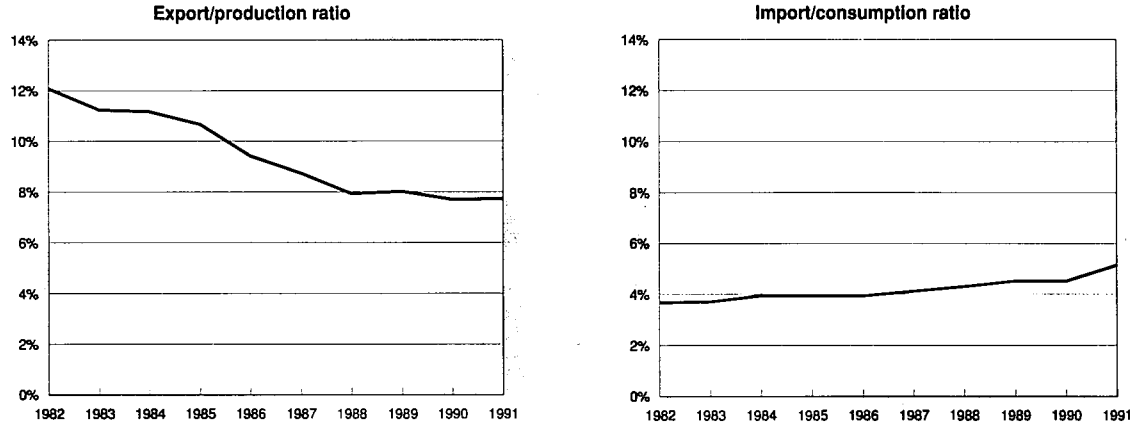
Since the early 1980s productivity has been increased through greater automation of production processes. Apart form the introduction of robotics, the industry is utilising innovations such as Computer Numerical Control (CNC), Computer Aided Design (CAD) and Flexible Manufacturing Systems. As a result, the need for skilled labour in these sectors is increasing. Although firms are striving for greater mechanisation of production, most sectors of the metal products industry remain labour intensive. For example, in the forging industry, personnel costs range between 40% to 50%. Most of the remaining costs are allocated to metal inputs and energy costs.

Figure 7: Metal products
Origin of EC imports



Source: Eurostat

Figure 8: Metal products
Trade intensities



Source: Eurostat

INDUSTRY STRUCTURE

Companies

The metal products industry is characterised by relatively low industry concentration. About 98% of all enterprises employ less than 100 people. These small firms account for 56% of employment in the sector and almost 35% of turnover. As most firms do not serve final consumer markets, they tend not to have brand names recognised by the general public.

Strategies

In certain sectors, the need to lessen the dependence on heavy industry has encouraged firms to diversify their operations. Many firms are not only seeking new outlets for products but are reconsidering the composition of their key activities.

REGIONAL DISTRIBUTION

For most of the sectors, the high weight/value ratio prohibits long-distance transport of goods. In order to remain profitable, many firms locate near their clients. Given that Germany in particular has a number of relatively large regions of heavy industry, it follows that large number of firms in the metal products industry are in close proximity to such clients. For example, German companies account for 51% of EC forging, and 80% of all German forging companies are concentrated in North Rhine-Westphalia.

ENVIRONMENT

Each of the sectors in the metal products industry has a unique environmental concern. To summarise these issues, a short description of environmental problems concerning individual sectors is in order.

Foundries are very active in recycling materials used during the production process. This sector is also focused on the subject of clean air, and often makes large investments in order to comply with strict regulations.

The forging industry is mainly concerned with reducing noise pollution resulting from the use of forging hammers. Furthermore, energy conservation has been emphasised with efforts to use more efficient electro-hydraulic systems to power forging hammers and to utilise waste heat from the forging process.

The electroplating industry (secondary transformation of metals) is particularly concerned with reducing the metal content of the effluent through the introduction of new production processes.

Table 6: Metal products
Production at constant prices and employment by Member State (1)

Country	Production (million ECU) 1982	1991	Employment (thousands) 1982	1991
Belgique/België	2 692	2 990	45 398	50 005
Danmark	1 342	2 204	22 566	31 549
BR Deutschland	38 782	54 805	666 137	787 459
Hellas	785	775	18 439	14 383
España	9 679	12 444	254 554	242 775
France	26 739	29 731	452 087	390 920
Ireland	490	658	11 498	7 371
Italia	13 787	19 782	225 268	249 983
Luxembourg	86	377	1 658	2 987
Nederland	4 060	5 610	64 399	71 315
Portugal	541	1 390	52 011	37 568
United Kingdom	19 945	19 571	399 790	298 462

(1) Estimates are used if country data is not available, especially in 1991
Source: Eurostat

Table 7: Metal products
Sectoral share of production and employment, 1991 (1)

Description and NACE code	Production (%)	Employment (%)
Foundries (311)	11.1	12.7
Forging, pressing and stamping (312)	8.0	7.8
Secondary transformation (313)	14.8	16.3
Manufacture of structural metal products (314)	15.2	14.7
Boilermaking (315)	10.4	9.9
Tools (316)	39.5	37.2
Other metal workshops (319)	1.0	1.6
Total manufacture of metal articles (31)	100.0	100.0

(1) Estimates are used if country data is not available
Source: Eurostat

Apart from environmental issues related to production, the boilers and metal containers sector is concerned with the corrosion of tanks containing chemicals and oil products during underground storage.

The light metal packaging industry is presently exploring new programmes which will ameliorate the environmental impact of its products, mainly through the promotion of consumer recycling.

REGULATIONS

At present, directives pertaining to the metal products industry are primarily related to safety standards. One of the more notable examples is a study taking place which would make ISO 9000 standards compulsory not only for EC manufacturers, but also for importers.

One of the major issues confronting the metal products industry is the harmonisation of EC standards. The present difficulty for manufacturers is deciding what standard of production processes will be used in the near future (i.e. existing national standards or a future unspecified EC standard). The unpredictability associated with this situation is an obstacle in making future investment decisions.

The general upgrading of environmental requirements in the EC will have a particular impact on foundries, which might suffer a loss in competitiveness vis-à-vis third countries producers.

OUTLOOK

Due to the present recession in the major markets of the metal products industry a fall in real terms is forecasted for 1993. In the medium term the outlook is not so discouraging.

Table 8: Metal products
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-0.5	2.3
Production	-0.5	2.3
Extra-EC exports	-2.0	1.5

Source: Orgalime, EC Commission

Improvements in the mechanical engineering, motor vehicles and construction markets are necessary for strong growth in the metal products industry. It should be noted, however, that efforts to lessen dependence on heavy industry in recent years has helped reduce the degree of cyclical downturns of demand intermediate commodities traditionally supplied by this industry. Furthermore, innovations in production processes are also allowing sectors to become more profitable not only by reducing material waste but also by producing products with a higher grade of value added.

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Foundries
NACE 311.1, 311.2

The EC is one of the largest casting producers in the world, with about 20 billion ECU in production per year.
Most castings serve as components in the motor vehicle and mechanical engineering industries. Foundries are usually small or medium sized enterprises, but are often part of a larger enterprise, producing castings for 'in house' use. Customers are typically large companies.
Employment in the EC as a whole fell between 1982 and 1991, but productivity increased. Although external trade is not a significant part of production, imports have been rising. The trade balance is, however, still positive.

INDUSTRY PROFILE

Description of the sector

Foundries are industrial plants which produce castings, which are primarily used as semi-finished products for other industries. To make a casting, liquid metals are cast in a mould to solidify; different techniques are available to produce castings of various sizes and shapes. Foundries can be classified by the different type of casting, but in the NACE are grouped according to the metal used in the casting:

- iron and steel foundries (NACE 311.1) which produce cast iron, ductile cast iron, malleable cast iron and steel cast;
- non-ferrous foundries (NACE 311.2) which produce copper cast, aluminium cast, zinc cast, etc.

Many alloys exist for each metal mentioned, some of which are standardised, but others of which vary according to the requirements of the casting demanded. Foundries often offer around 200 different qualities or alloys.

Statistics on external trade in castings are not complete. Many castings, including those used as components in car manufacturing, are not recorded separately, but are included in the "miscellaneous goods" category.

Main indicators

Production and apparent consumption have both risen steadily since 1982. Employment has decreased nearly 20% overall since 1982, however, resulting in increased productivity. Exports were variable between 1982 and 1991, and the trade balance, though still positive, shrunk about 5.5% annually over that time.

More than 80% of all castings in volume produced in the EC are still ferrous metal castings, but the proportion is declining. In the last ten years, the share of non-ferrous metal castings increased from 12% to about 16%, and in value the proportion is much higher. The proportions vary widely throughout the EC: in Germany and France, the share of non-ferrous metals is 34%, and in Spain about 40%.

The largest European producer of castings is Germany with 37% of total value added in the EC, followed by France with 22%. The five largest producers, Germany, France Italy, the United Kingdom and Spain, are responsible for about 95% of EC production.

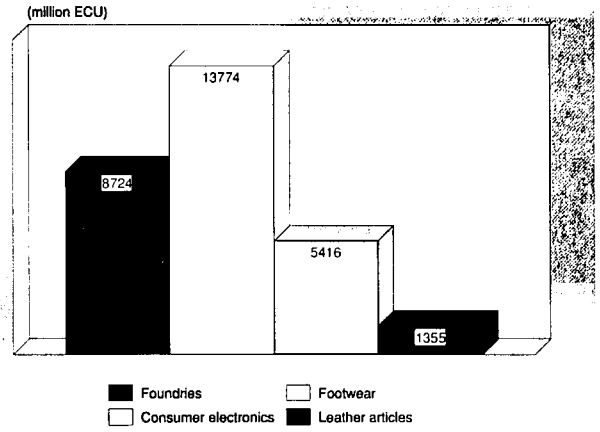
Personnel costs in foundries can reach 50% of total production costs. Therefore, the value added in relation to the production value is relatively high.

Recent trends

Production at constant prices for the foundry industry has risen steadily since 1982, but at a much slower rate than that of manufacturing in general. Employment, however, decreased almost 20% between 1982 and 1991, compared to a 5% drop in employment in manufacturing.

Although both production and apparent consumption grew between 1982 and 1991, most of the growth was in the second half of the decade. Imports also had a higher growth rate between 1985 and 1991 than between 1982 and 1985. Exports, which decreased sharply in the first half of the 1980s, recovered somewhat after 1985, although they continued to decline.

Figure 1: Foundries
Value added in comparison with other industries, 1991 (1)



(1) Excluding integrated foundries
Source: Eurostat

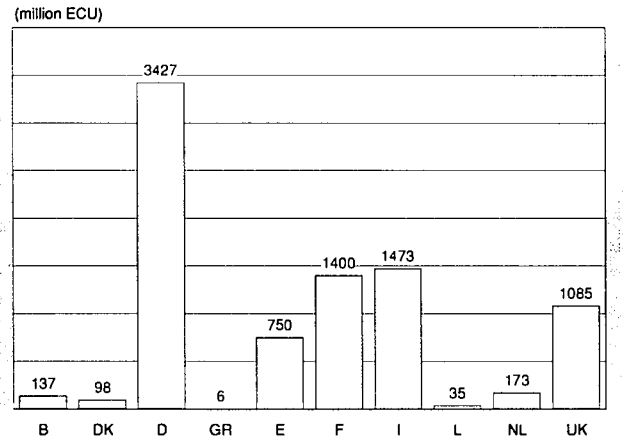
International comparison

Following to the break-up of the USSR, the EC has become the largest producer of castings, followed by the USA. China and Japan are also large world producers.

About 20% of all castings in volume produced in the world are fabricated in the EC, but the EC share in value is higher. The EC has been shifting to lighter, thin walled castings and light alloys with higher value by weight.

The EC, the USA and Japan all have very similar product lines. Their shares of non-ferrous metals castings achieve between 13% and 15% of their total production. The foundry industries in all three respond to the same economic factors, so shifts in production are similar as well.

Figure 2: Foundries
Value added by Member State, 1991 (1)



(1) Excluding integrated foundries
Source: Eurostat

Table 1: Foundries
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	12 579	13 306	14 351	14 695	15 135	14 970	16 897	19 283	19 633	19 454	20 018
Production	13 362	13 795	14 905	15 259	15 659	15 443	17 428	19 795	20 086	19 844	20 419
Extra-EC exports	1 051	763	844	897	866	826	919	963	960	976	994
Trade balance	782	489	554	564	524	473	531	512	453	390	389
Employment (thousands)	332.8	314.3	299.7	283.2	275.9	266.6	269.9	279.2	282.6	276.9	265.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) DGV estimates
Source: Eurostat

Table 2: Foundries
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	0.2	1.7	1.2
Production	-0.5	1.4	0.8
Extra-EC exports	-9.6	-1.1	-4.0
Extra-EC imports	1.5	6.1	4.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Foundries
Breakdown by product line (1)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Ferrous metal	10 092	9 465	9 350	9 452	9 070	8 786	9 374	9 807	9 582	9 153	8 970
Non ferrous metal	1 364	1 352	1 408	1 425	1 556	1 637	1 765	1 869	1 799	1 752	1 734
All castings	11 456	10 817	10 758	10 877	10 626	10 423	11 139	11 676	11 381	10 905	10 704
% ferrous metals	88.1	87.5	86.9	86.9	85.4	84.3	84.2	84.0	84.2	83.9	83.8
% non ferrous metals	11.9	12.5	13.1	13.1	14.6	15.7	15.8	16.0	15.8	16.1	16.2

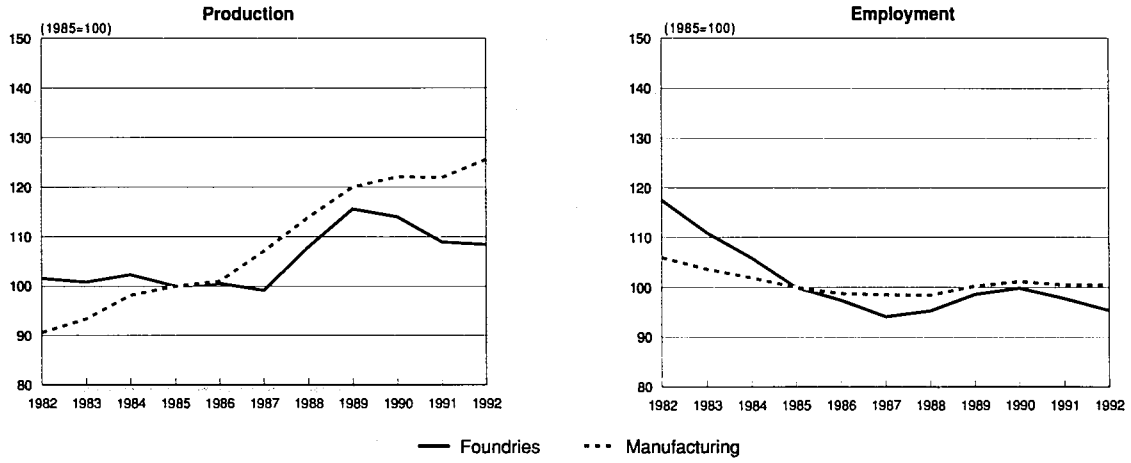
(1) Excluding Danmark, Greece, Ireland and Luxembourg
(2) DGV estimates
Source: CAEF, Modern Casting

Table 4: Foundries
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	25.4	26.3	26.9	28.0	30.4	31.8	32.8	32.6	32.4	31.5
Productivity index	90.8	93.9	96.0	100.0	108.7	113.5	117.1	116.5	115.7	112.6
Unit labour costs index (3)	80.4	85.6	92.6	100.0	105.9	110.2	115.9	119.9	125.1	N/A
Total unit costs index (4)	71.0	81.0	93.3	100.0	100.7	100.3	116.7	127.6	124.7	126.3

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Foundries
Production and employment indices compared to EC manufacturing



Source: Eurostat

There is a large difference in labour productivity, however, expressed as production value per person employed. Productivity in the Japanese industry is almost twice as high as in the EC, and productivity rates in the US are 20% higher than in the EC.

Foreign trade

Historically, foundries were built near collieries and/or smelting works. Today, they are more customer-oriented. Products must correspond to individual requirements, and permanent contact with the customer is necessary. Also, due to the weight and size of the castings, transportation costs are high compared to value of the products. For these two reasons, external trade is of minor importance in the foundry industry compared to other industries. The most important trade partners are neighbouring countries. Therefore, intra-EC trade is much greater than extra-EC trade, and the EFTA countries are by far the primary extra-EC trade partners. Trade over large distances is usually confined to components, spare parts for plants and special products with a high value such as finished high grade steel castings.

MARKET FORCES

Demand

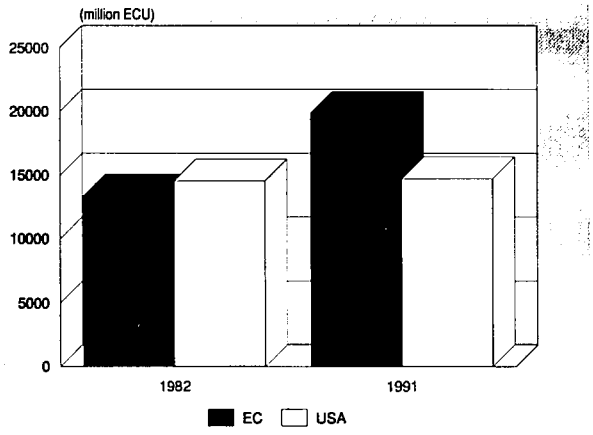
The largest consumer of foundry products is the car industry. More than 70% of all aluminium-based (Al-based) castings are installed in cars. The proportion of ferrous metals castings delivered to the automotive industry is lower than for Al-based castings, but is still significant at about 30%, and is as high as 45% in Germany.

Another important client of the foundry industry is the mechanical engineering industry which consumed up to 30% (in Germany) of all grey iron and nodular iron castings in 1991. During boom years, this percentage can rise much higher, due to increased investment in machines.

Pressure pipes and fittings are the most important end-product of the foundry industry. Their share in production is the highest in France at 31%. However, the value of these products is relatively low.

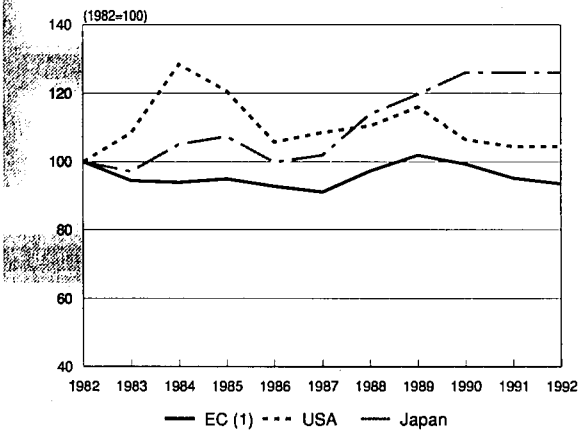
The foundry industry is a mature, rather than a rapidly growing, industry. The yearly production in tons was stable between

Figure 4: Foundries
International comparison of production at current prices



Source: Eurostat

Figure 5: Foundries
International comparison of production in volume



(1) Excluding Danmark, Greece, Ireland and Luxembourg
Source: CAEF, Modern Casting, Annual Statistics of Material Process Industries (Japan), US Industry

Table 5: Foundries
International comparison of employment

(thousands)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC	332.8	314.3	299.7	283.2	275.9	266.6	269.9	279.2	282.6	276.9
USA	232.4	212.2	229.8	218.6	205.1	206.5	208.8	209.9	N/A	N/A
Japan	95.5	92.4	93.3	92.6	88.4	83.8	86.8	87.2	87.6	N/A

Source: CAEF, Modern Casting, Annual Statistics of Material Process Industries (Japan), US Industrial Outlook

Table 6: Foundries
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 050.6	762.7	843.8	896.9	865.8	826.2	919.1	962.6	960.0	975.9
Extra-EC imports	268.3	273.4	290.1	333.4	341.3	353.3	388.1	450.6	506.7	585.5
Trade balance	782.3	489.3	553.7	563.5	524.5	472.9	531.1	512.0	453.4	390.4
Ratio exports/imports	3.9	2.8	2.9	2.7	2.5	2.3	2.4	2.1	1.9	1.7
Terms of trade index	102.7	103.1	101.4	100.0	103.2	104.6	100.1	96.8	95.0	94.2
Intra-EC trade	730.5	720.8	804.4	926.9	1 019.1	1 031.2	1 219.2	1 424.2	1 653.1	1 696.8
Share of total imports (%)	73.1	72.5	73.5	73.5	74.9	74.5	75.8	76.0	76.5	74.3

(1) Estimates
Source: Eurostat

1982 and 1991. Growth occurred only in value, caused by the shift to lighter, thin walled and core intensive complex constructions and lighter alloys, especially aluminium-based alloys.

Casting as a master pattern process is in direct competition with sintering, but also with methods of metal forming such as forging, rolling, pressing, drawing and deep drawing. Joining techniques, such as welding, gluing, riveting, and screwing, also offer substitutes for casting.

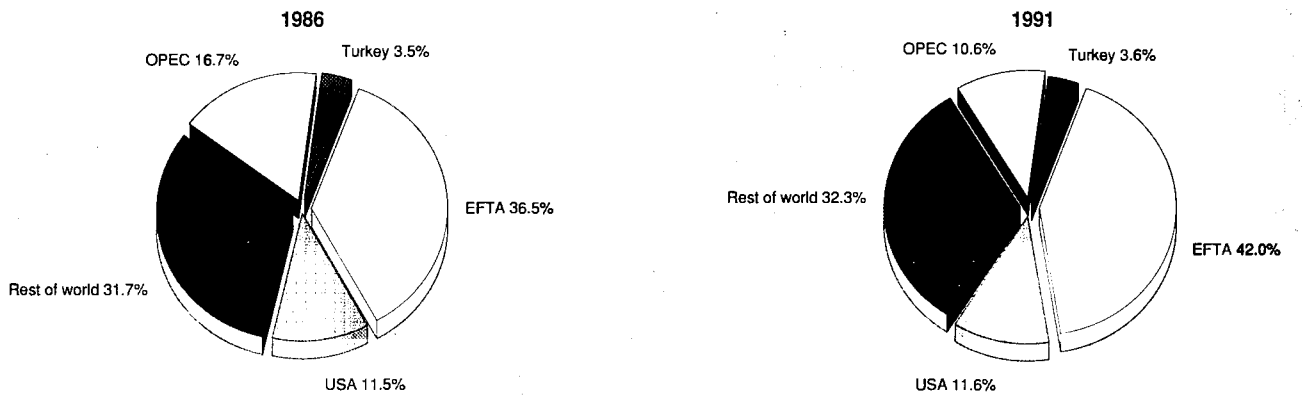
In recent years, however, the competition between various materials has been of greater importance. The importance of certain plastic products in the production of cars, pipes and fittings has increased rapidly. Heavy products, such as ingot moulds, are substituted with complex light components in the automotive industry as well. It appears that this substitution process is slowing down. Generally, reasons for substitution are weight, wear-, heat- or acid- resistance, behaviour in ageing, price, or the possibility of recycling. In the future, mineral products such as ceramics, or composite materials such as fibre could become important substitutes.

Since castings are mainly intermediate products, foundries are highly sensitive to changes in economic conditions in those sectors which use castings as an input, particularly the motor vehicle industry and mechanical engineering sector. This explains the industry's relatively poor performance in the early 1980s, and the profitability improvements recorded in more recent years.

Supply and competition

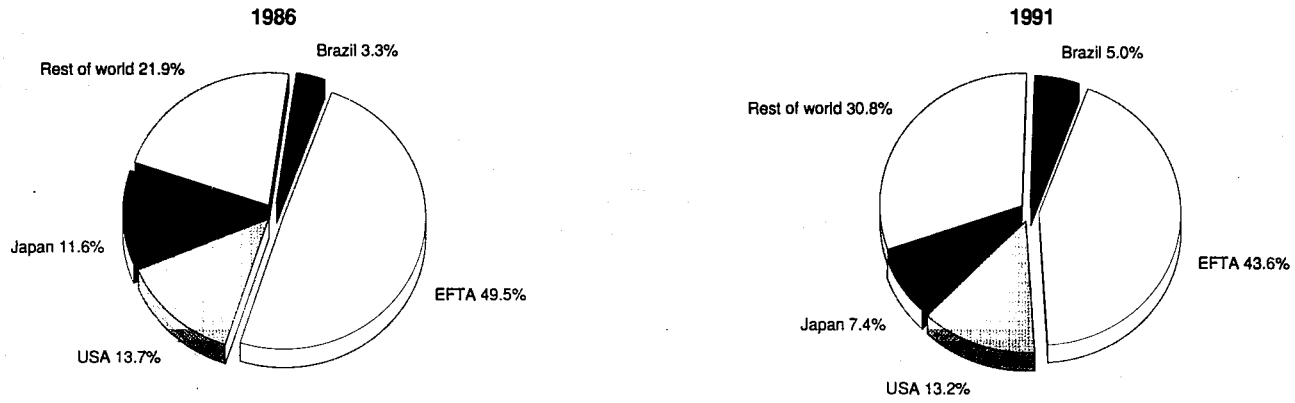
Although the intensity of use of castings has decreased in the major client industries, the booms in car and machine production in the late 1980s were strong enough to result in a slight growth in volume. However, when comparing actual volumes of production with that of 1980 or even 1970, a decline is obvious. Furnace-, moulding- or fettling capacities are therefore more than sufficient to satisfy demand, although there is difficulty finding sufficient skilled labour. Because of the excess capacity and large number of foundries and the strong market power of the industry's major customers, foundries do not have much power to set prices, and profit margins are low.

Figure 6: Foundries
Destination of EC exports



Source: Eurostat

Figure 7: Foundries
Origin of EC imports



Source: Eurostat

The direct effects of the Single European Market on foundries are likely to be small, since the simplification of border formalities and the elimination of delays at borders will have little impact on international trade with castings. Changes in other sectors, however, will probably have significant spill-over effects, such as the liberalisation of public procurement, which will have important implications for such products as pressure pipes or castings for sewer systems. Furthermore, changes in the transport and insurance sector will make it possible to sell castings in more distant markets. Since the demand for castings itself is not expected to increase rapidly in the EC, however, this will also mean enhanced competition among EC firms. The foundries in low labour cost areas, as well as those having the lowest production costs with reference to environmental legislation, will enjoy a competitive advantage. Both factors vary widely across Member States.

Production process

Casting production is still a labour intensive industry. Even when the production process is extremely mechanised, the proportion of personnel costs in total cost reaches 40%. In hand-moulding and single-piece work, the share of labour costs achieves 50% or more in some cases. Much effort has therefore gone into increasing productivity in order to decrease labour costs.

Metal inputs are also an important cost to the industry. Its share of total production costs varies widely, between 15% and 25%, depending on the input materials (scrap, pig iron, alloys, high purity metals) and the current prices. While the input materials depend on the required end-product, prices are subject to market forces. Capital costs such as depreciation and interest costs, depend on the technology used. They are higher in a fully automated foundry and lower in hand moulding and single-piece work.

Energy costs are significant as well. Depending on the furnace installed, either coke or electricity is the primary source of energy; coke for a cupola and electricity for an electric induction or an arc furnace. Because of increasing quality requirements and the shift to nodular iron or light alloys castings the share of foundries using electricity is increasing compared those using coke.

INDUSTRY STRUCTURE

Companies

Foundries are generally small or medium-sized companies. More than half employ fewer than 50 employees, and many are family concerns. Those that are not are often vertically integrated into part of a bigger enterprise, producing castings for use "in-house". Foundries have not found it necessary to develop a more concentrated industrial structure. Investments in rationalisation were meant only to increase labour productivity.

Advanced technology, however, allowed the development of a number of large firms in the sector. The development of automatic moulding machines made large series production possible. Since this type of production requires two to three work shifts to be efficient, certain firms grew to 1000 or more employees. Such foundries specialise primarily in producing large series, especially castings designated for cars.

The average size of production units is distinctly higher in the case of ferrous foundries compared to non-ferrous. Those foundries which specialise in the production of Al-based cast-

Table 7: Foundries
Major customer industries of gray and ductile iron, 1991

(%)	D	E	F	I(1)	UK
Pipes, fittings	10.5	12.5	31.1	29.3	26.9
Building, domestic	3.8	15.3	5.2	N/A	5.0
Ingot moulds, rolls	1.7	0.6	0.5	3.4	3.4
Machine building	30.0	21.3	16.2	26.8	21.4
Vehicle industry	43.5	29.8	32.7	33.7	25.1
Others	10.5	20.6	14.3	6.8	18.3

(1) Pipes and fittings include building and domestic
Source: CAEF

Table 8: Foundries
Breakdown of produciton by main European producers

	D		E		F		I		UK	
(thousand tonnes)	1986	1991	1986	1991	1986	1991	1986	1991	1986	1991(1)
Grey iron	2 296	2 121	422	390	932	991	1 185	1 139	739	633
Ductile iron	932	1 069	159	219	737	934	177	192	339	421
steel	224	202	105	92	129	133	98	90	108	89
Total ferrous metal	3 452	3 392	686	701	1 798	2 058	1 460	1 421	1 186	1 143
Cu-base	76	100	13	15	23	24	84	95	43	36
Al-base	427	470	55	95	187	230	305	379	64	62
Other non-ferrous	85	81	21	25	39	39	61	70	36	33
Total non-ferrous metal	588	651	89	135	249	293	450	544	143	131
All castings	4 040	4 043	775	836	2 047	2 351	1 910	1 965	1 329	1 274

(1) Non-ferrous metals estimated
Source: CAEF, Modern Casting

ings for the use in autos are exceptions, and are often as large as the corresponding ferrous foundries.

Strategies

The foundry industry is constantly looking for innovation in both production and material technology. New alloys are always being sought to correspond with specific client needs. In particular, new compounds are developed which are more resistant to wear, heat, rust, and acid.

Castings are both becoming smaller and lighter, and bigger and heavier, depending on the use to which they will be put. In many cases, dimensional tolerances are becoming narrower as well. The different demands on the foundries, often pulling in opposite directions, are resulting an increased heterogeneity of foundries.

A single strategy for foundries is therefore not viable. Problems for all foundries are labour costs and environmental legislation, resulting in higher costs. The first objectives of investment are modernisation, to increase labour productivity and reduce emissions. Spanish and French foundries have so far had the greatest success in increasing labour productivity.

Mergers and acquisitions also occur in the foundry industry, but usually the production units remain unchanged, as a profit centre of the new owner. There are two primary reasons for M&A activity:

- to produce castings for in-house use, resulting in increased independence for the client industry;
- to produce a wide variety of goods, both light alloy and high grade steel for example. This would allow a foundry either to fulfil all demand for a few specific customers with diverse needs, or to fulfil demand for a number of firms in an area.

REGIONAL DISTRIBUTION

As previously mentioned, foundries which traditionally were built near supplies of raw materials are now built close to clients, although many foundries are still located near collieries and coal mines. As a result, modern and efficient foundries now tend to locate in those regions of Europe where high-capacity car production plants, or productive mechanical engineering companies are found.

ENVIRONMENT

Recycling has always been extremely important for foundries, as a large portion of materials used can be recycled in the production process: metals can be smelted again, and the sand used in moulding or the core shop can be reconditioned. Furthermore, used castings are recycled to the production process.

Nevertheless, it is impossible to avoid waste completely. Certain residues, such as thermally worn moulding sands, always occur, although foundries do look for ways to reduce these residues further.

The prime concern of foundries in their environmental production work at present is clean air, particularly to eliminate dust. Strict conditions laid down by in regulations must be complied with, and high investments are necessary in some cases.

Since not all foundries have the financial capacity to undertake such investments, some of them will have to stop production after the transition period. Profitability for those that remain will decrease as well, due to increased costs. Currently, environmental legislation varies form country to country, resulting in loss of competitiveness for foundries in environmentally-conscious countries, so the EC will need to harmonise environmental legislation.

Table 9: Foundries
Number of enterprises and employment, 1991

	Number of enterprises		Employment	
	Ferrous metal	Non ferrous metal (1)	Ferrous metal	Non ferrous metal (1)
BR Deutschland	390	455	65 358	35 914
España	194	N/A	19 210	6 175
France	194	366	26 559	23 443
Italia	400	N/A	23 100	N/A
United Kingdom	317	N/A	35 701	N/A

(1) 1990 figures
Source: CAEF

Table 10: Foundries
Investment trends

(million ECU)	1982	1988
BR Deutschland		
Net investments	197.7	350.6
Turnover	4 888	6 391
Net investments/turnover (%)	4.05	5.49
France		
Net investments	114.3	179.3
Turnover	2 987	3 025
Net investments/turnover (%)	3.83	5.93
Italia		
Net investments	94.5	197.4
Turnover	1 880	3 445
Net investments/turnover (%)	5.03	5.73
United Kingdom		
Net investments	79.2	114.7
Turnover	2 160	2 697
Net investments/turnover (%)	3.67	4.25

Source: Eurostat

REGULATIONS

There are no EC-wide regulations specific to foundries. Among the regulations which will affect the industry are:

- regulations affecting the protection of the environment;
- regulations regarding additional costs to wages and salaries (social security taxes);
- regulations affecting tax rates, especially local business taxes, general property taxes, corporation taxes;
- regulations regarding prices for energy, public levies to deposit waste, wages and salaries;

OUTLOOK

Favourably influenced by cyclical factors, the tonnage of foundries increased by 12% in the late 1980s. The early 1990s saw a reduction of 7%. In the mid-1990s, decreases in growth are expected due to reductions in the outputs of the car and the mechanical engineering industries. Imports from non-EC countries are expected to increase as well.

To limit the effects of these factors, different strategies are possible:

- foundries could develop higher quality products, for instance by using sophisticated alloys;

Table 11: Foundries
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-1.0	-1.0
Production	-1.2	-1.2
Extra-EC exports	-0.5	-0.5

Source: DGV

- foundries could offer additional services, through a higher grade of value added, for instance by finishing operations;
- foundries can adopt modern techniques on a large scale for developing complex cast constructions, such as axle trees, which were impossible to cast only a few years ago;
- foundries could find new end-markets, for instance by producing lamp-posts, castings for sanitary facilities or bells.

Although the trade balance has been weakening, the international position of EC foundries is not bad at present. However, since many steps of the operations are highly labour-intensive, particularly in pattern making, the fettling shops and the finishing process, further rationalisation is necessary. CAD/CAM systems for patternmaking and/or the fettling shops, as well as CNC machines for finishing operations could be a solution. Speeding up the delivery process, avoiding factory rejects, supplying castings 'just-in-time' and producing high quality products are important ways of improving the world wide competitiveness of EC foundry products.

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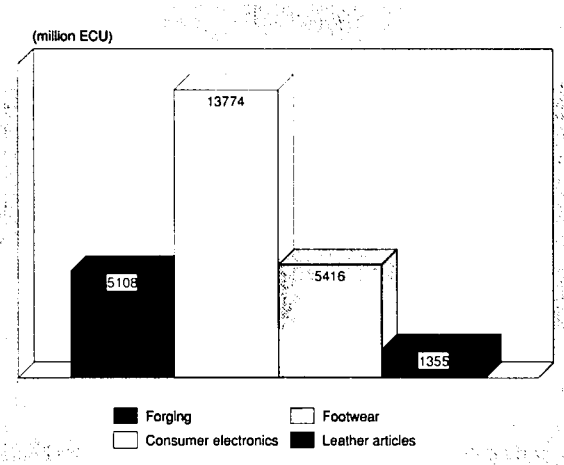
Forging
NACE 312.1

With an output of 3.3 million tonnes in 1990, the EC forging industry is ahead of both the United States and Japan in terms of size.
The forging industry supplies high-tech areas, such as the aviation industry, railways and the automobile industry. Other important end markets are agricultural and construction machinery, industrial trucks.
A slowdown in production in the industry at the end of the 1980s stemmed from the weakening economic climate in Europe combined with market saturation. This slowdown in forging activity is expected to continue throughout the first half of the 1990s.

Figure 1: Forging (1)
Value added in comparison with other industries, 1991



(1) NACE: 312.
Source: Eurostat

INDUSTRY PROFILE

Description of the sector

Forging consists of taking a piece of semi-finished metal (a "slug"), heating it until it becomes malleable and then forming it into a die, the two halves of which are brought together rapidly in forging hammers or presses. Forged metal products are used when great forces have to be transmitted and where particular emphasis is placed on safety and reliability, for example in engines, aircraft turbines, steering and axle systems of motor vehicles. Forgings are primarily semi-finished products, usually requiring further processing at least in certain areas, e.g. heat treatment, surface treatment or machining. They are used in other industries such as the aviation, railway rolling stock, and automobile industries. In some cases, however, items can be produced ready for use.

Forgings are produced with or without heating the blank, which in most cases is a length of rectangular or round bar or a shaped piece of thick sheet metal, using specialised forming tools. Hammer forgings are produced with simple flat or round tools with a machining allowance of several millimetres. In other product groups, such as drop forgings, flanges and extrusions, more specialised and technologically advanced tools are used for a more specifically shaped product. In many cases, ready-to-use working surfaces and products can be produced by a combination of production methods.

A wide variety of steel materials and non-ferrous metals (Al, Mg, Cu, Ms, Ni-alloys, etc.) can be transformed by forging. The different malleability of the various materials determines the nature of the production methods and also limits the shape and accuracy which can be achieved.

The properties and characteristics of the products, in regards to strength, structure, machinability, etc., are governed both by the processing itself (heat treatment by forge, work-hardening, etc.) and by subsequent operations (annealing, temper-hardening, strength radiation, etc.).

The forging industry is capable of producing high-quality products, offering considerable advantages for the customer, particularly according to criteria of weight, security against fracture, service life and consistent quality.

Main indicators and recent trends

In 1990, the forging industry in the EC produced 1.834 million tonnes of drop forgings from steel. If drop forges of the automobile and other industries are included (0.523 million tonnes), the greatest part of forge output (approximately 71%) was attributable to the drop forge product group.

Production of forged steel products (NACE 312.11) measured in volume terms declined over the period 1982 and 1986, brought about by the weakness in demand in EC market. As the European investment climate improved in the second half of the eighties so did demand for steel forged products and consumption and production started to recover in 1987. The trade balance has increased since the beginning of the eighties although in 1991, it was down from its peak in 1985.

The trend towards increased output observed in various countries starting in the mid-1980s reversed after 1990. The downturn was caused primarily by weaknesses in engineering, mining and agricultural machinery, and the declining demand for motor vehicles.

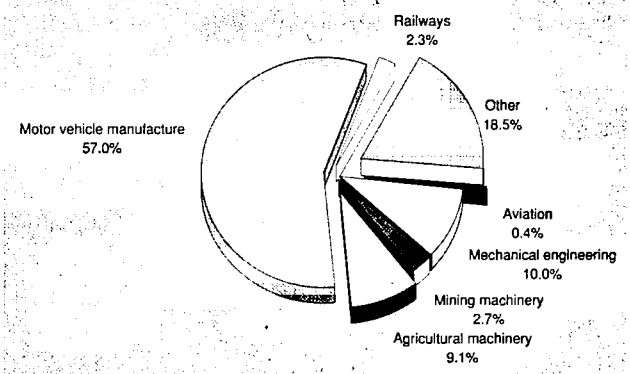
MARKET FORCES

Demand, supply and competition

In 1990, with an output of around 3.3 million tonnes and sales of roughly 6.6 billion ECU, the European forging industry occupied the top spot among western countries, ahead of Japan and the USA.

The motor-vehicle industry is by far the most important customer for forges, and uses about 50% of total forge production. Other important clients include different engineering industries

Figure 2: Forging (1)
Breakdown of sales by product line



(1) NACE 312.11.
Source: Euroforge

Table 1: Forging (1)
Main indicators (2)

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Apparent consumption	1 610	1 496	1 455	1 368	1 367	1 421	1 649	1 749	1 661	1 552
Production	1 720	1 614	1 605	1 618	1 604	1 648	1 820	1 918	1 831	1 726
Net exports	110	118	150	250	237	227	171	169	170	171
Employment (thousands)	62	59	58	56	56	54	55	57	54	51

(1) NACE 312.11; Steel forging
(2) BR Deutschland, Belgique/België, España, Italia, France and the United Kingdom
Source: Euroforge

Table 2: Forging (1)
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	368	348	415	451	352	345	440	541	545	554
Extra-EC imports	129	119	143	171	160	137	194	260	311	342
Trade balance	239	229	272	280	191	209	245	280	234	212
Ratio exports/imports	2.85	2.93	2.90	2.64	2.19	2.53	2.26	2.08	1.75	1.62
Terms of trade index	105.1	105.4	103.8	100.0	95.5	99.8	97.9	101.6	100.1	95.7
Intra-EC trade	295	282	334	384	360	344	740	766	798	862
Share of total imports (%)	69.5	70.3	69.9	69.2	69.2	71.6	79.2	74.5	71.9	71.6

(1) NACE 312
(2) Estimates
Source: Eurostat

such as agricultural machinery, construction machinery, industrial trucks, static machinery and engine construction.

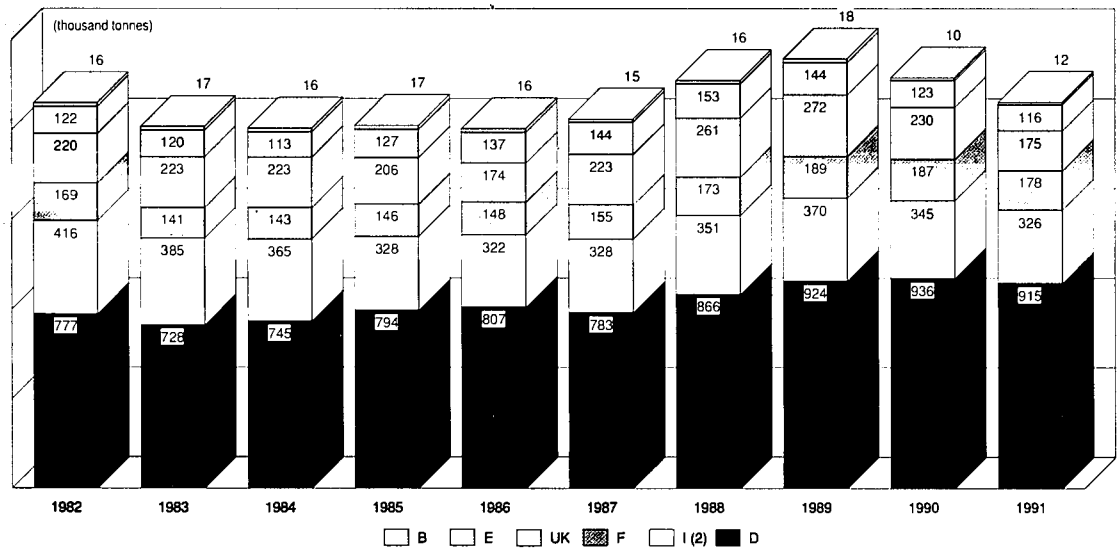
The majority of firms in the forging industry are component suppliers. Both standard products such as shafts, clamping systems for the construction industry, etc., and products designed to a customer's specifications are sold on the open market. Hammer forges are often large firms, such as steelworks. The drop forging and extrusion companies are predominantly medium-sized. In cases of recurrent large production runs, some automobile and bearing manufacturers produce individual items in their own production shops, but this is not done frequently.

INDUSTRY STRUCTURE

Companies and regional distribution

The drop-forging industry is comprised principally of medium-sized firms, although concentration and cooperation activities have spread beyond national borders. In recent years, output has developed in various areas in different Member

Figure 3: Forging (1)
Production by country



(1) Nace: 312.11.
(2) Data for Italy are estimates
Source: Euroforge

States. There are some 140 drop-forging companies in existence in Germany, accounting for roughly 51% of EC production. Germany thus occupies a leading position in the western world. 80% of German companies are located in North Rhine-Westphalia and 12% in Baden-Württemberg. Information on forges in the former East Germany is not yet available. 22% of German forges employ more than 200 workers, 20% have between 100 and 200 employees, 22% between 50 and 100 employees, and 36% have less than 50 employees. The major firms include Thyssen, Gerlach and Peddinghaus.

In Italy, which accounts for 19% of EC production, 30% of the national production is concentrated in the Canavese region. Other locations include Lombardy, Veneto and Emilia Romagna. The major companies are Teksid, a subsidiary of Fiat (90% of the output of which is destined for the automobile industry), Riganti and Casartelli. Other important Limited companies are Figli si S. Bertoldo Spa, Massucco Industrie Spa, Facem Spa, Canavera Spa and Benevenuta Spa.

In the United Kingdom, which is responsible for 12% of EC production, the majority of manufacturers of small forgings are located in the Midlands, in the vicinity of Birmingham, while larger forgings are produced principally in the region of Sheffield, in South Yorkshire. The largest company is United Engineering Steels Ltd., which accounts for roughly 45% of UK output. Other forges of importance are Firth-Rixon, the INCO Group and the Cameron Iron Works.

In France (10% of EC production), 72 companies are active in the industry. 35% of the firms are in the Ardennes, 8% in the Loire Region, and 19% are in Eastern France. Three firms dominate the sector: Ascometal, Forges Stephanoises and Forges de Courcelles.

In Spain (7% of EC production), 37 firms are in business in the field. About 80% of these are based in the Basque country, the remainder being spread over Cataluña, Arragón, Madrid and Galicia. The largest proportion of firms (40%) employ less than 50 workers. Eight companies employ more than 150 workers, five employ between 100 and 150, and nine employ between 50 and 100. The major companies of P. Echeveria SA, La Forge Casanova SA, Forgas de Villalba SA (Forjanor Group) and Forges de Galicia SA together account for around 60% of Spain's output.

In Belgium (1% of EC production), there are about ten companies active in the forging industry, five of which specialise in drop forging. Most of these are small businesses, located around Charleroi, Liège and Mechelen.

ENVIRONMENT

In recent years, a considerable proportion of investment in the forging industry has been devoted to measures to protect the environment. Emphasis has been on measures required by law for acoustic protection, to reduce or eliminate vibration, and to save energy, for example by equipping furnaces with recuperators, by replacing the expensive compressed-air drives of hammers by electro-hydraulic systems, and by utilising the waste heat from the forging process.

One advantage of forged products over certain substitutes is the excellent recyclability of forged materials. This has contributed to a reduction of substitution by plastic products, which had been an increasing tendency of consumers.

OUTLOOK

The rates of growth recorded in various European countries in recent years may not be achieved again in the foreseeable future. The trend towards larger business units will not only continue, but will speed up. Questions of location will have to be re-addressed, since the consumers of forged products have also been considering this problem. Steps taken by the forging industry to maintain its competitiveness in the market will ensure that forged products will continue to constitute a significant proportion of industrial output in the future.

Table 3: Forging (1)
Breakdown by major product line, 1990

	Production (1000 tonnes)	Sales (million ECU)
Open die forging	542	925
Drop forgings, of which:	2 355	4 596
drop forging industry	1 832	3 576
in-house forging	523	1 021
Flanges	206	472
Extrusions	216	621
Total	3 319	6 614

(1) NACE 312
Source: Euroforge

Risks to the industry include a fall in demand for the products of their client industries, since forges continue to be dependent on their principal customers.

Increased competition from LDCs also poses a risk for the industry. However, the possibilities of innovative product development offer new opportunities for firms. In addition the reputation for high quality will help EC companies to compete with new foreign competitors.

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Secondary transformation of metals

NACE 313

The primary sectors of the industry are fasteners and galvanising. These sectors supply outlets like the automotive and the building and construction sectors. Output increased in general during the 1980s, but production growth slowed in 1991. For the coming years an average output growth of 5% per year is expected. Markets are highly bounded by geography: international trade is relatively unimportant when compared with consumption. Major markets are France and Germany.

The increased use of new techniques and systems are necessary to meet market demand, such as for specially designed fasteners. This has led on the one hand to increased demand for skilled labour, and on the other hand to a decrease in labour requirements.

INDUSTRY PROFILE

Description of the sector

Data for the secondary transformation of metals industry are classified under NACE 313. The products of this industry are highly diversified and can be divided up into the following categories:

- manufacture of articles on turning machines or lathes, including the manufacture of turned screws (NACE 313.11);
- nuts, bolts, rivets, screws and related products (NACE 313.12);
- springs, except furniture and watch springs (NACE 313.2);
- sintering of metals (NACE 313.3);
- chains, except articulated link chains (NACE 313.4);
- treatment and coating of metals, including zinc coating, aluminising, anodising, enamelling etc. (NACE 313.5);
- general mechanical engineering on a subcontract basis (NACE 313.6).

In general, the most important subsectors are the fasteners industry (the first two sectors) and the treatment and coating industry.

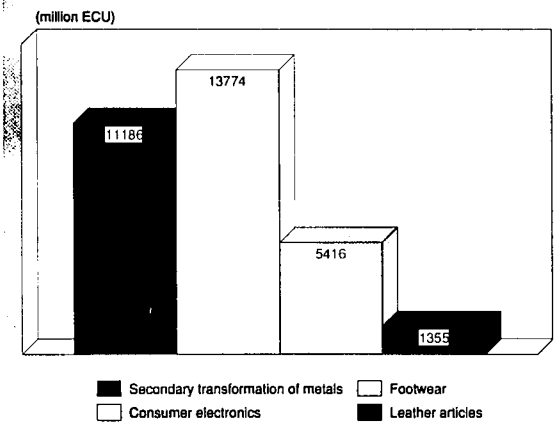
Fasteners can be divided into two main categories: those which are used for construction purposes, and those which are used for assembly purposes and which do not come under stress or load. From a market point of view, fasteners can be divided into common fasteners and special fasteners. In the first category price is important, in the second, quality, marketing and delivery time are important.

The purpose of galvanising is to improve the qualities of the metal. This can be done by several techniques, such as electrolysis. Galvanising, formally "hot-dip galvanising", involves coating steel with zinc by immersion in molten zinc metal.

Main indicators

Production grew in 1991, but at a slower rate than in the preceding decade. Production growth took place primarily in high quality products. The EC is a net exporter, but the trade balance deteriorated throughout the 1980s, despite growing exports. The market for products of secondary transformation of metals increased steadily, from 11.8 billion ECU in 1982 to 24.7 billion ECU in 1991.

Figure 1: Secondary transformation of metals Value added in comparison with other industries, 1991



Source: Eurostat

Employment grew in line with production to a record level of 355 000 in 1991. Since most of the enterprises in the industry employ less than 20 workers, however, this figure underestimates total employment. Between countries, there is a wide divergence in average firm size. For instance, the average firm in Spain in 1991 had 9 employees, whereas the average firm in West Germany had 129.

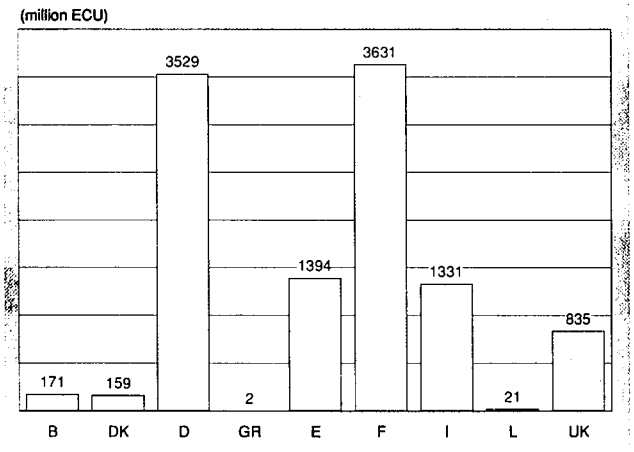
The West European output of steel galvanised as fabricated products in 1991 increased 5% from 1990, to a total of 4.4 million tonnes. Germany, France, Spain, Denmark, Austria and Norway had increases in output, whereas the UK, the Netherlands, Sweden, Switzerland and Finland experienced decreases. Other countries had a stable output.

The bulk of European production of secondary transformation of metals comes from France and Germany, which together account for 60% of EC production. According to Eurostat data, France is the leading manufacturer of secondary transformation of metals within the EC.

Recent trends

EC production in current value grew by 60% between 1985 and 1991, and in constant prices by 42%. In 1991, production in constant prices showed no growth compared with 1990.

Figure 2: Secondary transformation of metals Value added by Member State, 1991



Source: Eurostat

Table 1: Secondary transformation of metals
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	11 822	12 622	13 827	15 403	16 258	17 230	20 049	22 953	24 493	24 665	25 898
Production	11 983	12 795	14 082	15 671	16 481	17 411	20 203	23 031	24 549	24 682	25 916
Extra-EC exports	609	620	789	874	838	815	1 027	1 177	1 134	1 126	1 126
Trade balance	161	174	255	268	223	181	154	78	57	17	18
Employment (thousands)	294.9	296.7	295.7	298.7	301.6	305.8	323.7	342.2	352.8	355.0	365.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Secondary transformation of metals
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.5	6.3	5.7
Production	4.8	6.0	5.6
Extra-EC exports	6.3	1.4	3.0
Extra-EC imports	-0.9	7.4	4.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Secondary transformation of metals
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	609	620	789	874	838	815	1 027	1 177	1 134	1 126
Extra-EC imports	448	446	534	606	615	634	872	1 099	1 077	1 109
Trade balance	161	174	255	268	223	181	154	78	57	17
Ratio exports/imports	1.36	1.39	1.48	1.44	1.36	1.28	1.18	1.07	1.05	1.02
Terms of trade index	116.1	109.6	103.5	100.0	106.1	108.4	111.4	105.6	102.2	99.3
Intra-EC trade	870	896	1 041	1 170	1 292	1 324	1 603	1 818	1 889	1 872
Share of total imports (%)	66.0	66.7	66.1	65.8	67.7	67.6	64.7	62.2	63.6	62.8

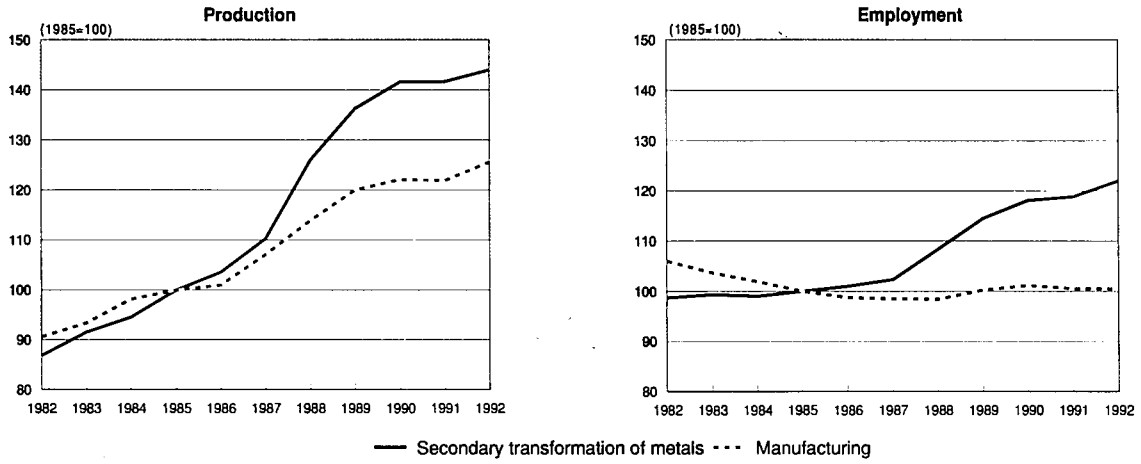
(1) Estimates
Source: Eurostat

Table 4: Secondary transformation of metals
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	24.9	25.8	26.0	27.3	28.5	30.1	31.7	31.5	31.8	31.5
Productivity index	91.3	94.8	95.5	100.0	104.7	110.6	116.2	115.7	116.7	115.6
Unit labour costs index (3)	83.9	87.5	93.4	100.0	105.9	109.8	113.8	119.9	126.6	N/A
Total unit costs index (4)	77.1	85.0	92.8	100.0	102.2	106.4	120.6	124.5	129.0	130.2

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Secondary transformation of metals
Production and employment indices compared to EC manufacturing



Source: Eurostat

The general economic slowdown is reflected in the output of screws, bolts, springs and plates of galvanised steel. The growth rate of value added lagged behind production growth, in nominal as well as in constant prices. The investments of EC producers grew strongly in the 1980s.

In the 1980s, many firms went out of business as a result of strong international competition, especially in the mass market fastener sector. For instance, in Germany the number of employed people in the fastener industry declined 25% from 1978 to 1988. The number of people working in the entire industry of secondary transformation of metals, however, grew from 294 900 in 1982 to 355 000 in 1991, with the strongest growth in 1988 to 1990. The evolution varies from country to country. Employment is mainly concentrated in France and Germany, which account for 60% of employment. Italy, Spain and the UK are the other large producers and employers in the EC. Only in the UK did the industry as a whole experience an overall decrease in employment between 1989 and 1991.

International comparison

An international comparison is difficult to make, due to varying classification systems for industries in the EC countries, the USA and Japan. Some comparisons can be made, however.

In the USA, the market for industrial fasteners declined in 1991, reflecting the recession. The weak demand from the automotive sector added to this effect. On the other hand, US exports to the EC increased strongly (growth figures of 20% or more as regards several EC countries). US manufacturers are increasingly serving their client industries in overseas, as well as domestic, markets. Most US exports are high quality products, while their imports are mass market products from East Asia, especially Taiwan.

Due to their relatively high costs of production, Japanese fasteners have become less competitive.

Foreign trade

The EC experienced an almost continuous rise in imports until 1989, while exports grew at a lower rate with a temporary decline in 1986-1987. Therefore both the extra-EC export/import ratio and the trade balance declined in the 1980s. The trade balance is expected to be around zero in 1992. The development in nominal terms was reinforced by the decrease in the terms of trade since 1988. There was increased import penetration during the 1980s, 3.8% of consumption in 1982 to 4.5% in 1991.

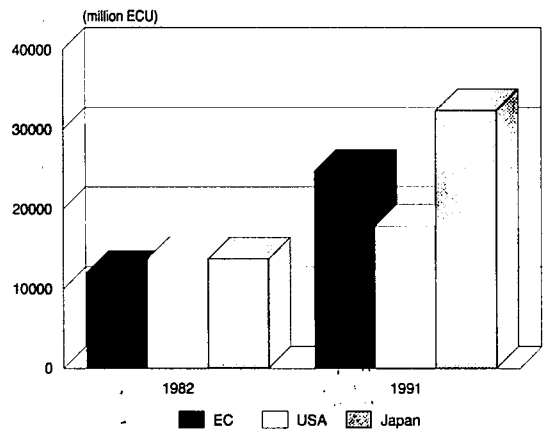
Germany and Italy are the only EC countries with positive internal and external trade balances. France has a positive extra-EC trade balance, but a negative intra-EC balance. Spanish trade balances (extra- as well as intra-EC) deteriorated substantially during the 1980s and turned from surplus to deficit.

The main export markets for the EC are the EFTA countries, which account for around 40% of extra EC exports. Mexico has also gained importance as a market for fasteners and related products.

Japan's place as the third largest exporter to the EC is becoming increasingly threatened by Taiwan, although Japan retains its proportion of total imports. Taiwan has already taken Japan's place as primary exporter to the USA. Taiwan's increased proportion of EC imports has come at the expense of EFTA and the USA's proportion of imports, rather than at the expense of Japan's.

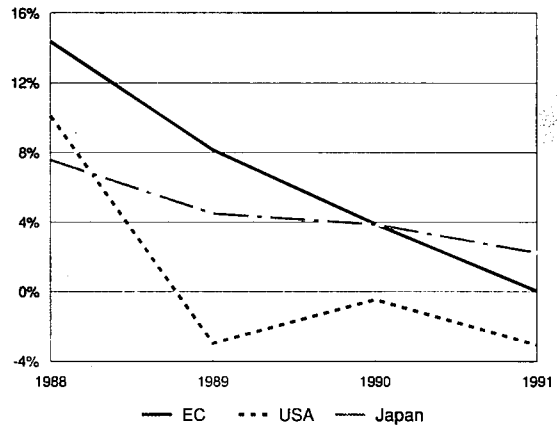
One of the major characteristics of this sector is its national, and often regional, orientation, reflected in the low ratio of exports to production. Even combined intra- and extra-EC trade amounts to only 13% of production. This figure is inflated

Figure 4: Secondary transformation of metals
International comparison of production at current prices



Source: Eurostat

Figure 5: Secondary transformation of metals International comparison of production growth at constant prices



Source: Eurostat

upward due to the relative increase of export and import prices versus EC producer prices.

MARKET FORCES

Demand

The primary client industry of the fastener industry is the automotive sector. Other important sectors are mechanical engineering, furniture, household appliances, construction and electronics. There is also a relatively small amount of consumer demand for screws, etc. The galvanising industry serves more or less the same branches, but with the addition of building and construction, which take up 39% of West European galvanising of fabricated products output.

Technical and logistical developments in the client industries have a strong impact on the fastener industry. Technologically, the ongoing automation and robotisation of production processes has influenced demand for speciality and high quality fasteners, interestingly often in a negative way. Most of the standards for screws, for example, are designed for manual fastening. These standards are widely used, and producers can take advantage of economies of scale. Therefore the price is normally relatively low. This has led to the use of these screws in automated production systems, even though in terms of quality of the end-product, the use of specially designed screws would be preferable.

Supply and competition

The world-wide overcapacity in the mass-market production capability of fasteners led to downward pressure on prices. Because of the competition in this part of the market, many manufacturers went out of business in the first part of the 1980s, in the USA as well as the EC.

The market power of the main clients of the secondary transformation industry, especially the automotive industry, continues to increase. In response, the associations in the industry opened dialogues with representatives of the automotive industry. But due to pressure from Japanese competition, EC automotive manufacturers require more security, just-in-time delivery, and increased quality from their subcontractors and suppliers. In this way the upstream industries bear both the costs and the risks. However, the tendency towards small, family-owned fastener producers precludes the availability of substantial R&D resources.

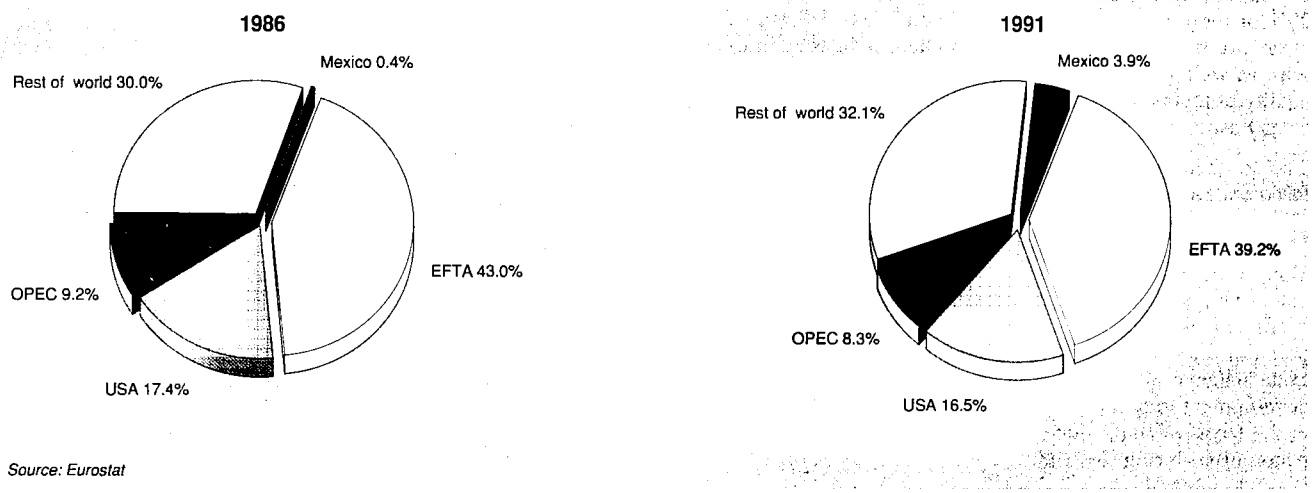
Other problems will develop in the future, as well. The growth of Japanese automobile production within the EC will necessitate cooperation between EC fastener manufacturers and Japanese motor-vehicle producers, who have different design specifications than European automobile manufacturers.

Another problem in the relationship between the secondary transformation industry and the automotive industry is the increasing use of single-sources by motor vehicle manufacturers, meaning less utilisation of subcontractors and fewer suppliers. Combined with the ongoing tendency towards concentration in the client industries, the mutual dependency of the supplier and client industries is growing.

The EC fastener industry is continuously faced with strong competition from East Asian countries in mass production of standard screws, nuts and bolts. In this area there is a world-wide overcapacity. Sophisticated, specially designed fasteners form the core of the competitive power of the EC industry. Competition takes place primarily in regards to price in the mass market. The standard nuts and bolts from outside Europe are usually destined for the consumer market.

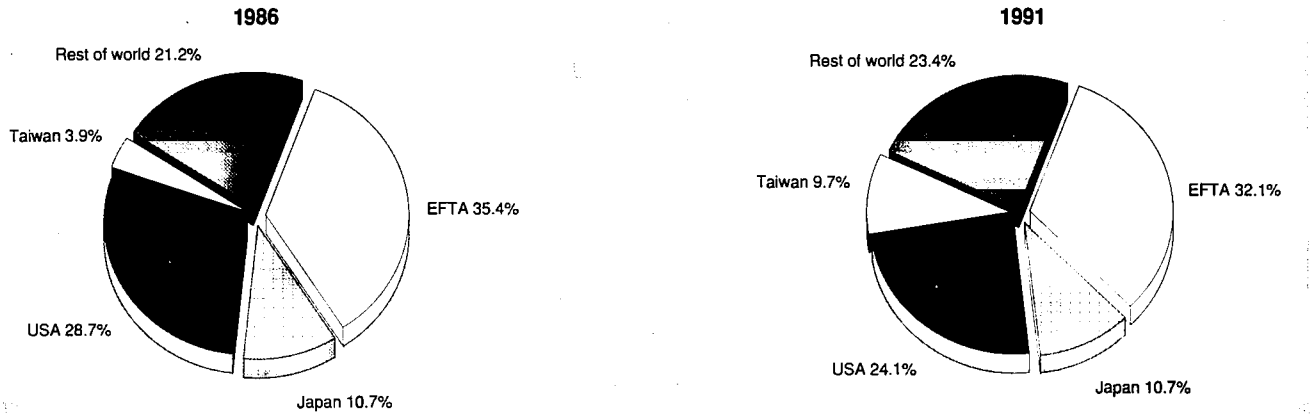
Although the amount of exports of the industry itself is not significant, the export of products in which a large amount of fasteners and treated metals is being used is substantial. These exports have been under pressure in the world markets, which has sharpened competition at home.

Figure 6: Secondary transformation of metals Destination of EC exports



Source: Eurostat

Figure 7: Secondary transformation of metals
Origin of EC imports



Source: Eurostat

Because of the competition, the fastener industry is seeking high volume markets, such as Germany. But manufacturers from East Asia and Eastern Europe are also seeking the interesting markets. The trend in trade is to export high value added products and to import low value added items.

Hot dip galvanising capacity increased in the early 1990s, in spite of the general economic slowdown. The West European output of steel products galvanised after manufacture was 4 410 000 tonnes in 1991, an increase of 4.8% over 1990. The production process has also become more efficeiant. The average throughout Europe in 1991 was 13 tonnes of steel galvanised for every tonne of zinc consumed, while the average in 1970 was 11 tonnes of steel per tonne of zinc.

Production process

Fasteners are products that to a large extent are standardised. On the other hand, the production of tailor-made screws is gaining in importance. An example are multifunctional screws, which can drill, tap and fasten all in one. Automation is necessary to fulfil the needs for more tailor-made fasteners.

The hot-dip galvanising industry has four separate areas: the coating of pre-fabricated products, the coating of steel sheets, the coating of steel wire, and the coating of steel tubes in automatic plants.

Electroplating techniques can be divided into three areas: upgrading of metals, plastic-galvanising and conductor plate technique. The methods include the use of zinc alloys and chromium alloys to fight rust, copper-nickel chromatising, chemical nickel and hard-chromium. The most important alloys in the conventional electroplating process are: copper-tin, copper-zinc, zinc-nickel, nickel-iron, lead-nickel and aluminium alloys. The electroplating technique has gained importance in the field of electronics and printed circuits, which has led to a more efficient use of zinc in electroplating.

Skilled labour is becoming more and more important, because of the increasing use of Computer Numerical Control (CNC), Computer Aided Design (CAD) and Flexible Manufacturing Systems. The use of these new machines and techniques is necessary to be able to produce new kinds of fasteners through cold-forming, for example. Lack of skilled labour is especially a problem here, although the techniques themselves, in particular CNC, help to alleviate part of the problem. Increasing use of CNC can lead to a decrease in labour requirements, which results in a decline in unit labour costs.

Unit labour costs rose an estimated 51% between 1982 and 1990, but there are significant differences between countries. In 1988, unit labour costs were 7600 ECU in Greece, and 24900 ECU in Luxembourg. Productivity in Greece declined over 20% between 1982 and 1989, while in Germany, for example, productivity increased with 20%.

INDUSTRY STRUCTURE

Companies

The galvanising of products industry can roughly be subdivided in three areas:

- small enterprises which use primarily hand-skilled labour;
- larger enterprises which operate more on a manufacturing scale, including in-house production of galvanised metal as part of the production process;
- supply of zinc, machines, chemicals, etc., for the galvanising process.

The fastener industry roughly follows a same pattern, with many small and medium sized enterprises. There are a few, however, that could be classified as medium to large enterprises, with sales over 100 million ECU. The largest companies and dealers are German, which is not surprising giving the importance of the German machinery and motor vehicle industries in Europe. Italian, French and British manufacturers are not far behind, however.In the galvanising and electroplating sector, Metaleurop (Germany) has sales of approximately 140 million ECU in 1990, and in continuous galvanising of steel sheet, Galvanage (Luxembourg) had annual sales of around 140 million ECU in 1989.

Strategies

Competition has been forcing producers to seek ways to lower production costs, especially through rationalisation. In addition, increased quality of products is required, because the low labour costs of some foreign producers are not an advantage in that part of the market. Quality standards and just-in-time delivery further demand continuous review of the logistics chain. These factors all lead to increased investment in new equipment.

In the subsector of speciality products, Computer Numerical Control (CNC) machines decrease the time and cost of changeovers. The trend toward orders for smaller lot sizes at more frequent intervals and with shorter lead times leads to increased numbers of changeovers for machinery. The use of CNC machinery partially alleviates the shortage of skilled labour as well.

All of these factors combined have resulted in increased specialisation and product development in both fastener and galvanising sectors. Subcontracting of galvanising will also become more important, despite the preference of some client industries for single sourcing.

REGIONAL DISTRIBUTION

In general, enterprises in the secondary transformation sector are located near the major industrial centres of Europe. Because of the small scale of many of the firms, long distance transport is not viable in general. To decrease transportation costs, firms must be located near their clients. For instance, in Germany the centre of the galvanising industry is in Nordrhein-Westfalen and in Baden-Württemberg.

ENVIRONMENT

The electroplating industry is looking for ways to reduce the amount of waste created, in particular the metal content of the effluent. The metals concerned are copper, chromium, nickel and zinc. Efforts are being made to develop production processes which generate less effluent by regenerating it and by extending the dipping time. Furthermore the use of techniques such as ultra filtration and electrolysis have the advantage that they do not use additional chemicals. The cascade-washing technique in combination with the recycling of metals could reduce the metal concentration in the effluent from 300 g/l to 0.3 g/l.

Furthermore, recycling of metals out of the galvanic waste disposal is an option, but only if the waste has a high enough metal content, preferably of a single metal. This is currently not very practical. Most of the small and medium sized enterprises use third party firms for recycling metals. Also, the traditional technique of the galvanic bath is more and more replaced by showering the metal plates. The main waste products of hot dip galvanising - zinc dross and zinc ash - are essential raw materials for the zinc chemicals industry.

REGULATIONS

Fasteners are highly dependent on standardisation. The quality of fasteners is usually indicated by the German quality standard (DIN).

Currently, a study is taking place for a directive on quality and consumer safety which would make ISO 9000 standards compulsory not only for EC manufacturers, but also for importers. This initiative has broad support from European producers, although some argue that it would be preferable to have individual quality controls rather than be bound by a general standard which is below standards already met by some manufacturers.

In the subsector of galvanising, the possibility of standardisation of hot dip galvanising of fabricated products is being studied. A draft based on ISO 1461 has been completed, and will presumably lead to generally accepted standards after a period in which comments are considered.

Table 5: Secondary transformation of metals
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	5.5	5.5
Production	5.0	5.0
Extra-EC exports	4.0	4.0

Source: NEI

OUTLOOK

It is expected that the trend towards specialisation will continue, which will lead to a greater demand for a higher skilled labour force and, in general, to more quality. The expected economic recovery, even if moderate, will spur demand for products of secondary transformation. Growth in general will be caused by the sale of new products in which fasteners and the like are used, as opposed to repair services.

For the galvanising of products industry in particular, the development of the building and construction industry is particular important. Opportunities include the possible construction activities in Eastern Europe, which, however, is highly dependent on the general economic development in that area.

The production of secondary transformation of metals in the EC slowed down in 1991, reflecting the general economic slowdown. These circumstances are likely to continue in the short term, but growth will gradually pick up. Growth in demand is expected to be roughly 5.5%. Given some import penetration in the mass market products, production should grow by approximately 5% per year. This will be accompanied by some growth of employment figures in the coming years.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by:
Organisme de liaison des industries métalliques européennes (ORGALIME) Address: rue de Stassart 99, B-1050 Brussels; tel: (32 2) 511 34 84; fax: (32 2) 51 23 01; and,
European Industrial Fasteners Institute (EIFI). Address: c/o Deutscher Schraubenverband E.V., Goldene Pforte 1, P.O. Box 666, W-5800 Hagen 1; tel: (49 23 31) 95 88 50; fax: (49 23 31) 5 10 44; and,
European General Galvanizers Association (EGGA). Address: London House, 68 Upper Richmond Road, Putney, London SW15 2RP; tel: (44 81) 874 21 22; fax: (44 81) 874 32 51. (This organisation covers galvanising of pre-fabricated products only.)

Boilers and metal containers

NACE 315

The boilermaking industry is highly dependent on its client industries, which are all affected by swings in the general economic outlook. Cutbacks in investment in some of these client industries have greatly affected production and employment. Overcapacity has forced restructuring and diversification in the industry. Boilermakers need to seek new outlets in rapidly growing industries and to update technical skills if they are to remain strong in an increasingly competitive market.

INDUSTRY PROFILE

Description of the sector

Data for the boilermaking industry are classified under NACE 315. The products of this industry can be divided up into the following categories: steam generators and boilers; nuclear boiler construction; fittings for steam generators and boilers; flat and tubular heat exchangers and condensers for nuclear reactors; water tanks, containers and cisterns; distillation, refining and similar equipment; pipework; miscellaneous activities, including installation and maintenance.

Since classifications differ within the EC, it is difficult to estimate the importance of the industry in each country.

Main indicators

Production in 1991 increased in nominal terms for the fifth consecutive year. In 1991, it stood at 18.4 billion ECU. In volume terms, however, production dropped slightly in 1991. Improvements in production in constant terms in France and the UK could not outweigh the declining production of the other EC countries. France is the largest producer in the EC, accounting for 36.3% of EC production in 1991, followed by Germany with 32.9%.

Employment dropped on average by 2.8% per year in the 1980s, but increased slightly in 1989 and 1990. Extra-EC trade is a small portion of production and consumption.

Recent trends

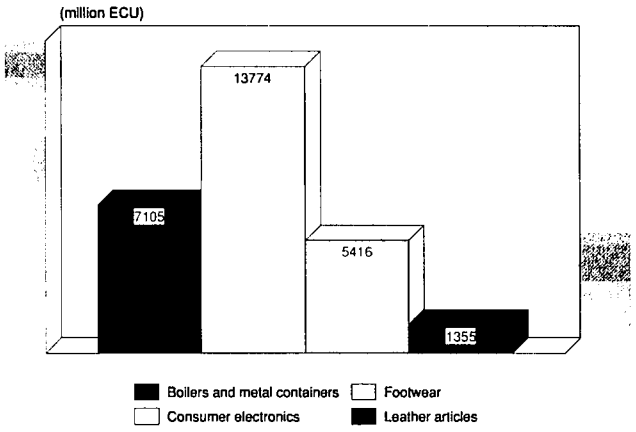
EC production in current value grew by 18.3% between 1985 and 1991. In constant prices this figure was only 0.3%. Investments by EC producers fluctuated in the 1980s, with strong growth in 1987 and 1988. No data are available for more recent years, but the expectation is that investment growth has declined.

French production increased by 1% per year between 1982 and 1991 and Italian production by around 2%. In the same period, production in Germany declined with 0.7% per year, and production in the United Kingdom declined 6.6% per year. In 1982, United Kingdom production was almost 74% of French production; by 1991, this proportion had dropped to 36%. Employment in the United Kingdom more than halved in that time. Employment dropped slightly in most Member States; only in Belgium, Denmark and Luxembourg did employment rise.

International comparison

The EC is by far the largest producer of boilers and metal containers in the world. In the USA, consumption has been subject to large fluctuations which affect production, but overall production and consumption declined in the 1980s. Japanese production and consumption, although also subject to large fluctuations, increased on average during the years 1980 to 1990.

Figure 1: Boilers and metal containers
Value added in comparison with other industries, 1991



Source: Eurostat

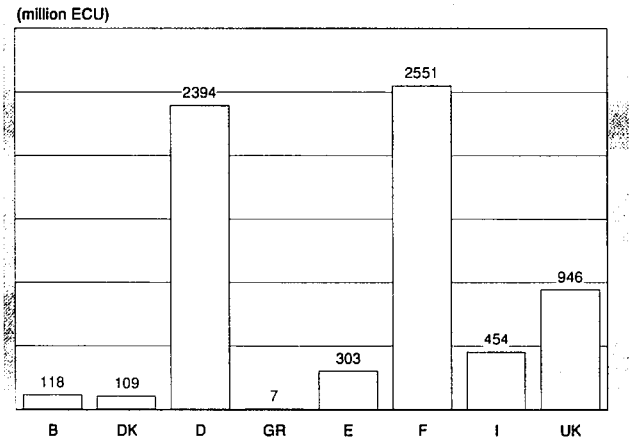
Foreign trade

Extra-EC exports fluctuated around 1.1 to 1.3 billion ECU per year between 1982 and 1991. Exports remained larger than imports, but due to higher growth in imports, the ratio of exports to imports deteriorated, from 7.11 in 1982 to 3.2 in 1991. During the 1980s, intra-EC trade became increasingly important. Intra-EC trade accounted for 9% of apparent consumption in 1991, while extra EC imports accounted for 2.2%. These low proportions underline the rather limited geographical coverage of most of the enterprises in the sector.

The EC as a whole had a positive trade balance in 1991. All Member States except Greece had a positive extra-EC trade balance in that year. France, Germany, Italy, Denmark and Portugal also had positive intra-EC trade balances. Other Member States, including the UK (a large producer country) had negative intra-EC trade balances.

The main export market for the EC is the EFTA countries, accounting for some 26% of extra-EC exports in 1991. OPEC is the second largest export market, but the importance of

Figure 2: Boilers and metal containers
Value added by Member State, 1991



Source: Eurostat

Table 1: Boilers and metal containers
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	13 318	13 424	12 900	14 474	14 192	14 271	15 191	16 416	17 054	17 546	18 072
Production	14 589	14 510	14 032	15 559	15 213	15 179	15 964	17 377	18 012	18 410	18 962
Extra-EC exports	1 479	1 284	1 298	1 264	1 205	1 120	956	1 200	1 232	1 252	1 252
Trade balance	1 271	1 087	1 133	1 085	1 021	908	773	961	959	864	864
Employment (thousands)	262.5	243.9	233.4	239.7	231.2	227.3	212.7	215.0	219.6	216.4	216.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Boilers and metal containers
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-2.1	0.5	-0.4
Production	-2.7	0.0	-0.9
Extra-EC exports	-9.1	-3.1	-5.2
Extra-EC imports	-10.0	12.0	4.1

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Boilers and metal containers
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 479	1 284	1 298	1 264	1 205	1 120	956	1 200	1 232	1 252
Extra-EC imports	208.1	197.9	165.6	178.5	183.9	212.0	183.0	239.0	273.2	388.5
Trade balance	1 271	1 087	1 133	1 085	1 021	908	773	961	959	864
Ratio exports/imports	7.11	6.49	7.84	7.08	6.55	5.28	5.23	5.02	4.51	3.22
Terms of trade index	103.3	104.4	105.2	100.0	105.4	104.0	117.6	113.7	108.9	108.5
Intra-EC trade	572	600	672	762	809	941	983	1 148	1 305	1 559
Share of total imports (%)	73.3	75.1	80.2	81.0	81.4	81.5	84.3	82.7	82.6	80.0

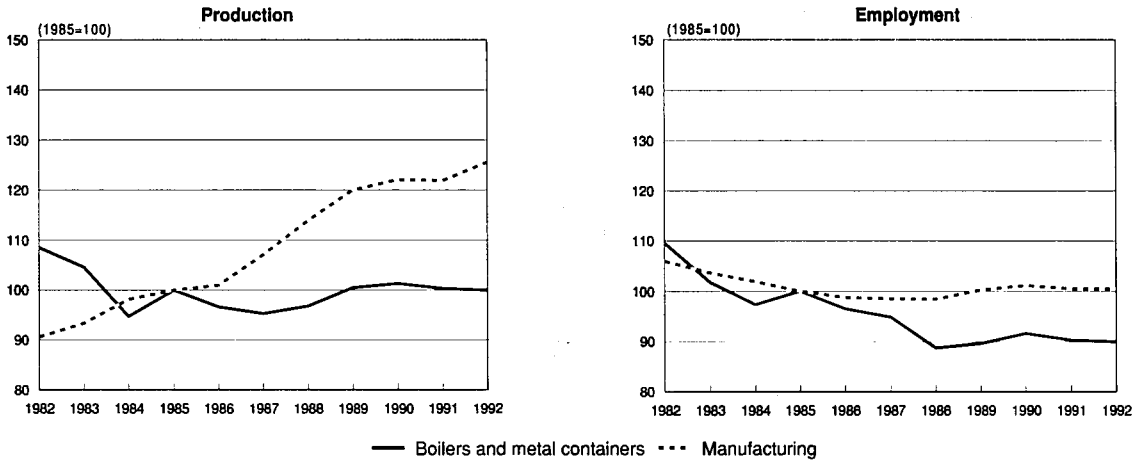
(1) Estimates
Source: Eurostat

Table 4: Boilers and metal containers
Production at constant prices and employment by Member State (1)

	Production (million ECU)		Employment (thousand)	
	1982	1991	1982	1991
Belgique/België	245	259	4 915	4 757
Danmark	119	224	2 062	3 417
BR Deutschland	4 804	4 501	69 728	67 864
Hellas	23	29	762	N/A
España	668	542	14 977	N/A
France	5 643	6 207	78 560	75 713
Ireland	34	39	940	587
Italia	913	1 103	11 984	13 230
Luxembourg	N/A	N/A	119	224
Nederland	N/A	N/A	4 804	4 501
Portugal	67	135	6 453	3 855
United Kingdom	4 160	2 246	68 218	29 307

(1) Estimates are used if country data is not available, especially in 1991
Source: Eurostat

Figure 3: Boilers and metal containers
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

the OPEC countries as export destinations is dependent on European construction activities in those countries. The methods by which Member States remain competitive on the world market vary from country to country. France has sold its specialised nuclear power station technology to industrialising countries, while West Germany maintains a positive trade balance by meeting existing demand, especially in Africa and the Middle East.

The EFTA countries are also the most important extra-EC suppliers of boilers and metal containers, supplying over 50% of total extra-EC imports in 1991. The share of the USA declined in line with its decreasing production figures during the second half the 1980s. Imports from East European countries have become more important, due to the need of producers in those countries to find new clients outlets.

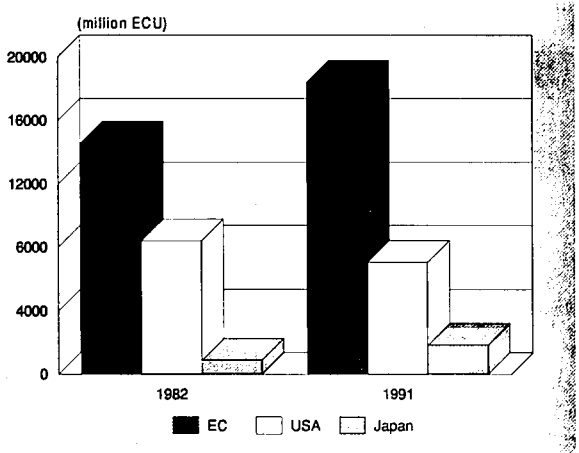
MARKET FORCES

Demand

The boilermaking industry equips many branches of industry. Its products are used for the following purposes (in decreasing order of importance): the production of thermal and nuclear power; the oil and gas industry; the chemical, petrochemical and pharmaceutical industries; the food and drink industry; the construction industry; the iron and steel and metalworking industries; the paper industry; various other industries including automobiles, textiles, mechanical engineering, cement, rubber and electronics.

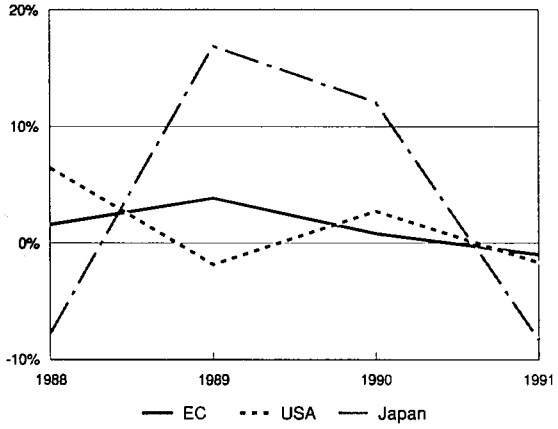
The importance of client sectors varies among Member States. In France, the main outlets are energy (nuclear and classical; 17%), oil and gas (7%), chemical industry (15%), the food and drink industry (11%) and building and construction (9%). In Germany, major downstream industries are the chemical, automotive, engine construction and energy industries. In the United Kingdom, oil, energy, harbour and shipping, iron and steel are primary outlets, while in Italy, energy, automobile, harbour and shipping and ventilation industries are major clients. The market has been subject to significant changes, including shifts in the relative importance of the main clients. For instance, demand from the nuclear power industry collapsed due to sharp cutbacks in investments. New major outlets are the food and drink industry and the chemical industry.

Figure 4: Boilers and metal containers
International comparison of production at current prices



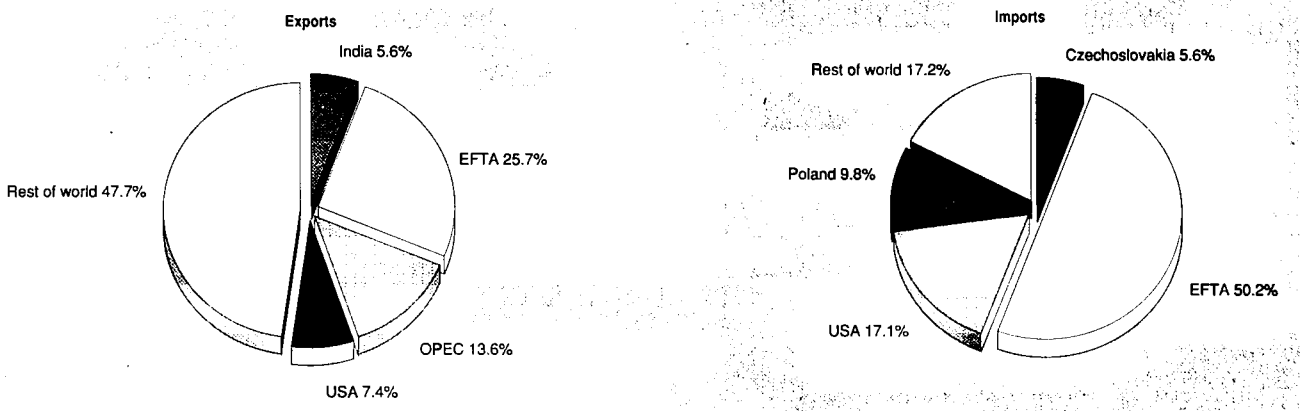
Source: Eurostat

Figure 5: Boilers and metal containers
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Boilers and metal containers
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

The market for boilers and metal containers is subject to large cyclical and structural up- and downswings. Energy prices have a sizeable impact on industry demand for boilers and energy-saving equipment (heat exchangers) since they affect investment decisions. The relatively low oil prices since the end of 1985 are one factor in recent demand trends. The sensitivity of this sector to the general economic development is another factor. Postponement of investments in downstream industries affects the position of the boilermaking industry. Enterprises specialising in large boilers for heavy industry, such as power stations, are particularly vulnerable to these swings.

Supply and competition

Overcapacity in the subsector providing boilers for heavy industry has forced several firms to reconsider their activities in this field. Estimated profitability (non-labour income in value added) declined significantly during the 1980s. The emergence of more dynamic competitors on the export market, especially from Japan and East Europe, increased the competition.

Declining investments in domestic markets and a slow down of investments in developing countries has caused the industry trouble. The emergence of East Asian boilermaking and the reduced purchasing power of OPEC countries increased the difficulty in obtaining profitable export contracts.

Production process

Unit labour costs rose an estimated 52% between 1982 and 1990. Between countries there are large differences. For instance, Greece has very low labour costs compared to Germany. However, productivity in Greece is low compared to German productivity. The rise in labour costs has not been matched by increases in productivity (measured as value added per worker), thereby putting the profitability of the industry under pressure. In current prices, productivity increased 44% between 1982 and 1990; in constant prices the increase amounted to only 5%.

Within the industry, system integrators are concentrating their activities on design, contracting and on-site installation. Much of the intermediate assembly work is contracted out to small local firms. The changing economic environment of the boilermaking industry - the need to improve productivity, for instance - increases the need for more skilled labour. Personnel training is a major concern.

INDUSTRY STRUCTURE

Companies

There are three types of firms in the boilermaking industry:

- System integrators (firms which install systems) are the smallest group, but the most powerful. They are usually medium-sized firms or divisions of large diversified industrial groups and have three activities: design and engineering, manufacturing and on-site installation. The principal characteristic of system integrators is the high value added content of their activities. Raw material input represents about 20% of turnover, whereas labour costs run at about 45% due to large design and engineering departments with highly-qualified technical staff.
- Product specialists (firms which supply equipment such as vessels, boilers and heat exchangers) can successfully export specific products because of the low unit costs of production. The enterprises, however, tend to be domestically oriented. The firms are normally medium-sized enterprises. Raw material input represent over a third of total turnover. The value added content is less than for system integrators.

Table 5: Boilers and metal containers
Breakdown by product line, 1989 (1)

	(million ECU)	(%)
Water tube boilers	883	14.8
Shell boilers	116	1.9
Other boilers	69	1.2
Accessories for boilers and steam generators	45	0.8
Heat exchangers	52	0.9
Stockage or transport cisterns for:		
- Chemical products	69	1.2
- Food products	37	0.6
Compressed gas vessels	543	9.1
Industrial piping	384	6.4
Penstock piping	512	8.6
Other products	3 238	54.5
Total	5 947	100.0

(1) France, BR Deutschland, Belgique/België, Portugal
Source: CECT

Table 6: Boilers and metal containers
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	31.2	33.3	32.5	32.0	32.5	32.1	34.8	33.4	32.8	32.8
Productivity index	97.5	104.1	101.6	100.0	101.6	100.1	108.7	104.3	102.4	102.5
Unit labour costs index (3)	83.7	89.3	94.3	100.0	104.6	108.4	114.8	123.7	127.3	N/A
Total unit costs index (4)	95.2	98.7	89.9	100.0	100.1	103.2	115.8	124.8	124.2	129.5

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

- Activity specialists (firms which manufacture particularly specialised items, mostly from blueprint of the client) are the most common type of firm. They are sub-contractors of the system-integrators and operate on a small scale. Their rather weak basis due to their specialisation hinders export activity.

In general, enterprises in this sector can be found near the centres of heavy industry. The largest companies tend to be located in the countries which dominate the Single Market, although only one of the ten largest EC firms is located in Germany (Deutsche Babcock). In Germany, there are many medium sized enterprises. Babcock is a special case, however. If all activities of the enterprise in Germany, the United Kingdom and France are taken together, Babcock is the largest EC firm. Other large firms involved in the industry include CLN (I), Degremont (F), Sabroe Refrigeration (DK), Alsthom (F), Industria Cantieri Metallurgici (I), Dexion International (UK) which is a subsidiary of Interlake (USA), Ponticelli (F), Aallborg (DK), Cockerill Sambre (B) and Stork (NL). Both US and Japanese firms have subsidiaries in the United Kingdom.

Strategies

In this market, successful firms are mostly demand oriented, rather than innovative. The relatively weak development of demand, as well as the changing roles of the diverse outlets of the industry, has forced enterprises to reconsider their key activities. Many companies are attempting to lessen their dependence on the heavy industry as the main outlet.

Competition over labour costs forces the enterprises to turn to related areas of work: mechanical engineering, electricity and civil engineering. System integrators offer an ever wider range of maintenance services. Maintenance work is no longer lengthy and infrequent: the ageing of machines and the concern regarding the financial viability of the installations makes quick, frequent maintenance necessary. In areas which require a high level of skill, such as nuclear energy, firms are tending to broaden the scope of their services.

ENVIRONMENT

Environmental concern has its impact on the boilermaking industry in several ways. Tanks for underground storage of chemicals and oil products are of increasing concern, because of the danger of leakage. In response, much research has been done in the field of corrosion containment and substitute raw materials for tanks. In the USA, about 90% of all new tanks for oil stocking are made of plastic. The discovery that metal tanks corrode not only from outside but from inside as well, stimulated the use of plastic tanks. Installation of underground plastic tanks is very different from metal tanks, and demands a completely different organisation of the work. For instance, the use of a special glue allows only a limited amount of time to connect the pipework.

The market for environmental products such as for cleaning industrial waste water or air pollution is becoming increasingly important. This creates opportunities for the boilermaking industry. Enterprises are likely to have a competitive edge in countries where environmental regulation is already very strict (e.g. Germany and the Netherlands).

REGULATIONS

The opening up of the public procurement in power plant markets in 1993 is expected to induce great changes in electrical power equipment supplier firms. More generally, EC energy policy will have a major impact on the upstream industries of the energy sector. But harmonisation of the laws of Member States concerning pressure equipment is also needed to establish an internal market for boilers. The Commission is currently preparing a proposal for a directive on this subject.

Already in 1987 a directive on simple pressure vessels (87/404/EEC) was adopted. It relates to unfired vessels of a simple geometry which contain air or nitrogen. These vessels are mainly used as air receivers or braking cylinders. Simple pressure vessels have to fulfil several demands regarding safety in order to receive the CE mark. The directive does not apply to pressure vessels for nuclear installations, to pressure vessels for the propulsion of ships and aeroplanes or to fire extinguishers.

OUTLOOK

The trend towards diversification is expected to continue, leading to greater demand for higher and differently skilled labour force. Training will be an important means through which firms can update technical skills. Furthermore, the changes that have been taking place in the industry structure are likely to continue. Firms will redefine their core activities and seek cooperation, to survive in the competitive market. More engineering services are likely to be part of this.

Investments in heavy industry are not likely to pick up in the near future. Prospects for the chemical industry indicate low growth rates in the short term. The outlooks for the food and drink industry and the energy sector are of moderate growth. Combined with moderate growth and competition on the international market in the short term, low growth rates for the industry are expected in the short run. In the medium term production and consumption growth could increase. New opportunities stemming from environmental concerns in particular could stimulate demand for special boilers and heat exchangers.

Table 7: Boilers and metal containers
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.0	2.5
Production	1.0	2.5
Extra-EC exports	1.0	1.5

Source: NEI

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: Comité Européen de la Chaudronnerie et de la Tuyauterie / European Committee of Boiler, Vessel and Pipework Manufacturers (CECT). Address: c/o PGCA, Leicester House, 8 Leicester Street, London WC2H 7BN; tel: (44 71) 437 0678; fax: (44 71) 734 2413.

Hand tools
NACE 316.11

In the early 1990s the trend of increasing production and consumption of hand tools came to a halt. For the medium term, the outlook however is more promising. Demand for quality products could then increase, which is favourable for European manufacturers. EC manufacturers are leaders in terms of product quality, technical innovation and after-sales service.

INDUSTRY PROFILE

Description of the sector

The tools industry comprises four principal segments: hand tools; tools for joinery; fixing tools for construction; and metal saws.

The sector manufactures products including axes, screwdrivers, saws, files, rasps, pliers, shears, spanners, tools for drilling, taps and dies, hammers, planes, chisels, etc.

Although both hand tools and power tools perform in some cases the same function and tools driven by hand are increasingly being replaced by electrically driven tools, they are different products, occupy different market segments and are subject to different regulations.

Main indicators and recent trends

Production of hand tools declined 2.3% in 1991 compared to 1990, although apparent consumption increased slightly. Almost all subsectors are experiencing weak demand. The trade balance was negative for the first time for the period starting in 1982. Exports stagnated while imports grew almost 11%.

Germany was by far the largest EC producer in 1991, with value added of 819 million ECU which represents 42% of total EC production. France and the United Kingdom trailed behind Germany with value added of 395 million ECU and 361 million ECU, respectively.

Major consumer countries are Germany (almost 40% of EC consumption), France and the United Kingdom.

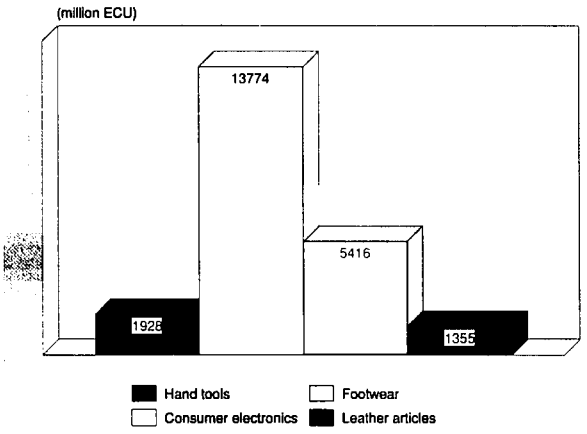
According to industry sources, screwdrivers, spanners (mostly used for home car repair) and wrenches are the most important sectors of the do-it-yourself (DIY) hand tool market. The spanner sector was by far the most important until the mid 1980s, but has since suffered a decline owing to a reduction in sales of socket sets. The screwdriver sector has been adversely affected by rising sales of cordless drills, which double as cordless screwdrivers. A fast growing segment is the market for replacement parts and accessories for power tools; growth will probably generated in this subsector at the expense of the power tools themselves.

EC production in current value grew 4.7% per year on average during the 1980s. Growth rates for the first and second halves of the decade were similar. Apparent consumption grew faster, however, at a rate of 5.7% per year, resulting in a diminishing trade balance.

International comparison

The EC is the world leader in the production of tools. Competition, however, is increasing, especially from the East Asian countries of Hong Kong, Singapore and South Korea, and from some East European countries. These countries are especially competitive through pricing. Of all EC countries for which data is available, only Germany has a positive trade balance. Spain had a positive trade balance until 1988.

Figure 1: Hand tools
Value added in comparison with other industries, 1991



Source: Eurostat, CEO

Foreign trade

Over the past decade, extra-EC imports rose faster on average than extra-EC exports. The trade balance declined steadily until it reached a deficit in 1991. EC imports totalled 48% of consumption in 1988 compared to 42% in 1982.

Extra-EC export destinations did not change much from 1986 to 1991. The main export markets for the EC were the EFTA countries, which accounted for around 31% of extra EC exports in 1991. The USA was second, with around 12% of extra-EC exports, while Japan trailed with a 3% share.

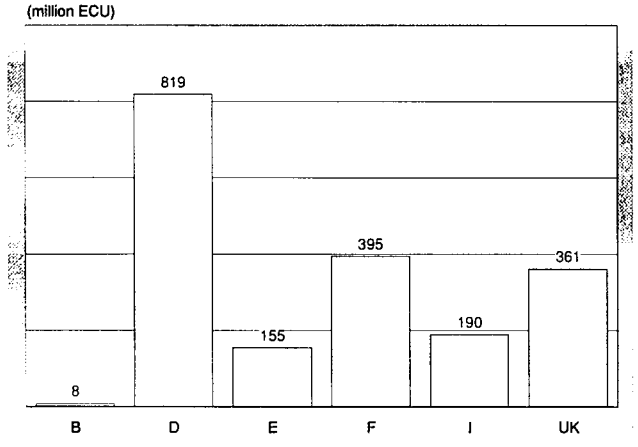
The origins of extra-EC imports shifted a little more than export destinations between 1986 and 1991. The EFTA remained the largest trade partner with a 27% share of imports. Taiwan's share increased from 15.4% in 1986 to 23.5% in 1991, raising it to the second largest supplier, ahead of the USA, although the USA lost only a small amount of its market share to Taiwan.

MARKET FORCES

Demand

Tools for private use have, in general, a long economic life. When the economy is strong, these tools have a high price

Figure 2: Hand tools
Value added by Member State, 1991



Source: CEO

Table 1: Hand tools
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	1 053	1 092	1 161	1 240	1 270	1 418	1 619	1 714	1 902	1 936	1 955
Production	1 282	1 337	1 449	1 562	1 526	1 563	1 676	1 809	1 974	1 928	1 947
Extra-EC exports	583	612	732	792	732	708	718	827	804	805	813
Trade balance	229	245	288	322	256	145	57	95	72	-8	0

(1) Belgium, BR Deutschland, France, Italia, España and the United Kingdom; exports: whole EC
(2) NEI estimates
Source: CEO, Eurostat

Table 2: Hand tools
Breakdown by major product line, United Kingdom, 1990

(% of value retail hand tool market)	
Screwdrivers	15.0
Spanners and wrenches	15.0
Measuring and marking-out tools	13.0
Pliers and pincers	13.0
Handsaws and blades	12.0
Hammers	7.0
Files	2.0
Chisels and gouges	1.5
Breces and drills	1.5
Others	20.0

Source: Eurostat

elasticity. However, declining disposable income is a strong factor in pushing demand towards the cheaper end of the product range.

Demand for hand tools for industrial use is linked to the general level of economic activity. Different factors are in this respect important. In the case of saws and tools for joinery machines and metal saws, demand is almost entirely a factor of investments made by downstream industries (furniture manufacturers, sawmills, mechanical engineering in general). Demand for tools for construction (including anchor bolts, masonry drills and power tools) is affected by the strength of the building and construction industry which is in turn dependent on the general economic climate. The explosive growth of office automation equipment is also responsible for increased demand for high-quality hand tools.

The DIY sector boomed in the 1980s with rising home ownership levels. As people became more confident about tackling DIY jobs, they tended to buy higher quality tools. Manufacturers have introduced more advanced products, such as hardpoint saws, to the DIY market in response to this change in demand.

Supply and competition

The EC countries can be split into three categories depending on the size of the market:

- leaders (already large and developed): Germany, the United Kingdom, France and Italy;
- developing: Ireland, Spain, Greece and Portugal;
- small: Belgium, Denmark, Luxembourg, the Netherlands.

The four leading countries account for 70% of the Single Market. Several distribution channels, which are used intensively, exist in these countries, which have a long tradition of tooling and DIY activities. In the second group, which accounts for an estimated 15% of the market, modern distribution networks are taking shape as distribution chains from the leader countries establish themselves in those countries. The small countries also account for around 15% of the market and have distribution channels similar to those in the leading countries.

In the leading countries, 50% to 60% of all sales of hand tools through the retail trade are accounted for by DIY superstores/multiples. These stores are characterised by wide product ranges, accessible presentation and competitive pricing. Another 15% or so of sales go through independent DIY stores, while specialist hardware stores account for a further 18%. Tools for joinery machines and metal saws are partly distributed by retailers and partly sold direct to manufacturers of plant and machinery. In the last few years, a stagnation in the DIY market has led to alterations in the distribution system. In France the medium-sized stores (around 3000 sq. metres) are having difficulties.

Production process

The cost of labour continued to grow in the early 1990s, despite the fact that the market for hand tools was showing signs of recession. This factor gave an extra stimulus for manufacturers to rationalise their production process and to concentrate production on products with a high value added content.

INDUSTRY STRUCTURE

Companies

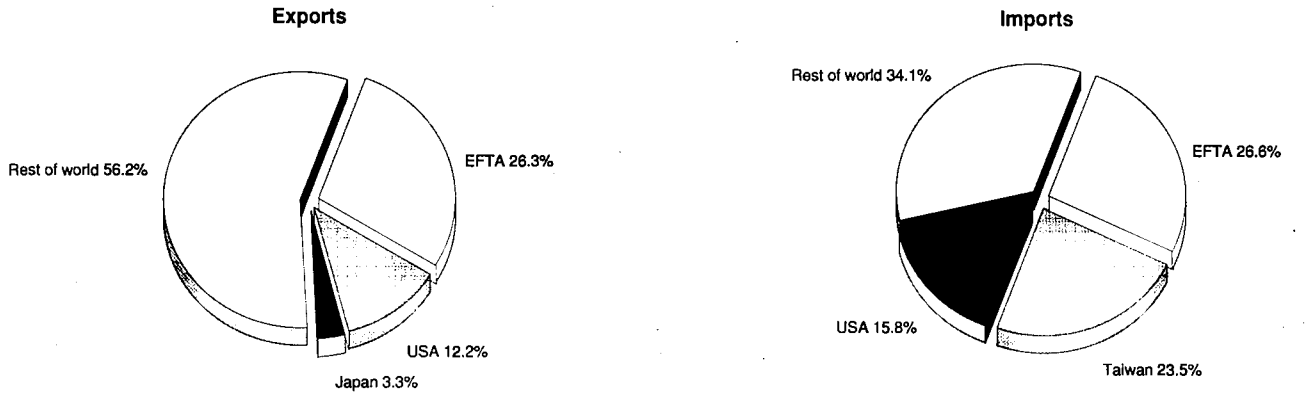
The bulk of the enterprises in this sector are small: 65% have less than 20 employees. Many tool manufacturing companies are family-owned, which can be a limiting factor in the acquisition of capital. The largest part of production, however,

Table 3: Hand tools
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	583	612	732	792	732	708	718	827	804	805
Extra-EC imports	354	367	445	470	476	564	661	732	732	812
Trade balance	229	245	288	322	256	145	57	95	72	-8
Ratio exports/imports	1.65	1.67	1.65	1.69	1.54	1.26	1.09	1.13	1.10	0.99

Source: Eurostat

Figure 3: Hand tools
• Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Table 4: Electric power tools
EC consumption by Member State, 1990

	(%)
Belgique/België	3.6
Danmark	2.0
BR Deutschland	38.9
Hellas	1.5
España	4.8
France	17.6
Ireland	0.5
Italia	11.1
Nederland	5.5
Portugal	1.0
United Kingdom	13.5

Source: Bosch

comes from a few big companies, sometimes at the international level.

Factors responsible for the large number of small enterprises in the industry include: the low value added nature of the products; the wide diversity of products; and the small production runs per item.

There are a few, however, that could be classified as medium to large enterprises. These include Sandvik and Bahco (S), Stanley (F/UK), Rotherberger (D) and Hilti (CH). It is interesting to note that the Swedish manufacturers, Sandvik and Bahco, have several production facilities in the EC. US-based Stanley Works is also a large manufacturer and retail market leader in the EC, especially in the United Kingdom and France.

In power tools manufacturing, large enterprises include Bosch, Black & Decker, Metabo, Peugeot, Makita, Andreas Stihl KG, Kango, Hitachi, Hilti and AEG.

In the leading countries major manufacturers often have a large share of the market. Stanley and Draper (an importer/packager) hold 50% of the DIY market for screwdrivers in the United Kingdom; 75% of the DIY market for hand drills is covered by Stanley, Draper and Record Ridgway.

Strategies

The keen competition of prices caused by the increasing volumes of cheaper imports should force many manufacturers to improve their productivity or to restructure their business operations. These factors are particularly important in those countries where incomes are relatively high like Germany.

Product quality and after-sales service, areas in which European manufacturers are strong, are important to remain competitive in the market; however, these qualities are of greater importance in a booming economy than in a recessive economy.

Eastern Europe is a market with significant opportunities. As an example, Stanley Works recently set up a joint venture with Fabryka Narzędzi Kuznia (Poland) near Krakow. The deal has two objectives. Firstly, the new company will take over Kuznia's hand tools manufacturing capacity, and make further investments in new equipment and facilities later. Secondly, Stanley will be able to manufacture Stanley-branded products cheaply, for sale throughout Europe.

REGIONAL DISTRIBUTION

Because of the dependence on the demand from downstream industries like mechanical engineering, manufacturers tend to be located in areas where these industries are concentrated. This is especially true of the many small firms which supply the professional market (rather than the DIY market). Germany's strength in the important downstream industries for hand tools explains why so many of the manufacturers are located there.

REGULATIONS

Since 1978 there exists European standards (HD 400 series) on hand-held electric motor operated tools. These standards are referred to in the Low Voltage Directive. With the adoption of the Machine Directive in 1989 a certain overlap has arisen on the coverage of power tools by the two directives, which may lead to some uncertainties as to the standards and certification procedures to be applied. Efforts are being undertaken by the European Commission, CEN and CENELEC to solve this transient problem.

OUTLOOK

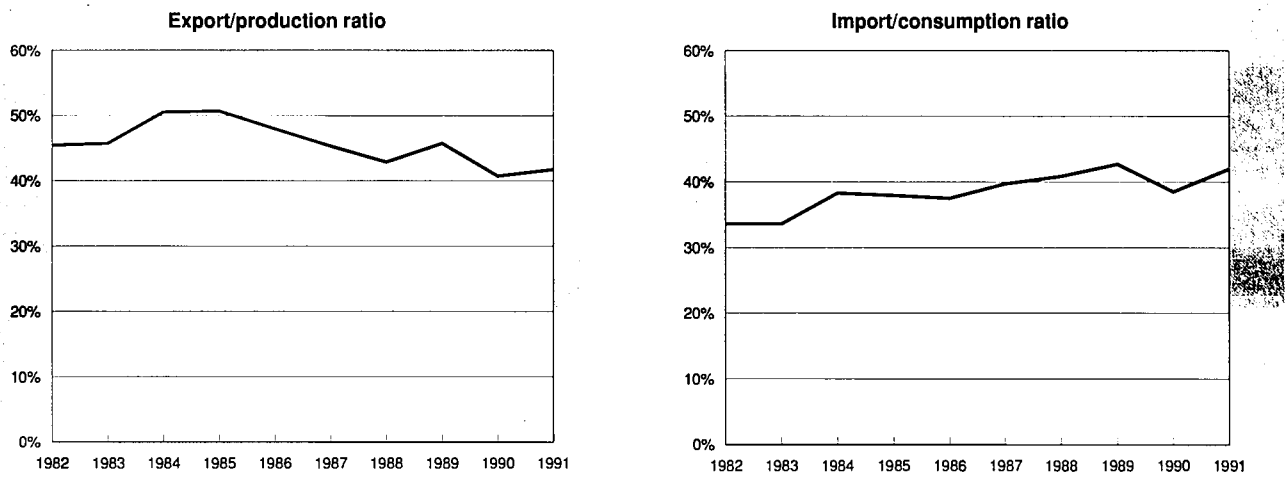
The economic slowdown at the beginning of the 1990s influenced the hand tools industry, especially because the building and construction industry was particularly hard hit. Since forecasts for the general economic situation do not show quick recovery, it is not expected that the hand tools manufacturing will experience fast growing demand in the mid-1990s. In

Table 5: Hand tools
Breakdown by size of enterprise, 1988

employees	D	E	F	I	Total	%
less then 20	528	15	59	78	680	65
20-100	164	12	62	45	283	27
more than 100	57	6	12	7	82	8
Total	749	33	133	130	1 045	100

Source: CEO

Figure 4: Hand tools
Trade intensities



Source: Eurostat

the medium term, however, the prospects are better, with expected growth rates of 2% to 2.5%.

Although there is an argument that poor economic conditions will increase the need for DIY products as people renovate their homes themselves instead of employing a professional, the overall decline on retail sales has mostly outweighed this influence. Declining disposable income pushes demand towards the lower end of the product range, but in the medium and longer term a pick up of economic growth will probably lead to more demand for high quality tools. Broadening of the product range found in the average householder's tool kit will lead to accruing sales opportunities. On the debit side, some impact will be felt during the 1990s from competition from power tools, especially from (rechargeable) cordless products.

In the professional market, the outlook in the medium term for the building and construction industry, as well as for mechanical engineering is one of some recovery from the recession years 1990-1992. This means faster growth for the tools sector as well.

However, for the EC industry it is essential to implement structural changes in order to maintain a competitive position into the future. More rationalisation is expected to take place in the form of take-overs, mergers and other types of alliances. This will put pressure on the smaller companies.

Table 6: Hand tools
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-2.5	2.5
Production	-3.0	2.3
Extra-EC exports	-3.0	2.0

Source: NEI

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: European Tool Committee / Comité Européen de l'Outillage (CEO). Address: rue Louis Blanc 39/41, F-92400 Courbevoie; tel: (33 1) 47 17 64 53; fax: (33 1) 47 17 64 55.

Light metal packaging
NACE 316.42

The light metal packaging industry has enjoyed sustained growth over the course of the last few years. Substantial production cost savings and significant productivity increases have been achieved, principally due to technological advances. The sector as a whole is characterised by a high degree of competitivity, given that a broad range of alternative processing and packaging options currently exist or are in development. The impact of environmental regulations and recycling is particularly important in this sector.

INDUSTRY PROFILE

Description of the sector

The term "light metal packaging" is applied to all metal packaging less than 0.49 mm thick and with a capacity below 40 litres. By contrast, the term "heavy metal packaging" is applied to packaging manufactured from cold-rolled sheet steel with a surface thickness equal to or greater than 0.5 mm and used in the fabrication of casks, cans and barrels with a capacity of between 30 and 220 litres.

The distinction between "light" and "heavy" metal packaging is by no means arbitrary: not only does it reflect different methods of using raw materials and different manufacturing technologies, it also relates to entirely distinct consumer markets.

Within the light metal packaging sector itself, further distinctions apply to specific product groups:

- packaging for foodstuffs, particularly cans for foods and beverages;
- various types of light multi-purpose packaging, notably removable-lid cans for paints and varnishes, oil cans, cans for cleaning agents, non-sealed cans for foodstuffs, decorative cans, aluminium dishes, and metal containers for specific industrial applications (e.g. electric battery cases);
- aerosol cans for use as containers for a mixture of gas and liquid, used primarily in the cosmetics, pharmaceutical and cleaning agents subsectors;
- lids and caps, including crown corks and other types of metal fastenings (especially for glass bottles), and screw-on caps and lids.

Main indicators

The value of the light metal packaging sector is estimated to be some 7.1 billion ECU. In 1991, the sector employed over 51 000 people in approximately 300 firms and used some 3.5 million tonnes of tinplate and 310 000 tonnes of aluminium. Net exports totalled about 300 million ECU in 1991 and apparent consumption reached 6.9 billion ECU.

Current estimates suggest that light metal packaging currently accounts for around 16% of the European packaging market as a whole, ranking it third in terms of packaging industry materials. By way of comparison, paper and board account for 30% of the packaging industry's current requirements, with plastic packaging accounting for a further 30%. The percentages for glass, heavy metal and wood are 7%, 4% and 4%, respectively.

Foreign trade

The metal packaging sector is one which is not traditionally characterised by major long-distance international trade. The EC is a net exporter in this sector. Imports, however, are growing at a faster rate than exports: the export/import ratio dropped from 7.1 in 1981 to 2.38 in 1991. Although imports currently represent little more than 3% of market demand, they have grown significantly over the course of the last few years. Intra-EC trade is increasing substantially and amounted to more than 1 billion ECU in 1991.

A permutation of sectoral restructuring and productivity-boosting measures has resulted in a steady fall in employment in this sector, which fell from 84,000 jobs in 1981 to around 51,000 jobs in 1991. Productivity over the same reference period increased from 70 000 ECU per employee in 1980 (at constant 1985 values) to more than 120 000 ECU in 1991.

MARKET FORCES

Demand

Although originally developed for food products, light metal packaging has developed an increasingly important role in everyday life, thanks to its unique properties compared with other forms of packaging. Food contained in metal packaging can be stored for long periods without any loss in nutritional value or any risk of corrosion or contamination. The primary advantage of this longevity is that products can be more readily transported and stored.

In recent years, economic growth within the sector has been relatively modest, ranging from 2% to 3% per year on average. This growth is primarily attributable to developments in the canned foods industry and the emergence of new market segments in canned beverages. As far as industrial packaging is concerned, the position is distinctly less positive; this is due to difficult conditions obtaining in certain consumer sectors (among them the construction industry) and to growing competition from the plastic packaging sector in terms of specific applications, notably motor oils and cleaning agents.

Overall, developments in the light metal packaging sector are strongly influenced by a number of external factors, e.g.:

Table 1: Light metal packaging
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990(2)	1991(3)
Apparent consumption	5 057	5 360	5 802	5 884	5 655	5 692	6 105	6 246	6 784	6 897
Production	5 267	5 585	6 048	6 144	5 875	5 900	6 322	6 667	7 022	7 196
Extra-EC exports	270	302	342	369	328	320	391	487	520	516
Trade balance	210	225	247	261	221	209	217	421	238	299
Employment (thousands)	75.9	73.8	69.8	67.9	62.8	60.1	56.8	53.2	52.2	51.3

(1) Excluding Portugal from 1989
(2) Including former East Germany for production and employment
(3) Including former East Germany for production and employment; estimates for trade
Source: SEFEL, Eurostat

Table 2: Light metal packaging
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	0.4	0.0	**0.0**
Production	0.4	-0.5	**-0.2**
Extra-EC exports	4.5	2.5	3.2
Extra-EC imports	14.2	12.1	12.8

(1) Excluding Portugal from 1989; including former East Germany for production and employment
Source: SEFEL, Eurostat

- changes in individual consumer preferences and patterns (including a trend towards individual portion packaging in the food industry and more sophisticated methods of preservation) which have prompted an increase in demand for packaging for pre-cooked dishes and aerosols;
- stiffer competition from new types of packaging (such as compound plastics on impregnated board, ultra-lightweight glass and flexible packaging) and new preservation technology (e.g. deep-freezing or freeze-drying);
- psychological aversion to certain types of packaging and product presentation, particularly where long-life foodstuffs are concerned.

Production process

At present, light metal packaging production can be broken down as follows: 60% food packaging (of which around 83% is accounted for by foodstuffs and 17% by beverages); 30% multi-purpose packaging; and 10% metal seals and accessories.

Tinplate, blackplate and aluminium are the three principal raw materials used in the manufacture of light metal packaging.

Tinplate is cold-rolled steel sheet less than 0.5 mm thick and coated on both sides with a thin (3g/m2) film of tin. It is used principally in the light metal packaging industry. Some 95% of annual tinplate production (which is to say, approximately 11 million tonnes) is used by this sector. Among the various properties which make it especially useful for the light metal packaging industry are high mechanical strength, susceptibility to decoration (it accepts print readily), and the fact that a vast range of products can be packaged using this material - notably food and chemical and pharmaceutical products.

Blackplate, usually referred to as tin-free steel, comprises a steel substrate coated with a chrome oxide compound. Although the technical properties of blackplate are inferior to those of tinplate, it has been widely used in recent years to manufacture products to less exacting specifications. Typical examples include can bases and lids, bottle caps, and so on. The principal factor in its favour is that it is approximately 10% less expensive than tinplate.

Aluminium is the third most popular base material for light metal packaging. Currently, around 10% of world aluminium production is earmarked for the packaging sector. Major uses include dishes, containers, flexible tubing, can lids and beverage cans. Use of aluminium for light metal packaging is varies significantly by region. Aluminium accounts for 95% of the can packaging for drinks market in the USA (with tinplate accounting for a modest 5%), about 40% in the United Kingdom and around 12% in Germany.

Changes in the relative cost of tinplate and aluminium largely dictate the use of these two materials in the metal packaging sector. At present, the preference is for tinplate, given the comparative stability of the price of tin over recent years. Aluminium, by contrast, has risen in price by some 50%. Over the longer term, however, this pattern could well change.

Packaging manufacturers, particularly in the foodstuffs subsector, rarely limit themselves to a single technology. The three leading groups worldwide each use a broad range of packaging materials.

All EC Member States are involved in the light metal packaging sector to varying degrees. The three largest producers are the United Kingdom, Germany and France, which together account for almost 60% of total EC output. EC output currently equals two-thirds of US output.

INDUSTRY STRUCTURE

Companies

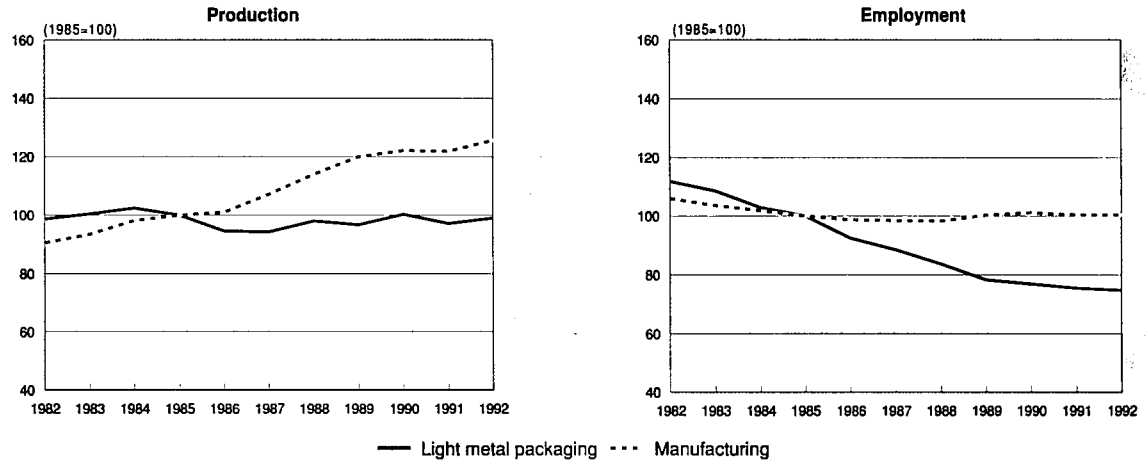
The light metal packaging sector is relatively concentrated within the EC. Its structure is based on two categories of companies: large groups that manufacture predominantly standardised products and small to medium-size firms that specialise in customised products.

Table 3: Light metal packaging
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	270.0	302.1	341.7	368.8	328.0	320.4	391.4	486.7	520.1	516.1
Extra-EC imports	73.3	91.7	111.6	109.3	108.5	111.9	176.7	171.4	181.9	217.2
Trade balance	196.7	210.4	230.1	259.5	219.5	208.5	214.7	315.3	338.2	298.9
Ratio exports/imports	3.68	3.30	3.06	3.37	3.02	2.86	2.21	2.84	2.86	2.38
Terms of trade index (3)	104.8	102.9	99.5	100.0	104.7	106.8	106.7	105.9	108.5	107.4
Intra-EC trade	496.9	545.9	609.8	647.8	684.9	729.5	941.6	1 047.6	1 198.6	1 334.1
Share of total imports (%)	87.1	85.6	84.5	85.6	86.3	86.7	84.2	85.9	86.8	86.0

(1) Excluding Portugal from 1989
(2) Estimates
(3) NACE 316
Source: Eurostat

Figure 1: Light metal packaging
Production and employment indices compared to EC manufacturing



1992 are DRI estimates
Source: SEFEL, Eurostat

Standardised products (i.e. those mass-produced on highly-automated production lines) are manufactured by a small number of large companies in each country. This is particularly true with respect to standard-size food and beverage cans, caps, and so on.

Several factors impact on concentration within the sector, not least of which is the capital investment implicit in large-scale production. A modern beverage can production line requires an initial outlay of up to 30 million ECU, so only major manufacturers have the requisite financial strength to make such investments. There is also the problem of access to advanced technologies. The trend towards mergers at the level of major industry clients such as food processing groups and brewers has also affected the structure of the light metal packaging sector. Finally, economies of scale implicit in mass-production are a factor in increased concentration.

M&A activity, joint ventures and cooperation agreements between firms is becoming increasingly common. As a result, beverage can production, for example, is now largely concentrated in the hands of five European manufacturers.

Customised products are manufactured in smaller quantities and for more limited markets. Customisation frequently relates to the shape of the packaging (conical or irregular shapes), non-standard sizes (outsize or mini-capacity packages), or product-specific decorative effects. Typically, such customised packaging is produced by small or medium-size firms employing between 20 and 200 people. General-line cans, where product variety and limited volume ensure optimal production flexibility, are manufactured principally by companies in this category.

REGIONAL DISTRIBUTION

The geographical spread of companies in the sector is largely determined by the nature of the products they manufacture.

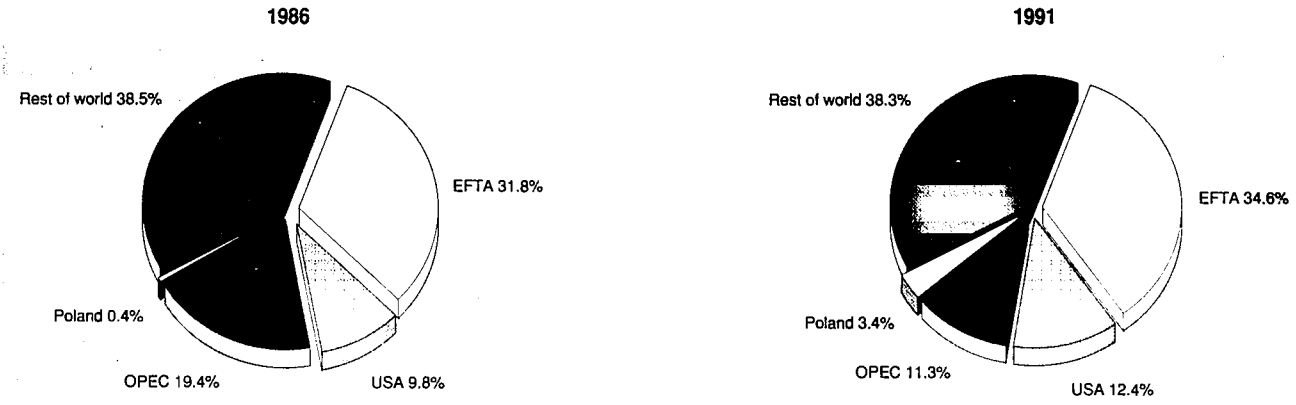
Metal packaging offers the benefits of a comparatively low unit value (the sale price of a standard can is currently around 0.1 ECU) combined with large volume. As the packaging requires significant space in transporting for small unit gains, large-scale exporting or long-distance delivery is not very profitable. In practical terms, the maximum sales radius within which a firm can deliver its products on a competitive basis (i.e., taking account of transportation costs) is approximately 300 kilometres. It is for this reason that firms are so widely dispersed throughout every region of the EC. It is also for this reason that food can manufacturers are typically located in predominantly farming regions. A wider market network

Table 4: Light metal packaging
Production by country

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC (1)	5 267	5 585	6 048	6 144	5 875	5 900	6 322	6 667	7 022	7 196
Belgique/België, Luxembourg	272	301	322	343	344	349	312	321	334	348
Danmark	176	196	224	236	235	232	185	197	200	199
BR Deutschland	965	1 006	1 105	1 102	1 178	1 164	1 196	1 260	1 426	1 462
Hellas	N/A	N/A	N/A	180	166	165	184	179	167	174
España	N/A	N/A	399	398	430	459	473	566	597	649
France	922	931	979	1 036	987	957	977	1 018	1 049	1 081
Italia	481	596	694	648	598	655	866	986	1 043	991
Nederland	475	490	492	494	405	408	408	396	424	450
Portugal	90	92	98	113	103	103	104	105	110	115
United Kingdom, Ireland	1 386	1 441	1 559	1 594	1 429	1 408	1 616	1 639	1 672	1 728

(1) 1982-83 Spain estimated; 1982-84 Greece estimated; 1989-91 excluding Portugal; from 1990 including former East Germany
Source: SEFEL

Figure 2: Light metal packaging
Destination of EC exports



Source: Eurostat

is achieved as a result of the tendency for large national or regional groups of manufacturers to buy up the products.

ENVIRONMENT

In volume terms, packaging accounts for nearly one-third of the 100 million tonnes of waste generated by EC households. By weight, on the other hand, metal packaging represents less than 2%, with drinks cans representing less than 0.5%.

EC and national waste policies typically have two aims: to increase the proportion of recyclable packaging by discouraging the sale of large quantities of non-returnable packaging; and to promote new forms of environment-friendly recycling.

These priorities have been underpinned by a series of rules and regulations, including an EC Directive dated June 27, 1985 on the packaging of food liquids.

A proposed new Directive covering the packaging industry as a whole was approved by the European Commission on 15 July 1992 and forwarded to the EC Minister Council for final approval. This new measure aims at promoting substantial reductions in the total volume of packaging on the market and stepping-up significantly requirements relating to re-use and recycling of all types of packaging. In the long term, 90% of all packaging used in the EC marketplace will be required to be re-usable and/or recyclable.

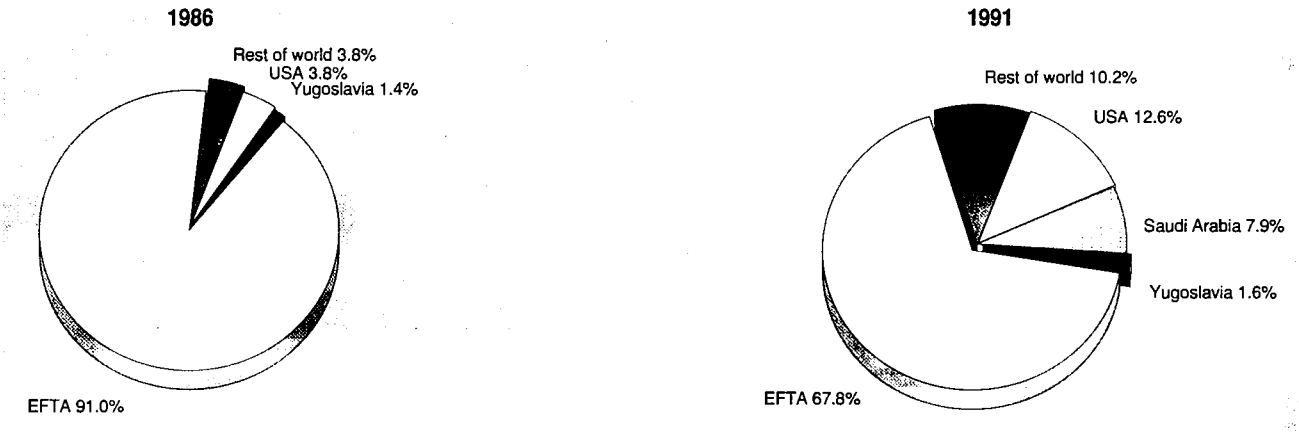
In this respect, the metal packaging industry seems well placed to comply with future EC legislative requirements because it represents a packaging process which is ecologically sound and capable of reducing waste to a minimum. The advantages for the light metal packaging industry include:

- the raw materials in question are in plentiful supply and will remain so for the foreseeable future;
- in the case of tinplate in particular, process, recycling and transport-related energy consumption is modest by comparison with other materials;
- elimination of downstream consumer waste is relatively simple to achieve given that the packaging material can be selectively recovered and recycled without difficulty.

Steel substrate-based packaging has a salient advantage in that it can be separated and recovered by magnetic means. This also means that steel packaging materials can be recovered even from non-separated domestic waste or after incineration.

As a non-magnetic material, aluminium does not offer this advantage. On the other hand, its high residual value constitutes a major incentive to selective recovery and recycling, an op-

Figure 3: Light metal packaging
Origin of EC imports



Source: Eurostat

eration that requires only one-twentieth of the energy required for primary smelting. After recovery, both aluminium and steel are readily reprocessed by raw materials producers in smelters or furnaces to derive new products which exhibit no quality loss.

As far as metal packaging recovery provisions are concerned, certain EC Member States - such as Denmark and Germany - have already introduced comparatively stringent regulations, whereas other jurisdictions have seen voluntary agreements negotiated at the level of public authorities, manufacturers and distributors. The recovery rate is already high - around 20% - but it will show a substantial improvement with the imminent passage of the new EC Directive. There are also grounds for optimism when one considers the situation in certain non-EC countries. In the USA, for example, more than 60% of beverage cans are now recovered and recycled. To this end, 22 international mass-market manufacturing and user firms, including several producers of light metal packaging, have decided to pool their efforts within the framework of an umbrella group known as the European Recovery and Recycling Association (ERRA) to develop and promote ecologically-sound and commercially cost-effective solutions to the problem of waste processing.

OUTLOOK

A diverging pattern of demand in various user sectors combined with increased competitive pressures exerted by plastic packaging across a broad spectrum of applications will act as a brake on output over the coming years in the light metal packaging sector. Thus:

- 1992 output is estimated at ECU 7.3 million, an increase of 2% compared to 1991;
- output in 1993 and 1994 is predicted to increase about 3% each year.

Certain market subsectors will outperform others. The food can industry seems poised on the threshold of a growth period and there is no indication that conventional food cans will be substituted by another type of packaging in the medium-term. The animal feed sector is currently expanding at between 6% and 10% per year and exhibits solid prospects for the years ahead. The total market for all kinds of beverage cans is projected to increase by close to 20% between 1991 and 1995, with metal cans predicted to increase substantially their current 15% share of this market. Nevertheless, certain EC manufacturers have over-reacted to this potential demand and committed substantial investment which could, in turn, lead to an excess of production capacity in certain regions of the EC. Packaging for miscellaneous applications (such as paints and detergents) should, at best, maintain its current position.

Table 5: Light metal packaging Industry structure, 1991

	Number of manufacturers	Employment
EC (1)	302	51 250
Belgique/België, Luxembourg	10	2 259
Danmark	13	1 850
BR Deutschland (2)	50	11 352
Hellas	15	1 800
España	70	6 000
France	35	8 129
Italia	63	5 090
Nederland	9	3 392
United Kingdom, Ireland	37	11 378

(1) Excluding Portugal
(2) Including former East Germany
Source: SEFEL

In addition to these specific market developments, there will be significant progress in the course of the next few years in terms of product quality and production-line yields. These forecasts are based on a variety of factors, including the development of new materials, the progressive ability to reduce the thickness and quantity of metal substrate as the quality of protective coatings improves, the use of laser welds, the rationalisation of production through the application of stricter standards, the introduction of more sophisticated printing techniques which enable packaging to play a more effective role in product promotion, and steady increases in productivity.

Overall, the tendency towards increased concentration noted in the metal packaging sector both within the EC and worldwide seems set to continue in the years ahead.

Written by: SEFEL
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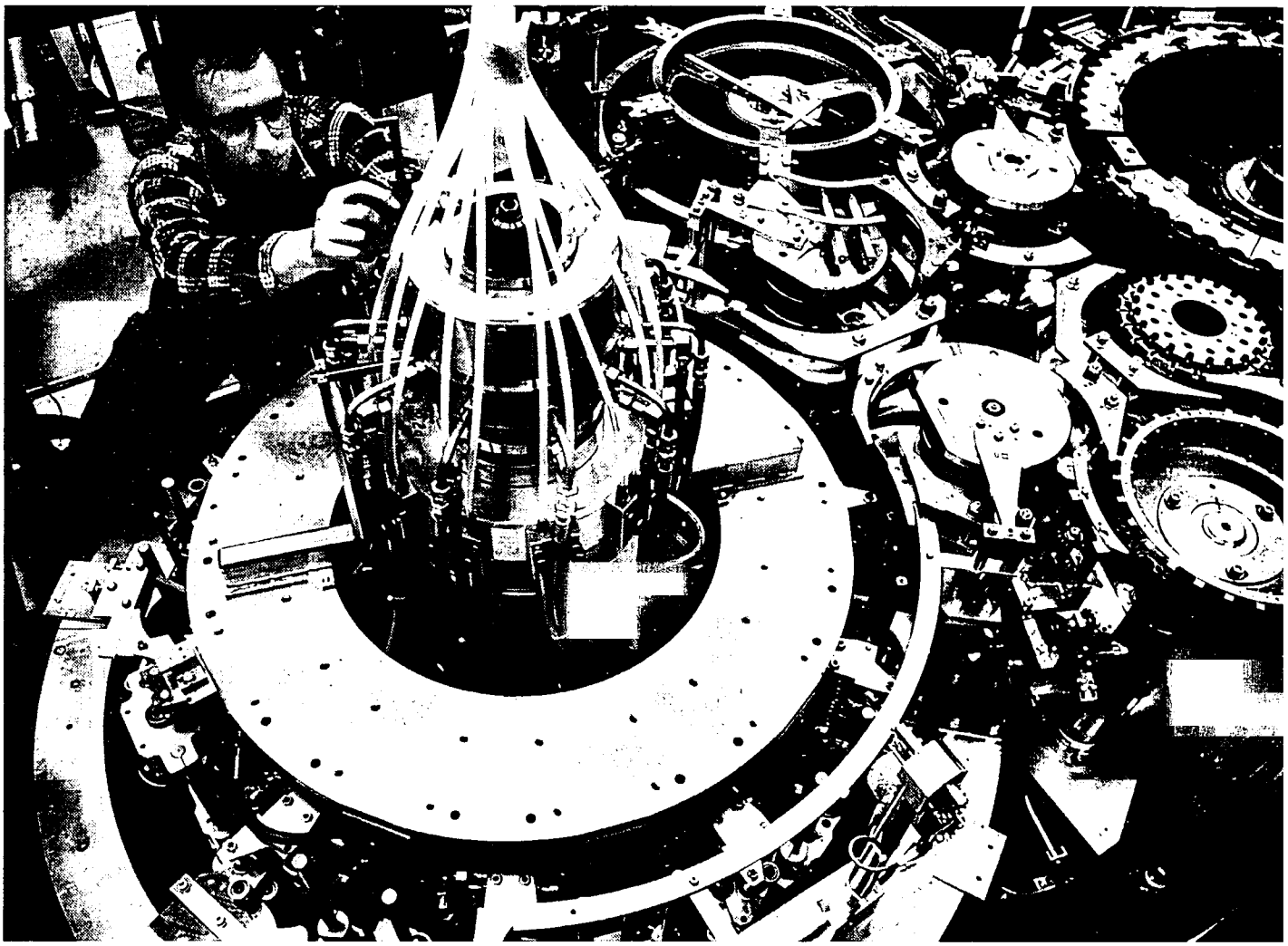


Mechanical engineering
NACE 32

Mechanical engineering produces almost exclusively capital goods, or components for such goods. Its development is therefore critically determined by the cyclical fluctuations of investment tendencies. The industry receives additional positive impetus from the progressive diffusion of the computer-aided generation of machines, the growing need for environmentally-sound technology, and the tendency toward its products providing ever more services. Mechanical engineering has hitherto been able to assert its leading international position. In the standard products area, however, it is coming under considerable pressure from the Far East.

INDUSTRY PROFILE

Description of the sector

Mechanical engineering accounts for about 8% of total EC industrial output.

Mechanical engineering is typified by the great variety of its products resulting from the function of supplying production equipment, or parts thereof, for all sectors and branches of the economy. It supplies everything from the most minute needle roller bearings through to complete production plant such as iron and steel works and rolling mills. Between these two extremes lie, inter alia, not only such traditional products as lathes, earth movers, cranes or circular knitting machines, but also the robot or the laser for metalworking.

With the integration of microelectronics in mechanical engineering products and the resultant advance of the computer in production the range of goods produced by the machine-builders has altered drastically: the centre of interest is no longer the stand-alone machine, but the integrated machine system, while the purchaser is increasingly demanding complementary services such as technical advice, training, maintenance or special software. Machine manufacturers already obtain over a tenth of their turnover from such services.

Recent trends

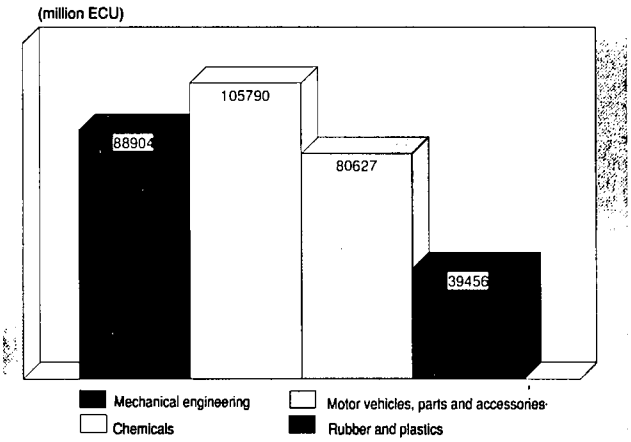
Mechanical engineering is experiencing regularly stronger cyclical fluctuations than most other industry groups. This is a result of its one-sided dependence on company investment activities, which react very sensitively to developments affecting the economy as a whole and thus rise and fall more abruptly than the other demand aggregates. This relationship is the key to any understanding of mechanical engineering in recent years.

In the 1988-90 period, the EC witnessed an unusually strong investment boom, which received added impetus from the backlog of demand from the first half of the 1980s and the preparation of industry and commerce for the Single Market. From 1987 to 1990, the demand for machines throughout the Community rose in real terms by 25%. Since this boom was anchored in a worldwide upswing machine-builders in the EC had healthy sales prospects in countries beyond the EC too. This occasionally brought about bottlenecks in machine production. On the one hand, technical capacities could not be expanded as quickly as desired, despite a major investment effort and, on the other, manufacturers were unable to find the necessary qualified workforce fast enough.

The next two years, 1991 and 1992, marked a sharp downturn in investment both within and outside the EC. Mechanical engineering was forced to reduce production, with the result that some of the growth achieved during the earlier upswing was lost again. The branches supplying components took especially severe punishment. Regarding roll bearings, gears, fluid aggregates and precision tools, clients had built up large stocks because they feared bottlenecks in supply. These stocks were now run down again in great haste, and the supplier's order books were consequently soon in a very sorry state, far below installation requirements.

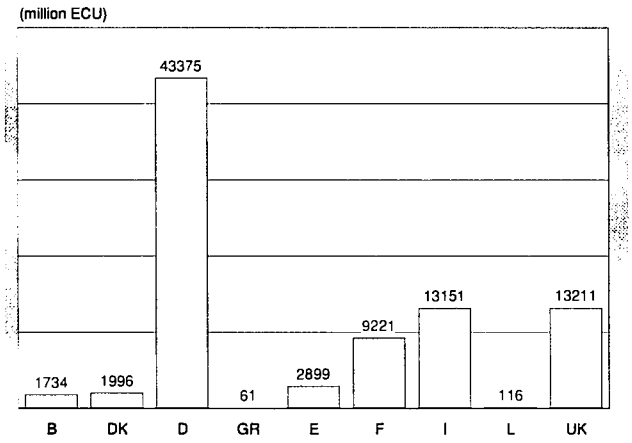
During the downward gradient of 1991 and 1992, machine-builders had to shed jobs in order to adapt to reduced capacities. They proceeded with caution here because they knew the next upswing would bring fresh difficulties in finding suitably skilled workers. See-sawing demand for machines during last year has presented mechanical engineering once again with the task of reacting to the cyclical trend with extreme flexibility. There is evidence that the small- and medium-sized enterprises coped with the situation particularly ably; this is a further reason why they dominate the mechanical engineering industry.

Figure 1: Mechanical engineering
Value added in comparison with other industrial sectors, 1991



Source: Eurostat

Figure 2: Mechanical engineering
Value added by Member State, 1991



Source: Eurostat

Table 1: Mechanical engineering
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	96 032	100 517	110 782	123 419	130 609	134 389	151 551	174 481	187 618	185 828	185 500
Production	127 389	131 571	144 400	160 315	166 388	166 749	183 630	210 115	224 443	221 247	221 500
Extra-EC exports	44 604	44 597	49 040	55 874	55 204	53 081	56 600	64 607	68 358	68 398	70 000
Trade balance	31 357	31 054	33 619	36 896	35 779	32 360	32 079	35 634	36 825	35 419	36 000
Employment (thousands)	2 445	2 373	2 314	2 325	2 340	2 278	2 283	2 356	2 390	2 371	2 290

(1) Estimates are used if country data is not available, especially from 1989 onwards.
However for trade, only 1991 has had to be estimated
(2) VDMA estimates
Source: Eurostat

Table 2: Mechanical engineering
Breakdown by major industry, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Agricultural machinery	10 416	12 244	2 998
Textile machinery	4 879	8 228	4 629
Machinery for mining, metallurgy, construction, lifting and handling	37 956	42 783	9 500
Transmission equipment	11 116	12 179	3 014
Machinery for wood working and paper laundry and leather	13 468	16 568	5 917

(1) Estimates are used if country data is not available
Source: Eurostat

Table 3: Mechanical engineering
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.4	3.1	3.9
Production	2.7	1.5	1.8
Extra-EC exports	-1.3	-1.5	-2.2
Extra-EC imports	1.1	4.7	3.6

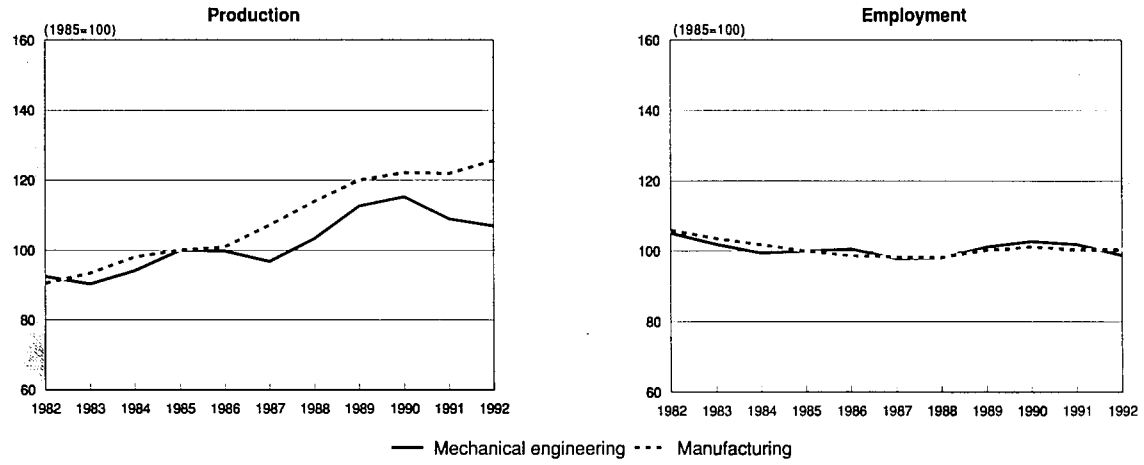
(1) Estimates are used if country data is not available, especially from 1989 onwards.
However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Mechanical engineering
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	44 604	44 597	49 040	55 874	55 204	53 081	56 600	64 607	68 358	68 398
Extra-EC imports	13 247	13 543	15 422	18 977	19 426	20 721	24 521	28 974	31 533	32 979
Trade balance	31 357	31 054	33 619	36 896	35 779	32 360	32 079	35 634	36 825	35 419
Ratio exports/imports	3.37	3.29	3.18	2.94	2.84	2.56	2.31	2.23	2.17	2.07
Terms of trade	106.2	104.4	101.0	100.0	104.2	107.5	108.6	106.4	110.5	109.9
Intra-EC trade	25 830	26 319	29 381	34 193	37 806	41 804	47 831	55 150	60 098	61 271
Share of total imports (%)	65.6	65.5	64.7	63.4	65.2	66.0	65.7	65.2	65.3	64.7

(1) Estimates
Source: Eurostat

Figure 3: Mechanical engineering
Production and employment indices compared to EC manufacturing



1992 are VDMA estimates
Source: Eurostat

International comparison

Having overtaken the market volume of the USA during the 1980s, the EC is now the world's largest machinery market. The EC is even more conspicuously in the lead since - unlike the USA - it is a stronger net exporter. The same applies also for Japan, whose output has caught up with the Americans. Going by present figures, American industry naturally looks to be in rather a bad shape in such comparisons within the triad because of the devaluation of the US dollar.

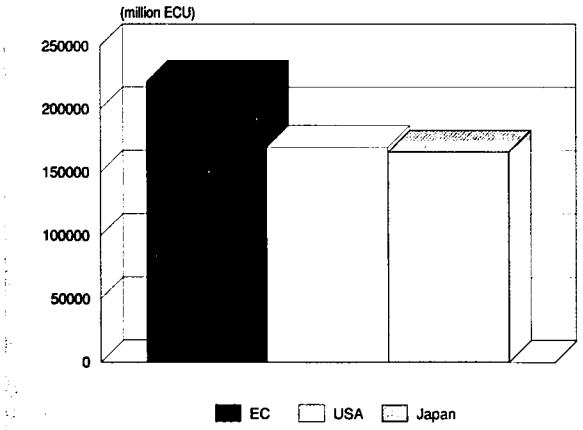
A glance at the current production development - as measured in the national production indexes - shows that the American machines industry had the slowest growth during the second half of the 1980s. On the other hand, strong growth was recorded in the EC and even more in Japan. There are two decisive reasons for this: first, Japanese demand for machines rose faster than in the EC; and the Japanese manufacturers did a great deal more than its European competitor to exploit the strong growth of demand throughout the threshold countries and developing countries of Eastern Asia in which they hold sway.

Foreign trade

Although EC countries do still continue to net a high surplus from the trade in machines with the rest of the world, that surplus has declined in the mid 1980s. Until 1990, this was mainly a result of the strong expansion of demand within the Community which well outstripped domestic production capacities and drew on available supplies from other countries to make up the difference. Come 1991 and 1992, the slackness of investments hamstrung exports, while imports profited from the tidal wave of demand unleashed by German reunification. The after-effects steadily reduced the export/import ratio of the EC in relation to other countries.

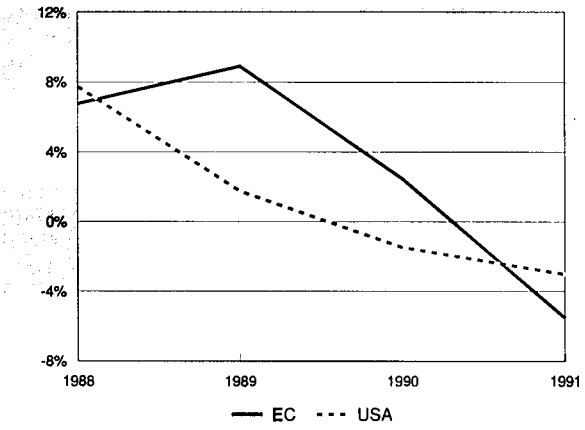
By the early 1990s, non-EC countries were supplying 18% of the EC machinery market, as against the 1982 import quota of 14%. Here, the largest share is held by the EFTA countries, with their market share of 7%, while the USA and Japan have taken as much as 5% and 3% respectively. Having said that, trade within the Community has also increased. At present, trade on the domestic market covers a third of the Community's mechanical engineering requirements.

Figure 4: Mechanical engineering
International comparison of production at current prices, 1991



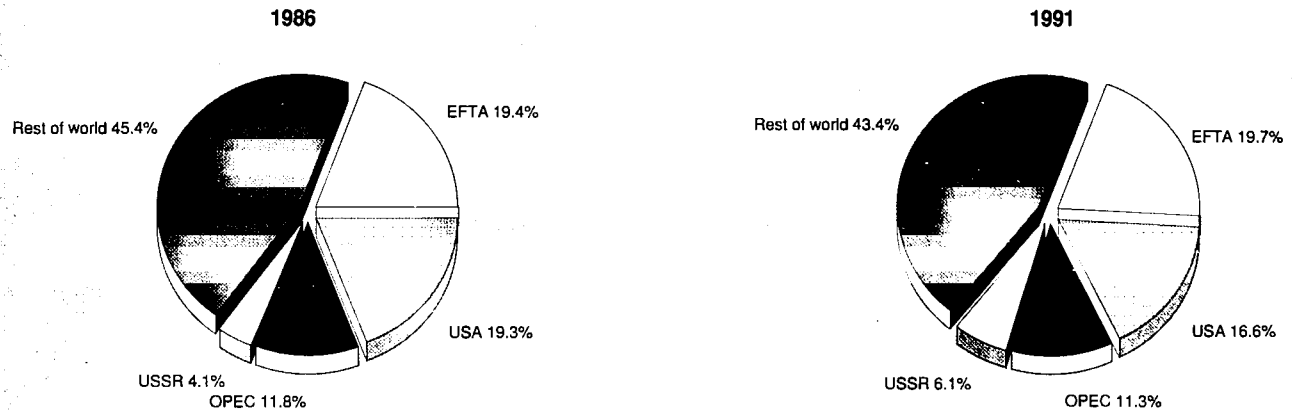
Source: Eurostat, Census of Manufacturers

Figure 5: Mechanical engineering
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Mechanical engineering
Destination of EC exports



Source: Eurostat

Taken as a whole, the EFTA countries are the biggest sales outlet for extra-EC machinery exports - their relative volume has even increased slightly over the last few years. The USA has lost ground because demand for machines met with less-than-favourable cyclical fortunes, and that the devaluation of the dollar handicapped exports from the EC. Japan - despite higher growth rates during the second half of the 1980s - continues to rank as a second-division export market. As a whole, the developing countries have proven to be fertile ground for sales of machinery from the EC, but thanks for this are to be ascribed simply to the burgeoning exports to Eastern Asian threshold countries and ASEAN countries. This region has for years shown itself to be the fastest-expanding mechanical engineering market anywhere in the world; machine-builders from the EC too have profited from it.

Mechanical engineering exports in recent years display a degree of convergent evolution: while intra-EC trade increased faster than production, exports to the rest of the world clearly hit an all-time low. This meant that domestic trade - which, in 1982, accounted for a bare 60% of exports to non-EC countries -had now, with almost 90%, all but caught up with them. The backdrop is, as already stated, largely a matter of cyclical trends. In spite of their below-average development, extra-EC mechanical engineering exports are still good for 30% of machinery production. This export quota is appreciably higher than those of the USA or Japan, which both score approximately 20%.

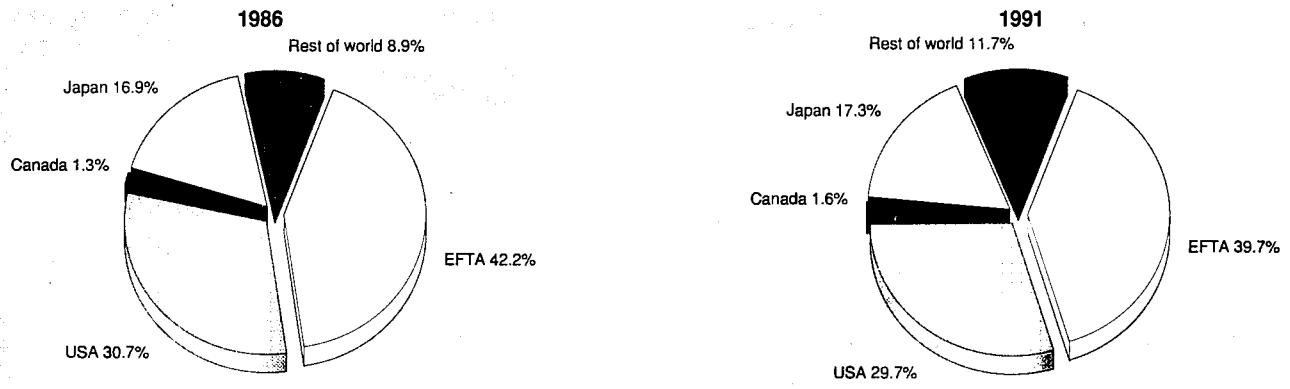
Machinery imports from outside the EC have since nudged their market share up to around 18%. This import quota already lies well above the quota for the USA, which has about 10% and Japan's modest 3%.

MARKET FORCES

Demand

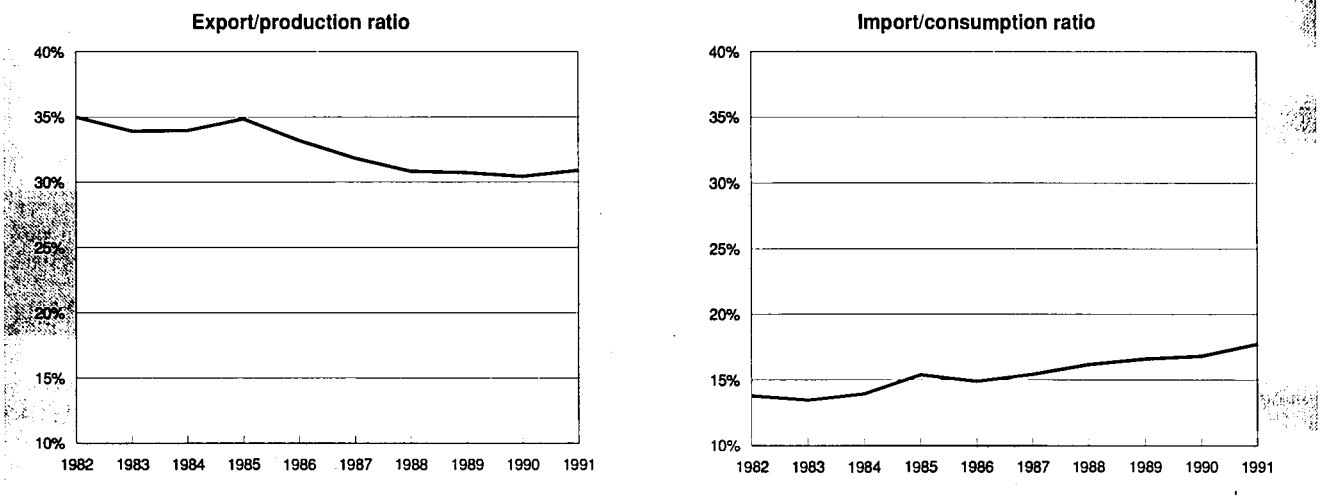
Considerably more than 50% of the goods produced by mechanical engineering are finished capital goods. The bulk of the remainder are parts and components for the construction of capital goods. These parts may be simple hydraulic elements, but also a complete turbine for the propulsion of a ship or an industrial furnace in a cement works. Only few such parts end up in consumer durables, e.g. a roller in a household washing machine. Therefore the demand for machinery - di-

Figure 7: Mechanical engineering
Origin of EC imports



Source: Eurostat

Figure 8: Mechanical engineering
Trade intensities



Source: Eurostat

rectly or otherwise- is completely dependent upon the investments climate.

The quantification of the dependence of mechanical engineering on demand from individual sectors of the economy is a more difficult undertaking than a description of these general connections, as there are not sufficient statistics to hand. In the case of Germany, the input-output tables compiled by the Statistisches Bundesamt, and the investment figures issued by the ifo Institute allows a reasonably accurate rating of the position of the branch in the home market: 72% of all mechanical engineering products goes to the processing industries, 7% to mains energy and water supply utilities and to mining, 6% to agriculture and forestry, 5% to the building and construction sector. The service sector takes a total of 8%, the State 2%. Given the high degree of intermeshing of parts for the processing industries, mechanical engineering is its own best customer, followed by the motor vehicle industry, the chemicals industry and electrical engineering.

Time and time again, this dependency pattern, binding mechanical engineering to the investment activities of industry, burdens the branch with serious fluctuations of demand. The industry is highly sensitive to actual or anticipated gain or loss in capacity, profit, financing costs and the general parameters when making decisions regarding investment. Particular attention is paid here to the enlargement investments which, given favourable odds, rise steadily but, under negative conditions, can fall back heavily.

The process of innovation in mechanical engineering has clearly gathered momentum over the last few years. Here, the role of pacemaker was played by microelectronics, which produced a new generation of machines back in the Seventies. Its distinctive feature is that production machines with conveyor devices, robots and automatic testing machines can be set up to computer-controlled systems; this not only attains high output, but also enables more flexible adaptation to variable production assignments. Using these machines therefore offers the investor ample opportunity for modernisation. The diffusion of this technology is already underway; it will bolster demand for mechanical engineering products during the years ahead.

In previous years, EC demand for machines benefited from the fact that undertakings in the Member States had stepped up investments with regard to the internal market. Research does, however, reveal that not all investments with an eye to the Single Market have yet been effected. This may give the coming upswing added impetus. Machine-builders in the EC can therefore expect a benign sales climate in the Community.

The sales outlook is equally good in most of the EC mechanical engineering export markets: the development tendencies in the EFTA countries regarding the "European Economic Space" are just as positive as in the EC, a marked increase in investment in the USA is forecast for 1993 and 1994, and the growth rate in East Asia during the 1990s will also remain higher than in any other region. Here, the machine manufacturers of the EC have not yet used up all their chances, since they have not as yet committed themselves fully enough to this market. At present, however, sales opportunities look rather forlorn in Eastern Europe, where suppliers from the EC have a good starting position, but economic reorganisation will require a considerable amount of time.

Supply and competition

The pronounced investment cycles saddle the machines industry with serious fluctuations in activity. The boom of 1989 and 1990, for instance, caused bottlenecks in capacity, while 1991 and 1992 were lean years. If we leave these extreme situations out of the equation, then mechanical engineering production capacities within the EC do more or less reflect the sales opportunities. However, these remarks do not apply to machine-building in East Germany, which could not find alternative sales openings after the collapse of its COMECON trade. East German production capacities are therefore very much reduced, but adaptation still cannot be ruled out in all sub-divisions.

Mechanical engineering in the EC is under constant pressure from Eastern Asian suppliers as regards prices. In the area of high-technology standard machines or components, Japanese competitors are able to undercut prices through mass production. Where simple products are concerned, manufacturers from Taiwan and South Korea are making inroads into the market through low prices, which in any event has hitherto had less of a knock-on effect within the EC than in other markets. On top of this, the devaluation of the US dollar and the yen have blunted the competitive edge of machine manufacturers from the EC over the last few years, as this gave the two big competitors a prices advantage in the world market.

Despite the pressure on prices, the EC's machine manufacturers can still stand their ground in international competition. They

Table 5: Mechanical engineering
Breakdown by size of enterprise, 1988

employees	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	89 918	82.0	14.0	10.3
20-99	15 610	14.2	22.3	19.8
More than 99	3 428	3.8	63.7	69.9

Source: Eurostat

benefit from the fact that customers do not base their decision on the mere price of a machine, but also (and more importantly) on its technology quotient, its quality, and the complementary service. For this reason, elasticity of price is lower for the demand for machinery than for most other industrial products. In addition, the timelag between price movements and their visible effects on the production and turnover figures is greater, owing to generally longer negotiation and completion schedules.

Despite stiff international competition, manufacturers' prices for machines show mostly increased rates in excess of the industrial average. The causes for this phenomenon are: an above-average proportion of the costs going on wages and salaries, and a below-average development of productivity - both resulting from a client-specific production that relegated mass production very much to the exception rather than the rule. The present profit indexes show that mechanical engineering, despite higher price increases, usually makes comparatively smaller profits which are, moreover, prey to extreme oscillations.

Production process

Machine-building is a labour-intensive industry: in the EC, its personnel costs stand at just above 30%. To accomplish its production tasks, it needs not only a large proportion of engineers, but also a suitably qualified force of skilled workers. Having these qualifications is therefore a general local requirement for successful mechanical engineering. Impasses in building up the workforce occur with regularity during upturn phases, because the labour market is unable to bring forth the required skilled workforce as quickly as the industry would wish.

Turning now to parts and components for machine-building, which account for an aggregate of 60% of the production value, the bulk of deliveries come from within the branch itself. Second place goes to electrotechnics, which is gaining ground thanks to the advance of microelectronics. In both cases, the components in question are qualitatively high-grade. The most important basic material in the construction of machines continues to be steel, often bought in ready-processed form (cast steel, steelworking products). These advance operations are problem-free, because the EC has competent suppliers of its own as well as being able to buy in from the rest of the world.

The mechanical engineering production process obtains most of its innovatory impulses from the consistent use of data technology or from product innovation within the branch itself. Computer-aided design (CAD) and computer-aided manufacturing (CAM) of orders are now common in most businesses; manufacturing proper is determined by flexible production cells. Not only do these techniques mean shorter total turnarounds, but they also make for the more flexible accommodation of individual clients' wishes. The more complex the machines produced become, the more clients will come to need product-specific services, such as technical advice, training, special software or maintenance. Machine-builders accord these services a high strategic priority, which is why they often provide them from within their own executive ranks.

INDUSTRY STRUCTURE

Companies

The machine construction sector in the EC numbers just about 110 000 companies, nearly 90 000 of which employ at least 20 workers, which may be considered the bare minimum for the production of complex mechanical engineering products. Nearly four-fifths of these companies have fewer than 100 workers, while 10% have between 100 and 199, and 6% between 200 and 499. Slightly more than just 3% have 500 or more on the payroll, and that is not even 700 manufacturers.

This company size scattergram shows that mechanical engineering is mainly the concern of small- and medium-sized enterprises. As a general rule, they are very highly specialised; production is dominated by "one-off" and small batch runs, because - despite intensive export activity - the market segment they serve does not carry mass production. The numerically relatively few big companies tend for the most part to concentrate on areas where standard machines or components allow economies of scale or call for the construction of complete large installations with high personnel and financial capacities.

Table 6: Mechanical engineering
The top 9 mechanical engineering firms in Europe, 1991

(million ECU)	Country	Turnover	Employees	Net profit
Mannesmann	D	12 105	125 188	191
MAN	D	9 229	64 604	308
Fried-Krupp	D	7 368	53 115	119
Hoesch	D	4 922	44 200	63
Thyssen Industrie	D	4 062	46 129	22
Gebruder Sulzer	CH	3 666	32 767	61
SKF	S	3 636	47 939	-149
Linde	D	3 368	28 535	117
Ag Fur Industrie Und Verkehrswesen (1)	D	2 828	31 633	51

(1) 1990
Source: DABLE

All studies on industrial concentration conclude that mechanical engineering is one of the least concentrated groups of industry. The turnover breakdown for Germany for 1990 indicates that the six largest enterprises together accounted for only 8.2% of the market, the ten largest only 11.3%, the 25 largest only 18.7% It should also be noted in this case that the percentage figures have continued to fall steeply in recent years; the 25 largest enterprises together accounted for 27.9% as recently as 1985.

Strategies

The decline in machine production during 1991 and 1992 reflects a fall-off of investment within the EC and in major countries elsewhere in the world. There is still room for the possibility that this cyclical trough will throw the structural problems of individual firms into sharper relief. The branch is endeavouring to ride out the seasonal slackness through strict cost management, which will simultaneously leave it strategically well placed in readiness for the next upswing. Many companies are redoubling product innovation efforts, because this is the main cornerstone of competitiveness.

The majority of machine-builders expect to have to face increased competitive pressure on completion of the Single European Market, but many also look forward to enhanced sales opportunities. In order to assert themselves in this tug-of-war, most enterprises are taking additional strategic measures. Expansion of their EC-wide sales operations is one obvious course of action, but there will also be recourse in this connection to increased innovation. In addition a minority will be pooling their resources to come up with more rational ways and means of opening markets.

The investment activities of mechanical engineering is very much dependent upon the cyclical situation of the industry group, and its investment quota stands at around 4%. The expansion of capacity being the burning investment topic of the day, companies stepped up their investments considerably during the second half of the 1980s. In 1991 and 1992, investment in machine construction within the EC had undergone a visible decline, and the accent now lay one-sidedly on modernisation plans, predominantly with the aim of controlling the rise in personnel costs.

REGIONAL DISTRIBUTION

The hub of EC mechanical engineering is undeniably Germany; in 1991, West Germany attained 46% of the EC total production. East Germany which, for statistical reasons, is not yet included in the EC figures, rated around 6% of the West German production value during the same period. The other big machine production countries are Italy, with an EC share of 17%, the United Kingdom, with 15%, and France, with 12% These are followed by country groups with shares of around 2% to 3%: these include Spain, the Netherlands, Belgium and Denmark. By the same token, all EC countries have regional mechanical engineering centres. Germany has Baden-Württemberg and Nordrhein-Westfalen, Italy has Lombardy and Emilia-Romagna, the United Kingdom has the South-East and the Midlands, France has the Bassin Parisien and Rhône-Alpes. This distribution shows that mechanical engineering always gravitates towards the industrial heartlands since it traditionally seeks the proximity of its main customers.

ENVIRONMENT

Machine construction does not as a rule cause great environmental problems. Noise-levels from metalworking used to be a problem, but modern machine-tools have reduced it considerably. Further problems arose from surface-finishing processes such as annealing and galvanising, but this work is nowadays contracted out to specialist firms from outside the machines industry. On balance, mechanical engineering does not generate much in the way of environmental protection costs.

At the same time mechanical engineering is one of the main suppliers of environmental technology. Only the construction industry invests more in such technologies. EC technical harmonisation is fostering a growing interest in environmental control among machine manufacturers.

REGULATIONS

The EC Machine Directive ensures that machinery placed on the EC market measures up to uniform basic safety requirements. EC Member States' regulations, which were often wielded as non-tariff trade barriers, are being replaced by national regulations which comply with the Directive. Trade with countries outside the EC must also make due allowance for the many and various special technical regulations which require that extra know-how from producers. However, machine-builders frequently face more serious problems from national export limitations, designed to prevent deliveries of high technology or armaments-related machinery to specific countries. This area requires not only EC harmonisation, but also administrative streamlining.

OUTLOOK

In the longer-term trend, which eliminates cyclical movements, machine-building within the EC will remain a growth industry. The most important arguments in support of this are as follows: the diffusion of the new computer-aided generation of machines is still progressing and contributes towards stabilisation of demand, besides which - thanks to microelectronics - the innovation potential of mechanical engineering is high. Environmental protection requirements offer further scope for activity. The internal market and the "European Economic Space" will provide additional impetus for investments during the coming years. In the longer-term perspective, better sales possibilities may be expected in Eastern Europe, which will benefit East German machine-builders in particular. Finally, the machine manufacturers within the EC have good chances of asserting their keen international competitiveness in future also. An indication can be found in the patents statistics, which show the EC with a clear lead over Japan and the USA.

Table 7: Mechanical engineering
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.0	2.5
Production	1.0	3.0
Extra-EC exports	2.0	3.5

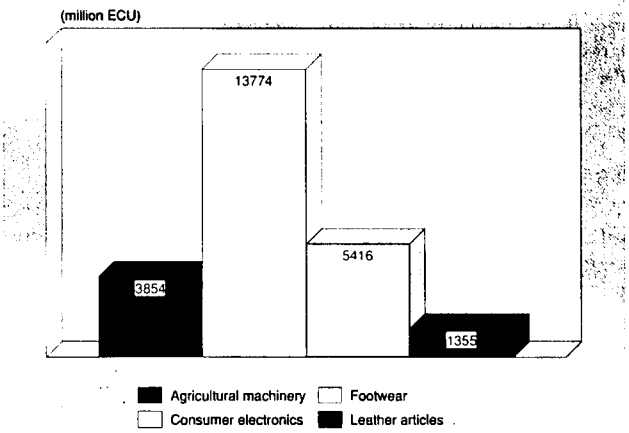
Source: VDMA

Written by: Verband Deutscher Maschinen- und Anlagenbau E.V. (VDMA)
The industry is represented at the EC level by: Organisme de Liaison des Industries Métalliques Européennes (Orgalime). Address: Rue de Stassart 99, B-1050 Brussels; tel: (32 2) 511 3484; fax: (32 2) 510 2301.

Agricultural machinery
NACE 321

The agricultural machinery industry in the EC is confronted with shrinking markets in Western Europe as a consequence of the need to reduce surplus production of agricultural products in the EC. The uncertainty about the future of the agricultural sector hampers investment from farmers. Demand from developing countries also show signs of weakness, due to financing difficulties. In other developed countries, such as the USA, Australia and South Africa, market saturation has been reached.
In the coming few years the situation is not likely to improve significantly. The situation in Eastern Europe is so uncertain that it is currently not possible to foresee the recovery of the EC agricultural machinery sector thanks to increased demand from this potential market. Even if demand from this region does improve, the main market for EC agricultural machinery will remain the home market.

Figure 1: Agricultural machinery
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The following products are manufactured by the agricultural machinery sector: single-axle motor hoes, motor driven mowers and motor lawn-mowers; machinery and equipment for soil preparation or cultivation; machinery and equipment for sowing seed, planting or distributing fertilisers; mechanical appliances for crop protection or irrigation; harvesting machinery and equipment; machinery and equipment for threshing, drying, winnowing, cleaning, sorting, grading and treating crops; machinery and equipment for livestock husbandry; other agricultural and horticultural machinery and equipment; agricultural tractors.

The sector of agricultural and horticultural machinery and tractors is one of the largest sectors of the mechanical engineering industry, covering 8% of its total production. The industry covers a wide range of equipment, with roughly 450 different categories of machines produced in Europe alone. Within the EC, the industry can be divided into two main segments of similar size: tractors and other machinery and equipment. The vast majority of the firms operating in this industry are specialised in the manufacture of agricultural machinery only. The few large firms in the industry are mainly producing tractors and automotive harvesting equipment. The small and medium sized firms specialise usually in the production of a single type of equipment, or of a range of products used in a specific subsector of agriculture.

Main indicators

In 1991, EC firms in the industry exported roughly 24% of their production. The trade balance in the industry has been positive throughout the last decade. But while the trade surplus has been rising in the first half of the 1980s by roughly 7% per year in nominal terms, it started to decline by about 5% per year from 1985 to 1991. Employment in the industry declined by 2.3% per year during the last decade. Germany is by far the largest producer, with about 37% of total EC value added, followed by Italy (22%), France (13%) and the United Kingdom (8%). The smaller EC countries produce about 20% of total value added.

Recent trends

During the last decade, the situation of the industry has deteriorated markedly, particularly in the second half of the 1980s. Demand for the industry's products declined rapidly from 1989 to 1991, falling to 10 400 million ECU in 1991, compared to 12 300 million ECU in 1989. During the same period, the performance of production was similar. Weak growth in extra-EC exports and sharp increases in extra-EC imports contributed to production decline of nearly 13%.

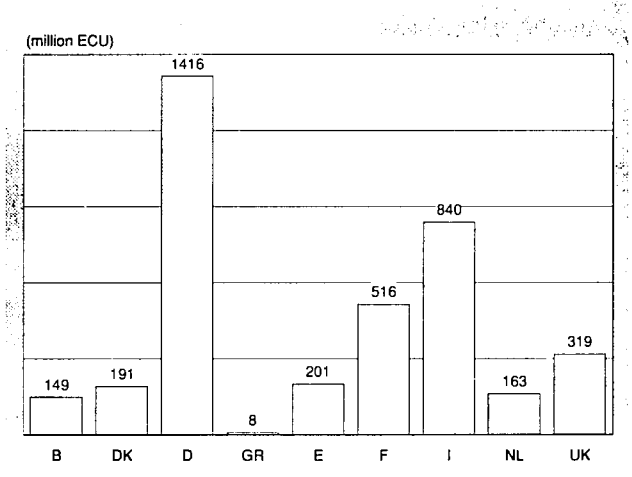
International comparison

Japan shares with the EC the same uncertainty about the future of the agricultural sector: in fact, Japanese farmers have been forced to cut their rice-growing acreage, while rice prices remain static. This situation explains why farmers have been getting more and more reluctant to purchase farm machinery, and production shrank by about 10% for two years running in 1987 and 1988.

Foreign trade

The EC is a net exporter of agricultural machinery. But while exports increased only slightly from 1982 to 1991 (an increase of 13% in terms of value), imports nearly doubled during the same period. The deterioration of the trade balance, however, was less marked, as extra-EC imports represent only 40% of extra-EC exports. The most important markets for EC exports are the USA and the EFTA countries, which account together for about 45% of the total. The former USSR increased in importance over the last few years; its share of exports

Figure 2: Agricultural machinery
Value added by Member State, 1991



Source: Eurostat

Table 1: Agricultural machinery
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	8 328	10 435	10 960	11 518	10 674	10 597	12 245	12 286	11 823	10 416	10 390
Production	10 358	12 535	13 341	13 988	12 605	12 233	13 847	14 091	13 880	12 244	12 163
Extra-EC exports	2 656	2 743	3 062	3 131	2 621	2 394	2 613	2 990	3 146	2 998	2 957
Trade balance	2 030	2 100	2 382	2 470	1 931	1 635	1 602	1 805	2 057	1 828	1 774
Employment (thousands)	170	186	183	177	167	154	149	139	140	137	135

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Agricultural machinery
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	5.6	-5.5	-2.0
Production	5.0	-5.8	-2.3
Extra-EC exports	0.6	-3.0	-1.8
Extra-EC imports	-5.8	7.4	2.8

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Agricultural machinery
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 656	2 743	3 062	3 131	2 621	2 394	2 613	2 990	3 146	2 998
Extra-EC imports	626	644	680	661	690	758	1 011	1 185	1 088	1 171
Trade balance	2 030	2 100	2 382	2 470	1 931	1 635	1 602	1 805	2 057	1 828
Ratio exports/imports	4.2	4.3	4.5	4.7	3.8	3.2	2.6	2.5	2.9	2.6
Terms of trade	109.1	107.0	105.2	100.0	103.2	106.5	105.5	101.1	104.8	99.6
Intra-EC trade	2 509	2 619	2 844	3 149	3 035	3 000	3 407	3 730	3 801	3 457
Share of total imports (%)	80.0	80.2	80.7	82.6	81.4	79.8	77.1	75.8	77.7	74.6

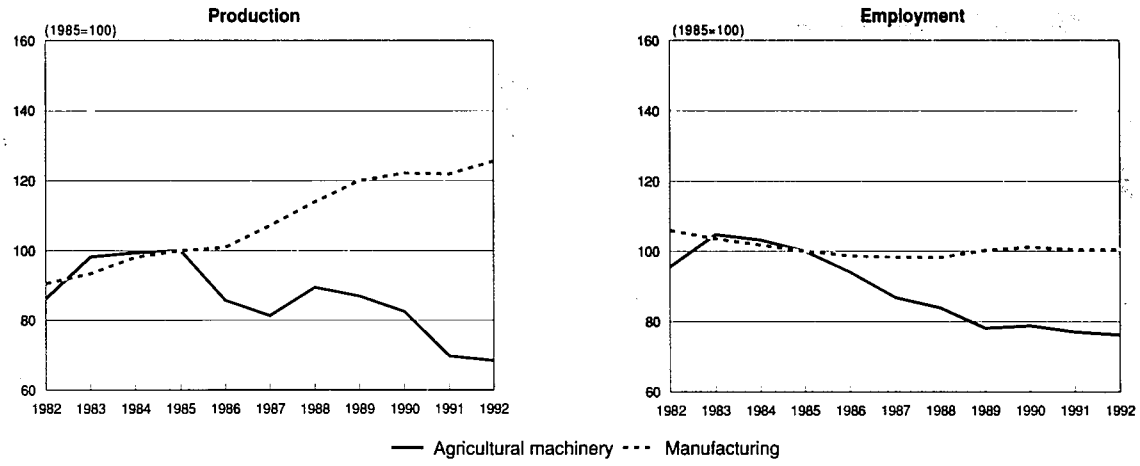
(1) Estimates
Source: Eurostat

Table 4: Agricultural machinery
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	30.0	31.5	32.5	32.3	29.6	30.2	34.5	34.0	32.2	28.2
Productivity index	93.0	97.6	100.7	100.0	91.7	93.6	106.8	105.1	99.7	87.3
Unit labour costs index (3)	80.2	87.7	94.7	100.0	105.9	110.2	118.3	115.2	129.3	N/A
Total unit costs index (4)	78.0	86.3	90.8	100.0	95.1	98.9	117.8	130.5	125.1	114.5

(1) Without Ireland
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed in current prices
(4) Excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Agricultural machinery
Production and employment indices compared to EC manufacturing



1992 are BAK estimates
Source: Eurostat

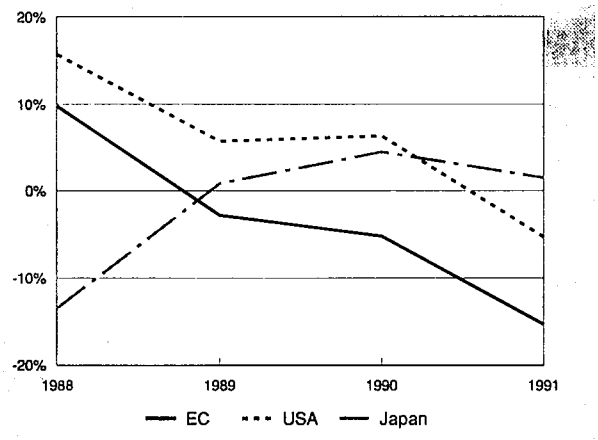
was about 12% higher in 1991 than in 1986. On the import side, the share of the USA in total extra-EC imports has risen from roughly 28% in 1986 to 41% in 1991, mainly to the detriment of the EFTA countries and Japan, which lost 7% each during the same period. Intra-EC trade grew by 3.6% per year during the last decade. However, due to the strong growth in extra-EC imports, the share of intra-EC trade over total imports decreased of 5.5% during the 1982-1991 period.

MARKET FORCES

Demand

Demand for agricultural machinery has been declining markedly over the last few years. The main external factor affecting the performance of the sector is the reform of the EC's Common Agricultural Policy (CAP), which is to progressively reduce production surpluses by reducing guaranteed prices and by imposing production quotas. Furthermore, rationalisation of agricultural production has caused the number of farms to decline, with the result of reducing the number of pieces of equipment needed, and at the same time causing a move towards larger pieces of equipment. Uncertainties regarding the future of the CAP, particularly in view of the difficulties encountered in the Uruguay Round of the GATT negotiations, have further hampered investment activities in agriculture.

Figure 4: Agricultural machinery
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Product innovation partly compensated for the decline in demand. Lately, a number of innovations have been introduced, using in particular electronics. Among these are: electronically controlled distribution of phytosanitary products and fertilisers, the electronic control of attachments, and the use of radar for adapting automatically the dosage of plant protection products to ground conditions. Progress has also been made in the field of safety, as many activities can now be carried out from the driver's seat.

Supply and competition

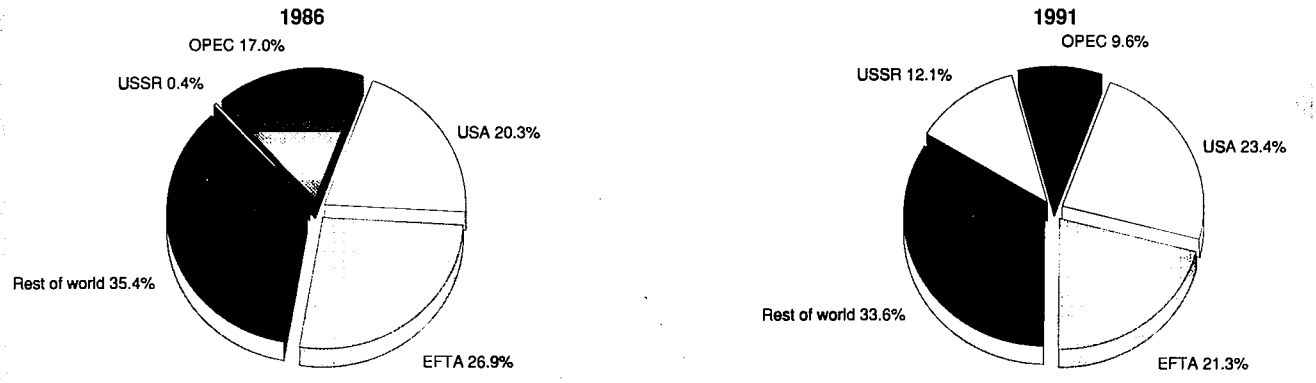
Despite the fact that it accounts for only about 7% of the world's population and 5% of total arable land, Europe is the world largest market for agricultural products. The importance of European agriculture has provided the basis for the development of the agricultural machinery industry and for its position among the world leaders. It should be pointed out, however, that the largest agricultural machinery producers in the Community are subsidiaries of US firms. EC producers find it more difficult to penetrate the US market due to the fact that the agricultural sector in the USA uses mainly larger and more powerful machines than those used and produced in the EC, given the large scale of farming enterprises there.

As demand for agricultural machinery declined over the last few years, the industry has been increasingly faced with excess capacity; equipment prices in the industry have therefore tended to decline, while prices of raw materials and labour have kept increasing, thus squeezing profits. This trend is likely to continue in the future as competition continues to stiffen.

Production process

The manufacturing process in the agricultural machinery industry is currently undergoing some restructuring. Sub-contracting, a traditional feature of the industry, is constantly on the increase. More and more firms restrict themselves to the design and assembly of products, as the increased use of hydraulics, electronics, and integrated data processing systems require a specific know-how which firms in the industry do not often have.

Figure 5: Agricultural machinery
Destination of EC exports



Source: Eurostat

Furthermore, producers are investing in robotics and in machining centres to increase flexibility, and to permit them to switch easily from one product to another and avoid costly accumulation of stocks. The efforts are illustrated by the rapid rise of inward investment, which increased at a rate of 8.3% per year from 1982 to 1988. These efforts of EC firms to rationalise production did not, however, bring about increased productivity, as the decline in value added during the last decade was even faster than the decline in employment. The stage is set, however, for fast increases in productivity, if and when demand and sales pick up.

INDUSTRY STRUCTURE

Companies

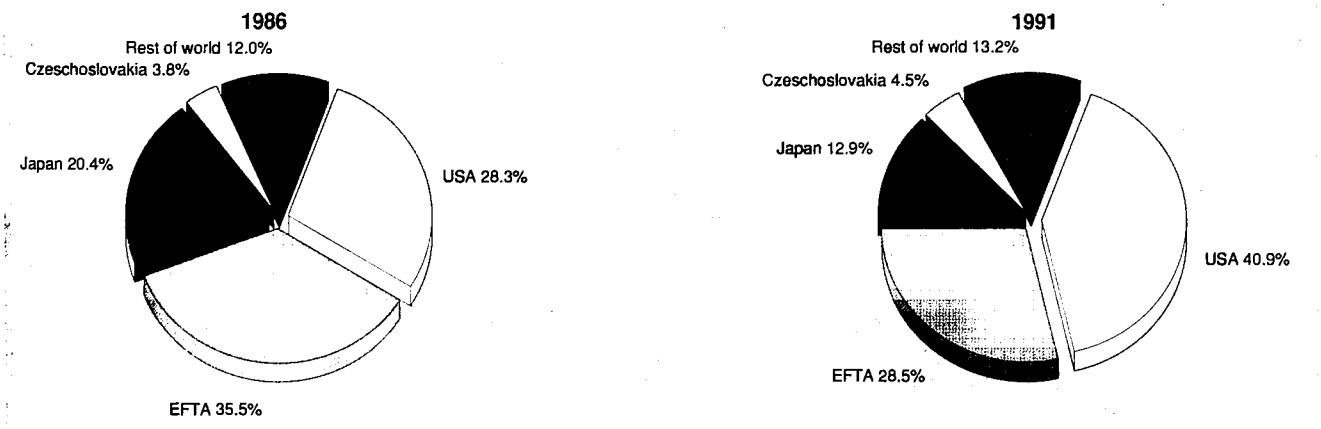
Given the extreme diversity in the types of equipment supplied by the EC agricultural machinery industry, it is very difficult to give a comprehensive picture of the companies in this sector. For its largest part, the industry is organised in a large number of small to medium-sized companies. The few larger firms in the industry are specialised in the manufacture of tractors and of automotive and trailed harvesting equipment for cereals and fodder. The main producers in the EC of these types of equipment are Fiat-Geotech (I), which consolidated its production of agricultural machinery with the European based US company Ford-New-Holland in 1991, Renault (F), KHD and Fendt (D), the Italian company Same (tractors), and Claas (harvesters) in Germany. Beside these companies, there are a few large US companies, based in Europe: Case International Harvester, John Deere and Massey-Ferguson. Altogether, large companies generate about 60% of the turnover of the industry. The remainder is produced by about 4000 companies, most of which are usually very specialised. The smallest firms occupy less than 10 employees, while the larger ones may have 1000 or more employees.

Since demand for farm machinery is not expected to grow in the medium-term, manufacturers are making all-out efforts to cultivate replacement demand by introducing multifunctional machines with added value. As demand for agricultural machinery has dropped, so has the number of companies in the sector. While leading manufacturers are diversifying as hard as they can and trying to penetrate overseas markets, a fair number of smaller firms are unfunded and find it increasingly difficult to operate on their own.

REGIONAL DISTRIBUTION

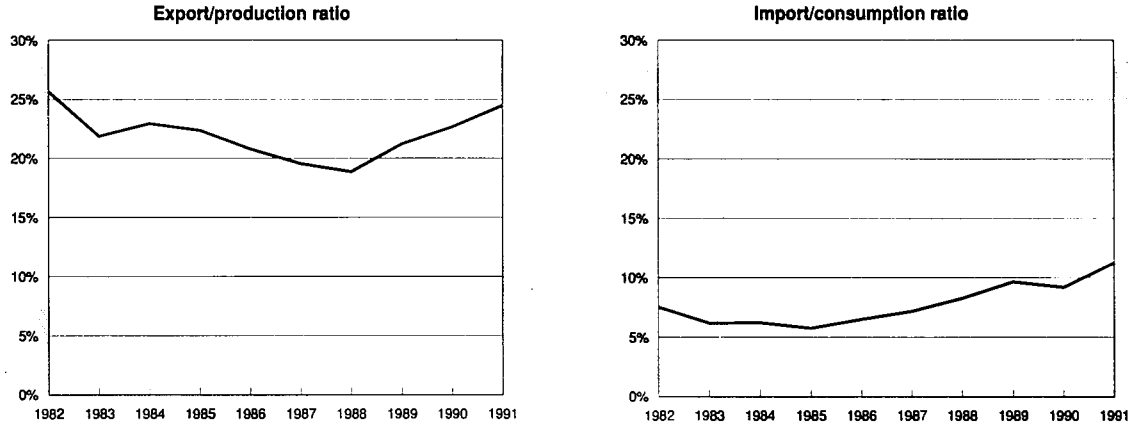
The largest producer of agricultural machinery in the EC is Germany, with 33% of total EC production in 1991, followed by Italy with about 21%, and France and the United Kingdom

Figure 6: Agricultural machinery
Origin of EC imports



Source: Eurostat

Figure 7: Agricultural machinery
Trade intensities



Source: Eurostat

with about 14% each. Germany is also the most important extra-EC exporter with 44% of the total, followed by the United Kingdom (21%), Italy (15%) and France (9%); regarding intra-EC trade, 31% is realised by Germany, followed by Italy (21%), and 13% by France and the United Kingdom. The agricultural machinery industries of France and Italy direct more than 60% of their total exports to other EC member countries. This explains why the decrease in production during the last decade was stronger in these two countries than in other large EC producers.

ENVIRONMENT

Ecological issues are gradually playing a more and more important role in the agricultural machinery industry. The use of agricultural machinery was traditionally linked with noise and smoke emissions, both relatively minor environmental problems, but considerable progress has been made in controlling them. Another environmental concern is the pollution of ground water by nitrates, dung water and other fertilisers and by phytosanitary products. The response of the industry has been electronically controlled distribution, to minimise the use of potential harmful products. Another innovation in this same context is the use of radar to measure ground conditions and to decide about the amount of fertilisers to be used. Progress has also been made to reduce soil compression thus limiting erosion. Thus, environmental concerns may offer new market opportunities to the industry, rather than represent a burden for it.

REGULATIONS

Directive 89/392 on machinery applies to all agricultural machinery and mechanical appliances with the exception of agricultural tractors. Agricultural tractors are subject of a large number of directives on type approval.

Any regulations affecting agriculture in the European Community may have heavy repercussions on demand for agricultural machinery. The most salient example of this is given by the recent decision to change the system of subsidies in the agricultural sector, in order to bring about a reduction in production. The final goal of the so-called McSharry plan is to progressively move EC agriculture to world prices. When implemented, this decision will reduce cultivated areas as well as the use of fertilisers and phytosanitary products in remaining cultivated areas - both of which will reduce needs for agricultural machinery.

OUTLOOK

Prospects for the agricultural machinery industry are not favourable. The above mentioned cuts in subsidies and the imposition of production quotas will hamper farming investment. The prospects for demand from abroad are not much better, at least in the short to medium term, limited by the already high level of market saturation in other developed countries.

In the USA and in Australia requirements for agricultural machinery are different from those of Western Europe, which makes it difficult for European producers to compete there with US producers. Although the prospects for the industry in Eastern Europe and in other developing countries are potentially good, the lack of financial resources might delay increases in sales. Until the situation in Eastern Europe improves, possibly in the second half of the nineties, production of agricultural machinery in the EC will increase only marginally. Environmental concerns, however, could generate new demand for the industry, particularly in relation to a newly defined role for the farmer, but its impact is not likely to be significant in the near future.

Table 5: Agricultural machinery
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-0.1	0.6
Production	-0.6	0.4
Extra-EC exports	-1.0	0.2

Source: BAK

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Machine tools
NACE 322

After the long period of growth during the second half of the 1980s, the favourable investment climate in the machine tool industry came to an end in 1990. Since then, the booming demand for machine tools changed into a strong decline.
The sector has a strong position in technology, and will be able to stay on the leading edge. The difficulties exist mainly with the application of adequate strategies in volume markets to meet the challenge of the Japanese competitors. Their advantage in economies of scale cannot be met by European companies, and the problem will not always be solved by the merging of independent firms.
The current recession is not expected to swing into an upward trend until the end of 1993. In the medium term, a growing demand for machines will solve the industry's most urgent problems, but competition among companies will remain high, partly because of continued penetration by Japanese companies. Under these circumstances, it is most important that the development of a homogeneous European industry continues.

INDUSTRY PROFILE

Description of the sector

The machine tool industry provides machines for the processing of metal. Machine tools can be divided into two broad product groups: cutting and forming machines. The first group, which accounts for three-quarters of the market volume, includes among its main products turning machines, milling machines, grinding machines, gear cutting machinery and machining centres. The group of forming machines comprises among its main products presses, bending machines and shearing machines. Non-mechanical manufacturing processes, such as electrical discharge manufacturing (EDM) and laser cutting are gaining importance.

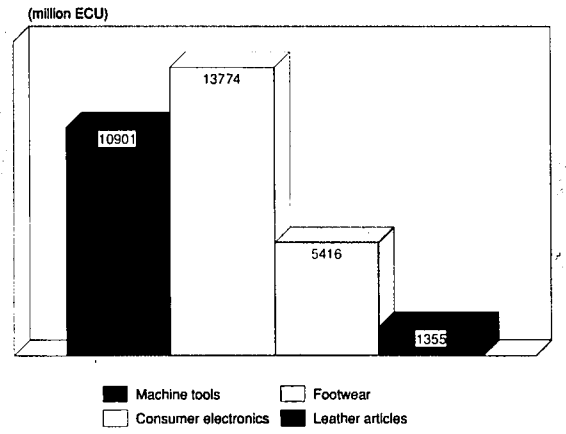
The industry's supply not only consists of stand-alone machines. Automated manufacturing using flexible manufacturing systems or flexible manufacturing cells (FMS/FMC) are also provided. They include controls, data processing equipment for the application of computer aided design (CAD), production planning (PPS), etc. Therefore, machine tool firms provide critical technology to manufacturing companies, and play an important role for the efficiency of the production in a broad range of industries.

Main indicators

European machine tool companies enjoyed a strong growth of the domestic market since the end of the recession in the first half of the 1980s. The major factors behind this development were the supply of advanced production technology and the preparation of manufacturing companies for increased competition in the Single Market. Moreover, capital stock was overaged due to the low investment activity in the EC during the previous decade, and a large part of machinery and equipment had to be substituted.

Between 1985 and 1990, production in real terms grew at a compound annual growth rate of 6%, outpacing EC export growth which had a compound annual growth rate of about 3% over the same period. Foreign competitors succeeded in penetrating the EC-market and now controls a share of about 23%. According to this development, the EC trade surplus in machine tools remained stable in the last decade, indicating that the European industry has lost some of its importance in world trade.

Figure 1: Machine tools
Value added in comparison with other industries, 1991



Source: Eurostat

Recent trends

The deep recession in 1982 and 1983 induced a sharp decline in the demand for capital goods. Compared with the overall cyclical development the market for machine tools showed a lag of nearly two years. By 1984, EC machine tool production volume was reduced by about one-fifth compared to 1980.

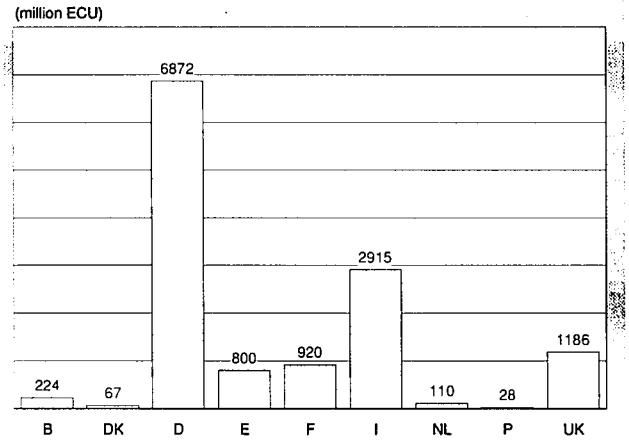
The economic development after 1982 and 1983 was stimulated by investment activity, and sectoral analysis proves that the demand for capital goods in manufacturing industries was most dynamic. Additionally, due to the long-lasting overall economic growth, the utilisation of machinery and equipment reached record heights and induced further demand for capital goods to expand capacities.

The situation for the EC machine tool industry started to deteriorate at the end of 1990, as a consequence of the structural problems for the European industry. Figure 3 shows the slump in 1991 and 1992 of the indices for the machine tool industry, which after 1984 had been constantly higher than those for overall manufacturing.

International comparison

The EC machine tool industry is by far the world's largest supplier, with a production share in current prices of about

Figure 2: Machine tools
Value added by Member State, 1991 (1)



(1) Excluding Greece and Ireland
Source: CECIMO, Ifo Institute

Table 1: Machine tools
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(3)	1992(3)
Apparent consumption	4 861	4 779	4 983	6 001	7 337	8 082	8 772	9 970	11 046	10 211	9 500
Production	6 714	6 605	6 772	7 830	9 162	9 721	10 666	12 050	13 055	12 111	11 450
Extra-EC exports	2 824	2 703	2 855	3 243	3 636	3 309	3 842	4 312	4 553	4 484	4 400
Trade balance	1 853	1 826	1 789	1 829	1 825	1 639	1 894	2 080	2 009	1 900	1 950
Employment (thousands) (2)	187.0	167.0	160.0	164.0	168.0	170.0	170.0	172.0	177.0	169.0	163.0

(1) Excluding Greece and Ireland
(2) Also excluding Denmark
(3) Estimated
Source: CECIMO, ifo Institute

Table 2: Machine tools
Average annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.0	8.9	3.8
Production	0.1	6.9	2.0
Ectra-EC exports	-0.4	3.0	0.6
Extra-EC imports	7.8	7.5	6.5

Source: CECIMO, ifo Institute

Table 3: Machine tools
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (2)
Extra-EC exports	2 824	2 703	2 855	3 243	3 636	3 309	3 842	4 312	4 553	4 484
Extra-EC imports	971	877	1 066	1 414	1 811	1 670	1 948	2 232	2 544	2 584
EC trade balance	1 853	1 826	1 789	1 829	1 825	1 639	1 894	2 080	2 009	1 900
Ratio exports / imports	2.91	3.08	2.68	2.29	2.01	1.98	1.97	1.93	1.79	1.74
Intra-EC trade	1 157	943	1 050	1 259	1 600	1 781	2 044	2 712	2 972	2 825
Share of total imports (%)	54.4	51.8	49.6	47.1	46.9	51.6	51.2	54.9	53.9	52.2

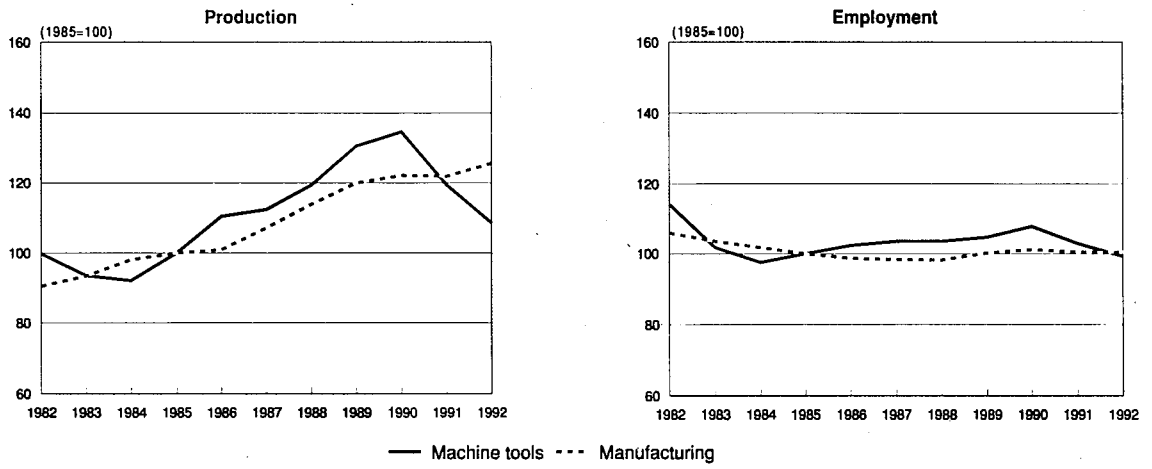
(1) Excluding Greece and Ireland
(2) Estimated
Source: CECIMO, ifo Institute

Table 4: Machine tools
Labour productivity (1)

(1982=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (2)
Productivity (thousand ECU)	35.9	39.6	42.3	47.7	54.5	57.2	62.7	70.1	73.8	71.7
Productivity index	100.0	104.0	104.0	111.3	118.7	117.4	126.6	131.3	132.0	126.3

(1) Excluding Greece and Ireland
(2) Estimated
Source: CECIMO, ifo Institute

Figure 3: Machine tools
Production and employment indices compared to EC manufacturing



1992 are ifo estimates
Source: CECIMO, ifo Institute

40%. Japan is the second largest machine tool with about 28% of the world production. Japan rapidly expanded its output within the past decade. Japanese production volume grew at an average yearly rate of 13.2%, whereas EC production expanded at an yearly rate of 3.9%. The US machine tool industry declined sharply during the 1980s. During this period, its production volume decreased by almost half.

The reason for these strong differences in growth lies partly in the domestic markets. Japanese demand for machines expanded dynamically, whereas the US manufacturing industries reduced their investment activity. Japanese suppliers of machine tools conquered the US market and now hold a share of more than 50%.

The development of the Japanese machine tool industry is even more impressive as its output prices remained stable during the 1980s, whereas EC and US companies increased their prices each year at 4.5% and 3 %, respectively.

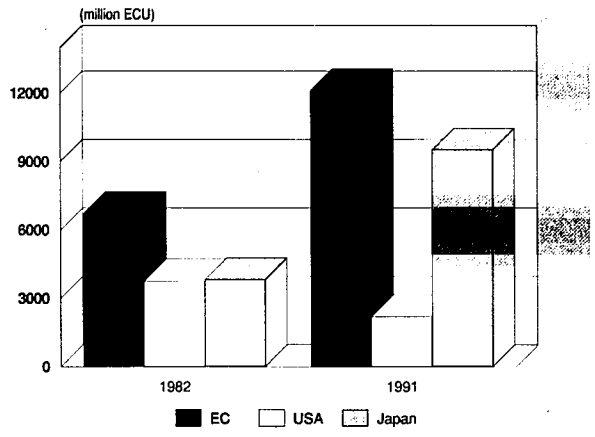
Foreign trade

The growth of the internal demand stimulated the intra-EC trade, which expanded at an average yearly rate (at current prices) of 12.5% between 1982 and 1990. This development can be partly regarded as a consequence of the process of achievement of the Single Market.

Extra-EC exports showed a less dynamic expansion at an average yearly growth rate of 5.8% at current prices. In 1987, there was a sharp decrease partly induced by some distortions in the financial markets and further intensified by the depreciation of the US dollar. The price competitiveness of European suppliers in the US market, which is the most important outside of Europe, has worsened. Extra-EC imports at current prices grew strongly at a rate of 12.8% per year and the size of the trade surplus was sharply reduced. The ratio of exports to imports decreased about 40% during the 1982 to 1991 period. Foreign suppliers could increase their share in the EC market from 20% to 25%.

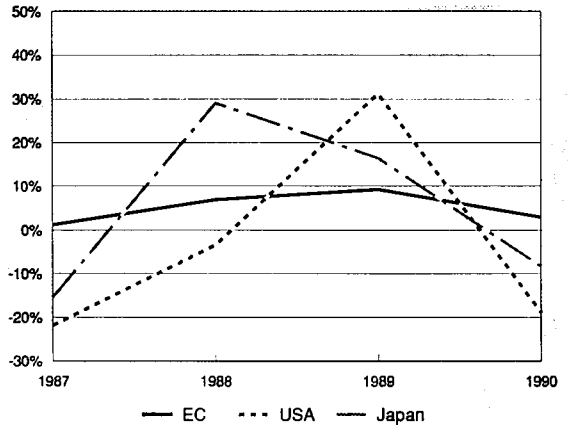
Most machine tools delivered into the EC are from the EFTA countries, particularly Switzerland. The next major exporter of machine tools to the EC is Japan. Both countries were able to increase their share on total EC imports. On the contrary, US producers since 1985 have lost importance as exporters.

Figure 4: Machine tools
International comparison of production at current prices



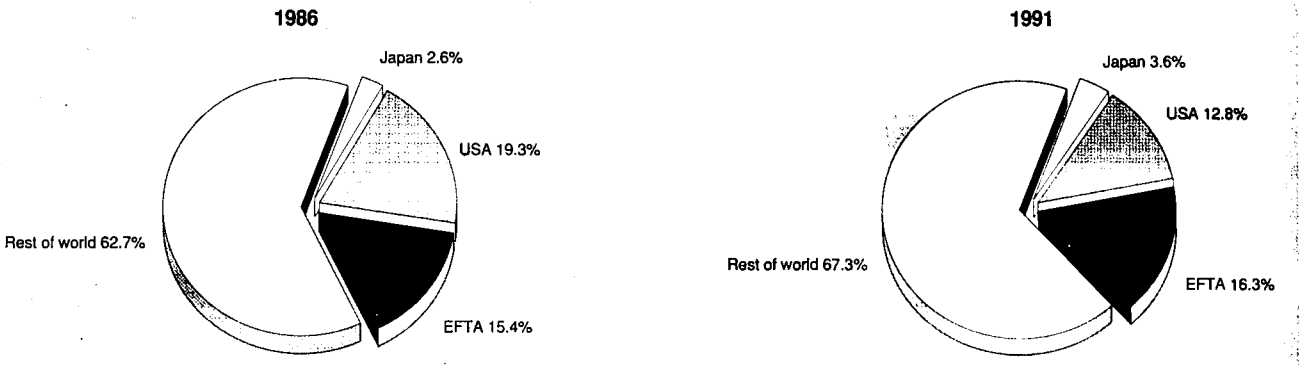
Source: CECIMO, ifo Institute

Figure 5: Machine tools
International comparison of production growth at constant prices



Source: CECIMO, ifo Institute

Figure 6: Machine tools
Destination of EC exports



Source: CECIMO, ifo Institute

MARKET FORCES

Demand

The industry supplies capital goods for final demand and is dependent on the overall investment climate. Above all, machine tools are bought by manufacturing industries, of which the most important are capital-good manufacturers. During the past decade, the machine tool industry enjoyed a strong demand caused by high investment activity. Preparation for the Single Market has stimulated investment in new technologies and capacities. The automotive industry deserves particular mention for being a very active source of demand for the machine tool industry.

This development was partly induced by the demand for newly designed production technology. The application of numerically controlled (NC) technology has been spreading during the 1980s, and since the end of the decade a slowdown of the diffusion rates indicates saturation of this important technology. Within the EC, the share of NC machines on all machine tools has gained 60% and will likely expand up to 70%.

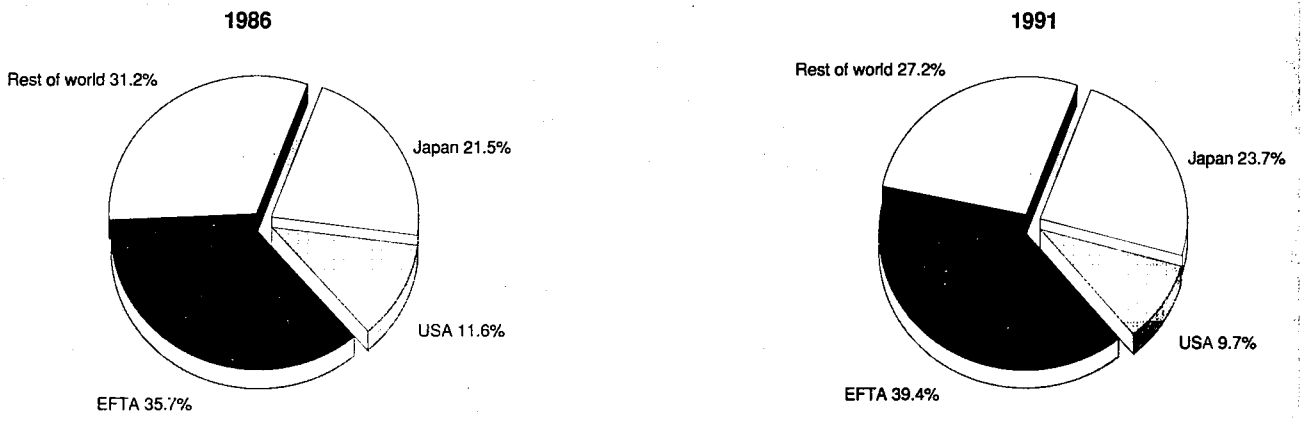
Supply and competition

The strong cyclical development of the demand for machines is a major factor affecting the companies of the industry. In a booming economy the supply can hardly follow the demand, while in a slowdown phase capacities are a burden and induce strong price competition. This environment is a challenge, especially for medium-sized enterprises, because it requires the ability to allocate resources for high investment volumes within short periods and the financing of a long-term liability.

In the past decade the market for standardised machinery has evolved to a volume market with global players. In this segment the price has got an increased importance. On the supply side, high discounts are accepted with regard to a long term strategic advantage in market shares. On the demand side standardised machines are homogeneous and a global supply provides alternatives that can be discriminated by the price.

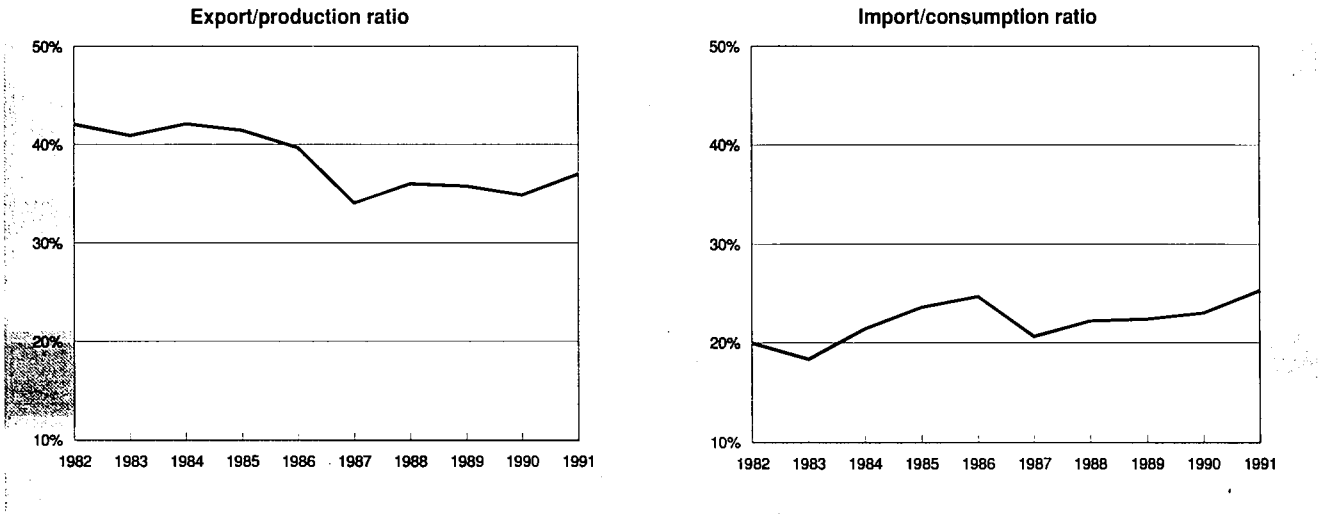
On the other hand, the growing level of automation in client industries requires an increasingly specialised supply, tailor-made systems, engineering and the development of software. In this market segment criteria other than price are of major importance. Clients use the technological know-how of a machine tool supplier for a specific process. This kind of co-operation can be regarded as outsourcing of production planning knowledge. In general, single purpose machines have lost some of their importance, whereas machining centres combining different processes and enabling multiple manufacturing with one chucking have raised their share in the EC production.

Figure 7: Machine tools
Origin of EC imports



Source: CECIMO, ifo Institute

Figure 8: Machine tools
Trade intensities



Source: CECIMO, Ifo Institute

Until now the EC machine tool industry has been a conglomerate of national industries with specific structures. The strong growth of the EC's internal trade within the past decade encourages a change in the industry's structure towards a more integrated EC machine tool industry.

The most important foreign competitors are Swiss and Japanese companies. Swiss firms often deliver to niche markets for specialised and high accuracy machines. Their main advantage lies in the technological know-how.

The Japanese are mainly supplying standardised machines. They hold a strong position in volume markets and have become global players, investing in large scale production and enjoying cost reduction effects. During the 1980s they penetrated the US market and set up transplants, and now control more than 50% of the US market in some product groups.

Simultaneously, Japanese companies have established footholds in Europe by making greenfield investments, acquiring companies, setting up cooperative agreements for knock-down production and issuing licenses. Japanese firms are prepared for the Single Market, and if demand improves, they will be able to expand their supply.

In comparison with the Japanese machine tool suppliers, European companies suffer a disadvantage in the volume production that can not be easily overcome. Nevertheless, they hold a strong position in research and development as well as in system technology. On one hand, their expenses for R&D as a percentage of total turnover is higher than for Japanese companies with 4.5% and 3.2%, respectively. It must be kept in mind that European companies are strong in customisation and some of their R&D funds are not spent for basic research but rather for a specific design. The analysis of the most important innovations proves that EC companies are technologically at the forefront. For instance, the number of important patents EC companies apply for is nearly double that for Japanese firms.

Production process

In former days, the manufacturing of a machine tool required many mechanical parts such as gears, transmission units, etc. The technological development of electrical drives and controls induced a substitution of mechanical components by electrical components that no longer had been produced in-house but procured by specialised suppliers. This development has reduced the value added share on total turnover in some cases down to 30%.

Outsourcing has become an important strategy to reduce costs as far as it concerns parts and components that are not of critical importance for the accuracy of the machine. But even casting requires a specific quality that makes it not easy to find an alternative supplier. For key components such as ball screws, the supply easily can create bottlenecks and hamper the expansion of the production when the demand for machine tools booms.

The procurement of the electronic and electrical equipment is strongly dependent on the design of the machine. Different components are combined by the R&D staff of a machine tool company to meet the requirements of a specific task. This procedure is typical for European firms, whereas Japanese companies focus on volume markets and prefer to use complete electrical/electronic packages, providing the advantage of lower R&D efforts and lower costs for the complete package.

Factory automation has been pushed in the industry. Some examples include flexible manufacturing systems and automated warehouses which have been installed in recent years. The improvements in the production process have induced some reductions in labour costs. The tendency of productivity in the EC machine tool industry indicates that there have been strong economies of scale at the end of the 1980s increasing the efficiency of labour inputs.

INDUSTRY STRUCTURE

Companies

The machine tool industry comprises about 1400 companies, of which about 370 have less than 20 employees. The average EC machine tool firm has a staff of about 120, although there are significant differences among Member States. For instance, German companies have an average number of employees of about 250, whereas Spanish companies only have about 53.

Among the largest EC machine tool firms are Schuler, Gildemeister, Maho, and Trumpf (D); Comau and Mandelli (I); The 600 Group and Bridgeport (UK); Brisard and Renault Automation (F).

In general, the machine tool industry is medium-sized by the number of employees. The analysis of the companies' turnover shows that there are no overwhelmingly large companies. The

top three enterprises account for less than 10% of the industry's output.

Compared with Japanese firms, EC firms are small. They have on average half as many employees, and a comparison of average turnover would indicate an even larger difference. In comparison with US firms, the average EC firm has only 75% as many employees.

Strategies

In the second half of the 1980s, EC machine tool suppliers expanded their investment budgets by about 50%, and as a percentage of the turnover the expenditures reached 7%. The increase was mainly induced by the objective to meet booming demand, but companies also invested in factory automation.

Apart from investment in existing facilities, companies tried to expand their distribution network, especially into other European countries. Mergers and acquisitions took place to complete their supply in the market or to improve market penetration abroad. Many companies have not been able to finance all these activities by themselves and had to open up new financing sources. Some family-held firms became joint-stock companies, others increased the equity or raised loans. Because of the dynamic development of the industry and the bright prospects it was relatively cheap to fund investments.

The quick worsening of the economic environment has damaged those firms which were most active in the preparation for the Single Market. High financial burden caused by investment in new capacities, a low utilisation of the production and a merging price pressure have become a trap for some companies.

Companies that want to survive in a volume market environment will have to expand their activities in coming years, with mergers and acquisitions being very important in reaching that objective. But the forging of groups out of former independent companies, as sometimes proposed, is no guarantee for success.

REGIONAL DISTRIBUTION

Germany and Italy provide three-quarters of the EC machine tool production. Both of these countries have been successful in the competition in the past decade. Next in the ranking by the output are the United Kingdom and France. The industries of both of these countries experienced difficulties in the market and lost some of their importance. Some companies left the industry and a restructuring took place. The Spanish industry, fifth in this ranking, has competitive prices and has caught up in the technological development.

In Germany the production of machine tools is concentrated in Nordrheinwestfalen, a traditional region for heavy engineering, and in Baden-Württemberg. The unified Germany has got another important region for machine tool production in the South of the new Länder. In Italy most of the industry is located in the North, in Lombardia, Piemonte, Emilia-Romagna and Veneto. French suppliers are concentrated around the Ile-de-France and Rhône-Alpes. In the United Kingdom the machine tool industry is located in the traditional industrialised region of the Midlands, in the South-East and in Yorkshire/Humberside. Spanish companies are centring in Euskadi, Catalunya and Madrid. In Portugal the industry is only concentrated around Oporto. In Denmark, Belgium and the Netherlands there are no particular areas of concentration.

ENVIRONMENT

The manufacturing of machine tools mainly consists of mechanical processes as turning, milling, boring, drilling, grinding and assembling. Most of the preliminary products are of metal, and the input of energy is of minor interest. Therefore, the major threat for the environment lies in the use of cooling and lubricating liquids which cannot be easily disposed other than by filtration which allows for a re-use of the liquids.

Hardening and galvanising are used to increase the durability and rigidity of materials and special surfaces such as slides. As hardening by heat treatment is not sufficient, chemical processes are necessary. Most of the machine tool companies do not have their own capacities for these processes and employ specialised subcontractors.

The technological progress has induced some changes in the products themselves. Advanced machine tools are equipped with controls, motors etc. New materials are used as composites and compounds for parts of the machines. Therefore, it is no longer easy to scrap an old machine. The recycling of its components will only be possible if the machine is adequately designed. Companies are only beginning to comply with such requirements.

REGULATIONS

There are few regulations hindering the international trade of machine tools. Most important of all, there is the COCOM rule which were introduced to hinder exports of advanced production technology to the countries of the former Eastern bloc. In spite of the recent developments, the regulation has not been abolished and hampers Western machine tool suppliers from increasing their exports.

There is no major hindrance for intra-EC trade, however the supplier must apply for a safety approval in order to deliver their machine tools in most other countries. The newly adopted Machine Directive ensures free circulation of machine-tools throughout the EC, reduces unnecessary administration and avoids duplication of essential safety requirements. Compliance with the directive is likely to reduce costs for manufacturers who meet harmonised standards.

Other regulations, as the electro-magnetic compatibility directive and the agreements on interfaces between data processing facilities set standards that ease the combination of products of different EC countries. These regulations are prerequisites for the Single Market and are very important for the set up of automated manufacturing processes.

OUTLOOK

The machine tool industry has been strongly hit by the interruption of overall economic growth. Demand declined worldwide at a double digit rate and posed problems to some companies in the industry. Presently there are no signs of a recovery.

Moreover, the breakdown of the economies in Eastern Europe had a negative impact on the machine tool industry. The medium-term perspectives for deliveries into East European countries remain bad and will not provide any compensation to the overall slackening demand.

However, a recovery of demand for machine tools from developing and newly industrialising countries is taking place.

Table 5: Machine tools
Expected real annual growth rates (1)

(%)	1992-93	1992-96
Apparent consumption	-14.0	-1.8
Production	-13.0	-1.3
Extra-EC exports	-5.0	0.8

(1) Excluding Greece and Ireland
Source: CECIMO, ifo Institute

The South-East Asian countries provide particularly good opportunities for growth.

In the event of an overall economic recovery, and taking account of the cyclical nature of demand for machine tools, it is expected that the sector will enjoy more sustained growth in the 1994 to 1997 period. However, the expansion will be by far less dynamic than in the past. In this environment the growing efforts of Japanese suppliers to enter the European market will keep competition tough, with current price pressures will declining only slightly.

Written by: Dr. Hans-Günther Vieweg
The industry is represented at the EC level by: Comité Européen de Coopération des Industries de la Machine-Outil (CECIMO). Address: Rue Capitaine Crespel 9, B-1050 Brussels; tel: (32 2) 502 7090; fax: (32 2) 502 6082.

Textile machinery
NACE 323

The EC textile machinery industry is one of the most heavily export-oriented sectors in the Community. After a period of great prosperity during the latter half of the 1980s, the industry suffered a serious set-back in activity in 1991 due to a sharp decrease in demand which followed the Gulf crisis. Competition on the world market is increasing, especially from Japanese companies. The EC industry is suffering from world overcapacity in spinning and weaving and is striving to maintain its technological advantage by way of R&D investment.

INDUSTRY PROFILE

Description of the sector

NACE 323 covers the production of machines for textile processing and accessories for such machines. Its main products are: short-staple spindles (for short-staple fibres, e.g. cotton); long-staple spindles (for long-staple fibres, e.g. wool); open-end rotors for spinning; shuttle looms for weaving; shuttle-less looms for weaving. These machines spin (natural and synthetic) fibres into yarn; weave or knit the yarn into fabric; dye, print and finish the resulting fabric; and produce garments or other fabric products. NACE 323 also includes the manufacture of sewing machines, which are the subject of a specific paragraph below.

Main indicators

Production in current prices more than doubled between 1983 and 1990 and reached a record high at 9.9 billion ECU in 1990. In 1991 the industry was confronted with serious problems as a result of a combination of depressed demand, the fall of the US dollar and overcapacity. EC production decreased by 1.6 billion ECU (or 18% in real terms), EC consumption dropped by 24%. As a consequence, reductions in labour occurred, although these remained limited to 4%. In 1992 the set-back in economic activity is estimated to continue and no major improvements are expected.

The breakdown by country shows that Germany is by far the largest producer of textile machinery in the EC, nearly four times the size of the next largest producer, Italy. These two countries account together for nearly three quarters of total EC production.

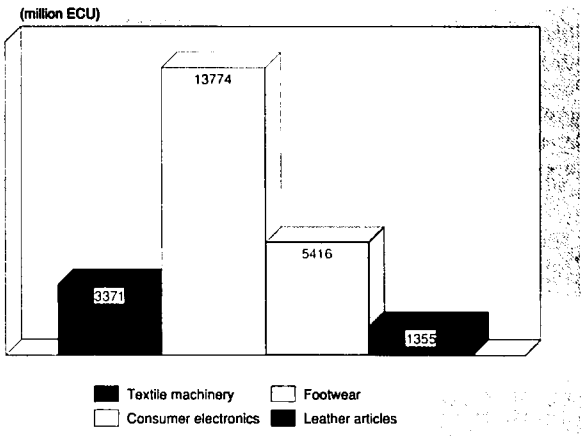
Recent trends

The industry underwent substantial difficulties during the period 1982-85, as it did not succeed in remaining competitive on both the domestic and the export markets. Since 1985 however, after having restructured, the industry was able to compete again, and production and employment started to recover. All over the 1980s and at the beginning of this decade, extra-EC exports accounted for about the half of total EC production, a fact that underlines the export-oriented nature of the industry.

International comparison

The EC is the world's largest producer of textile machinery. The size of the EC industry is nearly the double than the Japanese one and more than six times than that of the USA. In recent years, the traditional position of predominance of the EC industry has been seriously affected by the rapid development of the textile machinery industry in Japan and in the Newly Industrialised Countries (NICs). However, with the exclusion of some small subsectors, sales from Japan and the NICs represent a marginal, although fast growing competition for EC manufacturers on the European and US market,

Figure 1: Textile machinery
Value added in comparison with other industries, 1991



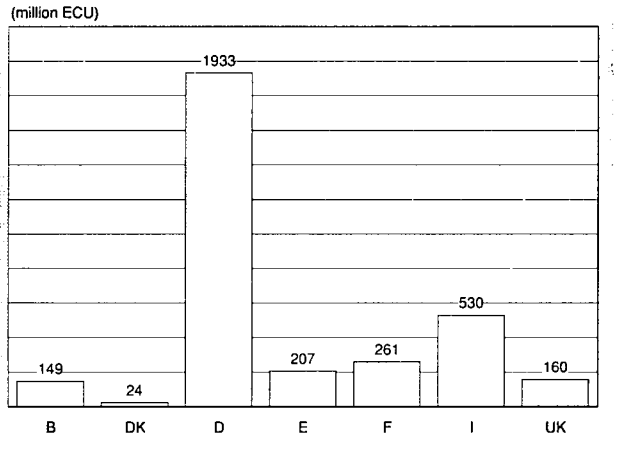
Source: Eurostat

the main thrust of Japanese and NICs competitors remaining in Asian markets. On the European market, Swiss textile machinery manufacturers are the most important competitors for the EC producers.

Foreign trade

The largest market for extra-EC exports is to be found in Asia. Textile manufacturers in countries like India, Indonesia, Korea, Taiwan, Pakistan and Thailand are investing heavily in new machinery, particularly in short-staple spindles and shuttle looms. Investment in these countries is both for replacement purpose and for the setting up of new firms. Another growing market can be found in the Commonwealth of Independent States (CIS) and the Eastern European countries. In 1991, 506 000 short-staple spindles were installed at CIS-textile manufacturers, and the CIS is also the largest market for open-end rotors. Domestic machinery manufacturers are not able to meet the demand both in terms of the volume of machinery requested and in terms of demanded technology. The North American market, although the second largest export market, has declined in importance since 1986, both as a share of total extra-EC exports and in absolute terms.

Figure 2: Textile machinery
Value added by Member State, 1991



Source: Eurostat

Table 1: Textile machinery
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	2 835	2 802	3 304	3 900	4 430	5 020	5 818	5 997	6 389	4 879	5 000
Production	4 340	4 247	5 278	6 304	7 079	7 762	8 636	9 463	9 871	8 228	8 400
Extra-EC exports	2 242	2 220	2 876	3 476	3 831	4 040	4 322	4 986	5 019	4 629	4 700
Trade balance	1 504	1 445	1 974	2 404	2 650	2 742	2 818	3 466	3 482	3 349	3 400
Employment (thousands)	109.1	99.8	97.8	101.8	102.0	105.2	106.0	107.3	108.9	104.6	105.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Textile machinery
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	7.7	1.7	3.7
Production	7.0	0.5	2.6
Extra-EC exports	4.6	-1.9	0.2
Extra-EC imports	2.0	-2.3	-0.9

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Textile machinery
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 242	2 220	2 876	3 476	3 831	4 040	4 322	4 986	5 019	4 629
Extra-EC imports	737	775	902	1 072	1 181	1 298	1 505	1 520	1 537	1 280
Trade balance	1 504	1 445	1 974	2 404	2 650	2 742	2 818	3 466	3 482	3 349
Ratio exports/imports	3.04	2.86	3.19	3.24	3.24	3.11	2.87	3.28	3.27	3.62
Terms of trade	101.2	100.0	99.5	100.0	101.3	103.9	102.1	104.1	107.0	109.0
Intra-EC trade	1 058	1 100	1 270	1 451	1 807	2 052	2 353	2 437	2 392	2 071
Share of total imports (%)	58.9	58.6	58.4	57.5	60.4	61.2	60.9	61.5	60.9	61.7

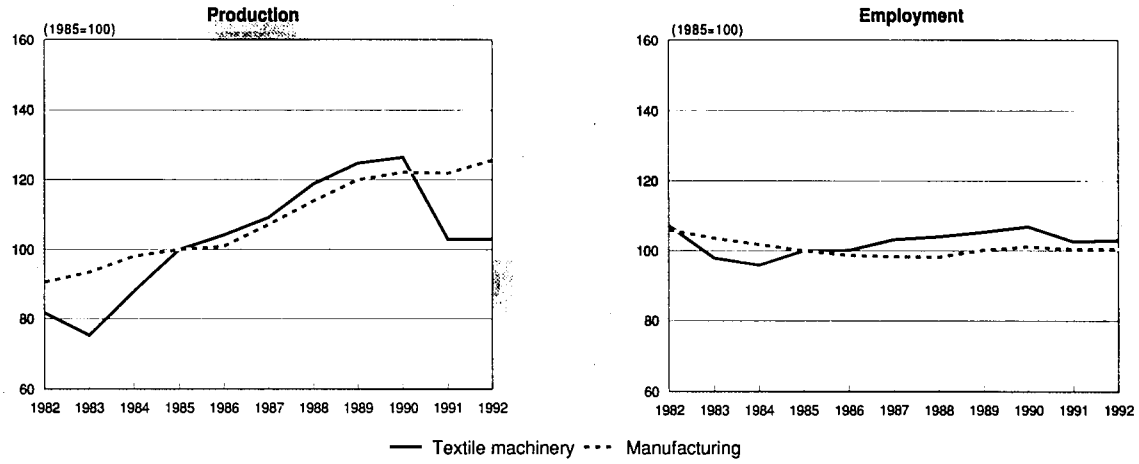
(1) Estimates
Source: Eurostat

Table 4: Textile machinery
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(5)
Productivity (thousand ECU) (2)	27.9	28.7	32.1	34.7	35.1	35.1	37.2	37.4	37.9	32.2
Productivity index	80.5	82.9	92.7	100.0	101.4	101.4	107.3	107.9	109.5	93.0
Unit labour costs index (3)	77.6	84.6	93.0	100.0	107.9	114.0	120.8	128.0	138.1	145.0
Total unit costs index (4)	61.0	64.6	88.3	100.0	114.6	123.1	136.3	147.0	150.4	137.1

(1) Excluding Ireland
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
(5) NEI estimate
Source: Eurostat

Figure 3: Textile machinery
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

MARKET FORCES

Demand

Demand for textile machinery is naturally linked with developments in textile manufacturing. About 50% of world-wide capacities for textile manufacturing are in Asia. The share of North America and the EC amounts to some 10% each. Hence it is clear that for EC manufacturers the demand for textile machinery is mainly in foreign markets. Conventional (short-staple and long-staple) spindles still account for three quarters of world deliveries. They produce superior yarns for some end uses, especially in finer count ranges. The shift to open-end rotors seems to have come to a halt or has even reversed.

There are significant differences in the structure of demand by region. Asian countries are strongly investing in spinning machines with short staple spindles; in the EC, demand for long staple spinning machines used for high quality yarns prevails. The same difference exists in demand for weaving machines: nearly all shuttle looms are procured by Asian countries, whereas textile firms from industrialised countries mainly concentrate their purchases on advanced shuttle-less looms, especially rapier/projectile and air-jet spinning machines.

Within the EC, Italy is by far the most important market for textile machinery. Over 30% of EC demand for spinning and weaving machines comes from this country. In particular Italian textile companies invest considerably (up to 60% of total investment) in long-staple spindles. Important customers for open-end rotor spinning machines are in Italy, Germany, France and Spain. EC demand for weaving machines is focused on shuttle-less looms. Again Italy is the most important in demand for this type of machinery.

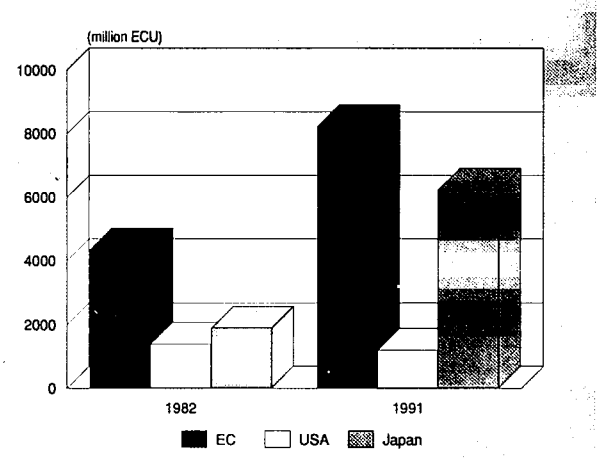
Sewing machines

The bulk of output goes to the industrialised countries. European producers sell about 70% of their output to customers in these countries. Germany as a supplier of mature specialised technology sells about three quarters of its exports to industrialised countries; the remaining quarter goes to developing countries. Japanese manufacturers sell about half of their exports to industrialised countries; the other half goes to developing countries.

Supply and competition

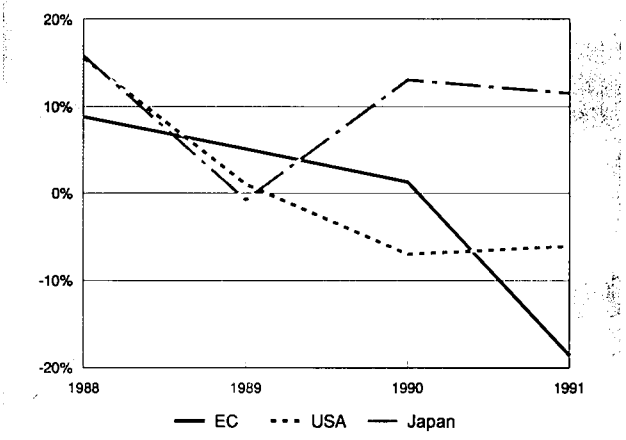
Japanese manufacturers are increasingly becoming a competitor on the world market. They are not only strong in producing

Figure 4: Textile machinery
International comparison of production at current prices



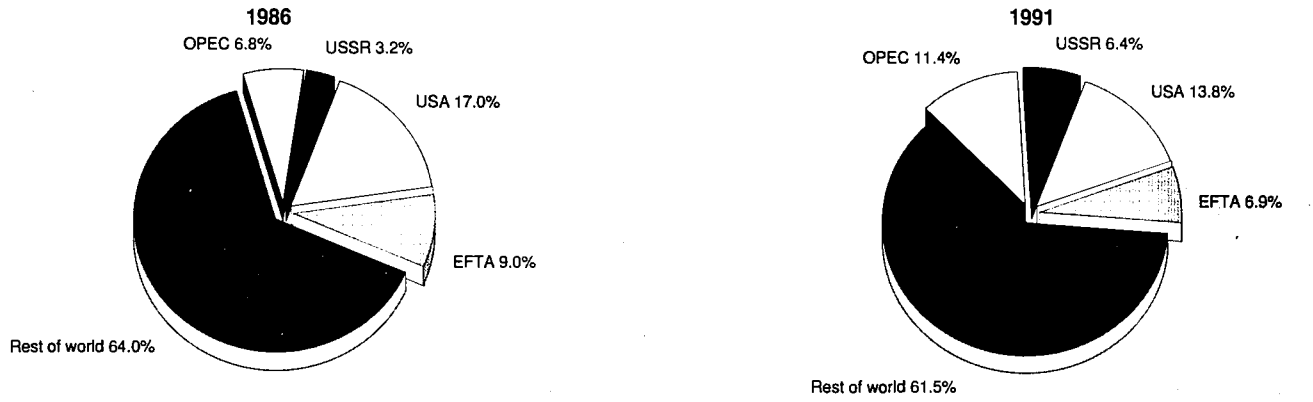
Source: Eurostat, Census of Manufacturers

Figure 5: Textile machinery
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Textile machinery
Destination of EC exports



Source: Eurostat

machinery of traditional technological standards, but they have also obtained considerable strength in highly advanced machinery. The largest part of their production (ECU 2 266 million out of ECU 4 159 million in 1989) is exported. Already in the Asian markets the Japanese have been able to acquire strong market positions, where demand is more with standard technology machinery: some 60% of exports go to these markets. Their importance on European and American markets is also growing.

There is also growing competition from local companies in the newly industrialising countries in the Far East and South East Asia. These companies produce standard technology machines at low prices and become more and more an important competitor on the Far East and South East Asia markets. Companies in developing countries manufacture machinery under licenses of EC manufacturers, which essentially represents an import substitution policy.

Sewing machines

In terms of supply the most important manufacturers of sewing machines are located in Germany, Japan, the United States, Sweden, Switzerland and the NICs in Asia. Japan and Germany together account for over 50% of world trade in sewing machines or the corresponding technology. The NICs like Taiwan, Hong Kong, Singapore and South Korea have become serious competitors imitating Japanese technology, but selling at lower prices. Industry in PR China is developing and may soon capture the domestic market or even enter the international market.

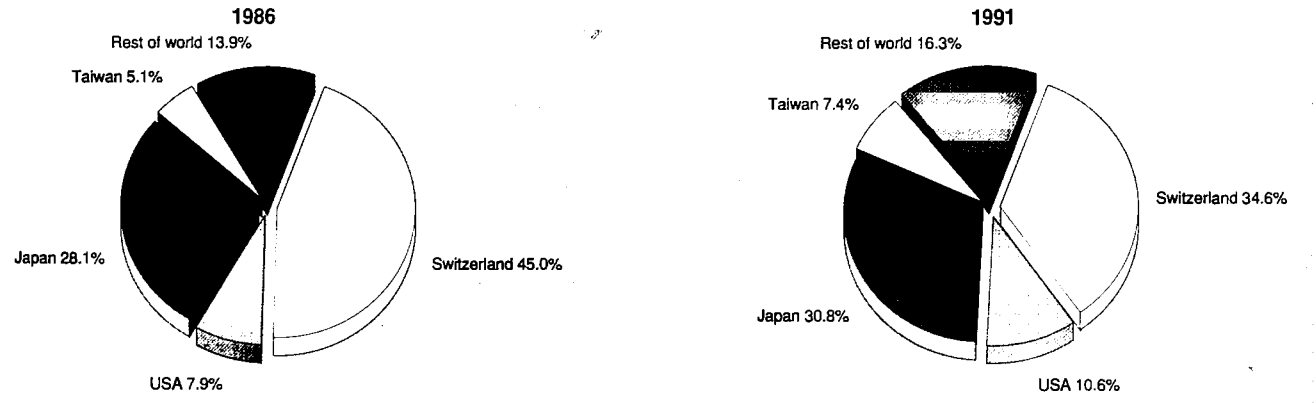
Production process

The EC textile machinery industry shows stable productivity at some ECU 37 000 per employee. During 1991 a sharp slump in sales caused a drop in productivity, as employment was not reduced accordingly. Unit labour costs on the other hand have grown considerably, whereas total unit costs have increased even more. This reveals the growing capital intensity of the sector.

EC enterprises have been highly investing in research and development (5% to 10% of turnover) to guarantee continuous technical and product innovation. Further marketing costs have also proliferated due to the need to attend international textile machinery exhibitions, especially to organise product promotion in developing markets.

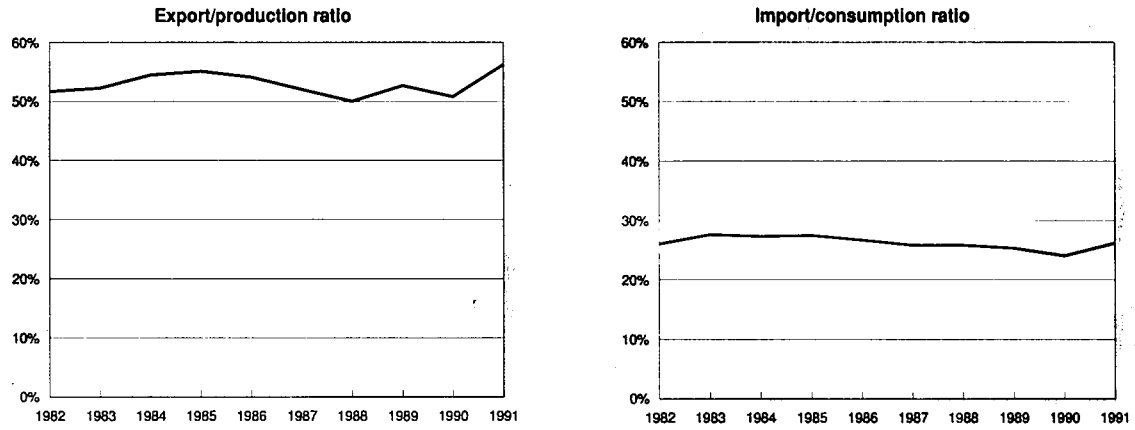
Technological innovation in the past has greatly improved productivity in textile manufacturing. Innovations have occurred in various fields, such as new automatic bale feeders, aerofeed systems, high-draft spinning, texturisation, shuttleless looms, needle punch machines, transfer printing, rotary

Figure 7: Textile machinery
Origin of EC imports



1Source: Eurostat

Figure 8: Textile machinery
Trade intensities



Source: Eurostat

screen printing and computer-integrated manufacture. This led to new machinery in all stages of the textile production process: material handling, yarn spinning, fabric weaving, dyeing, printing and finishing. It also led to automation of machinery functions.

INDUSTRY STRUCTURE

Companies

More than 1 100 companies in the EC are engaged in the manufacture of textile machinery, many of which are small or medium-sized enterprises. The largest textile manufacturers in the EC by type of machinery are the following:

- Spinning machines: Platt-Saco-Lowell (UK/USA) and Schubert & Salzer (D);
- Weaving machines: Dornier (D), Jumberca (E), Picanol (B) and Somet (I);
- Knitting machines: Mayer Albstad (D), Stoll (D), Sulzer Morat (D) and Terrot (D);
- Dyeing, printing, finishing: Adrioli and Co. (I), Kusters Corp. (D), Stork (NL) and Zimmer (D);
- All categories: Schlafhorst (D), Bentley (UK) and SAMT (F).

Two main factors determine the overall structural features of the EC textile machinery industry. First, the very high proportion of extra-EC sales indicate the global rather than regional nature of the industry. This is exemplified, for instance, by the fact that most major European textile machinery manufacturers have fully or majority-owned daughter companies in the US market, which enable them to serve the adjacent Canadian and Latin American regions. Other companies have similar arrangements or joint-ventures with local companies in other key regions such as the Far East.

Second, the high degree of specialisation of the EC textile machinery industry refers not merely to broad product categories such as spinning, but also to specialisation within these categories. Pressure on order volumes and profit margins and increased local competition in some developing markets have strengthened the movement towards specialisation.

Competition from outside the EC comes from large companies in Switzerland and Japan. Both countries are key players in the world market. With high efficiency and technologically advanced products they are able to capture a large share of

Table 5: Textile machinery
World market, 1991

	Spinning machines			Weaving machines			
	Spindles			Shuttle-less looms			Shuttle looms
(thousands)	Short staple	Long staple	Open-end rotors	Rapier projectile	Air jet	Water jet	Shuttle looms
Africa	236	16	4	650	359	6	70
North-America	95	2	53	1 120	1 584	119	36
of which USA	68	1	44	787	1 402	58	18
South America	160	14	16	1 278	300	101	86
Asia & Oceania	3 052	176	62	9 077	10 054	15 223	12 029
of which Japan	156	26	1	1 526	2 198	1 346	63
of which India	1 229	53	14	225	115	-	3 208
EC	266	95	29	3 619	1 010	148	-
EFTA	39	1	1	206	25	-	-
former COMECON	536	154	190	9 700	35	-	1
of which CIS	506	144	190	9 177	25	-	-
Rest of Europe	185	16	13	384	48	31	-
Total world	4 570	476	368	26 034	13 415	15 628	12 222

market demand even in countries with strong indigenous textile machine-making capacities.

Strategies

Some major manufacturers have adopted a strategy to reduce the number of variations of machine types within a particular product category or group. This enabled them to optimise the production of machine parts and to match production and orders in a better way.

The industry has also been confronted with internationalisation involving acquisitions, mergers and other forms of cooperation not only within the EC, but also at the international level. In this way specialised individual textile machinery manufacturers aim at becoming a more complete supplier to meet the growing demand for fully equipped, highly automated production plants. Examples are the French SAMT (merger of SACM and ARCT), Rieter (CH) acquiring 51% of Schubert & Salzer, Saurer (CH) having taken over Volkmann (D) and Schlafhorst acquiring Zinser.

REGIONAL DISTRIBUTION

The largest textile machinery companies within the European Community are mainly settled in Germany, a country with a long tradition in machinery manufacturing. Some 300 enterprises with a total employment of 56 550 account for 57% of total EC value added in 1991. In 1991 exports to EC countries absorbed 26% of total German exports. Germany's extra-EC exports in 1991 went to developing countries (46.6% of extra-EC exports), the USA (14.8%) and Japan (3.9%). Most of German exports consist of spinning and finishing machinery.

The second largest producer country is Italy: some 350 Italian companies employing over 18 000 persons take a share of 16% in EC value added. On average Italian manufacturers are substantially smaller in size than German manufacturers. The four largest companies only account for a third of total production. However, the relatively small size seems to be a factor working at the industry's advantage: it allows maximum specialisation and close customer relationships. Due to this specialisation output shows a large diversity with machinery covering practically every stage of the textile production process. Italy exports about 25% of total exports to other EC countries. Extra-EC exports are particularly destined for Third World countries (49.6% of total extra-EC exports in 1991) and the USA (10.9%).

The French industry employs some 6 600 workers in some 80 companies and accounts for 7.7% of EC value added. In output machinery for primary weaving and spinning takes a considerable share. Intra-EC exports from France constitute 44.6% of total exports. In 1991, 51% of extra-EC exports headed for Third World countries, while the share towards the USA amounted to 16.1%.

Textile manufacturers in Spain and the United Kingdom constitute 6.1% and 4.7% of 1991 EC value added respectively. Employment amounts to some 6 600 workers in Spain and about 7 100 workers (around 180 firms) in the UK. Spanish output covers the whole range of machines necessary for textile production; British output has an advantage in high technology areas, notably in tufting, yarn spinning and processing and the manufacture of non-wovens. In both countries a third of total exports is traded with EC countries. Important destinations for extra-EC exports are Third World countries (61.1% and 64.3% of 1991 extra-EC exports respectively) and the USA (10% and 12.8%).

REGULATIONS

Regulations in the field of trade mainly concentrate on the establishment of the internal market in the EC and the liberalisation of world trade through the GATT negotiations. Especially the latter is important for the European industry, given the importance of trade with Asian countries.

In this respect the Japanese Comprehensive Import Expansion Policy provides an interesting example. Already foreign producers take about 24% of the Japanese market for textile machinery, which amounted to 852 million ECU in 1989. Some 90% of these imports are handled by Japanese importers. The import policy, together with increasing sales efforts by importers, may cause the foreign share in the Japanese market to rise to the benefit of European producers.

Regulations on machine safety and health provisions are currently imposed on machine manufacturers. Provisions concern the design, the materials used, the way in which machine operations should be illuminated, machine operations itself, safety against mechanical risks, the application of screens and other safeguarding components, maintenance and machine indications and identifications. Machines complying with the EC regulations will obtain the EC mark.

Together with regulations on machine safety, provisions concerning technical standardisation are being developed. The European institutions on technical harmonisation CEN and CENELEC currently develop such standards applicable throughout the Community. Further international standards for quality control have been developed such as ISO 9000.

In the USA legislation was accepted in 1991 allowing subsidisation of R&D expenses of the US textile machinery industry in order to increase its technological competitiveness. The subsidies are to be financed by using a portion of the tariffs collected on imported machinery.

OUTLOOK

Textile machinery manufacturers will benefit from the integration of the EC market as a whole, although intra-EC competition will increase possibly causing downward pressure on prices and profit margins. However, the high productivity and the investments in R&D will safeguard the strong position on the world market, particularly on the important Asian market.

Essential for EC manufacturer's success will be the application of modern technology: sophisticated automation, electronics, and computer-to-computer communications. Another factor for future success will be the manufacture of machinery that allows the production of high-quality textile products with a high degree of machinery flexibility.

Especially in developing countries demand may not be for technologically advanced machinery, but more for machinery of accepted standard technology. The difference in productivity between both types of machinery may only be of limited importance, as labour costs in these countries are relatively low. These markets will become more important in the future.

Table 6: Textile machinery
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.5	2.5
Production	2.0	3.0
Extra-EC exports	3.5	5.0

Source: NEI

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: Comité Européen des Constructeurs de Materiel Textile (CEMATEX). Address: p/a FME, P.O. Box 190, NL-2700 AD Zoetermeer; tel: (31 79) 53 1100; fax: (31 79) 531 365.

Food, drink and tobacco processing machinery

NACE 324.11

As the market for food in the Western industrialised countries matures, not only food manufacturers but suppliers and manufacturers of food machinery and equipment as well have engaged in M&A activity to an increasing extent. Production of food is becoming centralised, causing demand for more flexible and efficient machinery to grow. As a consequence the application of robots and industrial automation systems in particular is growing.

INDUSTRY PROFILE

Description of the sector

The industrial production of food, drink and tobacco processing machinery accounted for an estimated 5% - 6% of total machinery production. Food processing machinery accounts for the greater part of the production of this NACE. The market of food processing machinery includes: flour milling equipment, noodle making machines, baking machines, confectionery machines, fermenting machines, dairy product processing machines, meat processing machines, seafood processing machines, rice & barley polishing machines, fruit and vegetable processing machinery, and other machinery.

In contrast with other machinery sectors, demand for, and consequently the supply of, food processing machinery is highly fragmented. Within the EC, meat processing machinery, bakery machinery and fruit and vegetable processing machinery are particularly important segments of the industry.

Main indicators

Germany strengthened its position as the largest manufacturer of food processing machinery throughout the 1980s, during which time French production stagnated. Strong in the production of other types of machinery (especially manufacture of packaging machinery with an estimated 30% of EC-production), Italy's share of the market for food processing machinery remains relatively low, with an estimated share of 17%.

Recent trends

German and Dutch production of food processing machinery recorded continuous growth during the 1980s, stimulated in particular by rising exports. However, in the early 1990s, German production was also stimulated by a booming domestic market as a result of the reunification.

Stagnating French production, together with increased German exports to France, suggests a weakening of the French competitive position, since demand remained high. Italian manufacturers, on the other hand, were confronted with stagnating domestic demand in 1991. The rise of Italian exports by 1.8% - resulting in an export share of 64% - was not sufficient to prevent a production decline in 1991.

International comparison

The production figures for Japan and the United States are in line with German production. As the applied definitions of the industry differ among the three countries, a definite comparison can not always be made.

The Japanese market is much more isolated than the US and EC markets. Japanese import penetration was only 2.8% in 1988, compared to 21% for the USA. For exports a similar picture can be identified: the Japanese ratio of exports to production was 3.3% in 1989, while the same ratio in the USA was estimated at 26%.

Foreign trade

The EC is the world's largest producer of food , drink and tobacco machinery. The market shares of Germany, the Netherlands and Italy increased during the 1980s. The export orientation of these countries have resulted in trade surpluses for the EC as a whole. Germany in particular is an extra-EC exporter, while Dutch and Italian producers mostly produce for European markets.

MARKET FORCES

Demand

Compared to packaging machinery, for example, the applications of the food processing machinery are less diverse and more limited to specific segments of the food processing industry. The demand for a variety of foods has a strong impact on the structure of the industry. Supply is highly fragmented, with manufacturers operating and specialised in one market segment, which can differ considerably in size. For instance, the manufacture of meat processing machinery, bakery machinery and processing machinery for fruits and vegetables are relatively large and important market segments with very specific applications. In other segments, changing consumer tastes together with intensifying industrial competition require flexible food processing techniques and equipment. Furthermore, the availability of reliable and non-perishable food products is increasingly a priority. Diet conscious consumers are reducing fat, salt, sugar and cholesterol intake while still demanding flavourful, wholesome and appealing foods along with greater convenience and variety. Negative publicity about smoking has caused a shift of demand towards light cigarettes. These trends create market challenges for both the food and tobacco industry and the food and tobacco processing machinery industry.

Table 1: Food, drink and tobacco processing machinery
Production at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Belgique/ België	68	71	72	73	67	81	88	113	N/A
BR Deutschland	1 542	1 668	1 766	1 938	2 102	2 249	2 385	2 569	2 847
France (1)	1 085	1 071	1 059	1 170	1 230	1 278	1 250	N/A	N/A
Italia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1297
Nederlands	392	410	464	486	536	601	634	693	N/A
United Kingdom	436	493	539	467	443	519	547	517	N/A

(1) NEI estimates
Source: National Statistics

Table 2: Food, drink and tobacco processing machinery
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	1 883	2 048	2 151	2 517	2 315	2 227	1 967	2 268	2 662	2 832
Extra-EC imports	330	362	406	410	481	483	451	511	542	624
Trade balance	1 553	1 686	1 745	2 107	1 834	1 744	1 516	1 757	2 120	2 208
Ratio exports/imports	5.7	5.7	5.3	6.1	4.8	4.6	4.4	4.4	4.9	4.5
Intra-EC trade	900	973	1 173	1 289	1 397	1 578	1 477	1 731	1 895	2 012
Share of total imports (%)	73.2	72.9	74.3	75.9	74.4	76.6	76.6	77.2	77.8	76.3

(1) 1982-83 excluding Spain and Portugal
Source: Eurostat

As the total market for food, drinks and tobacco consumption is maturing in the Western industrialised countries, it is essential for the food industry and machinery manufacturers to keep pace with the consumer trends in order to retain market positions and to look for any growth opportunities in order to strengthen these positions. This will result in a continuos search for new ideas and new products by the food industry, which will also have a positive influence on the machinery sector. Other growth opportunities could stem from the economic development of relatively less developed regions with high agricultural potential such as the former Eastern bloc countries. Demand from Eastern European countries is rising. The main problem for further developments is the lack of capital in these regions. The food industry and the food machinery industry are expected to benefit earlier than other industries from the industrial and political restructuring processes.

Supply and competition

Increasing concentration due to M&A activity has had significant consequences for the suppliers of food processing machinery. This concentration process is not limited to any one segment of the food industry; large multinationals such as Unilever and Nestlé are also diversifying into different segments of the food industry. This development also requires more concentration on the supply-side of the machinery manufacturing industry itself.

The high degree of concentration in downstream industries could result in price cuts and lower margins for the food processing industry in the long run. Furthermore, to fully benefit from the activities of these multinationals in the former Eastern bloc countries, a wide range of food processing machinery will need to be available.

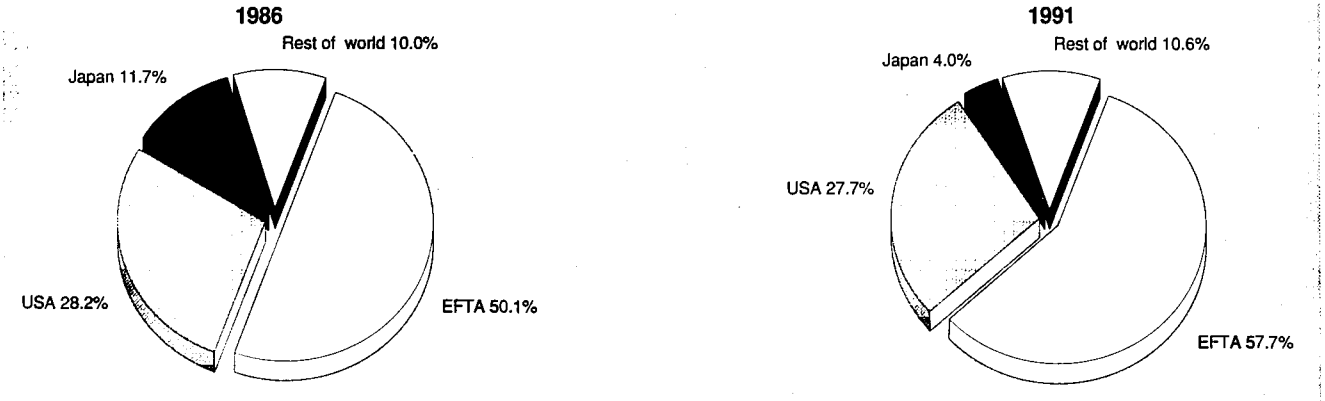
Similar to the packaging machinery industry, the low Japanese export ratio can be explained by the industry's orientation on the large domestic market and the considerable requirements for after-sales service. Furthermore, the fragmented industry resulting from specific customer demand is not in line with the Japanese industry's general aim for more standardisation. When the industrial trend moves towards more standardised machinery and equipment, Japan could become a more serious threat on the international market.

Production process

The food processing industry is developing towards fewer, larger production centres producing a greater variety of products. Concentration of production is developing very strongly in the Western industrialised countries and some Asian countries in particular. Consequently, production and process systems have to meet more stringent requirements for flexibility and efficiency. These requirements have stimulated the widespread application of CAD, CAM and flexible manufacturing techniques within the food industry.

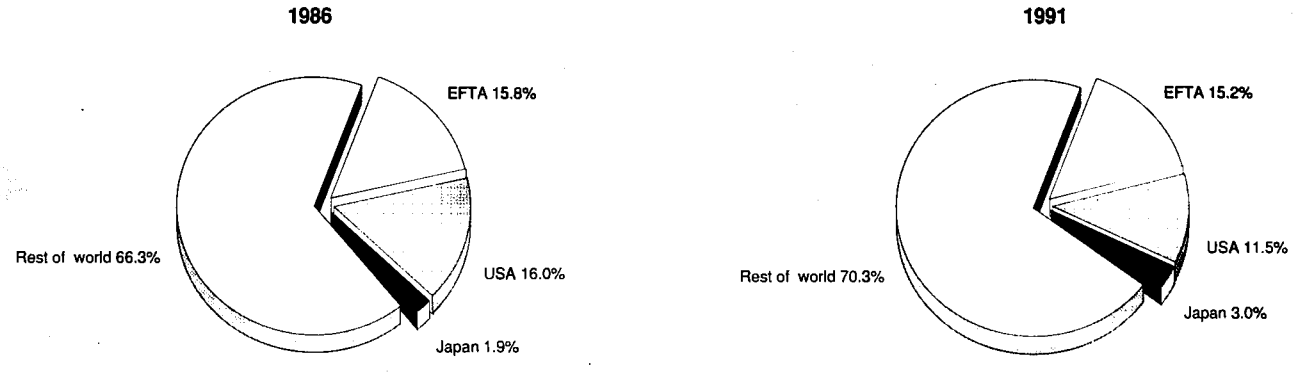
To keep pace with special market demands and increasingly complicated production processes, food processors and the machinery and equipment suppliers are developing joint R&D programs. These joint forces speeds the development, testing and introduction of new production equipment. The growing attention to R&D programs also demonstrates the importance of the quality of the labour force. In the future, the focus will be increasingly on the quality of education and training of employees.

Figure 1: Food, drink and tobacco processing machinery
Origin of EC imports



Source: Eurostat

Figure 2: Food, drink and tobacco processing machinery
Destination of EC exports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

Until the beginning of the 1990s, the process of concentration was characterised by horizontal integration. In 1991, however, the Swedish-owned milk and juice packaging group Tetra Pak took over Alfa-Laval, the Swedish manufacturer of industrial equipment, the second largest sector of which was food equipment. The food machinery manufacturing industry remains fragmented by different patterns of demand for food worldwide. The majority of enterprises are medium-sized and specialise in one or more subsectors of the food machinery industry. However, among these firms a trend towards more concentration and internationalisation can be observed. In Italy the focus is especially on Eastern European countries. Within every segment of the industry one or more relatively large companies is operative. Companies with over 500 employees are especially active in international markets.

The trend towards more concentration by the merger or co-operation of specialised medium-sized companies enables them to offer tailor-made machinery and equipment to meet specialised customer needs. After the Tetra Pak/Alfa-Laval take-over, a development towards vertical integration can also be expected among medium-sized firms. Vertical integration increases the convenience for customers who can purchase packaging and processing machinery at the same location. On the other hand, horizontally integrated firms will be better equipped to face the future challenges in the largely untapped markets of the LDCs and Eastern Europe.

ENVIRONMENT

The growing importance of ecological issues is especially reflected in measures against packaging waste. For the manufacture of food processing machinery, however, no specific consequences can be recognised. The more stringent EC-regulations on sanitary conditions during the processing of foods and drinks might enhance the technical requirements for the applied machinery. In general, however, the resulting effects on the food processing machinery industry are expected to be quite modest.

The increasing number of measures against smoking will continue to discourage the use of tobacco. A possible prohibition of promotional activities by the tobacco industry on EC-level will undoubtedly affect the number of smokers.

REGULATIONS

The European Technical Committee for machinery safety and health regulations (CEN TC/153) will introduce safety standards in 1993 which will also apply to the manufacture of food processing machinery. The central issue of the new regulations - self-certification by the industry itself - will give the final responsibility to the various industries to set their specific standards. CEN - the European Normalisation Institute - has the final task of providing detailed European standards. Control on the use of the new standards has been given to the national governments. The European industry would like to see the CEN standards adopted by the International Standards Organisation (ISO) to remain competitive in non-EC markets.

In addition, Directive 89/392 will implement additional safety and health standards for this industry, as well as all other machinery producing sectors.

OUTLOOK

The recession in some major markets continues to influence world demand for food processing machinery in a negative way and the maturing food market in the Western economies affects demand for food processing machinery. EC-manufacturers must increase their export efforts in response to these two factors. The markets in the former Eastern bloc are still uncertain. Because of its nature as a primary consumable, however, the food sector is likely to benefit more quickly than other sectors from the political and economical restructuring processes in these countries. Taking into account all these factors, EC production of food, drink and tobacco processing machinery should grow by 2.4% from 1992 to 1993 and by 4.4% in the 1992-1996 period.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: Committee of European Manufacturers of Food Industry (COCEMA). Address: c/o ANIMA, Via Battistotti Sassi 11, I-20133 Milano; tel: (39 2) 73 97 11; fax: (39 2) 73 97 316; and,
European Bakery Equipments Manufacturers Association (EBEMA). Address: 13, rue St. Lazare, F-75009 Paris; tel: (33 1) 42 80 44 41; fax: (33 1) 42 85 29 00.

Chemical machinery
NACE 324.12

In 1990, chemical machinery production in the EC stood at around 5 billion ECU. The industry provides an estimated 90 000 jobs in the EC and is a net exporter. The dependence of this sector on the processing industries, including, but not confined to, chemical processing, played an important role in a number of changes that took place. In the 1980s, the chemical plant equipment industry was confronted with several setbacks, including the fall in oil prices, the depreciation of the dollar, the recession at the beginning of the 1980s and more competitive export markets. The outlook for the industry is positive, however.

INDUSTRY PROFILE

Description of the sector

Data for the chemical process machinery making industry are classified under NACE code 324.12. The products of this industry can be divided up into the following categories:

- producer-gas or water-gas generators;
- centrifuges and dryers;
- filtration and purifying machinery for liquids and gases.

Included in the three categories are: pressure vessels, heat exchangers, process towers and reactors, dryers (rotary, belt and adsorption), piping, filtering engineering, mixers, structural steel engineering, valves and fittings, heavy walled tubulars, air conditioning and jacketpiles.

Several products are not specific to the chemical industry. Since classifications differ within the EC, it is difficult to estimate the importance of the industry in each country. For instance, the production of water purification equipment is usually classified under the heading of chemical plant equipment, but not always. Other equipment which may or may not be considered chemical machinery in national statistics are furnaces, heat exchangers and pressure vessels. Data should be considered with care.

Data were available only for Belgium, Germany, France, Italy, the Netherlands and the United Kingdom.

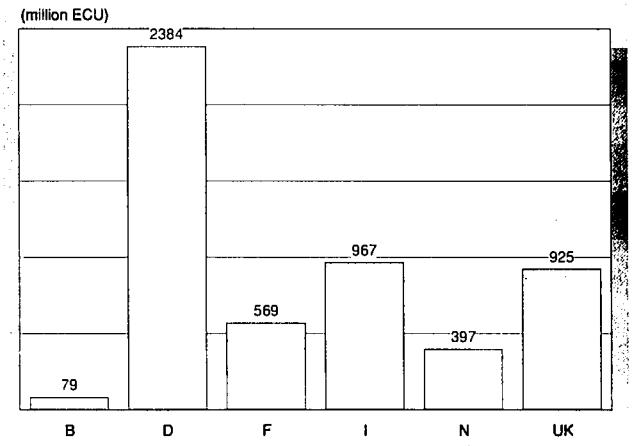
Main indicators

In 1990, production in most EC countries continued the growth which had characterised the second half of the 1980s with percentages varying between 1% and 9%. Capital spending in the chemical industry in the EC increasing by 8% in 1990, as well. Only German production slowed down in that year. 1991, however, proved to be a bad year for both the chemical industry and the chemical machinery industry. Investments in the chemical industry dropped below the 1990 level, partly as a consequence of the war in the Gulf.

Germany is the largest producer in the EC (of the countries for which data is available), accounting for 45% of EC production in 1990. France, Italy and the United Kingdom follow at a distance. However, due to the already mentioned differences in statistics, these figures give only an order of magnitude. It is presumed that the French figures underestimate the industry as several enterprises could be subsumed under the food processing machinery industry and under boilermaking.

The prediction made in mid-1991 by most chemical industry-experts of a recovery in the second half of 1991 and all of 1992 proved wrong. The stagnation in demand for most chemical products, combined with high input prices and low product prices, created a situation reminiscent of the early 1980s, when large restructuring of the chemical industry was necessary. However, the position of the chemical industry is not as bad as in those years, encouraging a relatively more optimistic view on the outlook of the chemical machinery industry.

Figure 1: Chemical machinery
Production by Member State, 1990



Source: National statistics; Italy: ANIMA

In general, spending for equipment and materials is estimated to be 50% of capital spending in the chemical industry. Using this criterion, demand for chemical and related machinery was an estimated 10.2 billion ECU in 1991.

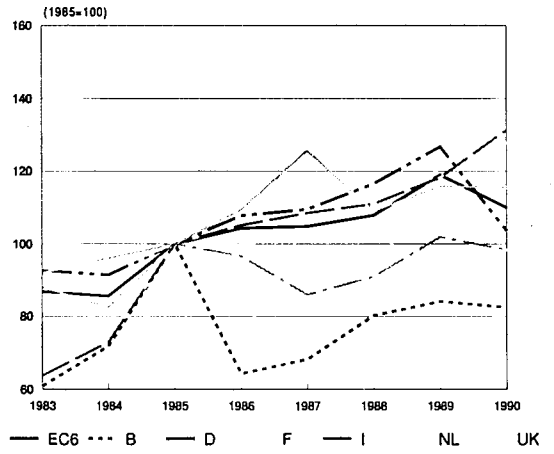
Employment in the industry is estimated at around 90 000 people in the countries considered. This estimate is made on the assumption of a productivity of 60 000 ECU per employee in 1990 (roughly the figure in the Netherlands and Italy).

Recent trends

Following the recession after the second oil crisis in 1979, a large shake-up took place in the chemical machinery industry, resulting in a decrease in production capacity, which is currently still lower than 1980 levels. The declining activity in the chemical industry was transferred to upstream industries with a small time lag. The industry faced several setbacks:

- the decline in orders from the traditional industrial countries;

Figure 2: Chemical machinery
Production at constant prices (1)



(1) Price deflator of NACE 324 used
Source: National statistics, Eurostat: ANIMA

Table 1: Chemical machinery
Production of chemical plant equipment

(million ECU)	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België (1)	45	55	81	53	57	70	78	79	N/A
BR Deutschland	1 485	1 541	1 829	2 097	2 199	2 417	2 786	2 384	N/A
France (2)	363	322	369	388	362	359	526	569	620
Italia (3)	343	418	634	685	710	760	851	966	1 052
Nederland	244	255	296	339	397	355	391	396	N/A
United Kingdom (4)	676	669	745	712	705	778	881	924	N/A

(1) 1990 estimated
(2) Estimates; figures do not include machinery for oil and energy industry"
(3) 1983-87 estimated
(4) Including industrial furnaces
Source: National statistics; Italy: ANIMA

- the international debt crisis which forced several developing countries to stop or postpone investments;
- the subsequent fall in oil prices which put orders from OPEC countries under pressure;
- the fall of the US dollar which started in March of 1985, and, more generally, the volatility of the dollar exchange rate vis-a-vis the European currencies.

EC production at current prices grew by 35% between 1985 and 1990, and in constant prices by 10%. The fall in production in 1990 in Germany was an exception. For 1991 and 1992, a slowing down of this growth is estimated, due to the declining investments in the chemical industry and the economic slowdown in general.

In Italy, production in value increased with 16% per year between 1983 and 1990. In the same period, production in Germany, Belgium, the Netherlands and France grew 7% to 8% per year. Only production in the United Kingdom showed a slower growth of 4.5% per year. In volume, however, production in Belgium and the United Kingdom was lower in 1990 than in 1985.

International comparison

Production in the EC is several times that of Japan (no figures are available for the USA due to differences in industry classification). This is not surprising giving the weight of the European chemical and more general processing industries.

Capital investment in the chemical industry of Western Europe is by far the largest in the world, compared with the USA and Japan. Investment in Japan, however, grew faster than in Europe during the 1980s.

Foreign trade

Extra-EC exports fluctuate around 1.04 and 1.4 billion ECU per year. Although this figure is still several times higher than imports, the ratio of exports to imports declined from 3.5 in 1982 to 1.8 in 1991. During the 1980s, intra-EC trade became increasingly important, reflecting the degree of internationality of the market.

In 1991, all Member States except Greece had a positive extra-EC trade balance, but several countries had negative intra-EC balances, including the United Kingdom, one of the larger producers. France, Germany, Italy, Denmark and Portugal have positive balances.

The main export markets for the EC are the EFTA countries, accounting for some 22.4% of extra-EC exports. The importance of the OPEC is related with the European construction activities in those countries. Destinations of EC exports did not change much from 1986 to 1991.

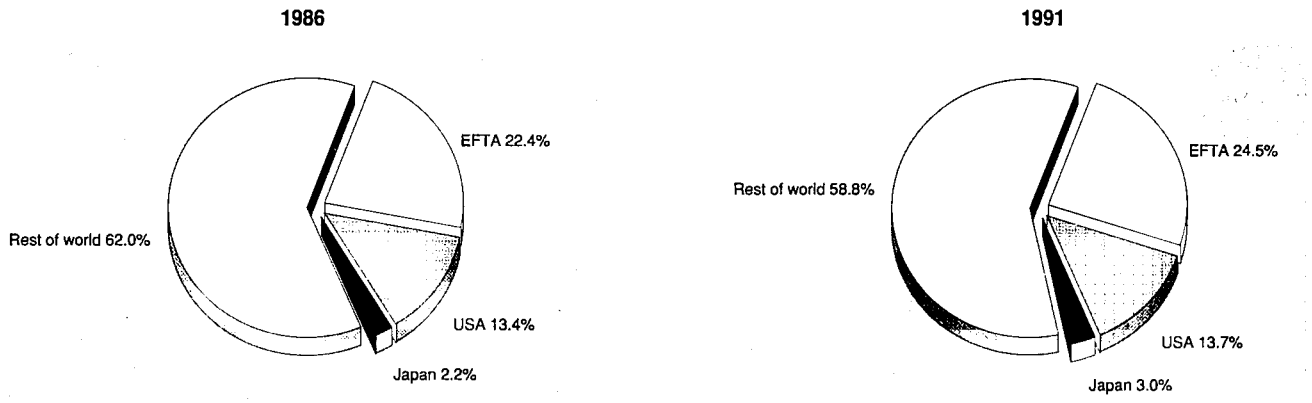
For imports, the USA plays the primary role. All three major suppliers (EFTA, USA, Japan), however, have lost supply share to smaller suppliers.

MARKET FORCES

Demand

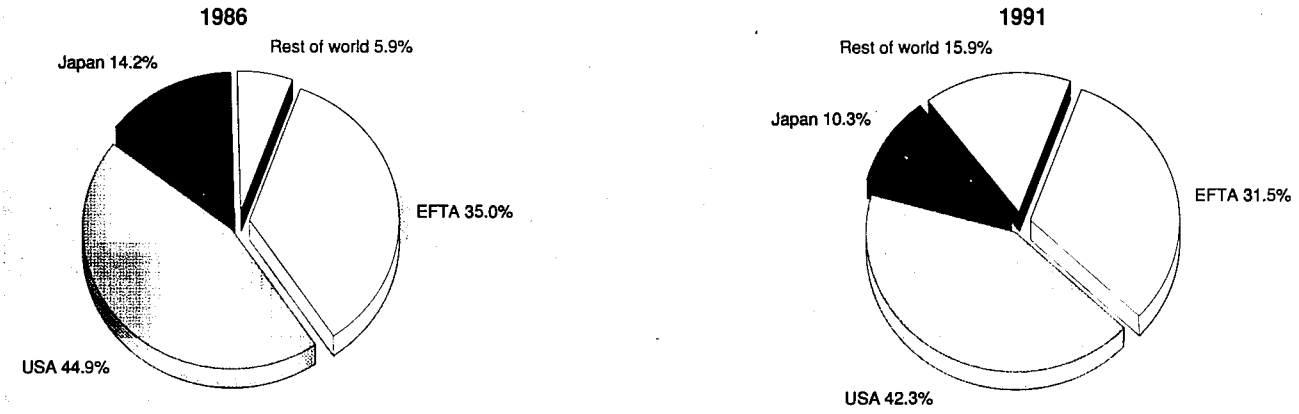
Besides the chemical industry, the chemical plant equipment industry has a number of clients, all of which are processing

Figure 3: Chemical machinery
Destination of EC exports



Source: Eurostat

Figure 4: Chemical machinery
Origin of EC imports



Source: Eurostat

industries. Among the outlets are: the chemical industry, the petrochemical industry, the pharmaceutical industry, the biochemical industry, the food processing industry, water purification utilities, oil and gas exploration and production companies, refineries, power generation, environmental applications, engineering contracting companies and government institutions.

The most important client industries for the chemical machinery manufacturers follow cyclical business patterns: they are vulnerable to swings of the business cycle. The development of capital spending in the chemical industries is of major importance for the processing machinery manufacturers.

During the upswing of the second half the 1980s, much of the spending in the chemical industry was directed towards de-bottlenecking, energy-efficiency, and environmental and safety measures, but real expansion investment was not common. The industry did manage to maintain high growth rates for a time.

Demand for chemicals began to decline in the middle of 1989, putting the chemical industry under pressure. With decreased capacity use, increased input prices, and output growing at barely the rate of inflation, the chemical industry does not have the resources to spend on capacity increases.

Factors which had a negative effect on the industry in 1991 included the war in the Gulf, the economic recession in some important export markets, the depreciation of the US dollar and Japanese yen. Only the increased demand from the former East Germany had an ameliorating effect, which was not strong enough to counter all the negative factors.

For the near future some of these factors, although not all, will continue to exist. The recent highs in capital spending as a percentage of turnover indicates that project commitments made during the economically strong years of 1987 to 1989 are still under way.

Chemical companies are taking a cautious approach to investment in Eastern Europe for the short term, at least until the direction of future economic and political developments is more clear.

Supply and competition

Chemical machinery manufacturers operate on the world market. Even small companies can have sales activities in the USA, India, Australia and Japan, as well as in European countries. One of the reasons behind this is the degree of international operation on the chemical and related markets, as well as the existence of large petrochemical multinationals. Since most of the machinery is designed for single-piece work, chemical machinery manufacturers from all over the world can bid for the specialised product needs of a multinational client. The competitiveness generated by this practice keeps prices low, and slow to respond to a booming market. On the other hand, in a recessive market, prices will tumble quickly.

One problem for EC exports remains the low dollar exchange rate, which affects not only exports to the USA. In a more indirect way, a depreciating dollar also affects competition in the EC market from competitors from abroad. In the past years, several orders have been lost due to high-valued EC currencies and the volatility of the US dollar.

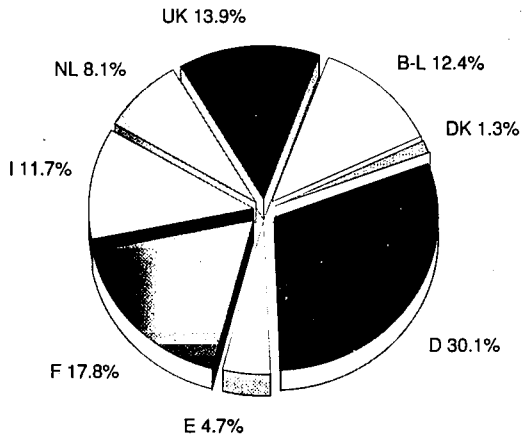
The price of oil is an important factor for the market for chemical machinery, especially for the production of heat exchangers. The relatively low oil prices since the end of 1985 have had a significant impact on production.

Table 2: Chemical machinery
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	1 038	1 079	1 041	1 250	1 179	1 119	1 134	1 268	1 415	1 428
Extra-EC imports	293	318	390	434	487	511	510	619	688	789
Trade balance	745	761	651	816	692	608	624	649	727	639
Ratio exports/imports	3.5	3.4	2.7	2.9	2.4	2.2	2.2	2.0	2.1	1.8
Intra-EC trade	474	479	597	705	774	827	852	1 049	1 222	1 375
Share of total imports (%)	61.8	60.1	60.5	61.9	61.4	61.8	62.6	62.9	64.0	63.5

Source: Eurostat

Figure 5: Chemical machinery
Capital investment by the chemical industry, 1990



Source: CEFIC

Chemical machinery manufacturers can deliver their products directly to the end-user, or indirectly through an engineering services firm, for which they act as a subcontractor. In recent years there has been a trend towards outsourcing of several engineering services by the chemical industry, which has led to a more important role for engineering firms as an outlet for the chemical machinery industry.

Production process

Quality control has been a major concern of the industry over the past years. Several companies already comply with ISO 9000/9001/9002 quality standards, and others are working to reach these standards. Most of the companies comply already with some national standards, which is necessary to serve different customers in a competitive market.

From the technological viewpoint, interesting developments are: size-reduction technology; energy-savings; new materials; new fibre finishes; computer aided manufacturing and engineering; and environmental engineering.

One of the topics that will influence the investments of the chemical industry in both the near and distant futures is pollution control. The Chemical Industries Association of the UK found through a survey that in 1989 spending on environmental protection represented 11% of total capital spending, and was expected to double between 1990 and 1992.

Growing activity in the field of biotechnical research will lead to growing demand for laboratory and production equipment, which will become an increasingly important part of the industry.

The increasing complexity of the machines as well as the higher quality standards with which they must comply, make it necessary to have more and better skilled labour. It is in this area that shortages are common. In-house training is a possible solution.

INDUSTRY STRUCTURE

Companies

There are two types of firms in the chemical machinery industry: product specialists and jobbers or activity specialists.

Product specialists are firms which design and develop equipment by themselves and can successfully export specific products due to low unit costs. The enterprises are normally medium sized enterprises, and usually more than half of production is exported. They will usually have technical knowledge of the process in which the machinery will be involved after production.

Jobbers, or activity specialists are firms which manufacture items from the client's blueprint and which are the most common type of firm. They are less export oriented than the product specialists; exports account normally for less than 50% of production. They have mostly a very small knowledge of the processes in which the machinery will be involved.

In this industry there are no large multinational enterprises, although most of the companies engage in exports.

Strategies

The strong dependency on the chemical industry makes the chemical machinery industry vulnerable not only to cyclical swings, but also vulnerable in more structural way. One-sidedness can lead to a product-oriented attitude which can be detrimental in a market in which competition is growing.

Knowledge of the chemical processes can be profitable for an enterprise, because it gives the company the ability to discuss with the customer not only the apparatus, but also the whole process in which it is a part. This is important because optimisation of the process cannot be achieved through optimisation of the individual units. An overall plan must be made.

Companies are diversifying in several ways. One of these is to engage in other markets than the chemical industry. Given the process oriented products, logical markets are the food, pharmaceutical, power and environmental industries. Other companies are applying knowledge of the chemical industry to develop new products for that industry. These companies tend to become niche players. While there are not too many real niches in the world, those companies which find one are much less affected by cyclical downswings.

ENVIRONMENT

It is estimated that in 1991 a world total of 4.4 billion ECU was spent for the prevention, containment, treatment and disposal of air, liquid and solid wastes in the petrochemical industry. A major focus of environmental control in the chemical industry will be waste minimisation.

Environmental concern has and will have a large impact on the chemical machinery industry. The market for environmental products for cleaning industrial waste water, for example, is increasingly important, opening new opportunities to the chemical machinery industry. In countries where environmental regulation is already very strict, such as Germany and the Netherlands, enterprises are likely to have a competitive edge in this area.

There is, however, a caveat: introduction of differing environmental regulations can distort the market. Competitive positions can be altered by the strictness of regulations in different countries. Imports from countries with a less stringent policy than the EC could become serious threats.

REGULATIONS

As in other sectors of mechanical engineering, the EC directive on machine safety is of primary importance. Provisions concern the design, the materials used, the application of screens and other safeguarding components, maintenance and machine indications and identifications. The directive is effective as of January 1, 1993. Until January 1, 1995 however, manufacturers have the option of complying either with the old standards used in the Member State where the products are sold or with the new EC standards. Those complying with the EC standards will have the advantage of being labelled with the 'CE mark', which provides free access to the markets of the EC countries.

Table 3: Chemical machinery
Breakdown of worldwide petrochemical spending, 1991 (1)

(million ECU)

Piping	1 655
Valves	920
Vessels & internals	1 308
Pumps	985
Compressors	1 057
Mixers & agitators	266
Drivers	1 235
Heat exchangers	2 260
Structurals	379
Instruments	3 575
Electricals	1 743
Furnaces & tubes	1 364
Storage tanks	500
Insulation/refractories	638
Paints/coatings	331
Buildings	129
Materials handling	137
Tools	202
Other equipment	775
Chemicals/catalysts	17 837
Containers/packaging	3 632
Other materials	3 632
Total	44 560

(1) Estimated
Source: Hydrocarbon Processing, 1990

The EC directive on compressed gases vessels (87/404/EEC) is also important for this sector. The directive concerns simple compressed gases vessels, especially for oxygen and nitrogen. Pressure vessels have to fulfil several requirements regarding safety; after positive testing the manufacturer receives a certificate and can add the CE mark to his product. The directive does not apply to pressure vessels for nuclear installations, pressure vessels for the propulsion of ships and aeroplanes or fire extinguishers.

OUTLOOK

Project activity in the petrochemical industry is expected to grow slowly in the near future, with important stimuli from the environmental and health and safety regulations. Prospects for the chemical industry indicate low growth rates in the short term. However, in the medium term, growth rates could increase. Combined with the competition on the international market, moderate growth rates of about 5% are expected for the mid-1990s. In the medium term production and consumption growth could increase. New opportunities stemming from environmental and safety concerns will stimulate demand.

It is expected that the trends of diversification and better and more quality control will continue, which will lead to a greater demand for higher and different skilled labour force.

Opportunities exist in environmental engineering; future strategies should include more knowledge of chemical processes and a more market/customer-oriented attitude.

Demand from Eastern European countries is not expected to increase significantly in the near future due to the relative unimportance of the chemical industry in those countries at this time. The need for restructuring, as well as the environmental need for upgrading plants, will lead to more demand for equipment. In the short term demand will be restricted by the slow recovery and the shortages of foreign exchange.

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The industry is represented at the EC level by: European Committee of Chemical Plant Manufacturers (EUCHEMAP). Address: 39-41 rue Louis Blanc, F-92400 Courbevoie, Cedex 72, Paris la Défense; tel: (33 1) 47 17 63 64; fax: (33 1) 47 17 63 65.

Bottling, packaging, wrapping and related machinery

NACE 324.2

The demand boom in former East Germany stimulated German production in 1991. In the export markets, however, German manufacturers lost market share to Italian firms, which have concentrated on improvements in engineering quality. This high quality has been the key factor for the dominant position of the EC on the world market. At the same time, this element could pose a major threat of the EC industry, as the growing need for high quality and more versatile products requires more R&D expenditure and a large and highly qualified labour force. If those requirements can not be met, EC competitiveness will weaken.

INDUSTRY PROFILE

Description of the sector

The purposes of the machinery belonging to this NACE vary widely in use. They include: form, fill and seal machines; combined filling and closing machines; group packaging and filling; accessories, parts and spares.

Approximately 59% of production is accounted for by these four groups. The other 41% is accounted for by "other machinery." These products are used in a few main downstream industries. According to a LEK study, there are 1100 producers in the EC.

Main indicators

In 1990, EC production totalled around 5 billion ECU. The two major manufacturing countries, Germany and Italy, accounted for 70% of EC production. Both countries export about 70% of their production. Among EC countries, Spain, France and the United Kingdom recorded trade deficits in 1990. The breakdown of production stresses the importance of form, fill and seal machinery and the combined filling and closing machinery. Both types of machinery are used mainly in the food, beverage and tobacco processing industries.

Recent trends

German manufacturers of packaging machinery recorded stronger growth than Italian manufacturers until 1990. The rise of production in both countries was partly due to flourishing exports. German unification could continue to cushion the declining capacity utilisation of the industry. The boom in domestic demand caused by unification, however, seems to have come to an end. The expected economic recovery of countries like France, the United Kingdom and the USA is expected to become the major stimulus for EC production.

International comparison

The EC accounted for 46% of 1991 world production, while Japan and the USA each constituted around 20%. Consumption in the latter two countries was also lower than EC consumption. In contrast with the USA and Japan, the EC was a net exporter of packaging machinery in 1991.

In contrast with other mechanical engineering industries, however, the Japanese packaging machinery industry mainly supplied the domestic market. Japanese exports have been comparatively low, indicated by an export share of only 7% in 1990.

Foreign trade

Germany and Italy dominate both extra-EC and intra-EC trade. Only a small proportion of EC imports come from the USA and Japan. The share of these countries together on the EC market is estimated at 10%. The USA, on the other hand, is a major market for European machinery. In 1991, Italy led Germany as the foremost US supplier. Both countries together accounted for more than 50% of the US import market. Wrapping machines for candy, tobacco products and sundries were the most important EC products.

The lack of competitive Japanese exports also enhances the market opportunities of EC manufacturers in East Asian countries. Market demand for European packaging machinery in countries such as China and Singapore recorded high increases in 1991.

MARKET FORCES

Demand

The food, beverage and tobacco industry account for an estimated 60% to 70% of total demand for packaging machinery, followed by the pharmaceutical, chemicals and related industries. These downstream industries each have their own specific markets. The fact that these industries meet primary consumer needs causes demand for packaging machinery to be cyclical to a lesser extent than demand for other machinery and equipment.

Within these downstream industries, demand for more efficient, reliable, flexible and versatile machinery is rising due to the quick change-overs needed for packaging for different products, various package sizes and variable quantity production runs. The further diversification of consumer demand will shorten product life cycles.

Supply and competition

In recent years, many Italian manufacturers have invested heavily in research and development, and production equipment in order to enhance the engineering quality of their products. Flexibility, production speeds and fast change-over times are the primary market requirements.

The minor Japanese share on the world market and low export ratio can be explained by the structure of the industry; the comparatively small business scales and the custom-tailored

Table 1: Bottling, packaging, wrapping and related machinery
Main indicators, 1990

(million ECU)	D	F	E	I	NL	UK	Japan	USA
Apparent consumption	985	670	370	620	145	375	2 135	2 090
Production	2 250	430	220	1 425	175	260	2 135	2 060
Exports world	1 650	215	65	980	215	125	150	445
Imports world	385	455	215	175	185	240	150	475
Trade balance	1 265	-240	-150	805	30	-115	0	-30

Source: COPAMA, NEI

Table 2: Bottling, packaging, wrapping and related machinery
Breakdown of production according to product line

(%)

Form, fill and seal machines	21.5
Combined filling and closing machines	16.6
Group packaging and filling	8.0
Accessories, parts and spares	12.9
Other machinery	41.0
Total	100.0

Source: Frost & Sullivan

products which require extensive after-delivery service. For this reason, Japanese firms have been focusing on the large domestic market. Should the industry move towards more standardised machinery and equipment, Japanese companies will be able to develop advantages similar to those they have in the automotive and other industries. For the coming years, however, when much attention will still be focused on engineering and tailor-made solutions, Japan's industry is not much of a threat.

In contrast with other US machinery industries, the packaging machinery industry benefited from the lower dollar exchange rate. US exports increased by 4% in 1991, but the export share remains relatively low (24%), if compared to Italy and Germany. US packaging machinery is noted for its strong construction and sophisticated electronics.

The high degree of concentration in downstream industries such as the food industry might result in price cuts and lower margins in the long run. The packaging machinery industry itself, however, is responding with a similar trend towards more concentration and increased internationalisation.

Production process

As with other mechanical engineering industries (especially where custom-tailored products are being produced) the labour force is an important factor in ensuring engineering quality. As a consequence, the quality of the labour force and thus the quality of the training programs are major influences in the success of EC industry in the long run. The quantity and quality of education and training must be maintained; otherwise the technological advantage of the industry could fall behind. Furthermore, when demand for well-trained employees exceeds the supply of labour, productivity losses are likely to occur.

Keeping the quality of the labour force high, however, should not lead to excessive wage increases. Sharp rises in input prices of materials and labour wages, as happened during the end of the 1980s and the beginning of the 1990s, would have a negative impact on the industry's profitability and cause reduction in investments which would weaken EC competitiveness.

Beside the quality of the labour force, the extent to which a manufacturer of packaging machinery is able to meet customer requirements is also determined by the quality and precision of the production equipment. The increasing demand for versatile machinery, for instance, requires advanced production equipment together with high labour skills and large investments in R&D.

INDUSTRY STRUCTURE

Companies

In general, the enterprises which deal exclusively with the manufacturing of packaging machinery are medium-sized and focus on one market niche, e.g. mostly one machine function for a specific industry. The German firm Uhlmann, for instance, deals only with blister machinery and equipment. Larger firms (such as the German enterprises Bosch and Krones, which offer a whole range of products for several downstream industries) are rare.

Vertical integration might become more common in the near future. The purchase of the Swedish Alfa-Laval (manufacturer of food and other industrial equipment) by Swedish Tetra Pak (milk and juice packaging group) the ability to purchase packaging and processing machinery through one supplier.

Table 3: Bottling, packaging, wrapping and related machinery
International comparison of production at current prices

(million ECU)	1986	1987	1988	1989	1990	1991(1)	1992(1)	1993(1)	1994(1)	1995(1)
BR Deutschland	1 550	1 620	1 750	2 020	2 250	2 375	2 470	2 640	2 820	3 025
Italia	1 110	1 184	1 250	1 330	1 425	1 615	1 700	1 820	1 950	2 085
Japan	1 280	1 330	1 730	1 980	2 135	N/A	N/A	N/A	N/A	N/A
USA	1 980	1 770	1 830	2 110	2 060	N/A	N/A	N/A	N/A	N/A

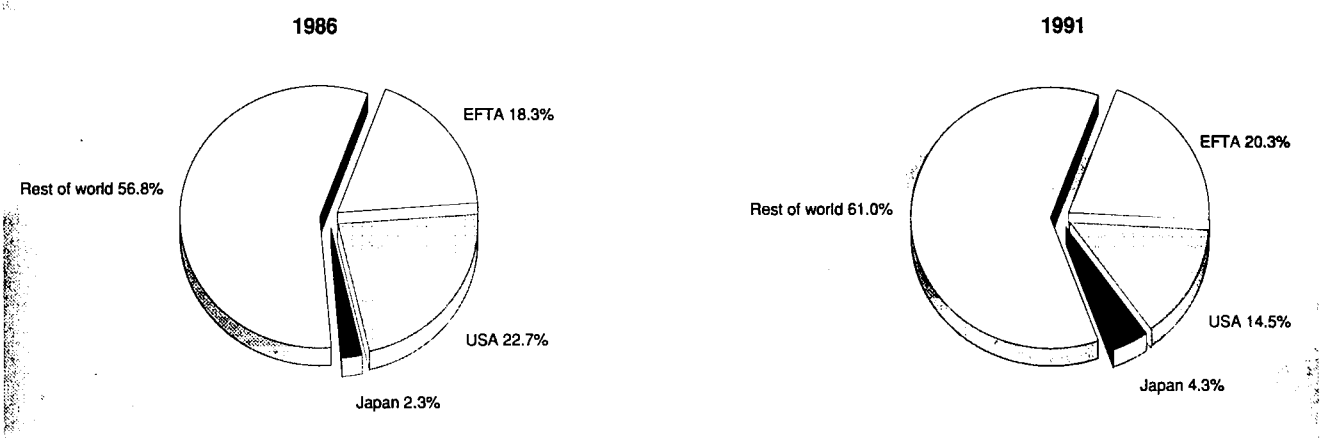
(1) NEI estimates
Source: VDMA, JETRO, PMMI, UCIMA, COPAMA, ifo Institute

Table 4: Bottling, packaging, wrapping and related machinery
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	1 142	1 202	1 495	1 635	1 724	1 600	1 728	1 911	2 092	2 257
Extra-EC imports	278	310	396	389	377	417	461	540	609	637
Trade balance	864	892	1 099	1 246	1 347	1 183	1 267	1 371	1 483	1 620
Ratio exports/imports	4.1	3.9	3.8	4.2	4.6	3.8	3.7	3.5	3.4	3.5
Intra-EC trade	640	709	911	993	1 095	1 244	1 423	1 658	1 766	1 971
Share of total imports (%)	-69.7	69.6	69.7	71.9	74.4	74.9	75.5	75.4	74.4	75.6

(1) 1982-83 excluding Spain and Portugal
Source: Eurostat

Figure 1: Bottling, packaging, wrapping, and related machinery
Destination of EC exports



Source: Eurostat

In general, the enterprises not only react to increased business due to the Single Market, German unification or from the political changes in the former Eastern bloc countries, but also to developments in specific markets which force them to review company strategies. The general trend towards more concentration by specialised companies merging or cooperating can also be explained by such developments. Cooperation enables them to offer tailor-made machinery and equipment to meet customer needs. A further explanation for the concentration of activities is the threat of increasing market power of some large multinationals which dominate the downstream markets. This might lead to lower margins for the manufacturers of packaging machinery.

On the other hand, the same multinationals, by their expansions in the former Eastern bloc countries, also offer market opportunities for the EC packaging machinery manufacturers. This trend of medium-sized companies penetrating more and more into these countries can also be observed within the Single Market. Further internationalisation will also increase the strength of current market positions and will enhance opportunities to benefit from the European unification.

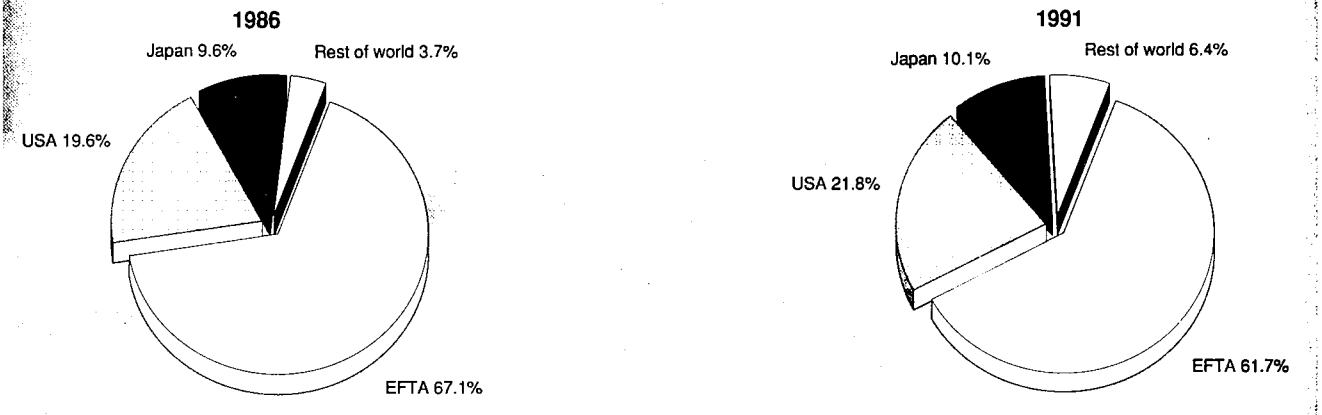
To remain competitive, European manufacturers should invest in new, more efficient and precise production equipment in order to enhance the engineering quality and to reduce costs. Italian firms' efforts to upgrade in particular are an example of successful investment. The increasing demand for more versatile machinery, however, will also require new investments by machinery manufacturers.

ENVIRONMENT

The growing consciousness among consumers regarding environmental issues, for example, has already been translated into more nature-friendly packaging and cost reductions have been a major stimulus for downsizing of packaging. Material usage and packaging sizes can still be best controlled by domestic government or EC legislation. However, especially in the northern EC countries, the increasing influence of the downstream industries and retail networks on packaging decisions is also becoming a determinant factor within the industrial chain. For instance, mutual agreements between the Dutch government, the food industry and retailers in the Netherlands led to voluntary decisions to retain recyclable glass bottles and move out of PVC packaging. When environmental measures are in line with commercial and financial objectives, more support and initiative can be expected from retailers.

For the near future, demand for form, fill and seal machinery is expected to grow, due to rising demand for snacks and

Figure 2: Bottling, packaging, wrapping, and related machinery
Origin of EC imports



Source: Eurostat

food in thermoform-packages. Further, growth is expected for combined filling and closing machinery and for group packaging.

REGULATIONS

Until now, environmental law and regulations have been limited to national levels. Germany and the Netherlands are in the lead in terms of actual measures, although other EC countries, especially those in the north, have also made progress with governmental legislation. In the Netherlands, mutual agreements are used. The German Packaging Ordinance, on the other hand, could constitute a barrier to free trade within the EC. In order to protect the Single Market principle, the European Commission has been urged to develop an EC directive in order to prevent the occurrence of differing national regulations.

In the beginning of 1992, a fourth draft of the EC Packaging Waste Directive was published. The stated objectives of the directive are:

- to reduce the amount of packaging waste produced;
- to require the recovery of packaging waste;
- and to minimise the amount of packaging waste which goes into final disposal.

Practical implementation, however, could take until the mid-1990s. The packaging industry will be confronted in the near future with discouragement policies which will affect growth of demand for packaging materials. Limitations on raw material usage, decreased weight of packages and more recycling do not necessarily imply a threat to the manufacturers of packaging machinery. Products need to be packaged, but the packaging material itself may change. Only if current level of packaging is forbidden might the industry be affected. Also, substitution of certain raw materials by less polluting materials, might have consequences for the applied machinery. Some currently applied machinery is able to process different types of material and/or reduce the quantity of materials used.

Enforcement of the development and production of new packaging materials could implement a stimulus for the manufacturers of packaging machinery. Demand for new and innovated machinery would rise and the extra expenses caused by the high development costs would probably be passed on to the end users.

The CENTEC 146 EC safety standards also apply to the packaging machinery. In each Member State, the packaging machinery manufacturers are cooperating with their national standardisation organisation to develop European standards. In addition, Directive 89/392 will implement additional safety and health standards for this industry, as well as all other machinery producing sectors.

OUTLOOK

The upswing of German demand caused by unification seems to have come to an end. In 1992 a general stabilisation is expected of the EC production of packaging machinery. For the years after 1992, the expected recoveries of the major countries' economies will stimulate overall demand, which will cause production to reach the 1980s growth rates. Companies entering the former Eastern bloc countries might further increase demand for packaging machinery.

A shift in demand to more versatile machinery will stimulate and require further technological development on the supply-side. The EC industry already has strong foothold on the world market. However, in order to retain its competitiveness, much effort and means have to be put into R&D.

The new EC Packaging Waste Directive will not necessarily harm the manufacturers of packaging machinery. While measures focus on recycling, less packaging quantities, and less waste of raw materials, the greater part of packaging is not excessive, and the machinery in use is often able to process different materials and packaging sizes.

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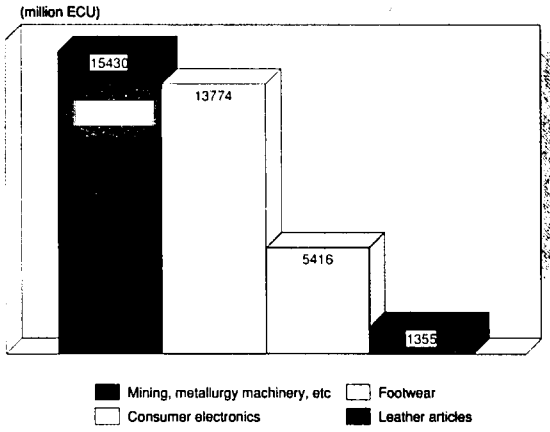
Machinery for mining, metallurgy, construction, lifting and handling

NACE 325

The industry of machinery for mining, metallurgy, construction, lifting and handling is very much dependent on the investment decisions of its client industries. The cyclical pattern of investment over time thus results in highly variable growth rates for the industry. While the EC industry covers around 90% of EC demand, this proportion has been falling as a result of strengthening imports. The EC is still the world leader in production, however, and remains a net exporter.
M&A activity has been strong over the past few years. Most companies in the industry tend to specialise in certain kinds of machinery, resulting in a high dependency on specific markets. Recognition of this dependency, as well as the expected increase in competition due to the Single European Market, underlie moves towards increased concentration.

Figure 1: Machinery for mining, metallurgy, construction, lifting and handling
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

NACE 325 includes a heterogeneous set of activities in machine manufacturing. It includes the manufacture of:

- mining machinery (NACE 325.1);
- plant for iron and steel and metallurgical industries and for foundries (NACE 325.2);
- brick making and other machinery for the preparation of building materials (NACE 325.3);
- construction and civil engineering equipment (NACE 325.4);
- mechanical lifting and handling equipment (NACE 325.5).

Manufacturers in this industry produce a broad variety of products. Examples are: bulldozers, construction cranes, shovel tractors, winders, conveyors, lorries for surface mining, hydraulic equipment, excavators, underground diesel locomotives, concrete handling machines, ground levelling machines, asphalt paving machines, and foundation work machines.

Products from the manufacture of mechanical lifting and handling equipment are generally referred to as "industrial trucks". These are defined as any wheeled vehicles, not running on rails, which are designed to carry, tow, push, or lift any kind of load. Examples are: elevators, escalators, ropeways and cablecars, cranes, pneumatic handling equipment, hoists (electric and pneumatic), elevating work platforms, storage and retrieval machines, etc. The production value of this industry has been estimated by FEM at around 16 billion ECU for 1989 in the EC and EFTA Member States.

Main indicators

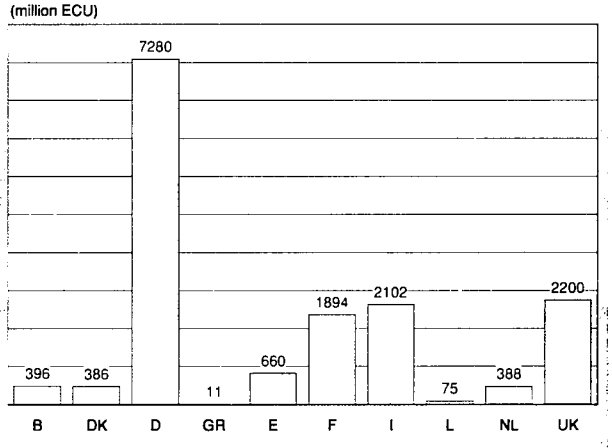
Growth rates declined significantly in 1990, and even more severely in 1991, as a result of the Gulf war. In France, demand volume fell by 7% in 1991 and production volume decreased by 5.8%. In the United Kingdom a similar fall in demand occurred, and production volume was reduced by 16.8%. Exceptions to the general decrease included Germany, where the process of German reunification caused a higher demand for new machinery, and Portugal, where infrastructure investments and new construction projects led to the ordering of new equipment.

Recent trends

During the beginning of the 1980s, the sector encountered serious difficulties due to declining markets both within and outside the EC. Employment was reduced considerably. After a temporary improvement in 1985, problems continued in 1986 and 1987 despite a growing EC market. In 1988 and 1989, growth rates in production considerably improved as a result of a further increase in growth of EC demand. However, demand growth has been covered to a great extent by imports from outside the EC.

Production of industrial trucks declined at the beginning of the 1980s and recovered in the cyclical upswing after 1982-83. In 1981, total production amounted to 1 426 million ECU; in 1989 production equalled 2 650 million ECU (in current values). In volume terms, production decreased 12% annually from 1980 to 1983. After 1983, annual volume growth amounted to 7.3% until 1989. At the beginning of the 1990s, industrial truck production encountered a reduction similar to that in the entire industry.

Figure 2: Machinery for mining, metallurgy, construction, lifting and handling
Value added by Member State, 1991



Source: Eurostat

Table 1: Machinery for mining, metallurgy, construction, lifting and handling
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	19 400	19 915	20 048	22 482	24 082	25 582	28 929	34 020	36 068	37 956	39 500
Production	26 251	25 489	25 990	28 904	30 196	30 746	33 483	38 916	41 539	42 783	44 000
Extra-EC exports	8 856	7 563	8 067	8 838	8 556	7 796	7 969	8 888	9 718	9 500	9 700
Trade balance	6 851	5 574	5 942	6 421	6 114	5 164	4 553	4 896	5 471	4 827	4 500
Employment (thousands)	450.2	424.6	401.5	396.7	396.9	387.3	378.4	388.3	396.1	397.6	399.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Machinery for mining, metallurgy, construction, lifting and handling
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.8	5.7	4.4
Production	-1.7	2.9	1.3
Extra-EC exports	-9.4	-5.3	-6.7
Extra-EC imports	-4.4	6.2	2.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated.
Source: Eurostat

Table 3: Machinery for mining, metallurgy, construction, lifting and handling
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	8 856	7 563	8 067	8 838	8 556	7 796	7 969	8 888	9 718	9 500
Extra-EC imports	2 005	1 989	2 125	2 416	2 442	2 632	3 415	3 991	4 247	4 673
Trade balance	6 851	5 574	5 942	6 421	6 114	5 164	4 553	4 896	5 471	4 827
Ratio exports/imports	4.42	3.80	3.80	3.66	3.50	2.96	2.33	2.23	2.29	2.03
Terms of trade	102.8	103.6	100.3	100.0	100.6	102.1	107.8	106.6	111.0	110.8
Intra-EC trade	4 125	4 015	4 441	5 092	5 435	6 204	7 525	9 395	10 070	10 102
Share of total imports (%)	67.2	66.8	67.5	67.7	68.9	70.1	68.7	70.2	70.3	68.3

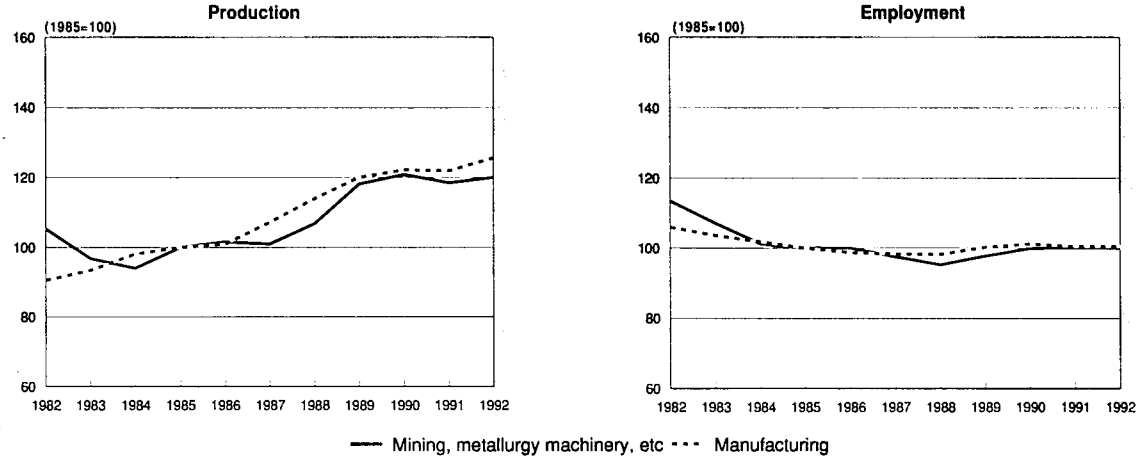
(1) Estimates
Source: Eurostat

Table 4: Machinery for mining, metallurgy, construction, lifting and handling
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	32.8	31.6	32.2	33.9	34.1	35.3	37.0	38.7	39.5	38.8
Productivity index	96.6	93.2	95.1	100.0	100.4	104.0	109.1	114.1	116.4	114.4
Unit labour costs index (3)	82.0	86.9	93.1	100.0	104.6	110.6	115.4	121.4	128.4	132.5 (5)
Total unit costs index (4)	79.5	81.9	87.3	100.0	104.5	107.3	122.5	141.1	144.4	148.6

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed(1991 prices
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
(5) NEI estimate
Source: Eurostat

Figure 3: Machinery for mining, metallurgy, construction, lifting and handling
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

International comparison

About 30% of Japanese production and 10% of EC and USA production is sold outside domestic markets. The EC is the largest manufacturer with a share of almost 50% of the Triad's total production.

EC production was experienced a negative growth rate of 2% in 1991. US production also declined, by 1%. Given the relatively high domestic market orientation of the sector, it is expected that production in Japan continued to grow, as the Japanese economy had only minor setbacks in growth rates, and as its exports to the EC increased.

Foreign trade

Extra-EC imports increased during the eighties from around 2 billion ECU in 1982 to about 4.7 billion ECU in 1991. The largest suppliers to the EC were the USA, Japan, Sweden, Austria and Switzerland. Extra-EC exports on the other hand fluctuated from some 7.5 billion ECU to about 8.9 billion ECU between 1982 and 1989. At the beginning of the nineties, exports increased considerably to approximately 9.7 billion ECU in 1990 and 9.5 billion ECU in 1991. Important destinations for exports were the USA, Switzerland, Austria, the former USSR and Sweden.

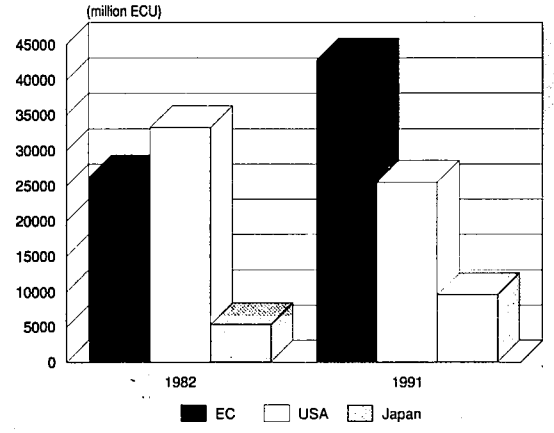
As a consequence of the stronger growth in imports, the export to import ratio declined over the years, from 4.4 in 1982 to 2.0 in 1991. The terms of trade improved only in the late eighties. The share of extra-EC imports in EC consumption increased from an average of 10% in the first half of the eighties to an average of 12% in the second half and the early 1990s.

MARKET FORCES

Demand

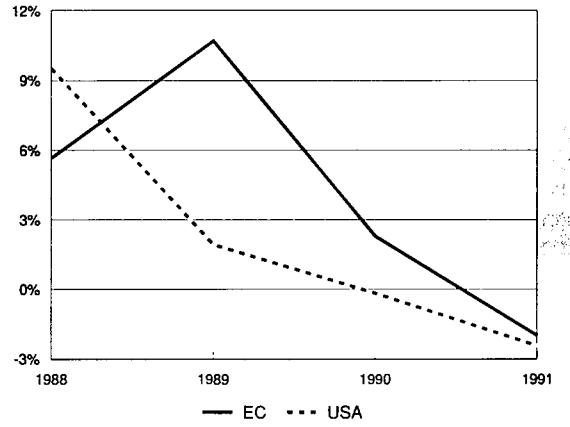
The industry basically produces capital goods. Demand for these products is highly dependent on the investment decisions in industries using this type of machinery, and thus on the development in the activities of these industries. An important aspect is the initiation of large civil engineering and construction projects.

Figure 4: Machinery for mining, metallurgy, construction, lifting and handling
International comparison of production at current prices



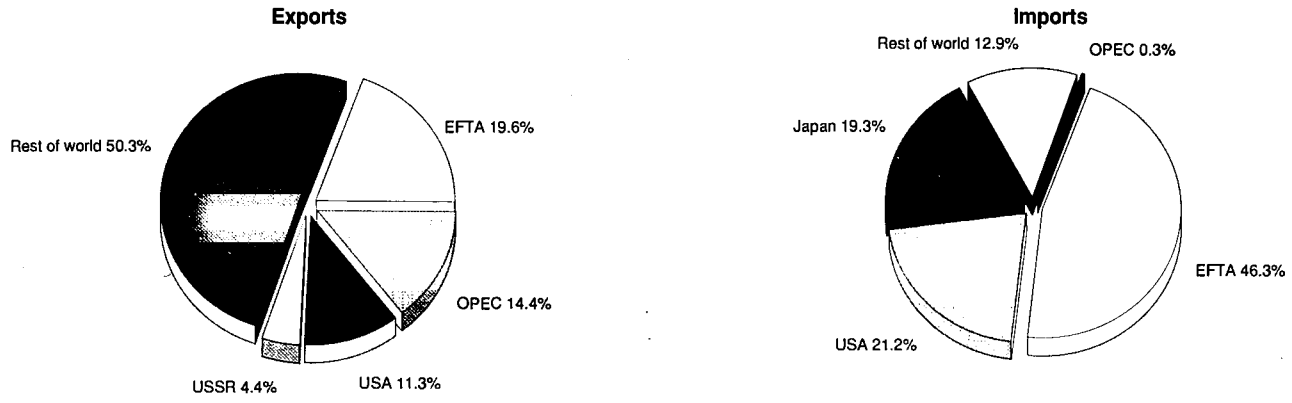
Source: Eurostat, Census of Manufacturers

Figure 5: Machinery for mining, metallurgy, construction, lifting and handling
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Machinery for mining, metallurgy, construction, lifting and handling
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

The cyclical variations in project initiations are reflected in the large volatility in annual growth rates for apparent consumption of the sector. Growth rates generally fluctuate between -25% and 50% in nominal terms.

Civil engineering projects are primarily public works investments and thus depend on public sector decision-making and budgets. Examples can be found in the building of new roads, railroads (e.g. high speed train networks like TGV in France, and underground systems), tunnels, bridges, airports (e.g. the new Munich airport), etc. Sometimes civil engineering projects are private sector operations, such as the Eurotunnel linking the United Kingdom and France and the extension of Schiphol Amsterdam Airport in the Netherlands.

Projects in construction are mostly undertaken by the private sector and vary according to developments in the national economy. Projects are often postponed during recessionary periods, while in boom cycles, numerous projects are begun. Examples can be found in the market for building office space and housing.

Different factors affect machinery for mining (including oil exploration and exploitation) and metallurgy. If demand for coal and steel is diminishing, mining, foundries and metallurgy companies prefer to hold off on investments in new machinery. Existing machinery may be upgraded, requiring only modest investments.

Demand for industrial trucks depends particularly on companies in the transport and warehousing sectors. In general, demand in the EC has reached a saturation level, implying that sales have become increasingly dependent on replacement investments, and on the application of trucks in new fields. Demand for all-purpose counterbalanced trucks has been losing ground to the more specialist trucks.

Supply and competition

The EC manufacturers are the most important suppliers of the EC market, covering 90% of EC consumption. In recent years however, competition from foreign suppliers, especially Japan, has become very strong. Non-EC manufacturers are gradually taking a larger share of the market.

In extra-EC exports, European manufacturers clearly lost market share. Whereas in the beginning of the 1908s EC companies exported about a third of total production to non-EC countries, in the latter half of the 1980s this share was reduced to only one fifth (22% in 1991).

Despite the high volatility in demand, profit rates have remained fairly stable and even improved at the end of the 1980s. In many industries, a declining market results in lower prices in order to fill existing capacities. However, lower prices have not affected profit margins considerably, implying that price competition is fairly limited. An explanation can be found in factors such as quality and technological level of products. Customers are prepared to pay more for high quality products, when efficiency improvements by these products result in a better return.

Production process

The production of machinery classified as heavy duty equipment requires high quality iron and steel inputs.

CAD/CAM systems are used to design and manufacture machines. Computerisation and the application of advanced electronics have also become a basic feature of new machinery, not only to improve the efficiency of the machine itself, but also for safety, pollution control, precision in operations and the like. Hence, innovation has become a top priority in maintaining competitive advantage.

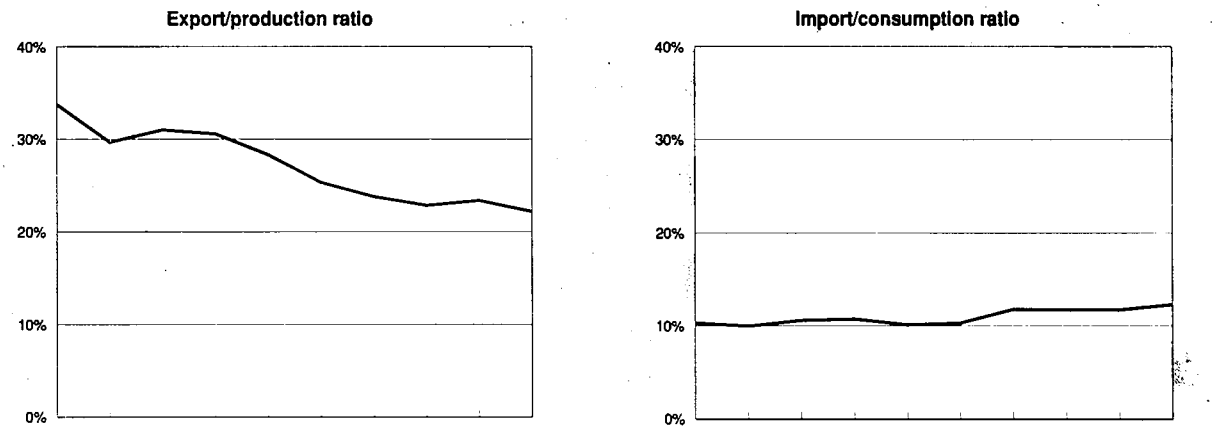
The industry requires highly trained employees with a knowledge of modern technologies in machinery and equipment. Some companies have education facilities for their employees to keep them up to date with these technologies.

Productivity consistently increased throughout the 1980s by about 1.9% annually. Unit labour costs have grown with 5.1% on average over the years. After accounting for inflation, real unit wage cost increases are comparable to productivity increases.

Industrial trucks have increasingly become customised, rather than standard, products. The production process is designed in a modular fashion, using standardised parts and components. By combining different modules customisation becomes possible. This however, requires increased production flexibility, which is made possible by the application of modern technologies in the production process.

Technological development is also proceeding in the industrial truck itself. As a result of factory automation and automated warehousing, trucks have to be equipped with electronic devices for advanced handling systems. An example of a modern industrial truck is the automated straddle carrier able to locate and move containers without human interference.

Figure 7: Machinery for mining, metallurgy, construction, lifting and handling
Trade intensities



Source: Eurostat

INDUSTRY STRUCTURE

Companies

Companies in the industry tend to specialise in certain types of machinery. During 1991 and 1992, various companies ran into severe difficulties due to declining market growth. The French manufacturer of public works machinery Tenneco-Case-Poclain (a subsidiary of Tenneco USA) encountered a drop in sales of 21% in 1991. For 1992, a further reduction by 18% is expected.

The industrial truck market is dominated by multinationals. European suppliers like Linde/Still (D), Lansing (UK), Jungheinrich (D), Lancer-Boss (UK), and Manitou (F) compete with leading suppliers from Japan, such as. Toyota and Komatsu, and from the USA, such as Hyster and Clark. An important non-EC supplier from Scandinavia is Valmet, which has 60% of the world market in straddle carriers.

Strategies

In order to prepare for increased competition on the EC market after 1992, companies are increasing their involvement in mergers, acquisitions and strategic alliances with other companies. This process has also involved non-EC companies, driven by fears of the establishment of a strong EC Internal Market.

Japanese manufacturers have responded by building production facilities in European countries. Nissan set up a product line for industrial trucks in Spain in 1989, Toyota, Komatsu and Mitsubishi have concluded cooperative agreements with EC sited companies, JCB (UK) linked with Sumitomo; Fiat (I), Hitachi (J) and John Deere (USA) considered a joint venture. In addition, Krupp of Germany concluded an agreement with Komatsu for selling Krupp's mobile cranes in Japan. US manufacturers also have expanded top Europe: Clark and Caterpillar relocated factories to Europe during 1986.

Another reason for concentration is that companies want to centralise around the core activities in which they have acquired strong positions. By merging or entering into strategic alliances with larger entities, the risk of the dependency on specific markets is minimised by entering into larger entities.

REGIONAL DISTRIBUTION

German manufacturers dominate the EC supply of machinery in this NACE. In terms of value added, they accounted for 47% of the EC total in 1991. Second in rank were the UK manufacturers with 14.3%. Italy ranked third with 13.6%, with France in fourth position at 12.3%.

ENVIRONMENT

Energy efficient and less polluting machinery and equipment are increasingly being demanded by the customers of this industry. The customers themselves want their production processes to be as clean as possible, not only as a result of consumer demands, but also to stay ahead of increasingly restrictive government measures. R&D therefore focuses on these environmental issues.

For industrial trucks for outdoor use, fuel-powered equipment is most common, and restrictions on pollution from exhaust fumes have become more important. Industries are trying to improve on energy efficiency and exhaust pollutants. For battery-powered trucks, mainly for indoor use, battery obsolescence is given more and more attention. Noise reduction is also important.

REGULATIONS

The EC directive on machine safety is of particular relevance for the industries in this NACE, as it is for the other mechanical engineering industries. This Directive, already accepted in 1989, envisages the application of safety standards for EC-produced machinery by January 1, 1993. Until January 1, 1995, however, manufacturers have the possibility to comply with either the old standards used in the EC country where products are sold or with the Directive standards. The latter has the advantage of the products being labelled with the CE-mark, which gives it free access to the markets of all EC countries.

In 1991 the coverage of the Directive was extended to apply to cranes and other lifting installations and to mobile machines as well. This extension is especially relevant for machinery in the construction industry and industrial trucks in mining and warehousing.

Another important issue is the harmonisation of technical norms and standards throughout the EC. Two normalisation institutes, CEN and CENELEC, are currently working on proposals for European standards, covering, among others, quality standards as specified in ISO-9000. There is also a preference to develop standards which meet those on a world level.

Regulations influencing the customers of industries in this NACE could affect the sector in an indirect way. For example

Table 5: Machinery for mining, metallurgy, construction, lifting and handling
Manufacturers in the EC

Manufacturer	Main products
Barber-Greene (UK, USA)	Asphalt plants and finishers, belt conveyors, concrete mobiles
Trex (UK, USA)	Crawler dozers, motor scrapers, dump trucks, wheel loaders
Vogel (D)	Asphalt finishers
Elba Werk (D)	Batcher plants
Knauer (D)	Concrete block manufacturing machines
Krupp Industrietechnik (D)	Hydraulic hammers and drills
Wende und Malter (D)	Construction machines
ABG (D)	Asphalt paving and finishing machines
Wirth Maschinen und Bohrgeräte Fabrik (D)	Tunnel boring machines
Mannesmann Demag (D)	Crawler and truck cranes
Wirth Maschinen (D)	Tunnel boring machines
Faun Werke (D)	Truck crane chassis
Soletanche (F)	Diaphragm well excavators
Case-Poclain (F)	Public works machinery and equipment
Fiat Trattori (I)	Tractors
Observator (NL)	Dredging instruments
JCB (UK)	Construction cranes

Source: NEI

the opening up of the Internal Market for public procurement by 1993 will influence activities in infrastructure construction and public works projects. Companies active in this field will need modern quality machinery in order to challenge the increased competition.

OUTLOOK

For 1992 and 1993 the perspectives are rather pessimistic, as order books do not yet reveal a revival. Further, the positive impact of German reunification on demand is diminishing rapidly. New orders are only expected to pick up again by mid-1993, when the business cycle is likely to enter the recovery phase. Growth rates may then gain momentum again.

Growth will, however, depend very much on the type of activity for which machinery is produced. In machinery for construction and brick making for example, volume growth is expected to be moderate due to a low level of project initiations for office buildings and dwellings. Currently, most machinery sold is for replacement of old machinery. In mining machinery, growth will depend on developments in energy consumption and metallurgy. In particular energy saving initiatives may cause the demand for mining machinery to be low. Demand for industrial trucks, on the other hand, may be growing stronger as the Internal Market will increase the need for transportation, distribution and warehousing facilities.

Table 6: Machinery for mining, metallurgy, construction, lifting and handling
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	3.5
Production	1.8	2.0
Extra-EC exports	-1.0	-2.0

Source: NEI

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: European Federation of Handling Industries / Fédération Européenne de la Manutention (FEM). Address: Kirchenweg, 4, CH-8032 Zürich; tel: (41 1) 384 4844; fax: (41 1) 384 4848; and,
European Committee for materials and products for foundries / Comité Européen des Matériels et Produits pour la Fonderie (CEMAFON). Address: Lyoner Strasse 18, D-6000 Frankfurt/Main 71; tel: (49 69) 660 3413; fax: (49 69) 660 3692.

Transmission equipment
NACE 326.1, 326.2

Similar to the other industries in mechanical engineering, companies belonging to this NACE recorded drops in production, consumption and exports. The EC industry, however, is expected to recover from weak demand in major countries. In order to fully benefit from the economic recovery in the long run, and to remain competitive on the world market, EC manufacturers should internationalise and should continue to assure the quality of their labour force, which is a very important asset in international competition.

INDUSTRY PROFILE

Description of the sector

This chapter includes the manufacture of transmission equipment for motive power (NACE 326.1) and the manufacture of ball, roller and similar bearings (NACE 326.2). The manufacture of transmission equipment includes the manufacture of gears, gear assemblies (gear-boxes, variable speed gears, industrial gear-boxes, high-speed gears and differentials), transmission chains (including bicycle chains) and other transmission equipment. Not included is transmission equipment manufactured for the automotive industry nor hydraulic or pneumatic transmission equipment. Some of the companies in the industry deliver to both the automotive industry and other manufacturing industries, or offer a wide product range, thereby covering other products than transmission equipment, gears and bearings.

The industry is medium-sized if compared to other mechanical engineering industries. Transmission equipment, gears and bearings constitute approximately 3% to 4% of total production of the mechanical engineering industry.

Main indicators

Consumption, production and exports peaked in 1990, in current prices. The decline of consumption, production, trade and employment figures in 1991 is, however, not considered as a structural phenomenon.

Figure 2 shows the leading position, in terms of value added, of Germany as a manufacturer of transmission equipment. It is followed by Italy, the United Kingdom and France. In the other EC countries the manufacture of transmission equipment is of minor importance.

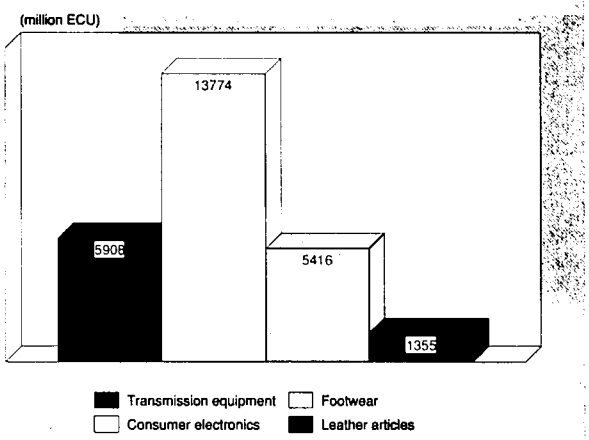
Recent trends

Production of the industry has grown since 1982. The industry demonstrated the highest growth just after the economic crisis of the early 1980s. While total employment dropped from 1982 to 1984, production increased by 15%. During the second half of the decade, the annual growth rates in current prices for production and consumption were low. The employment figure on the other hand remained rather stable, despite some fluctuations. During the same period, international trade increased. The development of the trade balance indicates a faster growth of extra-EC exports than of extra-EC imports, in current prices.

Foreign trade

The EFTA is the major trade partner of the EC, followed by the USA. The share of total EC imports from the latter country, however, are decreasing and have come down in 1991 to the same level as the Japanese share of the EC market.

Figure 1: Transmission equipment
Value added in comparison with other industries, 1991



Source: Eurostat

Intra-EC trade has been a great stimulus for EC production of transmission equipment. Both extra-EC exports and intra-EC trade have demonstrated strong growth rates in current prices. In volume, however, these increases were quite modest; during the 1980s the volume of extra-EC and intra-EC exports increased by an average annual growth rate of only 2.4% and 3% respectively.

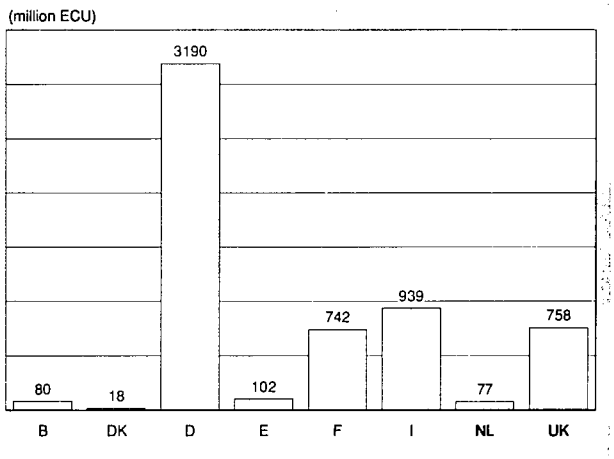
The foreign share in total EC consumption of transmission equipment has been stable at around 16 to 17% over the 1982-91 period.

MARKET FORCES

Demand

The industry's products are characterised by a widespread use among several manufacturing industries. Demand for transmission equipment therefore depends to a high extent on investments in capital goods made by downstream industries. After a period of booming investments in the second half of the 1980s by some major client industries, production fell in 1991. This lower production figure of transmission equipment in 1991 can be explained by disappointing growth rates on the downstream markets within the EC, but also in the USA.

Figure 2: Transmission equipment
Value added by Member State, 1991



Source: Eurostat

Table 1: Transmission equipment
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	6 650	6 449	7 369	8 435	8 660	8 566	9 264	11 067	11 928	11 116	11 500
Production	7 334	7 146	8 195	9 413	9 695	9 608	10 445	12 282	13 099	12 179	12 500
Extra-EC exports	1 749	1 754	2 094	2 421	2 433	2 401	2 701	3 096	3 236	3 014	3 100
Trade balance	685	697	826	978	1 036	1 042	1 181	1 215	1 171	1 064	1 100
Employment (thousands)	189.5	184.3	164.8	174.7	174.4	171.1	168.4	170.4	173.9	169.1	167.7

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Transmission equipment
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.1	1.0	1.3
Production	3.7	0.8	1.7
Extra-EC exports	6.9	0.3	2.4
Extra-EC imports	-0.7	1.1	0.5

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Transmission equipment
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 749	1 754	2 094	2 421	2 433	2 401	2 701	3 096	3 236	3 014
Extra-EC imports	1 064	1 057	1 268	1 443	1 398	1 360	1 519	1 880	2 065	1 950
Trade balance	685	697	826	978	1 036	1 042	1 181	1 215	1 171	1 064
Ratio exports/imports	1.64	1.66	1.65	1.68	1.74	1.77	1.78	1.65	1.57	1.55
Terms of trade	122.2	112.0	104.2	100.0	101.2	99.4	99.1	97.0	99.0	96.8
Intra-EC trade	1 876	1 907	2 163	2 567	2 752	2 868	3 153	3 699	3 925	3 788
Share of total imports (%)	63.8	64.2	63.0	63.6	66.0	67.8	67.1	65.9	65.2	65.7

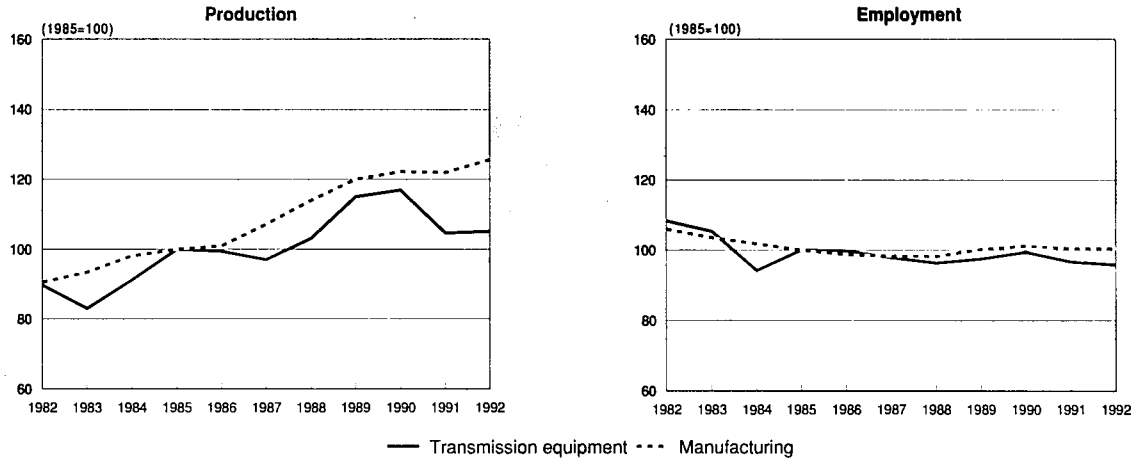
(1) Estimates
Source: Eurostat

Table 4: Transmission equipment
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	29.0	27.7	32.5	33.4	33.3	32.7	35.5	38.1	38.1	34.9
Productivity index	86.8	83.1	97.4	100.0	99.8	97.9	106.4	114.2	114.0	104.7
Unit labour costs index (3)	81.0	81.3	94.6	100.0	105.8	109.9	115.6	123.1	131.7	138.5(5)
Total unit costs index (4)	68.1	68.0	92.6	100.0	102.8	102.9	115.5	134.4	136.6	133.5

(1) Without Ireland and Portugal
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
(5) NEI estimate
Source: Eurostat

Figure 3: Transmission equipment
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

The drop in profits in the client industries, together with high interest rates, did not encourage investments in capital goods.

Electronics and miniaturisation increasingly play an important role. Especially in other transmission techniques, that compete with mechanical transmissions for some applications, like electrical, hydraulic and pneumatic means of transmission, technological developments are major impulses for relatively high growth rates. If and to what extent substitution is threatening the manufacture of mechanical transmission equipment, depends - among other factors - on the possible applications and on the extent to which transmission machinery and equipment based on other techniques can meet the customer's expectations. The increasing use and combination of different techniques by the manufacturers of transmission equipment makes it difficult to specify these substitution effects.

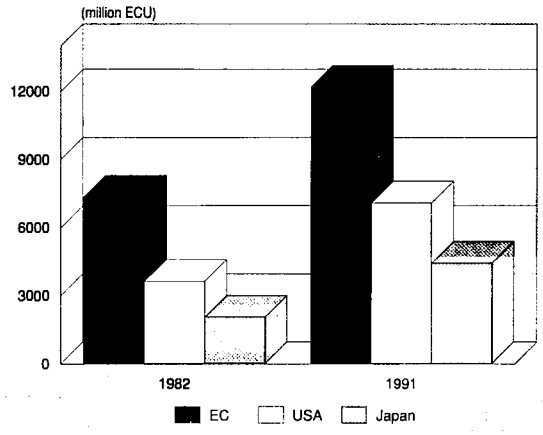
Supply and competition

Germany, France, Italy and the United Kingdom together produce 94% of total EC output. Germany alone constitutes almost 50% of total EC production. All four countries suffered from a production loss in 1991. Especially in Italy and Germany, a decrease in domestic consumption was the major cause. France and the United Kingdom mainly suffered from decreasing export figures to the USA, the EFTA countries and their former colonies.

In general, the production fall of transmission equipment in 1991 caused an excess capacity which is reflected in a lower aggregated productivity figure (see Table 4). Employment and total unit costs decreased, partly compensating the effect of a lower productivity. The evolution of the foreign shares on the EC market suggest that the EC industry does not seem to have lost competitiveness. Nevertheless, the weakness of demand will continue to put pressure on margins as competition will intensify.

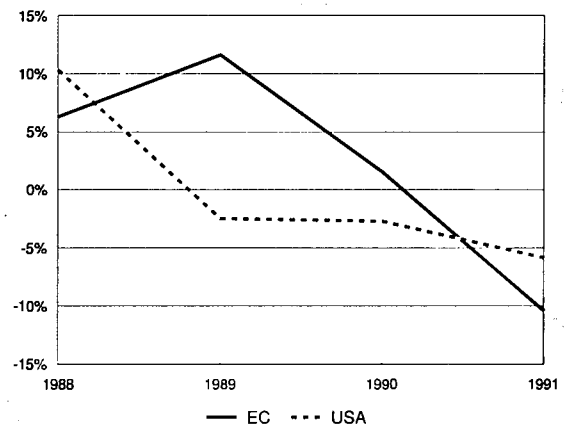
Because many manufacturers of transmission equipment also deliver to the automotive industry (not covered by this NACE), the industrial production has concentrated in Germany, France, Italy and the United Kingdom, which are the countries with the major automotive industries.

Figure 4: Transmission equipment
International comparison of production at current prices



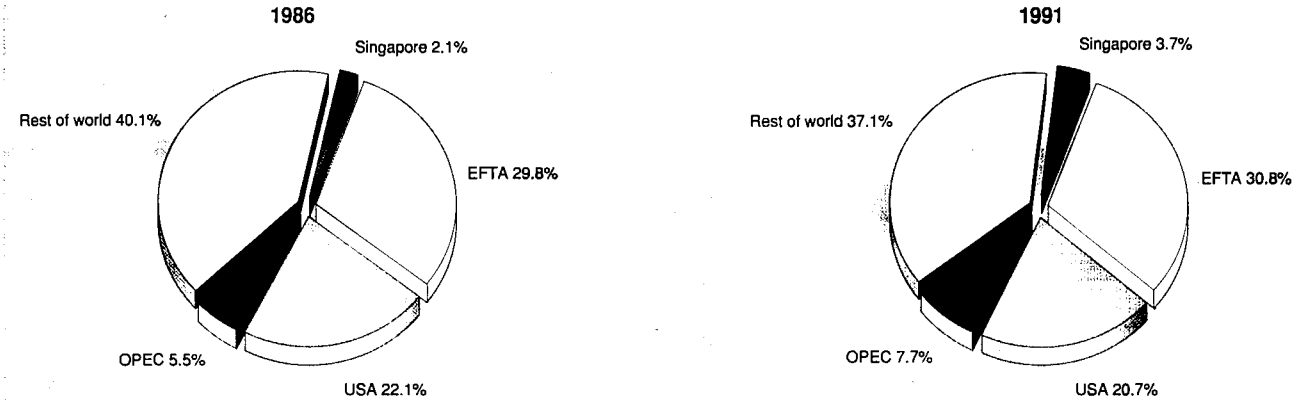
Source: Eurostat, Census of Manufacturers

Figure 5: Transmission equipment
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Transmission equipment
Destination of EC exports



Source: Eurostat

Production process

Both capital goods and labour force are important inputs in the production processes of the industry. Furthermore, technological research and development (R&D) is highly important, as the EC industry's competitiveness depends to a high extent on technological know how. In this respect, it is essential for the industry to continue investments in R&D and in training programmes to keep the labour force up to date with the latest technology.

INDUSTRY STRUCTURE

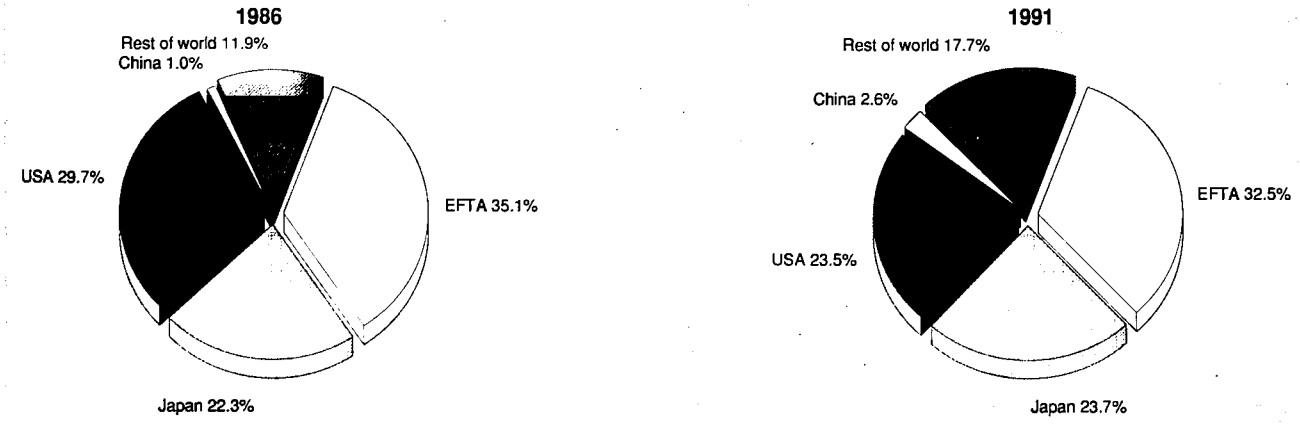
The manufacture of bearings is relatively more important than the manufacture of gears and transmission equipment. The German company FAG Kugelfischer and the Swedish SKF are dominant parties on the market for bearings. On the market for speed changers, industrial high speed drives and gears, the A.F.Flender AG is an important manufacturer. The German multinational company Kloeckner is also represented with a subsidiary on this market.

The enterprises are medium-sized and often do not operate plants in other countries than the mother country. Only a few EC enterprises are present in several EC countries. Of the non-EC manufacturers, the Swedish enterprise SKF already has a strong foothold in the EC with production facilities in the major EC countries. In contrast, Japanese production is still concentrated in Japan and other Asian countries; within the EC only a few production plants are Japanese owned. Nevertheless, with the help of low cost production and a world-wide distribution network, the Japanese increase their share of extra-EC imports and acquire a solid foothold on the EC market.

The European companies still put a lot of effort in R&D in order to retain and extend their market position. However, in order to avoid foreign companies from easily penetrating the EC market, the EC companies should expand operations to a European scale in order to enjoy the opportunities of the EC Internal Market.

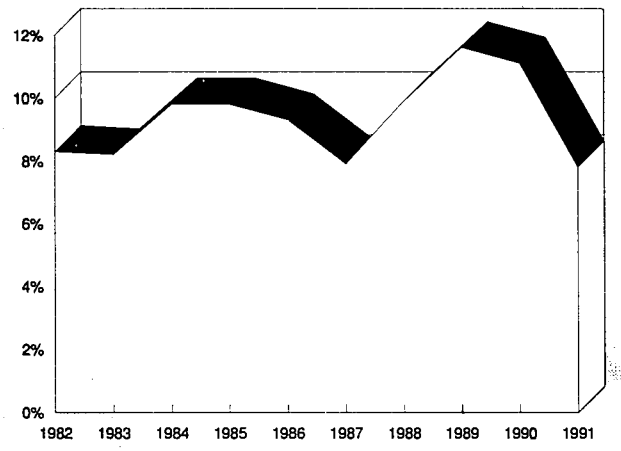
The German reunification could mean extra opportunities for the EC industry. FAG Kugelfischer has already acted and acquired eight production sites in the former East Germany. SKF, its main competitor from Sweden, has also invested in the same area. Some other companies are active in the former COMECON countries. In the short run, however, German reunification is expected to give the market more impulses than the restructuring processes in the Eastern European countries. These are likely to generate demand increases only in the medium to long run.

Figure 7: Transmission equipment
Origin of EC imports



Source: Eurostat

Figure 8: Transmission equipment
Pre-tax profits to turnover of the industry (1)



(1) Profits estimated as value added minus total labour costs
Source: NEI estimates on the basis of Eurostat data

ENVIRONMENT

The industry does not seriously threaten the environment. The hardening and galvanising stages of the production process could cause serious harm to the environment, but measures have already been taken to prevent this. As far as products in mechanical power transmission are concerned, noise might be a problem, although noise levels have been greatly reduced as a result of improvements in production techniques. Costs arising from environmental protection in the industry are relatively low.

The EC Directive on machinery applies to the industry's products only to a limited extent. The greater part of the output is absorbed by the production of bearings, which do not have a direct impact on the safety of work conditions in the industry. Furthermore, the industry's products are generally used as a component of machinery products, and it is at this latter level that safety provisions have to be complied with.

For the production processes within the industry itself, however, improved safety conditions of the capital goods used will be favourably received.

Table 5: Transmission equipment
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.3	4.4
Production	2.5	4.5
Extra-EC exports	2.4	4.7

Source: NEI

Companies will have to invest in quality improvements to meet the ISO 9000 quality standards. In the long run, the industry's competitiveness could be harmed if these quality standards would not be met.

OUTLOOK

In general, the industry will be confronted in 1992 with a further stabilisation of production, caused by weak demand. After 1993, however, the average growth rates will rise as the economies of the major Western industrialised countries are expected to recover. The political and industrial restructuring processes in Eastern Europe are not expected to create increases in demand in the coming years. More impulses can be expected from German reunification. Some threats could result from the fast growth of alternative transmission systems, electronic and other, although it is not clear to what extent manufacturers will be hit by adverse substitution effects. Also, in the coming years, the relatively strong R&D position and the high level of training of the labour force will assure a strong competitive position.

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The industry is represented at the EC level by: European Committee of Associations of Manufacturers of Gears and Transmission Parts (EUROTRANS). Address: rue Louis Blanc 39/41, F-92400 Courbevoie; tel: (33 1) 47 17 63 69; fax: (33 1) 47 17 63 70; and,
Federation of European Bearing Manufacturers Associations (FEBMA). Address: Lyonerstraße 18, Postfach 710864, D-6000 Frankfurt/Main 71; tel: (49 69) 660 3516; fax: (49 69) 660 3459.

Machinery for woodworking, paper production and processing, laundry and leather

NACE 327

Manufacturers of printing machinery and woodworking machinery were confronted in 1991 with weak markets. The machinery manufacturers for the leather processing and footwear industry have been suffering from low demand for a couple of years.
In 1991 the drop in demand was caused by the recession in the EC countries and the main export markets. Extra-EC exports especially felt the unfavourable economic conditions in the USA. A recovery of aggregated demand is only to be expected after 1992.

INDUSTRY PROFILE

Description of the sector

NACE 327 includes the manufacture of machinery and equipment for use in specific and quite diverse branches of industry. The following industries are categorised under this chapter:

- manufacture of machinery for working wood and similar materials (NACE 327.1);
- manufacture of paper, paper goods making, printing and bookbinding machinery (NACE 327.2);
- manufacture of laundry and dry cleaning machinery (NACE 327.3);
- manufacture of plant for the leather industry, including boot and shoe machinery (NACE 327.4).

The greater part of these four industries is concentrated in the same countries. Within the EC, Germany and Italy are the most important producers (together accounting for 78% of total EC production). Within the various branches a similar situation can be recognised. Outside Europe, Japan and the USA are the leading manufacturing countries.

Main indicators

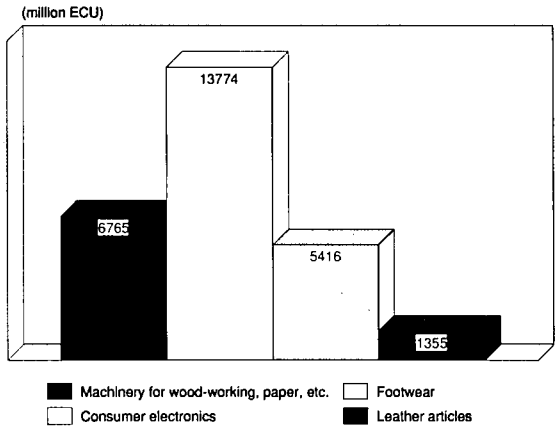
After the economic crisis of the early 1980s the industries went through a period of growth until 1990. A setback in production, consumption, extra-EC trade and the trade balance occurred in 1991. As a consequence, the steady growth in total labour force since 1986 stabilised in 1991.

More than 60% of total EC production is accounted for by printing machinery (NACE 327.2). The production share of machinery for working wood was estimated at 25% of total production, followed by much lower shares for plant for the leather industry and for the manufacture of laundry and dry cleaning machinery.

Recent trends

The high growth rates of EC demand during the 1980s enabled strong production growth, but also considerable increases in extra-EC imports. Especially after 1985, these imports recorded high growth rates, while the development of extra-EC exports has been disappointing since 1985. Total employment in 1990 was 15% higher than in 1985. The production fall in 1991 caused the growth of employment to stabilise.

Figure 1: Machinery for woodworking, paper production and processing, laundry and leather
Value added in comparison with other industries, 1991



Source: Eurostat

International comparison

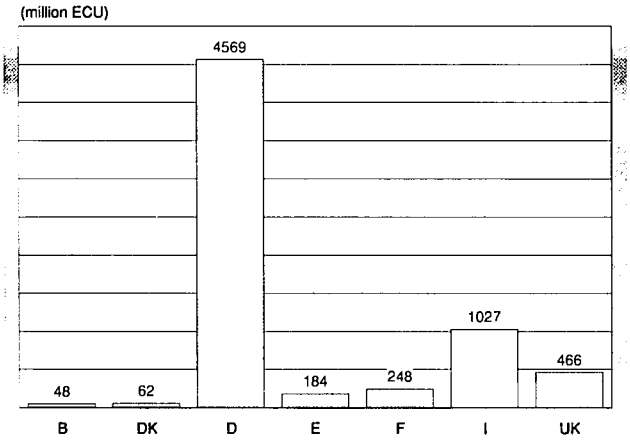
In 1991 the EC was the world's largest producer of machinery for woodworking, paper production and processing, laundry and leather. EC production was about 12% higher than that of the USA and 2.5 times bigger than the Japanese one.

1991 also saw a worldwide slump in the industry. Within the EC production decreased by 5%, in the USA by 1.7% and Japan recorded a stagnation (+0.2%).

Foreign trade

In current prices, the trade surplus has grown from 1982 to 1986 and from 1988 to 1990. The decreasing exports/imports ratio (see Table 3), however, demonstrates the higher growth rate of the extra-EC imports compared to that of extra-EC exports. Despite the recession in some EC countries, extra-EC imports (in current prices) continued to grow in 1991, whereas extra-EC exports fell in the same year. This drop was mainly caused by falling exports to the USA, where a considerable decrease in investments in new machinery occurred. On the other hand, exports to Japan increased, mainly caused by a rise in domestic demand for printing machinery. Especially Germany took advantage of this Japanese import boom.

Figure 2: Machinery for woodworking, paper production and processing, laundry and leather
Value added by Member State, 1991



Source: Eurostat

Table 1: Machinery for woodworking, paper production and processing, laundry and leather
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	5 570	5 701	6 452	7 613	8 097	9 110	11 408	12 744	13 884	13 468	14 500
Production	7 528	7 820	8 937	10 744	11 346	12 049	13 948	16 104	17 438	16 568	17 500
Extra-EC exports	2 857	3 125	3 640	4 488	4 717	4 753	4 806	5 898	6 257	5 917	6 000
Trade balance	1 958	2 119	2 485	3 131	3 248	2 939	2 540	3 359	3 554	3 100	2 500
Employment (thousands)	157.4	147.2	145.8	152.8	152.5	153.8	161.0	166.2	176.2	176.2	176.2

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Machinery for woodworking, paper production and processing, laundry and leather
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	8.0	5.9	6.6
Production	7.1	3.0	4.4
Extra-EC exports	4.3	-1.6	0.3
Extra-EC imports	2.8	6.2	5.1

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Machinery for woodworking, paper production and processing, laundry and leather
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 857	3 125	3 640	4 488	4 717	4 753	4 806	5 898	6 257	5 917
Extra-EC imports	899	1 006	1 155	1 356	1 468	1 814	2 266	2 538	2 703	2 817
Trade balance	1 958	2 119	2 485	3 131	3 248	2 939	2 540	3 359	3 554	3 100
Ratio exports/imports	3.18	3.11	3.15	3.31	3.21	2.62	2.12	2.32	2.31	2.10
Terms of trade	100.3	100.5	100.2	100.0	105.7	108.5	103.4	104.6	107.2	100.6
Intra-EC trade	1 863	1 991	2 279	2 804	3 309	3 978	4 674	5 283	5 372	5 406
Share of total imports (%)	67.4	66.4	66.3	67.3	69.2	68.6	67.3	67.5	66.5	65.7

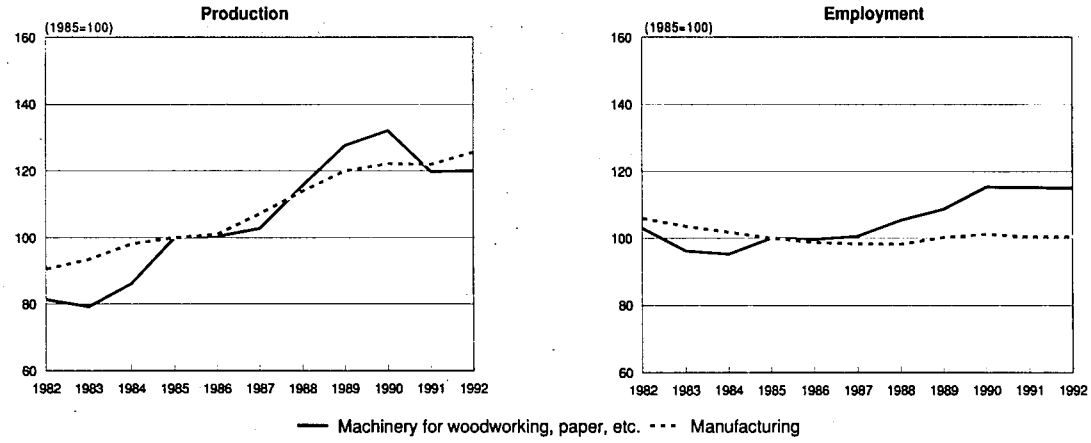
(1) Estimates
Source: Eurostat

Table 4: Machinery for woodworking, paper production and processing, laundry and leather
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	32.4	33.7	36.1	38.6	39.2	39.7	41.9	42.7	42.4	38.4
Productivity index	83.9	87.2	93.6	100.0	101.5	102.8	108.5	110.6	109.8	99.5
Unit labour costs index (3)	79.7	85.8	93.0	100.0	107.4	114.3	120.1	125.0	130.8	136.3(5)
Total unit costs index (4)	65.6	72.9	86.0	100.0	106.3	110.5	124.5	141.2	143.2	140.2

(1) Excluding Ireland and Portugal
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
(5) NEI estimate
Source: Eurostat

Figure 3: Machinery for woodworking, paper production and processing, laundry and leather
Employment and production indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

Despite the cheap dollar, the USA was not able to increase its market share in the EC. Similar to the general trend for mechanical engineering, the market position of this country is threatened by Japan. Although its share is still low, the growth of the EC imports from Brazil is remarkable.

The volume of intra-EC trade has increased at a lower rate than production (both figures in volumes). The disappointing development of extra-EC exports implies that production has been stimulated to a high extent by the domestic demand in the individual Member States. However, EC manufacturers were not able to fully benefit from the rise in EC demand, thereby giving non-EC manufacturers the opportunity to further penetrate on the EC internal market.

MARKET FORCES

Demand

The buyers of the overall industry's products can be mainly found in downstream industries. In the large manufacturing countries like Germany, Italy, USA and Japan there is a strong domestic demand. In some countries the export shares in total production are high. Germany, for example had an export share of 60% in the manufacture of woodworking machinery.

Printing machinery

The Italian market was stimulated by a boom in the turnover of newspapers and magazines during the second half of the 1980s. Also Germany's printing and paper processing industry could benefit from the ever increasing use of paperwork. However, the performance of the printing industry itself is highly sensitive to economic developments. As a consequence, the recession in 1991 caused demand to fall.

Woodworking machinery

For the manufacture of woodworking machinery, demand is with wood-processing industries. Hence, the final demand for wood and wood products is vital. Only in 1991 demand for woodworking machinery dropped, but expectations for 1992 are optimistic. The German and Italian industries observe an increasing demand for wood by the furniture industry. The construction market in both countries and in the USA are expected to fully recover in 1993. The former East Germany could become an important market area because of its rebuilding process. An increase of direct exports to the Commonwealth of Independent States (CIS) and the Eastern European countries is not expected at short notice, due to the economic and political restructuring processes currently going on.

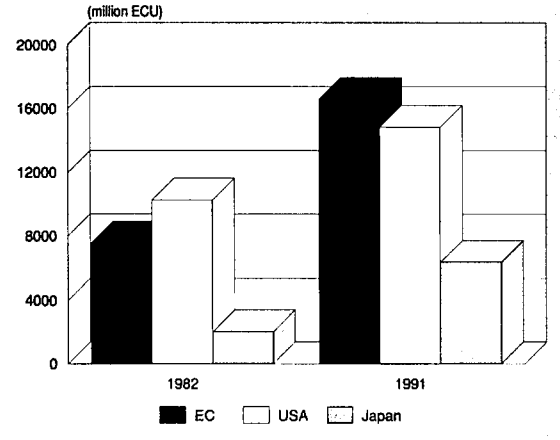
Plant for the leather industry

The market for leather machinery is also weak due to the world recession. Demand in the CIS and the former Eastern Block countries has even disappeared. Although some markets are becoming more and more important (such as Mexico, China, Iran and Algeria), EC manufacturers also suffered from the low exchange rate of the US dollar. Further the recession in the USA resulted in a 20-25% fall in output in Italy, in 1991.

Supply and competition

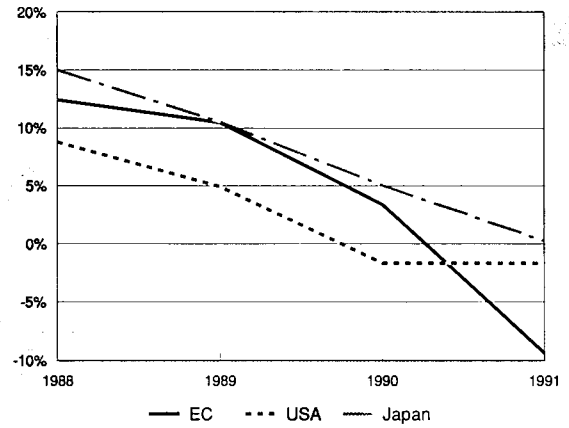
The decrease of sales in the described markets caused an excess capacity, and will inevitably reduce profit margins as price competition will intensify to some extent. However, the heterogeneous composition of the industrial customers group leaves room for extra margins, especially if customer specific solutions are asked for. In this area, the EC industry is ahead of the competition from Japan and Taiwan. Within the EC, only Germany and Italy are important suppliers of machinery for specific branches. Compared to 1985 Germany had even gained some more market share in 1991 (62.6% against 55.9%). Italy lost some of its share, although total EC production increased. Also productivity was lower for Italy com-

Figure 4: Machinery for woodworking, paper production and processing, laundry and leather
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Machinery for woodworking, paper production and processing, laundry and leather
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

pared to Germany. On the other hand, unit labour costs have grown at a faster rate in the latter country than in Italy.

The productivity loss in all EC countries is not surprising as value added decreased while employment remained at a stable level. Despite the stable labour force, the industry succeeded in cutting total unit costs in 1991. A wage inflation in Germany should be avoided in order to keep costs low. In addition, it should be clear that the drop of demand should not lead to the cutting of costs that might endanger final product quality now and in the future (e.g. by cutting costs in R&D), as this is one of the most important elements which determine the success of the EC industry. In the field of woodworking machinery, for example, the German share in inventions worldwide was 31% during the 1982-86 period. The USA (17%), Japan (8%) and Italy (3%) followed at considerable distance. Also, in the other industries - especially in printing machinery - Germany became the leading country by offering high quality products against reasonable prices. Italy is especially strong in the manufacture of leather processing machinery and puts much effort in R&D in order to retain its dominant position.

Printing machinery

In Italy, the trend towards further specialisation in the production of offset-, rotary type and flexographic printing machinery is still proceeding. Some trends in technology will have, and already have had, consequences for the users of printing machinery. Firstly, the development of desktop publishing has enabled especially the small scale printing enterprises to utilise cheaper production facilities (print shops) to cope with small-scale individual printing demands. Secondly, the development of direct plate outputting technologies enables the realisation of a filmless platemaking process, which provides a considerable cost reduction and serves as the foundation for picture data bases. Thirdly, the development of sophisticated picture transmission systems for the printing industry enables reduction of picture transmission costs. Finally, the development of automated input technologies and automatic translation systems could result in cost reduction and more efficient printing.

Woodworking machinery

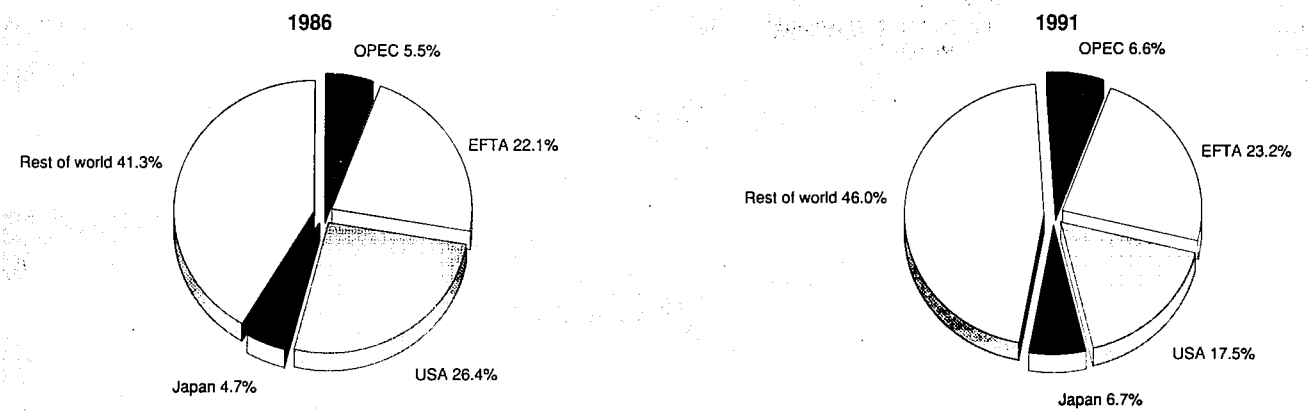
The German woodworking machinery which concentrates especially on labour intensive custom-made solutions, is negatively influenced by high wage costs due to increasing wages and decreasing effective working hours. On the US market competition is fierce and the low dollar exchange rate has a negative impact on German and Italian sales. The quality of the European machinery and after-sales service, however, are at a high level and constitute an important competitive advantage. In contrast with the European manufacturers, Japanese and Taiwanese firms tend to focus on the building and delivery of standard and low-cost machinery.

In the demand for woodworking machinery, a trend can be recognised towards further automation in order to save raw materials, to cut energy costs and to increase productivity and competitiveness. Furthermore, automation is aimed for in order to improve safety conditions in the woodworking industry.

Plant for the leather industry

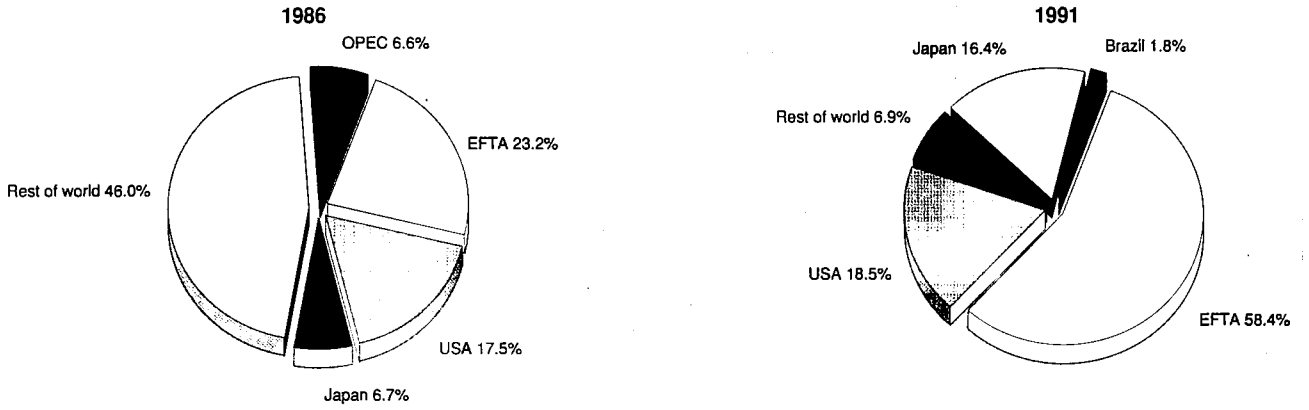
The trend towards more automation can also be recognised in the leather machinery industry. New control systems are made for environmental protection in order to comply with governmental regulations. Demand for leather products in the consumer markets changes rapidly. As a consequence, technical innovations are needed to improve existing and develop new machinery and equipment in order to enable the leather processing industry to become more flexible to adapt to changes in consumer demand.

Figure 6: Machinery for woodworking, paper production and processing, laundry and leather
Destination of EC exports



Source: Eurostat

Figure 7: Machinery for woodworking, paper production and processing, laundry and leather
Origin of EC imports



Source: Eurostat

INDUSTRY STRUCTURE

Companies

Printing machinery

The Italian factories in this industry are relatively small. In 1988, 150 manufacturers employed 7250 people, which means an average of only 48 employees per enterprise. Only 10 factories employed more than 150 people. The major part (60%), however, had a labour force of less than 50 people. In Germany the total number of employees in this industry is roughly estimated at a total of 70 000 in 1990. The average number of employees per enterprise is much higher compared to Italy. Companies like J.M. Voith GMBH, Heidelberger Druckmaschinen AG, and Man Roland Druckmaschinen AG, for example, employed more than 33 000 people in 1990.

Woodworking machinery

Around 780 EC companies in the manufacture of woodworking machinery employed 46 500 people in 1990 (average 59-60 employees per enterprise), compared to a number of 42 000 in 1988. In Germany and the United Kingdom, the average number of employees is more than 100, whereas in Italy it was only 37 people per factory. Furthermore, the EC industry is more labour intensive - due to its higher degree of specialisation - as production per employee within the EC was ECU 100 000 while the same figure was ECU 115 000 for the rest of the world in 1990.

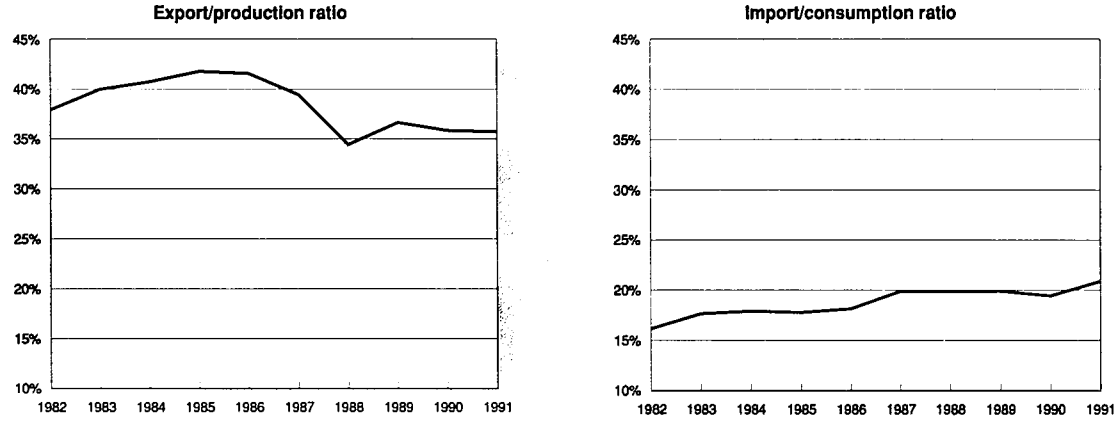
Strategies

Especially on the US market, where competition is fierce for the EC manufacturers, it will become more and more important to meet the specific market demands in order to retain market positions. In the former Eastern European countries companies from the Western industrialised countries (including EC countries) are looking for cooperation (joint ventures) in order to create a strong strategic position, anticipating economic growth in the future. Other manufacturers seem to focus on direct trade with these countries.

ENVIRONMENT

The manufacturers of leather processing plant and machinery are still looking for technological solutions to reduce pollution during the processing of leather and leather products. These problems, therefore, concern the downstream industries rather than the machinery industry itself. At the level of the industry itself, however, manufacturers also have to deal with environmental pressures to reduce pollution. For the manufacturers of woodworking machinery, possible measures against the

Figure 8: Machinery for woodworking, paper production and processing, laundry and leather
Trade intensities



Source: Eurostat

imports of tropical hardwood will inevitably affect demand for their machinery.

REGULATIONS

Directive 89/392 covers all types of machinery and defines their essential safety and health requirements.

In anticipation of EC regulations for a safer working environment the European manufacturers already put much effort in R&D for the improvement of safety conditions of their machinery. In the manufacture of woodworking machinery the trend towards more automation also implies less dangerous working conditions. The European Technical Committee for machinery safety regulations (CEN TC/142) will introduce its safety standards in 1993. The European industry, however, would like to see the CEN standards adopted by the International Standards Organisation (ISO) in order to safeguard the use of the same safety standards worldwide.

If ISO recognition does not happen, this legislation will probably result in European manufacturers having a two-tier production. Expensive machines with high safety standards will be built for the European market and cheaper versions will be built for other markets where safety standards are lower. This may allow European manufacturers to compete with emerging Asian manufacturers on a more equal footing.

OUTLOOK

For 1992, a low growth rate can be expected as the economic situation in the Western industrialised countries is gradually improving. The increase in intra-EC consumption and demand in foreign markets will cause production to grow by an estimated 1%. Employment, however, is not expected to show any growth, as the increase of production will be enabled by using the existing excess capacity.

Table 5: Machinery for woodworking, paper production and processing, laundry and leather
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.1	7.5
Production	2.6	5.0
Extra-EC exports	1.9	3.2

Source: NEI

A recovery of aggregated demand is only to be expected after 1992. From 1993 on, EC production will reach annual growth rates of 5%. This growth is expected to originate from both a recovery of markets in Western industrialised countries, namely internal EC demand, and demand from foreign markets such as the USA. A rise of demand in the former Eastern Block, however, is only expected after 1995.

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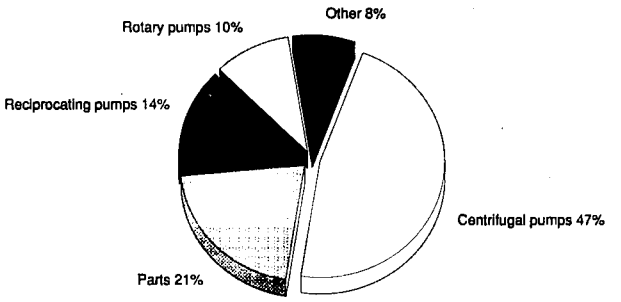
European Committee of Printing and Paper Converting Machinery Manufacturers (EUMAPRINT). Address: c/o National Printing Equipment and Supply Association, 1899 Preston White Drive, USA-22901 4326 Preston; tel: (1 703) 264 72 00; fax: (1 703) 620 09 94; and,
European Laundry and Dry Cleaning Machinery Manufacturers Organisation (ELMO). Address: c/o ACIMIT, Via Tevere 1, I-20123 Milano; tel: (39 2) 498 81 25; fax: (39 2) 48 00 83 42.

Liquid pumps
NACE 328.3

A boom in demand for liquid pumps in the former East Germany in 1991 camouflaged and partly compensated for weak export markets and order portfolios in the rest of the EC. Output growth over the next few years will not only depend on the economic recovery in the major countries and to a lesser extent on the progress of the restructuring process in Eastern Europe, but will also be stimulated by new demand for certain pumps (for instance, pumps for water purification) stemming from tighter water protection standards.

Figure 1: Liquid pumps
Breakdown by major product line in the EC, 1990



Source: Europump

INDUSTRY PROFILE

Description of the sector

NACE 328.3 includes the manufacture of compressors, pumps and equipment for operating machinery by hydraulic or pneumatic means. Besides liquid pumps, the sector also covers compressors and vacuum pumps. However, for these latter product groups little statistical information is available. As a consequence, the description of the sector will mainly cover liquid pumps.

The liquid pumps sector can be divided into six classes: hand pumps; plunger pumps; rotary displacement pumps; centrifugal pumps; other pumps (not elsewhere specified); and parts for pumps.

Recent trends

Between 1982 and 1990, production of liquid pumps in current prices increased by an average annual rate of 3.8%. In volume, however, production in 1990 had still not fully recovered from the drop in production caused by the economic crisis of 1981 to 1983. Production development of centrifugal pumps in particular was disappointing throughout the 1980s. Over the 1981 to 1989 period, real production of these pumps, which represents close to 50% of the pump industry's turnover, decreased by 1% per year. By contrast, plunger and rotary displacement pumps (25% of turnover) registered annual growth rates of 4% in real terms and represented the fastest growing segments.

Production growth has mainly been stimulated by an increase of EC demand. Apparent consumption in current prices increased by an average annual rate of approximately 5.5% during the 1982 to 1990 period, while net exports increased at an average annual rate of less than 1%. Extra-EC exports have suffered from the low dollar exchange rates since 1986.

Germany is the production leader in all categories of pumps, but has an especially strong lead in hand pumps, reciprocating pumps and rotary pumps. These markets, however, are relatively small. In total production, Germany was responsible for almost 49% of EC production, followed at a distant second by the United Kingdom with around 16%. Germany is the leading manufacturing country of vacuum pumps and compressors as well, although these pumps are not covered in the monograph. German production of vacuum pumps and compressors in 1991 was estimated at 1.7 billion ECU, compared to liquid pump production of 2.4 million ECU by Germany in 1990.

International comparison

Production of liquid pumps in the USA and Japan has fluctuated since 1985, partly due to significant variations in exchange rates. The EC remains the largest world's producer of liquid pumps, with a production nearly two times higher than that of the USA and nearly three times than that of Japan. If the general trend in mechanical engineering is applied to this sector, a continued weakening in the position of the USA and a growing Japanese share on the world market is likely.

Foreign trade

Germany had the highest export value as well as production value. Of all liquid pumps produced in Germany in 1991, 59% or 1248.1 million ECU were exported, of which 722.8 million ECU were extra-EC exports. The most important German extra-EC export markets were the USA with approximately 125 million ECU (8%) of German production, Switzerland with 85 million ECU (5.5%), and Sweden with 60 million ECU (4%). France and Italy are the most important EC markets for Germany, importing 165 million ECU (around 11%) and 135 million ECU (about 9%) of German production in 1990, respectively.

During the 1980s, and especially after 1988, growth in intra-EC exports was a major stimulus for production, caused by strong

Table 1: Pumps and compressors
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990(2)	1991(3)	1992(3)
Apparent consumption	2 491	2 384	2 602	2 671	2 806	3 085	3 326	3 625	3 873	4 200	4 100
Net exports	1 121	1 175	1 191	1 281	1 215	914	951	1 136	1 138	1 000	900
Production	3 612	3 559	3 793	3 952	4 021	3 999	4 277	4 761	5 011	5 200	5 000

(1) Excluding Ireland, Portugal and Luxembourg
(2) Also exluding Denmark and Greece
(3) NEI estimates
Source: Eurostat

Table 2: Liquid pumps
Breakdown of production by product line, 1991

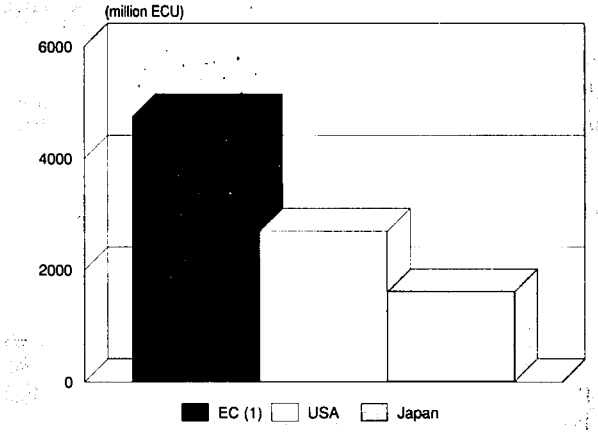
(%)	Hand pumps	Reciprocating pumps	Rotary pumps	Centrifugal pumps	Other pumps	Total original equipment	Parts	Total production
Belgique/België	0.0	0.5	0.7	1.0	2.5	1.0	2.1	1.2
Danmark	0.0	1.5	2.9	5.6	2.4	4.6	10.6	6.0
BR Deutschland	92.2	71.6	44.3	39.9	33.8	44.4	35.4	42.2
España	0.1	0.3	0.5	2.0	1.6	1.6	1.8	1.6
France	3.8	8.1	15.9	16.7	1.6	14.4	10.4	13.5
Italia	0.0	11.5	25.0	21.3	0.0	18.7	10.4	16.7
Nederland	0.0	0.0	0.0	2.1	18.0	2.7	2.9	2.8
United Kingdom	3.9	6.6	10.8	11.4	40.1	12.6	26.4	16.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Europump

demand in some major industries. Extra-EC exports on the other hand suffered from the low exchange rate of the US dollar. In 1990, however, the value of extra-EC exports was still higher than intra-EC exports.

Extra-EC imports remained around 20% of total consumption (in current prices) during the 1980s. In 1990, this share dropped to 17.7%. EC producers operate in relatively fast growing segments, while the Japanese firms, for example, are highly dependant on the market for centrifugal pumps, which has not been performing well. Both EC and US production are more diversified than Japanese production.

Figure 2: Liquid pumps
International comparison of production at current prices, 1990



(1) Excluding Greece
Source: Europump

MARKET FORCES

Demand

Various factors have caused weak demand for EC pump products since 1990. The Gulf war, economic downswings in several important export markets and low exchange rates for the US dollar and Japanese yen have all had an negative effect on EC production. In 1991, the only positive factor was the 19% rise of demand in the former East Germany, which mostly affected German production.

Market demand can be divided into two groups of liquid pumps: standardised pumps and engineered pumps. Both categories have a wide range of products and a wide range of applications. Major markets for standardised pumps are the chemical industry, process industry, construction industry, food industry, shipping, horticulture, civil engineering and the original equipment manufacture (OEM) sectors. Engineered pumps are used in the petrochemical and chemical industries, power stations, irrigation and water supply. Both markets require custom solutions, which requires a flexible and efficient production.

Demand is expanding from the traditional applications of pumps for water management, construction and the chemical industry, into the energy sector. Liquid pumps are especially useful for environmental protection and water purification.

Table 3: Liquid pumps
Production by Member State (1)

(million ECU)	1986	1987	1988	1989	1990	1991
EC	3 434	3 420	3 646	4 056	4 750	4 987
Belgique/België	60	54	52	59	75	61
Danmark	N/A	N/A	N/A	N/A	284	297
BR Deutschland	1 417	1 466	1 530	1 697	1 933	2 108
España	69	72	70	90	100	82
France	508	497	572	611	645	672
Italia	597	622	647	718	802	832
Nederland	166	127	112	130	127	139
United Kingdom	617	582	663	751	784	796

(1) Including parts
Source: Europump

Table 4: Pumps and compressors
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990 (2)
Extra-EC exports	1 572	1 603	1 685	1 875	1 699	1 538	1 624	1 890	1 823
Index	83.8	85.5	89.9	100.0	90.6	82.0	86.6	100.8	97.2
Extra-EC imports	451	428	494	594	484	624	673	754	685
Index	75.9	72.1	83.2	100.0	81.5	105.1	113.3	126.9	115.3
Export/import ratio	3.49	3.75	3.41	3.16	3.51	2.46	2.41	2.51	2.66
Intra-EC trade	897	893	1 004	886	1 001	1 042	1 153	1 415	1 578
Index	101.2	100.8	113.3	100.0	113.0	117.6	130.1	159.7	178.1
Share of total (%)	36.3	35.8	37.3	32.1	37.1	40.4	41.5	42.8	46.4

(1) Excluding Ireland, Luxembourg and Portugal
(2) Also excluding Denmark and Greece
Source: Eurostat

Supply and competition

The sharp increases in intra-EC trade in recent years in contrast with the low growth rates and decline in extra-EC imports, could be an indication of the strong competitiveness of EC industry. In contrast with Japan for instance, the EC industry in general seems to be more diversified into the various segments of the market for liquid pumps and has been able to benefit from growing sectors.

However, the weak international market intensifies price competition and, consequently, profit margins drop. Since the market for liquid pumps (for Germany in particular) follows the same cycles as the markets for machinery and equipment in general, diversification by companies such as Thyssen into other sectors of the machinery industry does not shield these firms from downswings in the business cycle.

Production process

Both capital goods and labour force are important inputs in the production processes of the various pump and compressor industries. The labour force is particularly important in regards to technological research and development. As a consequence, the quality of the labour force and of training programs is a major factor influencing the success of EC industry in the long run. Keeping the quality of the labour force at a high level should not lead to excessive wage increases, however. Sharp rises in labour wages next to increases in input prices of materials (as happened recent years) would have a negative impact on the industry's profitability and cause reductions in investments, which would weaken EC competitiveness.

INDUSTRY STRUCTURE

In general, most of the EC manufacturers of pumps are medium-sized and specialise in a certain kind of pump or concentrate on one or more branches of industry. Abel (Germany), for example, specialises in the development and production of pumps for the mining industry. ABS is the largest EC manufacturer of waste water pumps. Allweiler and Netzsch are both active in nearly all the different segments for liquid pumps. The multinational company Thyssen is also active in some parts of the market for liquid pumps, but its product range is less diverse than the range offered by Allweiler.

The completion of the Single Market will bring changes in the structure of the pump sector. In recent years, a number of buy-outs and mergers have resulted in some large pan-European companies such as KSB, SIHI, ABS-Pumps, Dresser and Grundfos. The industry is trying to internationalise in order to compete more aggressively in the Single Market. For the majority of the enterprises, specialised in smaller market niches, joint ventures with similar companies in other EC countries should be a better means to benefit from the advantages of the European unification process.

Weak markets have already forced many companies to capacity and cost reductions to retain competitiveness. The wide deployment of CAD/CAM/CIM (computer-aided design, computer-aided manufacturing, and computer-integrated manufacturing) has resulted in productivity improvements and consequently to labour cost savings. This trend is likely to continue. Widespread and efficient distribution networks on key markets are getting more and more important in the standardised pump sector. For most of the specialised companies, more effort in product innovation and product modification will be needed, both to retain competitive advantage to stimulate demand from the general trend towards increased environmental protection. The latter trend provides the industry with extra demand for pumps for water purification, for example. On the other hand the same trend has induced the industry to produce less polluting pumps (i.e. without leakage).

Table 5: Liquid pumps
Breakdown of trade by Member State in current value, 1991

(million ECU)	B	DK	D	E	F	I	NL	UK
Extra-EC exports	26.0	88.8	722.8	24.2	149.3	332.9	133.3	337.3
Extra-EC imports	39.0	26.1	257.6	35.2	112.0	62.6	81.8	142.3
Trade balance	-13.0	62.7	465.2	-11.0	37.3	270.3	51.5	195.0
Total exports	77.0	258.3	1248.1	65.2	347.0	592.4	303.3	530.1
Total imports	194.9	90.0	664.2	168.9	339.6	270.1	329.7	351.9
Ratio exports/imports	0.4	2.9	1.9	0.4	1.0	2.2	0.9	1.5
Intra-EC trade	155.9	65.1	406.8	133.7	227.7	207.5	248.0	210.1
Share of total imports (%)	80.0	72.3	61.2	79.2	67.0	76.8	75.2	59.7

Source: Europump

REGULATIONS

The European Technical Committee for machinery safety and health regulations (CEN TC/200) will introduce safety standards in 1993. These will also apply to the manufacture of liquid pumps. The central issue of the new regulations (self-certification by the industry) will give the final responsibility for setting standards to the various industries. CEN has the final task of providing detailed European standards.

Control on the use of the new standards has been given to the national governments. In Member States with a long industrial tradition (such as Germany), safety and health standards are already established at a high level. For these countries, new EC standards will not have a negative impact on the domestic industries. Other EC countries, however, such as Greece and Portugal, which currently have much lower standards, could have some difficulty in reaching the European CEN-norms. European industries would like to see the CEN standards adopted by the International Standards Organisation (ISO) in order to avoid unfair competition on foreign markets.

ENVIRONMENT

Besides the safety standards, more environmental regulations can be expected in the coming years. In the European Act of 1987, guidelines are set for the governments of the Member States to work on their own environmental laws. The industry fears unfair competition if these regulations are not applied on a European scale. The manufacturers of liquid pumps, however, are not expected to suffer from growing environmental pressures. Demand has risen for waste water pumps, partly due to the guideline (March 1991) addressing the management and processing of urban waste water.

Noise pollution has been considered a major problem for the industry, but thanks to steady improvements in production techniques and processes, noise has been and will be further reduced. Furthermore, due to growing environmental pressures, reflected in demand, the industry has been induced to manufacture less polluting pumps, with less leakage. Technologically developed manufacturers could take advantage of the environmental pressures if their products can meet the environmental requirements.

OUTLOOK

Some of the reasons underlying slack demand during 1991, such as the Gulf war, have been resolved. Other problems, however, are expected to continue. Recessions in some important export markets are expected to turn into slow recoveries. The exchange rate of the US dollar remains a big problem for EC exports to the USA. The political and economic restructuring processes of East Europe are proceeding very slowly, which makes any significant upswing of demand in these countries unlikely in the short term.

German domestic demand for the years after 1992 will depend to a large extent on the economic performance of its most important export markets. For the USA, Italy, the United Kingdom and France, low but improving economic growth rates are expected for the 1992-1995 period. This will have a positive impact on demand for liquid pumps. Additional demand can be expected from rising interest for environmental protection.

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Other machinery
NACE 328

The cyclical character of activities in the various industries in this sub-chapter is reflected in a weak demand and in declining production growth figures. Until now, the former COMECON countries (except for the former East Germany) could not stimulate world demand. Extra-EC exports declined and extra-EC imports increased, possibly indicating a weakening competitiveness of the EC industry on the world market. The industry should put a lot of effort in R&D to maintain its technological advantage. Furthermore, wage increases risk eroding price-competitiveness.

INDUSTRY PROFILE

Description of the sector

This NACE includes the manufacture of a heterogeneous variety of machinery and equipment not elsewhere categorised. The manufacture of compressors, pumps and equipment for operating machinery by hydraulic or pneumatic means also makes part of the NACE 328, yet is discussed in a separate sub-chapter.

NACE 328 includes the manufacture of:

- internal combustion engines, except those for road vehicles and aircraft (NACE 328.1);
- water-wheels and water and heat-turbines and other mechanical energy producing machinery (NACE 328.2);
- space-heating, ventilating and air-conditioning equipment (NACE 328.4);
- refrigerating machinery (except domestic type refrigerators and domestic deep freeze units) (NACE 328.5);
- non-electric industrial furnaces and ovens (NACE 328.6);
- non-electric welding-equipment (NACE 328.7);
- taps, cocks, valves and similar appliances (NACE 328.8);
- machinery and appliances not elsewhere specified (NACE 328.9).

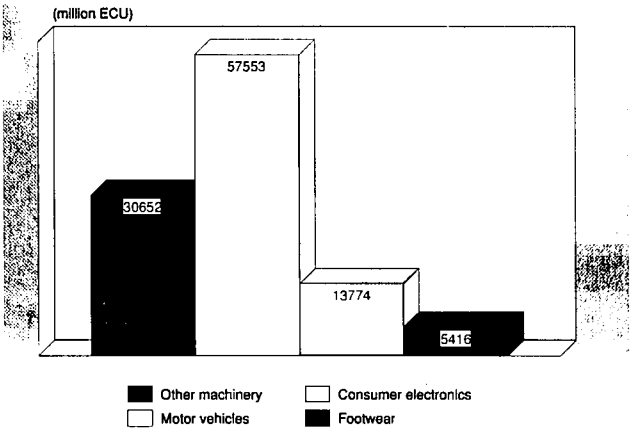
The entire industry, including NACE 328.3 (compressors and pumps, which is considered in the previous chapter), together generated an output worth about 75 billion ECU in 1991, with a total value added of more than 30 billion ECU. These figures stress the economic importance of the industry, that, in terms of value added, positions itself between other important industries such as the manufacture of motor vehicles, and consumer electronics.

The largest part of the machinery and equipment produced in the various industries is destined for industrial applications. A distinction can be made between machinery and equipment directly used or applied in production processes, and machinery and equipment with a more general use in the production environment. In both cases the machinery and equipment produced can find its applications in all kinds of industries.

In NACE 328.8, for instance, two main markets can be recognised: the industrial markets for valves, tubes etc., and the construction market for sanitary fittings. Similarly, air-conditioning equipment (NACE 328.4) can find its final destination in industrial production plants and office-buildings.

Investment in machinery and equipment in the downstream industries depend to a high extent on the final demand on their respective markets, which in turn is highly dependent on the overall economic situation. This makes the various industries particularly sensitive to cyclical developments in the economy.

Figure 1: Other machinery
Value added in comparison with other industries, 1991



Source: Eurostat

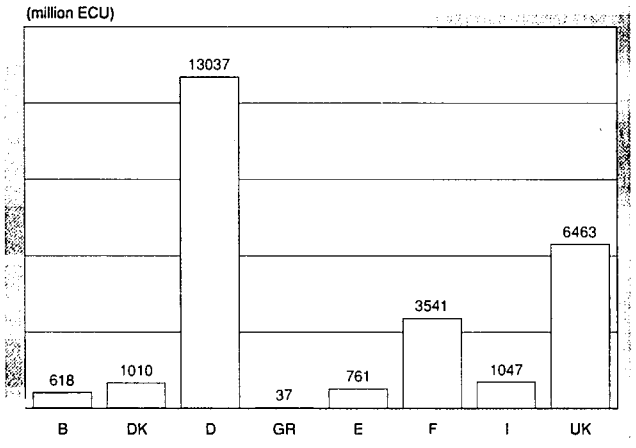
Main indicators

The economic downturn translated into decreasing growth rates in 1991 for production, consumption and extra-EC exports, at current prices. Also, in the early 1980s, growth rates were relatively low compared to those in the latter half of the 1980s. Only in 1987 production fell, caused by a drop in both extra-EC exports and EC consumption. Employment varied over the years between 750 000 and 800 000 people.

The geographical breakdown of value added indicates the dominant position of Germany in the machinery industry. In this NACE, however, Germany is not directly followed by Italy, usually the second EC country in mechanical engineering. It is the United Kingdom that takes the second position, ahead of Italy and France.

Only for Germany and the United Kingdom a further breakdown is available for the industry. Germany is represented in all separate industries, among which the manufacture of pumps (NACE 328.3) and the manufacture of valves (NACE 328.8) are the most important sectors.

Figure 2: Other machinery
Value added by Member State, 1991



Source: Eurostat

Table 1: Other machinery
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	35 174	36 010	40 661	44 550	46 066	45 148	49 914	58 793	63 756	64 022	65 900
Production	44 893	46 233	51 603	56 009	57 068	54 956	60 128	69 921	74 907	75 822	78 000
Extra-EC exports	14 743	15 426	16 792	19 462	18 686	17 971	19 850	22 764	24 189	25 705	27 250
Trade balance	9 719	10 223	10 942	11 459	11 002	9 809	10 215	11 128	11 150	11 799	11 800
Employment (thousands)	806.7	779.9	780.2	780.3	790.4	756.1	759.6	800.2	796.5	790.2	790.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Other machinery
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.6	3.3	3.3
Production	2.6	1.7	1.7
Extra-EC exports	0.9	0.7	-0.3
Extra-EC imports	3.7	8.2	5.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Other machinery
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	14 743	15 426	16 792	19 462	18 686	17 971	19 850	22 764	24 189	25 705
Extra-EC imports	5 024	5 203	5 850	8 003	7 684	8 163	9 636	11 636	13 039	13 905
Trade balance	9 719	10 223	10 942	11 459	11 002	9 809	10 215	11 128	11 150	11 799
Ratio exports/imports	2.93	2.96	2.87	2.43	2.43	2.20	2.06	1.96	1.86	1.85
Terms of trade	111.0	106.0	101.0	100.0	107.0	111.0	114.0	109.0	115.0	117.0
Intra-EC trade	9 051	9 406	10 262	12 030	13 346	14 713	16 700	19 170	21 346	22 784
Share of total imports (%)	63.0	63.2	61.5	58.1	61.3	62.2	62.5	61.5	61.4	61.5

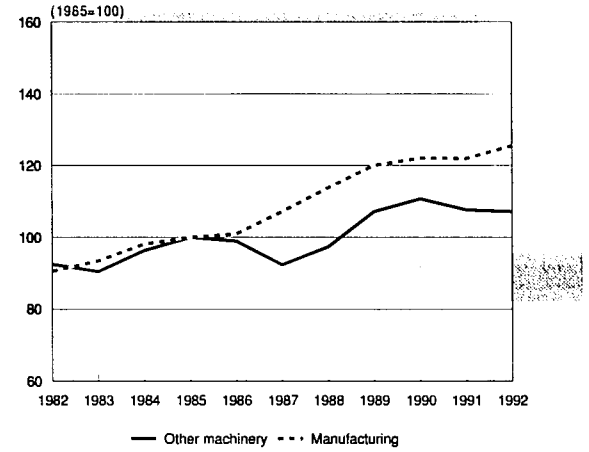
(1) Estimates
Source: Eurostat

Table 4: Other machinery
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	33.6	33.3	34.3	36.3	34.7	36.2	37.3	37.6	39.6	38.8
Productivity index	92.5	91.6	94.3	100.0	95.5	99.5	102.7	103.5	109.0	106.7
Unit labour costs index (3)	83.0	87.7	93.4	100.0	106.1	109.9	115.6	122.2	128.8	132.1(5)
Total unit costs index (4)	76.7	82.8	93.7	100.0	101.5	96.7	107.1	120.5	129.4	133.3

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
(5) NEI estimate
Source: Eurostat

Figure 3: Other machinery
Production index compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

Recent trends

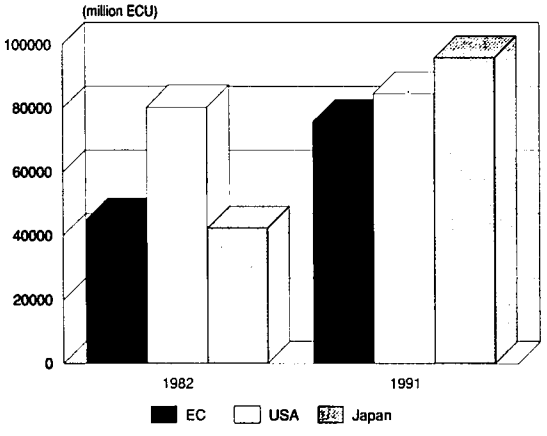
During the 1982-91 period, non-EC countries have absorbed a growing part of EC consumption in volume. Performance trends of the other machinery industry compare well to those of the entire mechanical engineering industry. The real growth rates of extra-EC imports - especially during the 1986-91 period - reveal a serious threat for EC producers. Furthermore, figures for extra-EC exports indicate a declining share on the world market.

In terms of real production growth, differences between EC countries exist. Germany and the United Kingdom were only able to increase production volume during 1982-91 by annual increases of 0.6% and 0.2% on average. France and Italy, however, have made strong progress throughout the 1980s: annual growth rates in real terms amounted to 4.5% and 6.1% respectively.

International comparison

Figures 4 and 5 reveal strong growth of the industry in both the EC and Japan, and a status-quo in the USA. Growth rates for both the EC and Japan, however, have been declining fast in recent years.

Figure 4: Other machinery
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Foreign trade

The development of the export-import ratio testifies the worsening position of the EC industry. The ratio went down from nearly 3.0 in the beginning of the 1980s to 1.85 in 1991. Despite the adverse developments in exports and imports, the trade balance remained at a surplus of about 10 to 12 billion ECU.

The EFTA countries saw their share of imports into the EC halved, from 20% in 1986 to 10% in 1991. In contrast with other mechanical engineering industries, the share of the USA as destination for extra-EC exports has not decreased, despite the higher exchange rate of the ECU against the US dollar.

From Table 3 it appears that extra-EC imports and EC consumption in nominal terms developed in a parallel way throughout the 1982-91 period. The ratio shows that non-EC market share on the EC market was maintained at some 40%. In volume, however, the same share increased from 17.9% in 1982 to 21.7% in 1991.

Up to now, East European markets have not provided a significant stimulus to the demand for machinery and equipment capital goods. Besides the dissolution of the economic and political system, the lack of foreign currency hampers the acquisition of new orders on these markets. Also, joint ventures of EC manufacturers with East European counterparts have not yet proven to be very dynamic. In many cases, they only signify a foothold for the distribution of Western products.

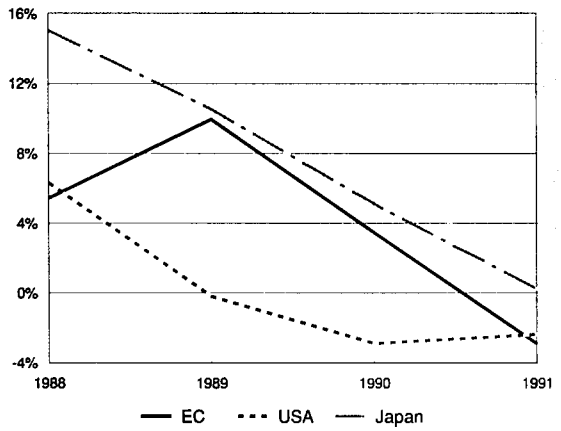
MARKET FORCES

Demand, supply and competition

Most of the mechanical engineering industries discussed in this sub-chapter, sell their goods to downstream industries of a varying nature. This heterogeneity implies a smaller degree of concentration of demand, which might allow the various industries to set higher prices and margins. The unification of the EC market, however, will lead to a further internationalisation and concentration of the client industries. This will put pressure on prices and margins.

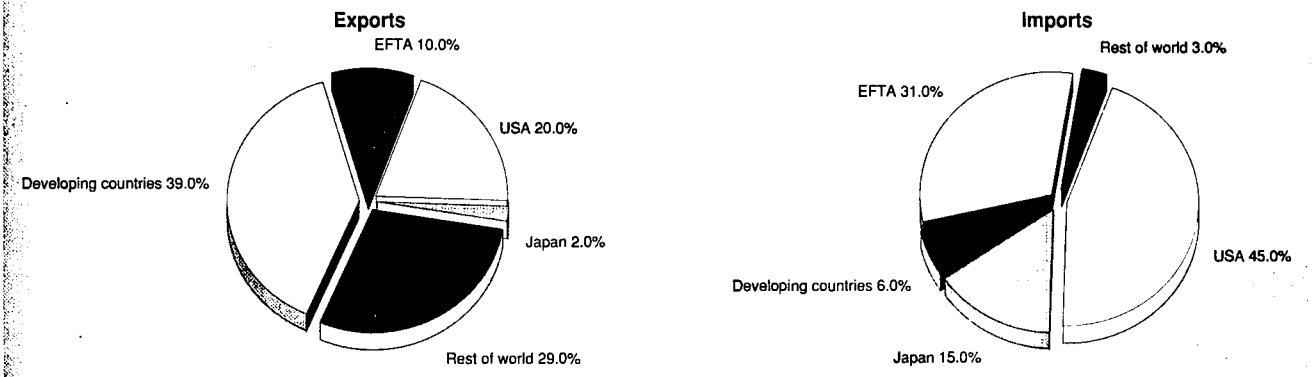
Foreign competition could also intensify. Especially, foreign companies with subsidiary production facilities within the EC could benefit from the European unification. As far as direct trade is concerned, the USA is expected to lose more share on the European market to Japan, despite improved price competitiveness.

Figure 5: Other machinery
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Other machinery
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Within the EC, some divergent developments in terms of competitiveness can be observed between countries. Compared to the United Kingdom, the labour unit costs were as much as 50% higher in Germany in 1990. In contrast, total unit costs have been increasing more rapidly in the United Kingdom than in Germany. Italian and French manufacturers managed to increase production without significantly expanding their labour force, indicating productivity growth. UK manufacturers were able to improve their productivity while reducing the number of employees.

In order to remain competitive, EC manufacturers will have to strive towards further cost reductions, thereby increasing productivity. In addition, the big technological advantage of EC mechanical engineering products - especially of Germany - on the world market will have to be maintained in order to meet the challenges of the EC Single Market and to effectively withstand worldwide competition.

Production process

Labour remains one of the major inputs. As can be derived from Table 4, average unit labour costs have risen throughout the 1980s. A similar trend can be observed for total unit costs. Although the higher unit labour costs are partly compensated by an increasing labour productivity, real wage increases above overall productivity growth become a considerable threat for the competitiveness of the industry, especially in Germany.

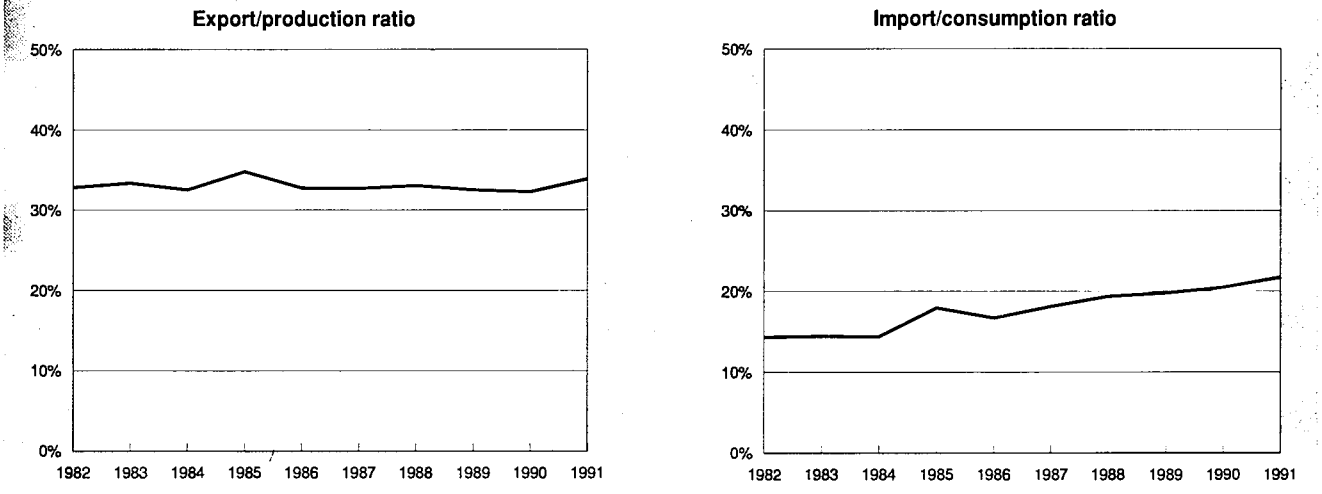
A trend towards further automation in order to improve the efficiency of production processes, not only within the factories of the industry itself, but also via their products in those of the downstream industries, can be signalled. This stresses the need for technical innovation. Another drive towards more technical innovation is coming from the increasing environmental pressures for more energy-efficient and less polluting machinery and equipment. Also, other elements as machine safety and the reduction of noise are gaining importance.

INDUSTRY STRUCTURE

Companies

The regional distribution of the various activities under this NACE heading is not very different from the general picture of the entire mechanical engineering industry. The major part

Figure 7: Other machinery
Trade intensities



Source: Eurostat

of the activities is concentrated in Germany, North Italy, the United Kingdom and France.

Some large, especially German, manufacturing companies are active in the various industries. Companies like Man-AG, Fried. Krupp Gesellschaft and Thyssen Industrie, active in one or more branches of the mechanical engineering industry, figure among the EC top ten. The French, English and Italian enterprises are smaller, but in general more specialised than their German colleagues.

In general, the European mechanical engineering industry consists of medium-sized companies. In order to avert the threat of non-EC companies penetrating into the EC market, the EC manufacturers should protect and improve their market position through further internationalisation. Through the conclusion of mergers, acquisitions or alliances, this strategy has already been followed by EC as well as non-EC manufacturers, and will continue to be followed in the future.

REGULATIONS

Directive 89/392 deals with all types of machinery and determines their essential safety and health requirements.

The European Technical Committee for machinery safety and health regulations (CEN TC/200) will introduce safety standards in 1993. The central issue of the new regulations - certification by the industry itself - will give the final responsibility to set specific standards to the various industries themselves. CEN - the European Normalisation Institute - has the final task to provide detailed European standards. Control on the use of the new standards lies at the level of the national EC governments.

The European industry would like to see the CEN standards adopted by the International Standards Organisation (ISO), in order to avoid unfair competition on foreign non-EC markets.

OUTLOOK

If apparent consumption trends during the 1980s are extrapolated, a further annual growth of 3% after 1992 can be expected until 1996. It is questionable, however, whether the EC production can fully benefit from these increases. The development of extra-EC exports has been disappointing and for the coming years no upswing is expected. As a result,

Table 5: Other machinery
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	3.0
Production	2.0	2.0
Extra-EC exports	0.0	0.0

Source: NEI

further production growth will have to originate from the own EC market, on which the volume share of non-EC products is already increasing. Nevertheless, an annual growth of about 2% in real values can be expected for the 1993-96 period. The production growth will result from a more efficient capacity utilisation, without employment increases.

In order to maintain their competitiveness, the European manufacturers should try to keep their lead in R&D. In addition, the EC industry should strive towards further automation in order to reduce production costs.

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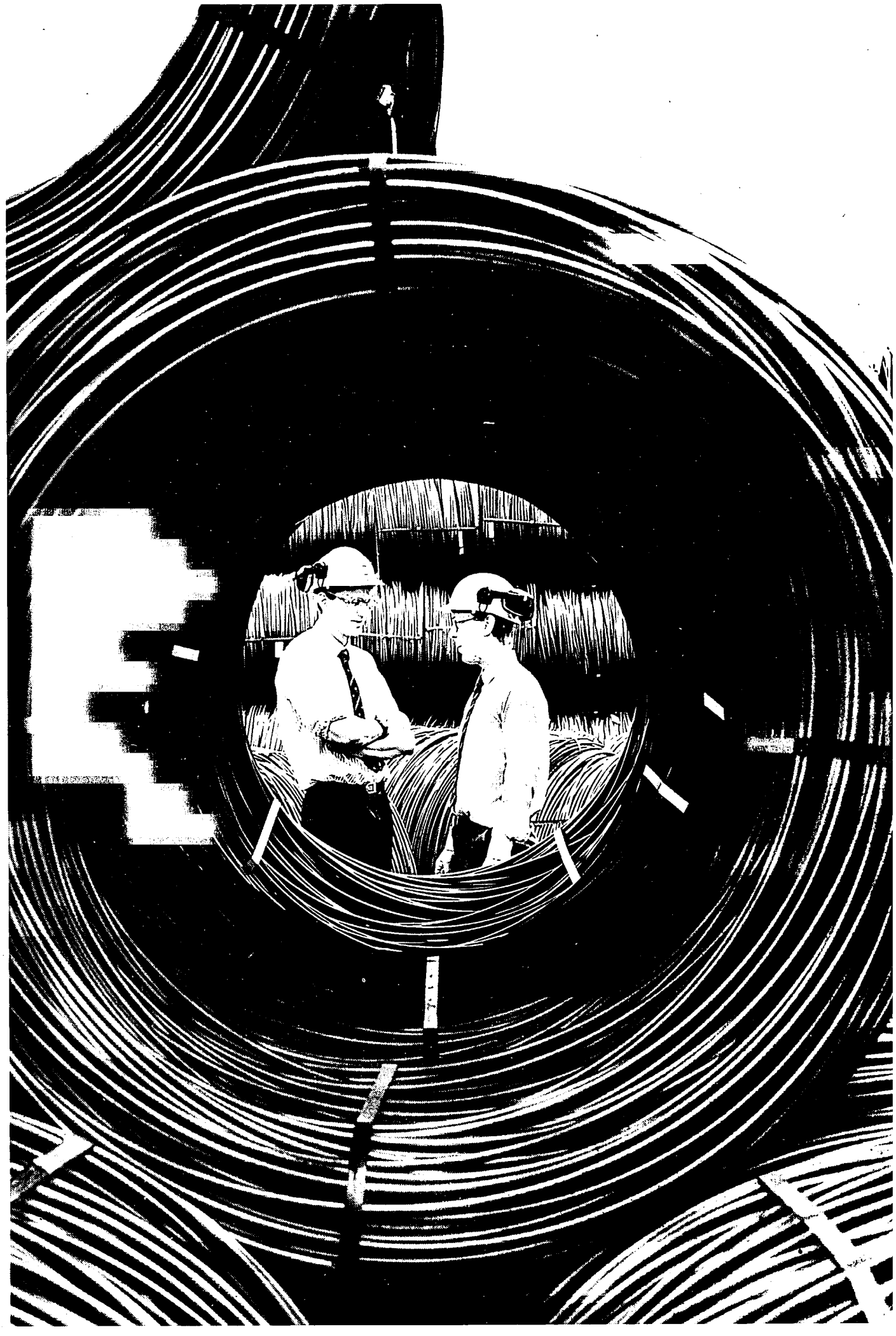
European Committee of Industrial Furnace and Heating Equipment Associations/Comité Européen des Constructeurs de Fours et d'Equipements Thermiques Industriels (CECOF). Address: Lyoner Strasse 18, Postfach 710864, D-6000 Frankfurt/Main; tel: (49 69) 660 3413; fax: (49 69) 660 3511; and,
European Committee for the Valves and Fittings Industry / Comité Européen de l'Industrie de la Robinetterie (CEIR). Address: c/o VDMA, Lyoner Strasse 18, D-6000 Frankfurt/Main; tel: (49 69) 660 3241; fax: (49 69) 660 3634.



Electrical and electronic engineering
NACE 34

The electrical and electronics industry, with a production value of more than 290 billion ECU and a workforce of 2.7 million in 1992, is one of Europe's largest industrial sectors. On the one hand, it profits from the strong growth of the markets for high-tech capital and consumer goods, goods for which it is one of the major buyers. On the other hand, its companies, with innovative technologies and products, are expanding the electrical and electronics markets in Europe.

INDUSTRY PROFILE

Description of the sector

NACE 34 includes the following sub-categories:

- insulated wires and cables (NACE 341);
- electrical machinery (including electric motors, generators, transformers, switchgears, etc.) (NACE 342);
- electrical equipment for industrial use and batteries and accumulators (NACE 343);
- telecommunications equipment, electrical and electronic measuring and recording equipment and electro-medical equipment (NACE 344);
- radio and television sets, sound reproducing and recording equipment (NACE 345);
- electric domestic appliances (NACE 346);
- electric lamps and other electric lighting equipment (NACE 347);
- assembly and installation of electrical equipment (NACE 348).

Given the difficulty of separating these sectors statistically, the electrical and electronics industries are considered together in this overview. Moreover, most companies in this sector have a foothold in both types of activity.

Main indicators

The sagging economic activity in Europe affected also the development of the electrical and electronics industry of the EC. In half of the EC Member States, production of electrical and electronic equipment declined in 1991, with only Germany, Ireland and Spain registering positive growth. The weak economic climate of 1992 also produced declines in the EC electrical and electronic engineering sector overall, although prospects for recovery seemed brighter by the end of the year.

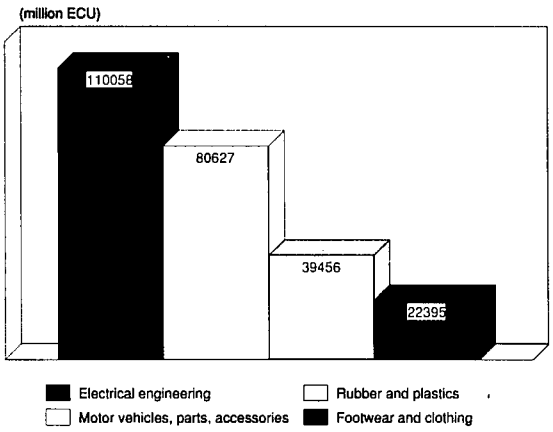
Production soared from 132.5 billion ECU in 1982 to 258.4 billion ECU in 1991. This gives an average growth rate of more than 6% per year in nominal terms (or 5% in real terms).

In terms of value added, the German electrical and electronics industry achieved 43% of the EC total compared to France, with 18%, Italy, with 14% and the United Kingdom, with 13%.

Recent trends

During the 1982-91 period, electrical and electronic engineering production growth in the major producer countries accelerated in real terms. Only in 1991 did this trend reverse in some countries. Of the countries reviewed, Germany ranked second in production growth after Japan and was above the average of the EC countries.

Figure 1: Electrical and electronic engineering Value added in comparison with other industrial sectors, 1991



Source: Eurostat

International comparison

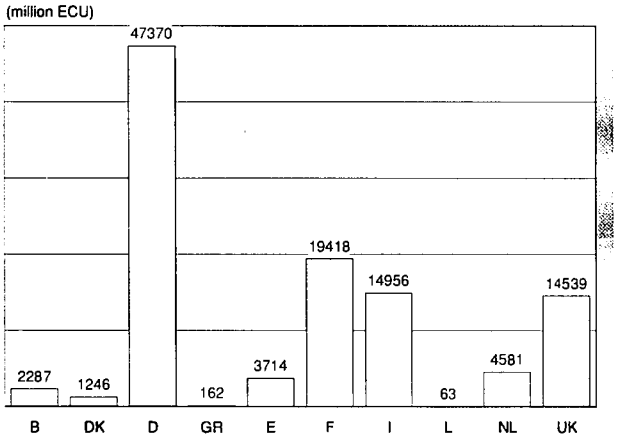
In 1982, the world market for electrical and electronic products had reached a volume of around 700 billion ECU. By 1991, the market had almost doubled to just under 1 400 billion ECU.

The biggest shares in the world electrical/electronics market are accounted for by the USA, Japan and the EC. Together these three blocs make up 70% of the world electrical/electronics market (including the Eastern bloc).

Foreign trade

The electrical industry has always been an export-intensive sector. The period 1982-91 witnessed a strong expansion in world exports which rose from 150 billion ECU in 1982 to 290 billion ECU in 1991. The three major exporting countries, Japan, the USA and Germany, together accounted for around

Figure 2: Electrical and electronic engineering Value added by Member State, 1991



Source: Eurostat

Table 1: Electrical and electronic engineering
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	126 730	141 957	155 549	167 930	177 674	192 665	215 997	238 117	252 117	267 145	273 407
Production	132 550	146 167	159 553	172 855	181 167	192 876	211 817	232 245	246 172	258 397	263 038
Extra-EC exports	24 124	25 445	29 643	33 216	32 228	32 037	34 216	38 252	39 663	42 480	42 395
Trade balance	5 820	4 210	4 004	4 925	3 493	211	-4 179	-5 872	-5 945	-8 748	-10 369
Employment (thousands)	2 709	2 722	2 695	2 688	2 696	2 715	2 707	2 773	2 787	2 778	2 724

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) ZVEI estimates
Source: Eurostat

Table 2: Electrical and electronic engineering
Breakdown by major sectors, 1991

(million ECU)	Apparent consumption	Production	Extra-EC exports
Insulated wires and cables (1)	11 478	11 600	1 606
Electrical machinery (2)	47 309	49 996	11 152
Domestic appliances (3)	23 217	23 949	3 028
Electric lighting (3)	7 774	8 115	1 319
Electronic components (4)	22 112	14 012	5 400
Telecommunications equipment (5)	26 780	27 136	5 424
Consumer electronics (3)	51 702	38 536	8 399

(1) ifo Institute estimates
(2) BAK estimates
(3) Eurostat estimates are used if country data is not available
(4) BIS Strategic Decisions estimates
(5) BIS Strategic Decisions estimates, except for extra-EC exports
Source: Europacable, Eurostat

Table 3: Electrical and electronic engineering
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.9	6.3	5.8
Production	4.9	5.0	5.0
Extra-EC exports	5.0	2.8	3.5
Extra-EC imports	4.6	10.3	8.4

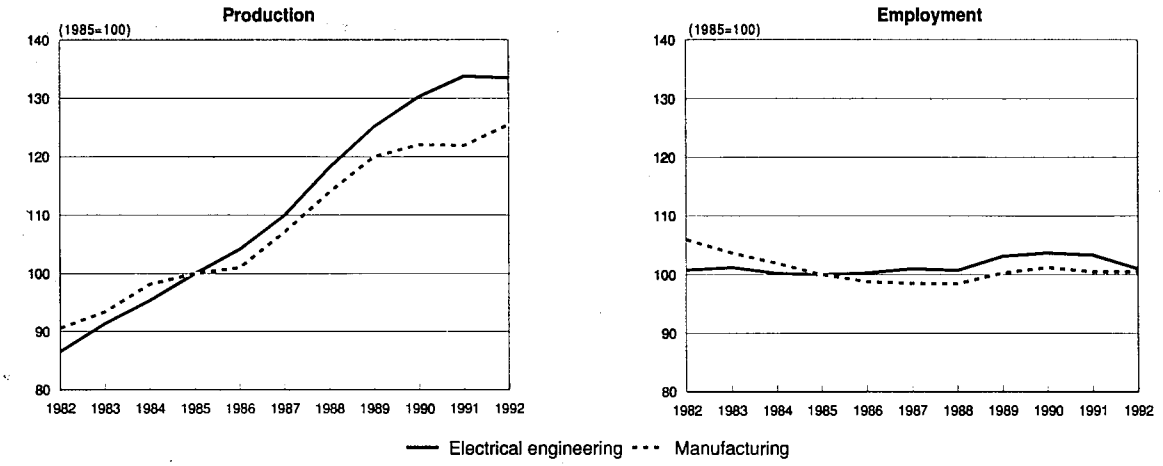
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Electrical and electronic engineering
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(2)
Extra-EC exports	24 124	25 445	29 643	33 216	32 228	32 037	34 216	38 252	39 663	42 480	42 395
Extra-EC imports	18 304	21 235	25 639	28 291	28 735	31 826	38 396	44 124	45 608	51 227	52 764
Trade balance	5 820	4 210	4 004	4 925	3 493	211	-4 179	-5 872	-5 945	-8 748	-10 369
Ratio exports/imports	1.32	1.20	1.16	1.17	1.12	1.01	0.89	0.87	0.87	0.83	0.80
Terms of trade index	113.5	109.9	102.8	100.0	105.2	107.1	107.3	105.0	110.6	107.6	N/A
Intra-EC trade	22 085	24 218	28 375	32 559	36 332	39 511	45 032	51 686	57 069	60 451	61 660
Share of total imports (%)	54.7	53.3	52.5	53.5	55.8	55.4	54.0	53.9	55.6	54.1	53.9

(1) Estimates
(2) ZVEI estimates
(3) ZVEI forecasts
Source: Eurostat

Figure 3: Electrical and electronic engineering
Production and employment indices compared to EC manufacturing



1992 are ZVEI estimates
Source: Eurostat

three fifths of exports of electrical and electronic equipment. Other major exporters are the United Kingdom, France, Italy and the Netherlands.

The European electrical and electronics industry is the third largest exporter of electrotechnical products after Japan and the USA.

Export growth over the eighties of products such as electronic components was well above the average for the electrical and electronic industry while in segments such as electronic measurement and control, power engineering, telecommunications and consumer electronics, export growth was below the average.

Capital goods make up nearly two-thirds of electrical and electronic equipment exports while consumer goods and primary products account for less than one fifth each. These product areas vary in their export orientation. Their dependence on external markets is also considerably larger than is indicated by the export ratio, i.e. the level of goods exported as a proportion of manufacturers' sales. If account is taken of indirect exports, i.e. of equipment which is integrated into products further processed, the export ratios would be much higher. Apart from motor vehicle manufacturing, indirect exports primarily occur in the mechanical engineering sector.

The largest end markets of EC exports of electrical and electronic equipment are the EFTA countries and the USA. The main buyers in the "rest of world" category are primarily the developing countries though their importance as customers has levelled off in recent years.

The continued convergence of international markets which has accompanied stiffer competition has also had its effects on electrical imports. Back in the 1970s, electrical imports were already rising faster than exports. In the period from 1982 to 1991, this development continued. Extra-EC imports rose nearly threefold over the period with growth averaging around 8% per year.

As for exports, capital goods also dominate the import structure, accounting for more than three-fifths of EC imports. Consumer goods and primary products between them share the remaining two-fifths.

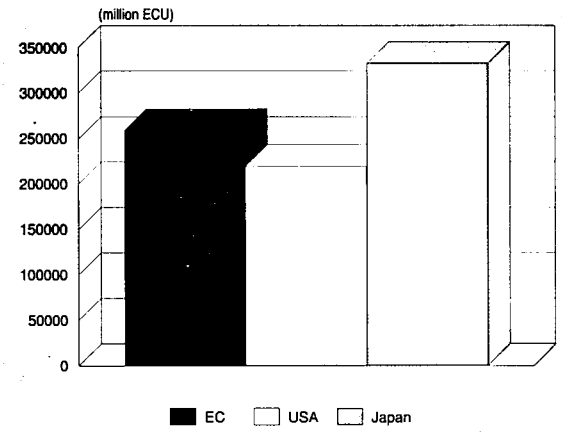
The import ratio, defined as the share of imports in total home market supply, rose steadily in the period under review and in 1991 stood at 19% for electrotechnical products.

Table 5: Electrical and electronic engineering
Production at constant prices and employment by Member State (1)

	Production (million ECU)		Employment (thousands)	
	1982	1991	1982	1991
Belgique/België	2 196	2 433	35.5	27.3
Danmark	N/A	N/A	N/A	N/A
BR Deutschland	28 125	38 319	466.5	543.1
Hellas	501	530	11.2	8.5
España	4 696	4 768	92.8	72.5
France	18 079	20 872	268.0	214.8
Ireland	274	752	6.6	9.6
Italia	10 276	15 416	196.4	144.9
Luxembourg	19	41	0.1	0.5
Nederland	3 786	5 598	48.9	52.0
Portugal	283	1 266	17.3	21.2
United Kingdom	12 093	16 123	257.6	228.1

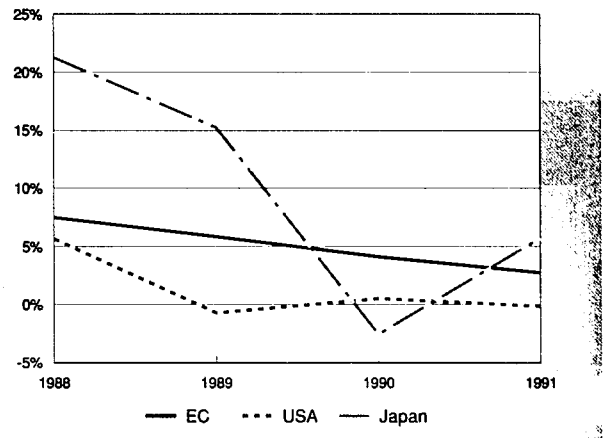
(1) Estimates are used especially in 1991
Source: Eurostat

Figure 4: Electrical and electronic engineering International comparison of production at current prices, 1991



Source: Eurostat, Census of Manufacturers

Figure 5: Electrical and electronic engineering International comparison of production growth at constant prices



Source: Eurostat

The regional structure of electrical imports shows that the major suppliers, like the major buyers, are European countries. Other important supplier countries are Japan and the USA, accounting for around one fourth of extra-EC imports each. With imports from nearly all countries having risen in absolute terms, there have been shifts in the supply shares. Share gains have been scored mainly by the Japanese manufacturers, this expansion being almost exclusively due to consumer electronics imports.

In the 1980s, external trade in electrotechnical products further strengthened in all sectors of electrical and electronic engineering. This is a sign of the intensified international division of labour. In fact, external trade in electrotechnical products swung from a surplus to a considerable deficit position. In 1982, the surplus totalled around 5.8 billion ECU, in 1987, the balance was nearly even. Thereafter, imports rose much faster than exports and this development led to a negative balance of nearly 9 billion ECU in 1991.

MARKET FORCES

Demand

About one-third of the electrical industry's production is accounted for by intermediate demand, i.e. subcontractors' supplies of electrotechnical products for further use in the industry's own or in other industries' manufacturing processes, and two-thirds by final demand.

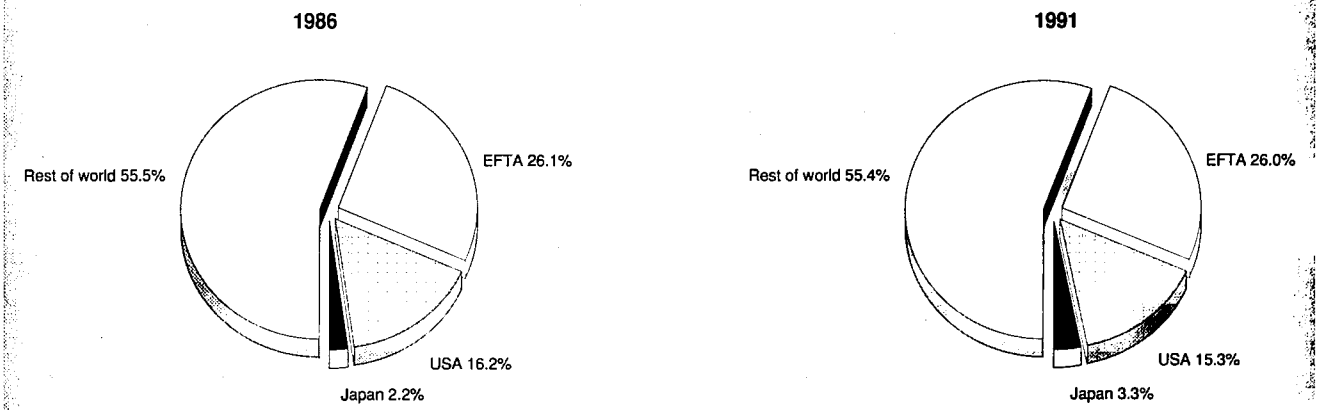
The electrical industry itself was the principal buyer of its own products for further processing or for integration into other products. Other important areas of intermediate consumption are mechanical engineering, the services sector and the motor vehicle industry.

If only capital goods of electrical and electronic production is taken, then the services sector was the main customer. Within this sector, traffic (including communications) was the weightiest consumer, followed by government and by road vehicle construction.

Supply and competition

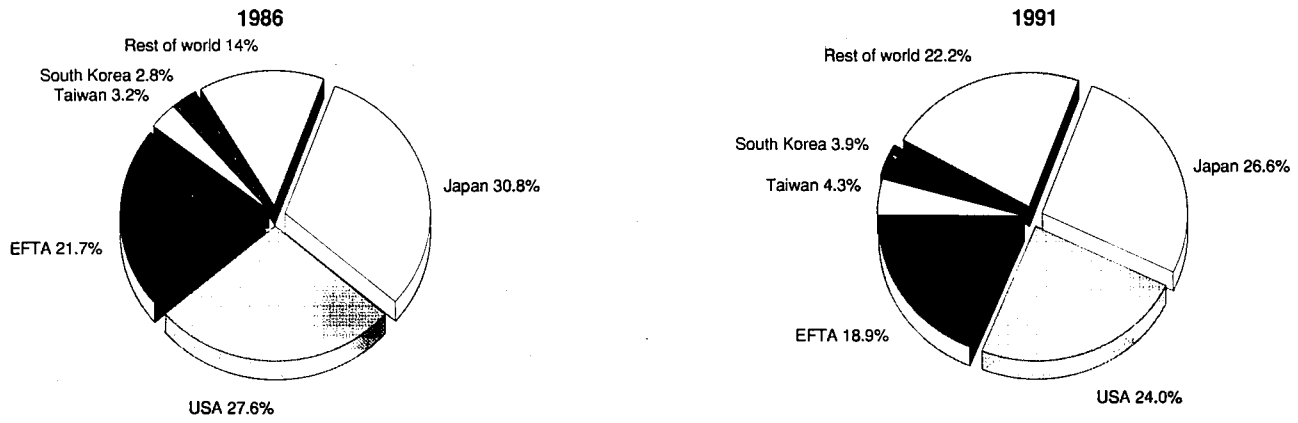
Measured by product types and applications, the electrical industry is a production sector of manifold and varied composition, with a spectrum ranging from microcomponents through to nuclear power plants. Therefore, the overall growth rate does not reflect the widely differentiated development patterns of the individual product areas. Here, output in terms of value is found to have risen highest in the area of electronic components, motor vehicle equipment and in measurement, control and automation. Slower growth can be found in elec-

Figure 6: Electrical and electronic engineering Destination of EC exports



Source: Eurostat

Figure 7: Electrical and electronic engineering
Origin of EC imports



Source: Eurostat

tricity distribution, in the domestic electrical appliances sector and in consumer electronics equipment. As in the whole electrical and electronics sector, all product areas have experienced an almost continuous rise in production over the period under review. The diverging developments in production for the individual product areas reflects the change in demand. Moreover, production growth is influenced by technological progress - the very differentiated production techniques of the electrical industry range from equipment found in heavy mechanical engineering to the miniaturisation used in precision mechanics - and by cost development, price movements and other factors.

The differences in the growth rates of the individual product groups led to a change in the production structure. Declines were registered especially for capital goods in the power engineering sector, for domestic electrical appliances and for consumer electronics. Growing shares were reported for capital goods in the electronics sector and for components.

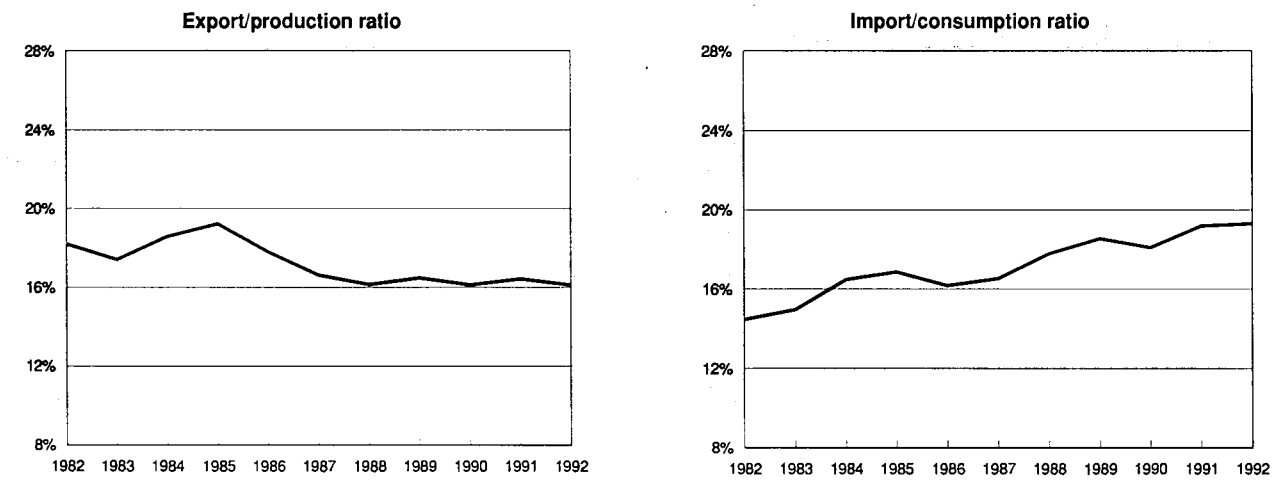
Both on the demand and on the supply side, there are strong interdependencies between the electrical and electronics sectors and other sectors of the economy because of the extremely wide range of electrical and electronic products.

Advance performance covers many spheres of the economy and imports. Internal supplies, i.e. intra-corporate electrical supplies, make up nearly 50%. The major extra-sectoral field of supply is the services sector, where trade and traffic (including communications) prevail as major single segments.

The big suppliers in the processing sectors are the plastics and the non-ferrous metal industry. These industries, as well as the iron and steel-making industry, supply primarily raw materials and semi-manufactured goods while primary and intermediate products, i.e. specific supplies, come from various other areas (plastics processing, iron, sheet and metal working industries, mechanical engineering, paper and glass industry etc.)

The proportion of services in advance performance has risen steeply while the proportions of the primary and producer goods industries has in general declined. This is largely due to material savings in the production process as a result of

Figure 8: Electrical and electronic engineering
Trade intensities



1992 are ZVEI estimates
Source: Eurostat

Table 6: Electrical and electronic engineering
Breakdown by size of enterprise, 1988 (1)

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	66 470	85.5	9.0	6.8
20-99	8 370	10.8	12.1	10.3
More than 99	2 936	3.8	78.9	82.9

(1) Estimates
Source: Eurostat

improved utilisation of materials and smaller product dimensions. At around 15%, the share of imports in advance performance has remained constant.

Among the industrial sectors from which the electrical and electronics industry procures capital goods, the mechanical engineering sector comes first. It supplied around half the electrical industry's gross fixed investment. The second largest supplier is the electrical industry itself, followed by the construction industry.

Production process

Of the processing industries, the electrical and electronics industry, besides mechanical engineering, is the biggest employer. In 1991 it provided jobs for 2 778 000 people. Employment went slightly up, compared with 1982.

Employment developed quite differently in the individual product areas. Above-average numbers were employed in product areas with above-average growth in production (e.g. measurement and control). By contrast, jobs were cut in areas with below-average growth rates (e.g. consumer entertainment electronics). This shows that labour productivity increased at different rates and it gives an idea of the varying degrees of rationalisation achieved in the individual product areas.

The electrical and electronics industry is one of the most research-intensive processing industries. Between 8 and 10% of its turnover are spent annually on research. This puts it at the top of the research-intensive sectors (excluding the aircraft and spacecraft industry).

INDUSTRY STRUCTURE

Companies

The EC electrical/electronic industry is a very concentrated one, as shown in Table 6: about 4% of all enterprises account for about 80% of employment and for more than 80% of total turnover.

In 1991, the three largest EC firms in the sector were Siemens (D), Philips (NL) and Alcatel-Alsthom (F). It is interesting to note the strong presence of EFTA firms among the top 15 firms, among which the most important were Asea Brown Boveri (CH/S), Electrolux (S) and Ericsson (S).

Strategies

Besides expanding exports, the electrical and electronics industry has continued pushing ahead its external commitment by foreign investments (establishment of production centres and marketing agencies), these activities being conducted to a wide extent in the developing countries. Foreign investments primarily serve the purpose of securing sales, related to the expansion or opening up of markets.

OUTLOOK

The liberalisation and standardisation of markets in the EC and technological progress will continue to determine the structural environment of the electrical and electronics industry.

According to ZVEI, the sector will grow at a slower pace during 1993, while a recovery is expected from 1994 onwards.

Table 7: Electrical and electronic engineering
The top 15 European electrical/electronic engineering firms, 1991

(million ECU)	Country	Turnover	Employees	Net profit
Siemens	D	35 489	402 000	898
Philips	NL	24 646	240 000	424
Asea Brown Boveri	CH/S	23 309	214 399	474
Alcatel-Alsthom	F	22 943	213 100	792
Electrolux	S	10 560	130 300	50
Thomson	F	10 202	105 000	0
General Electric Company	UK	8 205	104 995	713
AEG	D	6 822	76 338	-68
Finmeccanica (1)	I	6 766	55 000	68
Ericsson (L.M.)	S	6 119	71 247	118
CSF (Thomson)	F	5 045	46 900 (1)	337
Matra	F	3 253	21 334	36
Nokia	SF	3 090	29 167	37
Hawker Siddeley Group	UK	3 044	44 600	113
Racal Electronics	UK	2 572	35 384	120

(1) 1990
Source: DABLE

Table 8: Electrical and electronic engineering
Expected real annual growth rates

(%)	1992-93	1993-94
Apparent consumption	2.1	4.7
Production	1.9	3.7
Extra-EC exports	2.5	3.3

Source: ZVEI

Based on current estimates, the world market for electrotechnical products will have nearly doubled its volume by the year 2000, compared with 1990. Here, the future-oriented research and development work of the companies and their investment activity play a key role.

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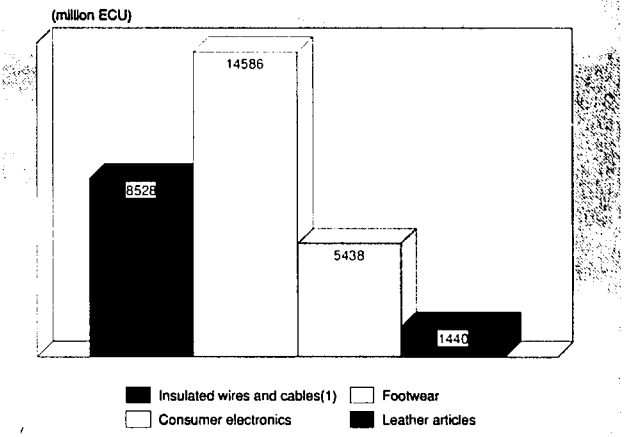
Insulated wires and cables

NACE 341

The insulated wires and cables industry manufactures three main products: energy cables, information cables and winding wires. With more than 100 companies and more than 250 manufacturing facilities, the EC is the world's largest producer of insulated wires and cables, followed by the US and Japan. Demand for insulated wires and cables is influenced by two fundamental factors: the development of the infrastructure for electricity and telecommunications, and the general health of the economy.

Figure 1: Insulated wires and cables Value added by Member State, 1991



(1) Excludes wiring harnesses
Source: Eurostat, EUROPACABLE

INDUSTRY PROFILE

Description of the sector

The markets for insulated wires and cables are extremely diverse with applications in virtually all areas of modern life, from the winding wire in the electrical shaver to the optical fibre which provides the basis for the telephone call and to the energy cables which are used in the basic infrastructure of energy generation, transmission and distribution.

Electrical energy cables are fundamental to domestic life and all industrial and commercial activities in all parts of the Community. Wires and cables supply energy from the electricity generation centres to the individual point of utilisation, differing according to the voltage range.

Information cables have two important areas of application: telecommunications and electronic data/control and broadcasting. Current demand is strong in the field of telecommunications cables reflecting the massive surge in the demand for new telephones associated with the increasing use of fax machines as well as the demand associated with investment in the telecommunications infrastructure, particularly in those Member States which are modernising and extending the optical fibre network. Demand for information cables is also strong in the multifaceted area of electronic data/control applications and broadcasting. For many of the latest developments in information technology, communications cables, ranging from simple wires to coaxial cables, armoured cables and glass fibres, are an important element.

Winding wires are used in all forms of electrical equipment where a magnet is required. Thus every electric motor, transformer, generator, dynamo, etc. requires a magnet or winding wire that is enamelled or otherwise insulated.

Main indicators

The insulated wires and cables industry employs 105 000 people in the EC and is just over half the size of the consumer electronics industry measured in terms of value added, as shown in Figure 1.

Between 1985 and 1989, consumption and production rose steadily, with growth tailing off in 1990. The strength came more from domestic demand than external demand as extra-EC exports account for less than 15% of production and have remained fairly steady since 1985 (Table 1). A decline in employment reflects recent restructuring and the adoption of less labour-intensive production techniques.

The fastest growing segment of the insulated wires and cables is that of information cables. Between 1986 and 1990, the share of communications cables in total production rose from 23% to 32%, while the share of energy cables declined from 70% to 58%. Winding wires have maintained their position (Table 2).

Within the EC, Germany (west) is the most important producer of cables and insulated wires accounting for 25% of total production in 1990, a figure which rises to 31% if the eastern Länder are included. France and Italy follow in terms of importance with shares of 15% each (Figure 2).

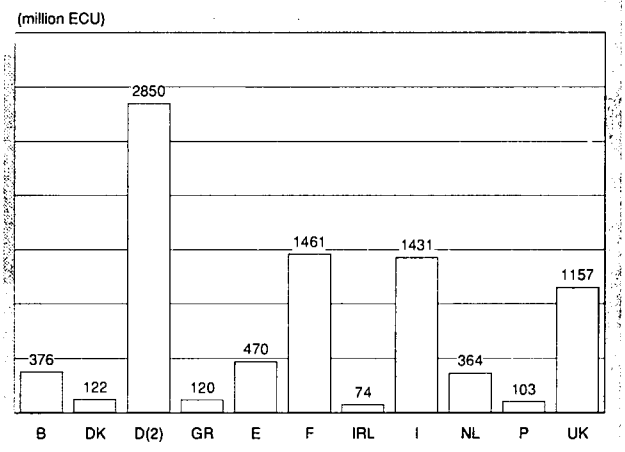
International comparison

The EC is currently the largest producer of insulated wires and cables in the world (Figure 3). Proximity to the market is very important, particularly for heavy industrial cable, and investment in Europe's infrastructure has thus been a strong source of demand for EC producers. Furthermore, healthy growth in export markets combined to boost annual production growth to more than 5% a year, which is similar to rates achieved in Japan over the same period.

Foreign trade

EC cable-makers have always been an important source of cables worldwide with average exports over the past decade topping 1000 million ECU per year. The industry's trade balance, however, has declined sharply over the last several years. Traditionally strong net exporters such as Germany

Figure 2: Insulated wires and cables Value added by Member State, 1991 (1)



(1) Excludes wiring harnesses
(2) Includes former East Germany
Source: EUROPACABLE

Table 1: Insulated wires and cables
Main indicators at current prices

(million ECU)	1985	1986	1987	1988	1989	1990(1)	1991(2)	1992(2)
Apparent consumption	7 473	8 364	8 930	10 554	11 287	11 131	11 478	11 800
Production	8 337	8 968	9 342	10 797	11 521	11 328	11 600	10 690
Extra-EC exports	1 504	1 214	1 137	1 152	1 409	1 533	1 606	1 630
Trade balance	864	604	412	243	234	197	122	80
Employment (thousands)	115	114	114	111	110	106	107	105

(1) ifo Institute estimate for employment
(2) ifo Institute estimates, except for trade data in 1991 which is estimated by Eurostat
Source: EUROPACABLE

Table 2: Insulated wires and cables
Production by product line

(million ECU)	1990	1991(1)	1992(1)
Energy cables	6 649	6 800	6 950
Information cables	3 681	3 750	3 850
Winding wires	997	1 050	1 080

(1) ifo Institute estimates
Source: EUROPACABLE

Table 3: Insulated wires and cables
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	N/A	4.9	N/A
Production	N/A	3.3	N/A
Extra-EC exports	-2.1	-0.8	-1.3
Extra-EC imports	13.8	11.5	12.3

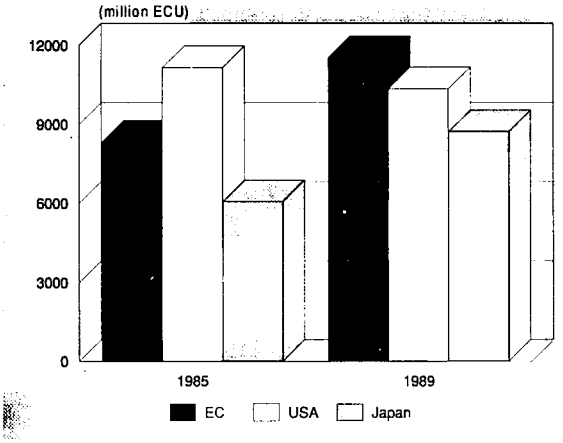
(1) Trade data are estimated by Eurostat for 1991, other variables are estimated by ifo for 1991
Source: EUROPACABLE

Table 4: Insulated wires and cables
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 357	1 257	1 259	1 504	1 214	1 137	1 152	1 409	1 533	1 606
Extra-EC imports	324	416	536	640	611	725	909	1 175	1 336	1 483
Trade balance	1 032	841	723	864	604	412	243	234	197	122
Ratio exports/imports	4.2	3.0	2.3	2.4	2.0	1.6	1.3	1.2	1.1	1.1
Terms of trade index	113.1	111.1	103.9	100.0	106.7	104.9	100.2	98.4	97.9	93.2
Intra-EC trade	780	856	1 050	1 306	1 430	1 471	1 723	2 179	2 332	2 519
Share of total imports (%)	70.6	67.3	66.2	67.1	70.0	67.0	65.4	64.9	63.5	61.8

(1) Estimates
Source: Eurostat

Figure 3: Insulated wires and cables international comparison of production at current prices



Source: EUROPACABLE

and United Kingdom both became net importers in 1991. Imports have also gained headway recently, with their share of the EC market climbing from 9% in 1985 to 13% in 1991.

The source of the weakness in EC exports can be explained in part by the fact that many former principal export markets have established their own production facilities. Sluggish markets in the Middle East oil-producing countries have been exacerbated by a tendency to greater home production. Opportunities still exist for EC cable makers, however, in countries where the level of technology is still beyond domestic production capacity.

In terms of exports markets, the EFTA and OPEC countries are the single most important trading regions (Figure 4). The EFTA countries are not only the largest customers of insulated wires and cables, but they are also important suppliers, accounting for 33.2% of total extra-EC imports in 1991 (Figure 5). Although the US was as important a supplier as the EFTA countries in 1986, its share of total EC imports fell to 22.4% in 1991.

MARKET FORCES

Demand

The three main categories of insulated wires and cables, that is, winding wires, information cables and energy cables, are subject to very different forces of demand.

The demand for energy cables is dependent on increases in electricity consumption but also on the demand for new production and transmission facilities, as well as on replacement demand. In the long-term, demand for energy cables will keep pace with the growth of GDP and the associated growth in electricity consumption. The customer structure of the energy cable industry shows the overwhelming share of power utility companies, which in many cases are publicly owned. As a result, the demand for wires and cables can be severely affected by the energy policy; privatisation of the UK energy market was accompanied by a 35% fall in sales of the insulated wires and cables industry.

The demand for information cables is linked to both the development of a country's telecommunications market and the level of advancement of its telecommunications infrastructure. The overwhelming portion of the market is accounted for by the public telephone network operators. The strongest growth is in trunk (long-distance) traffic, where technological developments have substantially reduced cable-costs. The demand for electronic data control cables is expected to continue its steady rise.

The demand for winding wires is naturally linked to trends in end markets such as electric tools and electro-medical devices.

Supply and competition

The production capacity of the EC cable and wire industry has traditionally exceeded demand. Technological improvements, an increase in capital intensity which has changed production techniques, and shrinking home demand, are the key forces which have combined to change the environment in which manufacturers operate.

The EC cable and wire industry has achieved a world lead in numerous technologies which are important for cable production: non-ferrous metallurgy, insulation physics, rubber chemistry, hightech materials, superconductivity and electrical engineering for power cables with optical fibre technology for information cables. The industry's investment in R&D has also translated into new production techniques which have generated higher productivity and a steady decrease in employment and improvements in production efficiency.

Production process

Two raw materials are of particular importance to insulated wires and cables production: copper and aluminium. In the EC cable and wire industry more than 1 million tons of copper and about 150 000 tonnes of aluminium are used per year on average. The use of these two main inputs, however, varies according to their price, which fluctuates widely, taking into account the fact that about twice as much aluminium as copper is needed in electrical applications. The trend in copper prices provides an example of the degree of this price variability; the price per tonne of copper doubled from 1592 ECU per tonne in January 1986 to 2986 ECU in January 1989. The average price per tonne of copper in 1991 was 1772 ECU. Given these wide price fluctuations, not to mention currency fluctuations, the trends in consumption, production and foreign trade in insulated wires and cables which appear in this report should be analysed in light of the price trends of its main raw materials, copper and aluminium.

INDUSTRY STRUCTURE

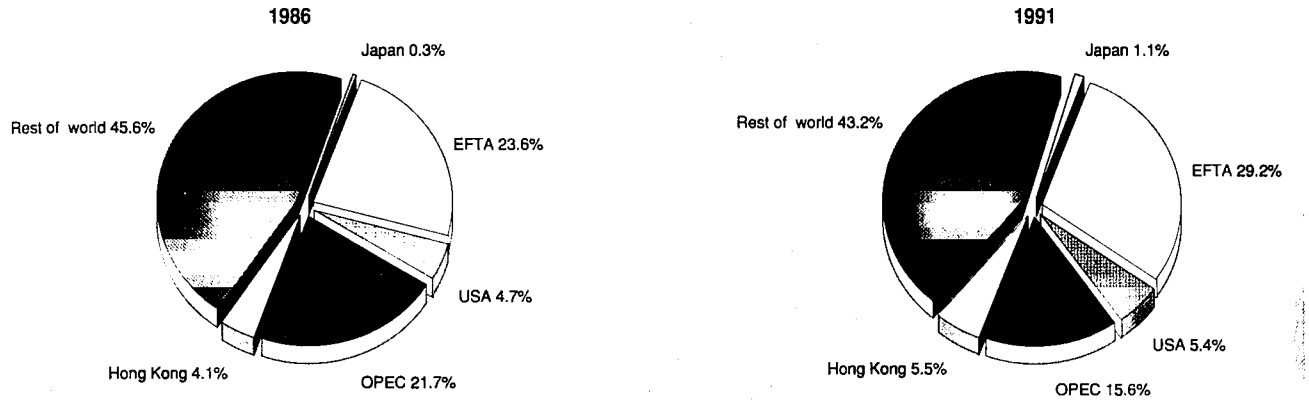
Companies

There are more than 100 firms that produce cables and insulated wires in the EC with 250 production facilities and some 105 000 employees. Production sites are located in all Member States, with the exception of Luxembourg (Figure 2). The major manufacturers of insulated wires and cables are Alcatel (F), BICC (UK), Pirelli (I), Siemens (D). If all of Europe is considered, ABB (S/CH) should be added to the list. These large companies produce both energy and information cables as well as winding wires. Small enterprises tend to specialise in one product, often in energy cables, although this varies according to country. In the smaller countries, small companies often manufacture the whole spectrum of products. In the France, Germany and Italy, however, apart from the top four of five large producers, there are many small specialist producers.

In the past few years there have been several fusions and takeovers. Examples are Alcatel's acquisition of the German AEG Kabel AG, BICC's purchase of KWO (D), and Pirelli's purchase of STC (UK).

The increasing share of glass fibre cables in information cables has led to an increase in the average size of firms, due to the necessary capital foundation for the technologically demanding production process. There are now only about a dozen manufacturers of optical fibre in the EC.

Figure 4: Insulated wires and cables
Destination of EC exports



Source: Eurostat

Strategies

To meet the challenges of increased competition there are three main strategies: investment, research and development, and cooperation and concentration. Investment activities have shown an upward trend, at least in the five EC countries for which figures are available. The main motive for investment is an increase in productivity and reduction in costs, especially labour costs. In the years when the cable business was booming, expansion was an additional objective.

Innovation in new products or new processes and production methods are other strategies for keeping up with the competitors.

Mergers, acquisitions, alliances, and corporations are organisational methods for increasing or at least maintaining competitiveness on the international market. Several large cable manufacturers have made cross-border investments within the EC, either for reasons of cost or for closer proximity to markets. Investments outside of the EC have been made above all by French and Italian, British and German cable producers; these have been primarily in North America (USA, Canada), Latin America (Mexico, Argentina, Brazil, Peru) and Africa (Lebanon, Morocco, Nigeria, South Africa).

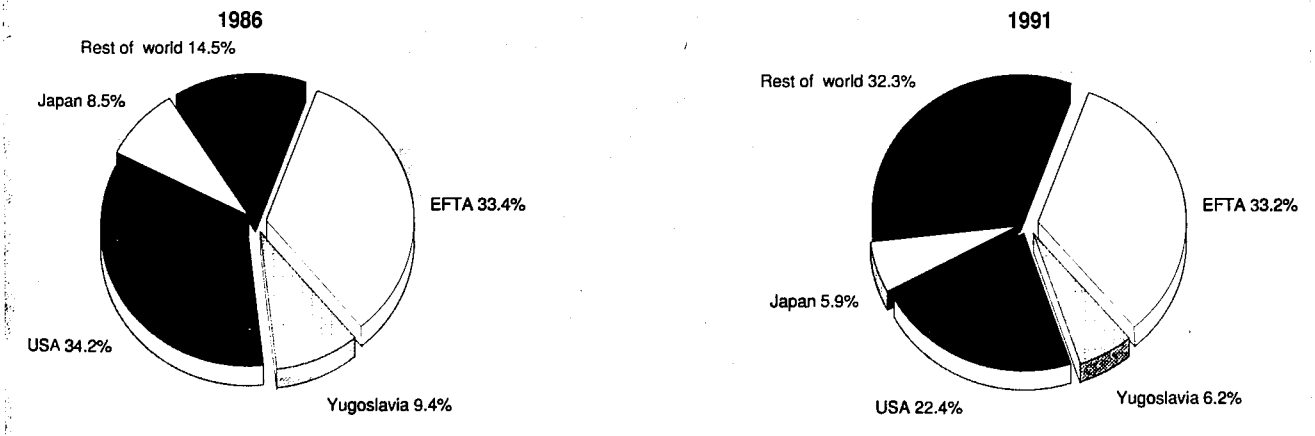
ENVIRONMENT

Generally speaking, cable manufacturing is not a burden on the environment. The manufacturing process is clean and the materials used are normally non-toxic; those posing potential risks are strictly regulated. The cable industry has been very responsive to environmental concerns in its use of raw materials and its design of products minimising the potential hazards of their installation and use. Specially designed cables with reduced flammability are available and there are already acceptable alternatives to PVC and other compounds in areas with fire risks. Cable makers no longer use materials containing dioxin and are investigating the possibilities of substituting materials containing halogens. Cable insulation without halogens emits little in the way of toxic fumes. This is particularly important in public areas, in transport and warehouses as well as any place frequented by people or housing combustible goods.

REGULATIONS

Regulations that relate to technical standards, the use of dangerous preparations, and health and safety, all have implications for cable makers although there are no specific directives which are directed to the industry. The directive on harmo-

Figure 5: Insulated wires and cables
Origin of EC imports



Source: Eurostat

nising national provisions on electromagnetic disturbance levels (89/336/EEC), for example, lays down the rules to which cables and other electrical equipment manufactures must adhere.

On another front are the public procurement directives which liberalise the awarding of public contracts. The market for insulated wires and cables has been dominated in the past by the public utilities (both in energy and telecommunications) which often favour national suppliers. With the liberalisation of the tender procedure and procurement, competition within the EC will intensify. Harmonised standards will also make it easier for EC manufacturers, and their foreign competitors, to penetrate other markets than their own.

OUTLOOK

A short term influence on demand for EC insulated wires and cables will be the expansion of the energy and telecommunications networks in the east German federal states. In general, although the requirement for insulated wires and cables in the former planned economies of Eastern Europe is enormous, a lack of finances will limit demand. Similarly, sales possibilities in Third World markets will increase only slightly; despite great needs, improvement in the infrastructure is making no or only very little progress due to limited financial leeway.

Table 5: Insulated wires and cables
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.5	3.0
Production	3.0	3.5
Extra-EC exports	3.3	3.3

Source: ifo Institute

The development of the information technology market and the expected increase in personal communications will dramatically increase demand for information cables. Equally, if not more important, will be the impact of privatisation and the liberalisation of public procurement on the energy and telecommunications sectors. In the long-term, demand for energy cables will strongly depend on the growth in GDP and the associated increase in electricity consumption. The demand for data and control cables as well as for winding wires will be primarily influenced by overall trends in the manufacturing industry and services sectors in the EC.

Written by: ifo Institut für Wirtschaftsforschung; Edited by: DRI Europe
This industry is represented at the EC level by: European Confederation of Associations of Manufacturers of Insulated Wires and Cables (EUROPACABLE). Address: Rue du Luxembourg 19-21, B-1040 Bruxelles; tel: (32 2) 513 0612; fax: (32 2) 502 2169.

Electrical machinery
NACE 342

The electrical machinery industry experienced a strong performance during the 1980s. At the end of the decade, however, production growth rates decreased, as investment activity of companies declined and overcapacity in the electricity sector dampened demand for products. Competition from outside the EC increased also, particularly from non-European competitors. In the medium term, prospects for the industry are favourable, thanks to the establishment of the Common Market, and to new sales outlets in the developing countries, China and Eastern Europe. Competition, however, will also rise and force EC firms to increase their cooperative efforts.

INDUSTRY PROFILE

Description of the sector

The electrical machinery industry can be subdivided into two groups: the manufacture of machines for the production and conversion of electricity and the manufacture of equipment for the distribution of electric power.

The manufacture of machines, apparatus and instruments for the production and conversion of electricity, includes the production of electric motors, electricity generators and rotary converters, transformers, current rectifiers and the production of electromagnets and electromagnetic apparatus.

The manufacture of equipment for the distribution of electric power includes the production of apparatus for closing, opening, and protecting electrical circuits 1 kV or more, installation equipment of up to 1 KV, and fixed and variable resistors, including potentiometers.

The large companies of the industry operate in a wide range of fields of electrical engineering, while smaller firms are usually active only in a few sectors of the industry, with some firms working in niche markets, producing one or two products.

Main indicators

The industry is highly export oriented; extra-EC exports were about 22% of EC production in 1991. The trade balance has been positive throughout the last decade, but has deteriorated considerably over time, due to higher growth in imports than exports.

Apparent consumption and production have both grown at steady rates, but apparent consumption has been growing at a faster rate since 1985, except in 1990 when production experienced a recovery.

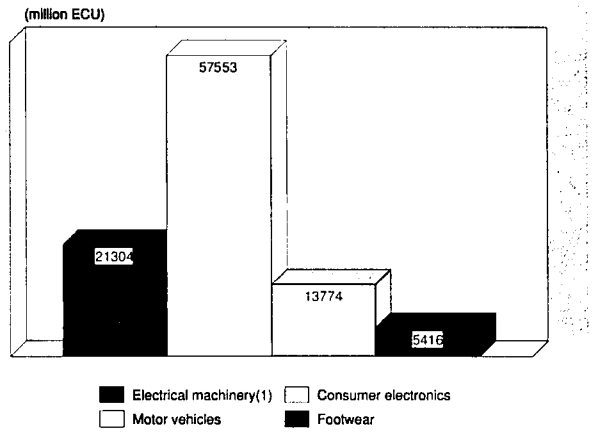
Germany is the most important producer in the EC, with about 45% of total EC production in terms of value added, followed by France (24%), the United Kingdom (15%) and Italy (7%). The production of the other EC member countries is about 9% of the total.

Recent trends

Production increased steadily from 1982 to 1992, with only one temporary setback in 1984. Growth in the industry lagged behind overall growth for manufacturing in the EC for that period.

The industry in the EC was characterised by favourable developments during the 1980s. Demand, measured by apparent consumption, grew considerably during this period. Production of electrical machinery, however, developed at a slower rate, as extra-EC imports increased remarkably, particularly in the period from 1985 to 1991. Exports developed favourably as well in the second half of the eighties; after a decline at the beginning of the decade, a sharp increase could be observed in the second half at rates of roughly 4% per year in volume.

Figure 1: Electrical machinery
Value added in comparison with other Industries, 1991



(1) BAK estimate
Source: Eurostat

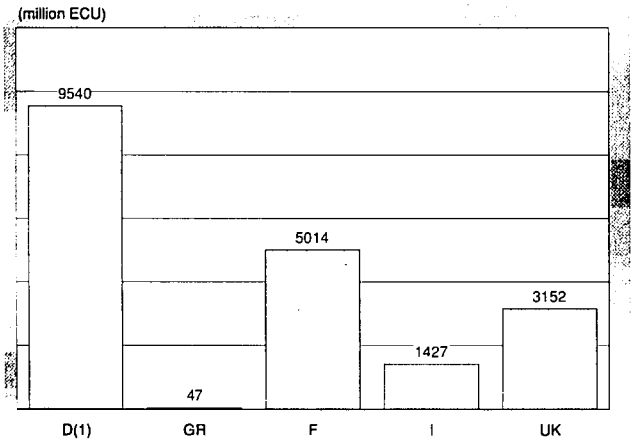
International comparison

The EC industry is the most important producer within the Triad. Output of Japanese firms was roughly 84% of EC production in 1991, while US firms were in the third position with about 63% of EC production. The development of production over the last few years has been uneven. The most dynamic performance was experienced by Japanese firms, whose production increased by roughly 41% from 1987 to 1991, corresponding to an annual average growth rate of roughly 9% in volume. Production in the EC developed more moderately, at about 4% growth per year in volume. US production increased by only 2% per year during the same period. In contrast to the EC and Japan, where production increased steadily over the whole period, US production has been declining since 1989.

Foreign trade

Trade with extra-EC countries increased significantly during the last decade. Extra-EC exports grew by 5.5% per year in value from 1982 to 1991. The largest importers of products

Figure 2: Electrical machinery
Value added by Member State, 1991



(1) BAK estimate
Source: Eurostat

Table 1: Electrical machinery
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(2)
Apparent consumption(2)	26 272	28 137	29 732	32 063	33 883	35 976	39 317	43 003	45 663	47 309	48 539
Production (2)	30 731	32 318	33 196	35 828	37 369	38 758	41 857	45 530	48 490	49 996	51 246
Extra-EC exports	6 892	6 945	6 996	7 656	8 234	7 779	8 570	9 666	10 286	11 152	11 783
Trade balance	4 460	4 181	3 464	3 765	3 486	2 782	2 540	2 527	2 827	2 687	2 705

(1) Eurostat estimates for trade data
(2) BAK estimates
Source: Eurostat

Table 2: Electrical machinery
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption (1)	2.2	4.9	3.9
Production (1)	1.1	3.8	2.9
Extra-EC exports (2)	-1.1	4.1	2.3
Extra-EC imports (2)	5.7	11.4	9.5

(1) BAK estimates
(2) Eurostat estimates for 1991
Source: Eurostat

Table 3: Electrical machinery
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	6 892	6 945	6 996	7 656	8 234	7 779	8 570	9 666	10 286	11 152
Extra-EC imports	2 433	2 764	3 532	3 891	4 748	4 997	6 030	7 139	7 459	8 465
Trade balance	4 460	4 181	3 464	3 765	3 486	2 782	2 540	2 527	2 827	2 687
Ratio exports/imports	2.83	2.51	1.98	1.97	1.73	1.56	1.42	1.35	1.38	1.32
Terms of trade index	117.9	111.3	102.8	100.0	102.1	101.6	102.9	101.5	105.0	101.0
Intra-EC trade	3 987	4 349	5 054	5 679	7 249	7 834	9 056	10 435	11 693	12 231
Share of total imports (%)	62.1	61.1	58.9	59.3	60.4	61.1	60.0	59.4	61.1	59.1

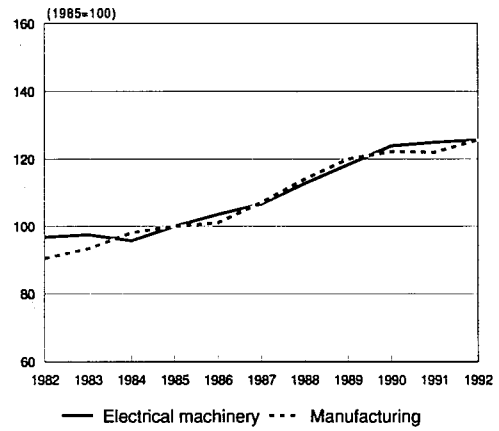
(1) Estimates
Source: Eurostat

Table 4: Power transformers
Trade by Member State, 1991 (1)

(thousand ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	65 375	10 599	162 274	1 444	17 810	117 443	5 249	86 481	28 011	15 876	57 662	568 224
Extra-EC imports	6 916	9 652	108 358	2 354	14 835	41 793	9 314	24 712	14 951	3 668	44 306	280 859
Trade balance (2)	52 214	-2 133	78 466	-4 339	-39 548	69 525	5 556	75 874	6 230	34 528	-6 263	287 365
Ratio exports/imports (2)	1.91	0.89	1.41	0.29	0.40	1.61	1.36	2.50	1.11	3.03	0.93	2.02
Intra-EC trade	50 117	9 189	81 216	3 744	51 399	72 816	6 160	25 921	43 328	13 261	44 653	401 804
Share of total imports (%)	87.9	48.8	42.8	61.4	77.6	63.5	39.8	51.2	74.3	78.3	50.2	58.9

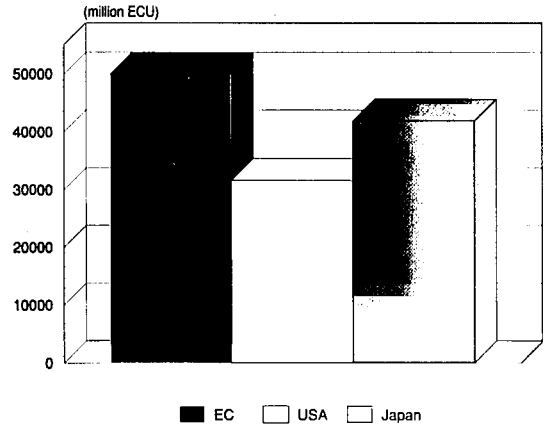
(1) Estimates
(2) Calculated using world data for the individual countries and extra-EC data for the EC total
Source: Eurostat

Figure 3: Electrical machinery
Production index compared to EC manufacturing



1992 are BAK estimates
Source: Eurostat

Figure 4: Electrical machinery
International comparison of production at current prices, 1991



EC is BAK estimate
Source: Eurostat, Census of Manufacturers

from EC firms are developing countries, including the East Asian NICs, with about 40% of total EC exports in 1991. EFTA countries received about 27% and the USA about 14%. Imports, however, increased at an even faster rate of nearly 15% per year on average during the same period. Consequently, the surplus in the EC trade balance has been decreasing by around 5.4% per year.

The most important importer is the USA with a share of about 25% of total EC imports in 1991, followed by Japan with 20% and Switzerland with 14%. With the exception of Japan, however, most competitors lost shares on the EC market during the last few years, to the benefit of the developing countries, especially East Asian NICs, which increased their market share from approximately 11% in 1986 to 16% in 1991, with a total value of about 1391 million ECU. Intra-EC trade increased sharply, by 13% per year, during the period of 1982 to 1991.

MARKET FORCES

Demand

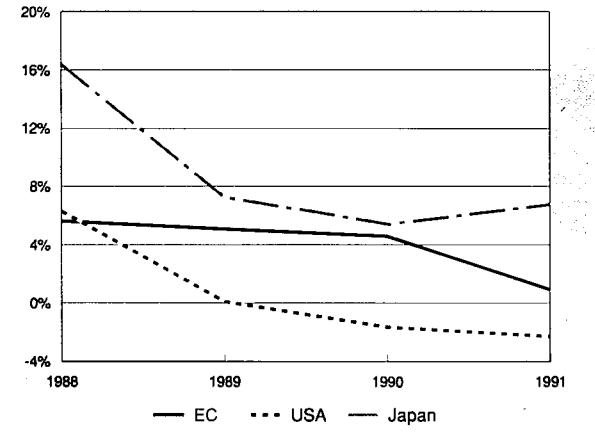
Demand for the products of the industry, measured in terms of apparent consumption, increased considerably during the last decade. In view of the great number of different products which respond to different demand patterns, the analysis of demand must distinguish between the different subsectors.

Demand for those products which are closely related to manufacturing processes profited the most from the investment boom which took place in the second half of the 1980s. Increased efforts of the EC manufacturing sector to expand their production capacities and to improve production efficiency in the expectation of the Single European Market, provided the producers of electric motors, electromagnetic apparatus, low- voltage switchgear (opening, closing and protecting electric circuits of less than 1 KV), installation equipment and fixed and variable resistors with rising demand. In addition, product innovations also played an important role in demand performance: for example, the switch from DC converters to three phase converters. At the end of the 1980s and beginning of the 1990s, however, demand for products of the industry grew more moderately, in line with declining investment activities.

Those industries which are closely related to the production and conversion of electricity experienced a quite different development pattern during the 1980s. Increased needs for energy at the beginning of the period resulted in an expansion in the field of energy supply and, therefore, in an expansion of distribution networks. Industries producing equipment such as electricity generators, transformers and high-voltage switchgear (opening, closing and protecting electrical circuits with more than 1 KV), benefited from this development during this period. Decisions to invest in power stations, however, are closely tied to expected growth in the GNP of a country. For this reason, this sector is affected by the general economic situation. While growth in the industry in the EC could be augmented by increased exports, problems arise in the international market. As equipment for the production of electric energy is considered "strategic," many industrial countries take protectionist measures which can limit the opportunities available to the EC manufacturers. In addition, less-developed countries, which have a great need for power stations and equipment, are often financially risky investments.

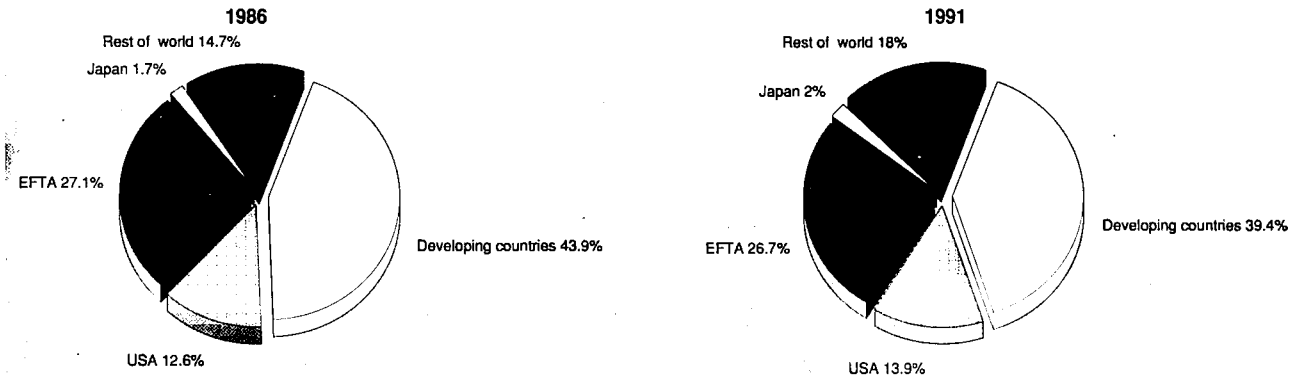
Towards the end of the 1980s, however, the picture changed. In line with the downturn in growth of the electricity sector, as a consequence of saturation effects, the fall in prices of fossil fuels and energy saving measures, demand for this type of product declined. Electricity distribution companies have now completed substantial investments in most of the EC countries, with the result that excess capacity is common.

Figure 5: Electrical machinery
International comparison of production growth at constant prices



EC is BAK estimate
Source: Eurostat, Census of Manufacturers

Figure 6: Electrical machinery
Destination of EC exports



Source: Eurostat

Investments in these areas will therefore be oriented towards replacement, rather than towards capacity widening, for a number of years at least.

Supply and competition

In line with increased demand for the products of the electrical machinery industry, EC production also grew significantly in the 1980s. The EC is the most important producer in the high-voltage switchgears sector, with a world production share of 35% in 1990. The US share reached roughly 28%, slightly above Japan's 26%. In the low-tension switchgear sector, the situation is similar, with EC firms in the leading position (35% in 1990), followed by US firms (24%) and Japanese firms (20%). The USA and the EC, however, lost production shares over the last decade, while Japan increased its share.

The trade balance of the EC deteriorated during the 1980s. The trade surplus in 1991 was only 40% of the surplus in 1982. In the field of transformers, imports increased sharply in the mid-1980s, causing the ratio of exports to imports to drop from 6.3 in 1982 to 2.0 in 1991. The most important competitors in the field of transformers are the USA and Japan, as well as Korea and the EFTA countries, chiefly Switzerland and Sweden.

Regarding high-voltage switchgear, world trade amounted to roughly 23% of world production. This relatively low share is explained by the protective measures of the governments of producing countries. Extra-EC competition in the field of low-tension switchgear increased also, mainly from Japan and the East Asian NICs. The latter are highly competitive in terms of prices, as a consequence of lower production costs and subsidised input prices and dumping policies. Japanese firms, which dominate the market in East Asia, tend towards mass production of standard types of equipment, which allows them to benefit from internal economies of scale.

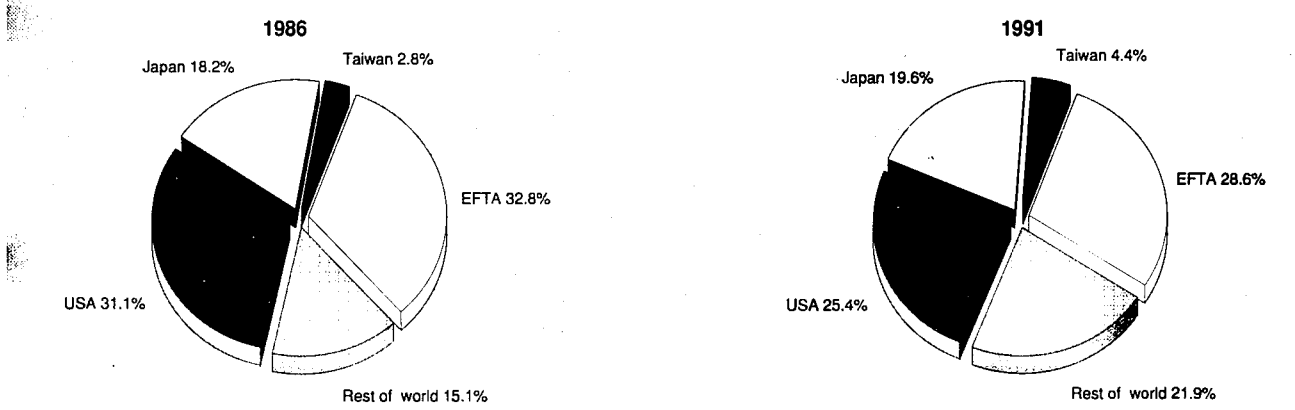
Intra-EC trade in the electrical machinery industry increased considerably as well. This development is mainly the result of the opening of electricity markets to competition, in line with the Single European Market in 1993, stimulating production to get a foothold in other EC countries.

INDUSTRY STRUCTURE

Companies

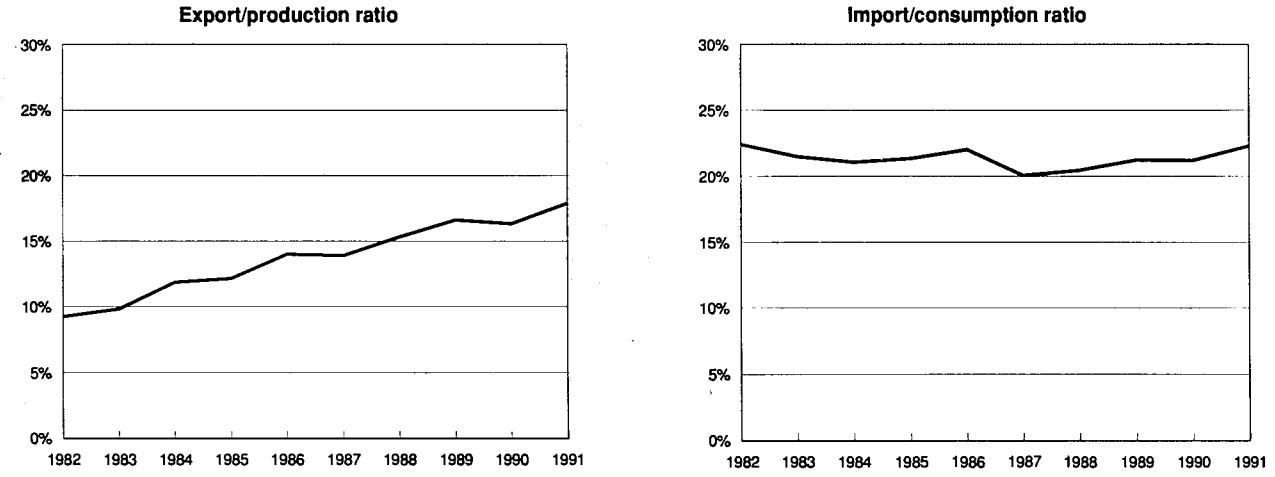
The industry is dominated by a small number of very large companies, which operate in a wide range of activities of the electrical engineering industry. The most important are ABB

Figure 7: Electrical machinery
Origin of EC imports



Source: Eurostat

Figure 8: Electrical machinery
Trade intensities



Source: Eurostat

(CH/S), the largest producer in the EC, Siemens and AEG (D) and GEC-Alsthom (UK/F).

Besides the few large companies, there is an important number of more specialised small and medium-sized companies, including Transfo (F) and Pauwels (B), which specialise in the production of transformers.

Around 35 000 people are employed in the high-voltage switchgear industry in the EC. In the field of low-voltage switchgears, Germany alone, the largest EC producer, employs 48 000 people.

The larger firms in the EC operate in the world market, where they meet strong competition from the USA and Japan. The smaller companies are oriented towards niche markets, and produce client-specific equipment. Consequently, these firms often operating only at the national or regional level.

Among the most important companies in the USA are the Westinghouse Electric Corporation, which is a premier producer of transformers. In Japan, the most important companies are Mitsubishi Electric Corp. and Kawasaki Heavy Industries Ltd, both working in the field of electric power generation equipment.

Strategies

The electrical machinery industry has a relatively strong position in the intra-EC market, with a number of important producers located within Western Europe.

Nevertheless, competition from outside the EC has been growing during the last few years, due mainly to cost advantages of the East Asian NICs. Efforts of the companies, therefore, have to be oriented towards cost reduction. On the other hand EC firms have to increase their R&D expenditures to increase the quality of their products. To meet these challenges, companies have already started their efforts to concentrate the industry.

In the field of transformers, the weakness of demand in the face of excess production capacity has brought about numerous structural changes, as many producers were forced to close production units and to reanalyse product ranges.

Other strategies of EC companies in this context could be an increase in export efforts towards growing markets, such as Eastern Europe, developing countries, and China. China will be an increasingly important potential market in the 1990s; its first nuclear power station went into operation in December, 1991. To be successful in these new markets, Siemens has formed a capital tie with Skoda, a Czech producer of heavy electrical equipment. These two companies plan to set up a joint venture in Czechoslovakia to manufacture equipment for nuclear, thermal and hydroelectric power generation plants, as well as anti-pollution devices. This development is mirrored internationally by a cooperative agreement between Hitachi (Japan) with General Electric Co (USA) for collaboration in the heavy electrical area; one result of the agreement has been the two firms' take-over of the Georgia, USA-based High Voltage Breakers Inc.

Table 5: Power transformers
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	586	546	489	439	421	376	412	484	510	568
Extra-EC imports	92	102	137	146	158	159	220	271	259	281
Trade balance	493	443	352	293	264	217	192	212	251	287
Ratio exports/imports	6.34	5.33	3.57	3.01	2.67	2.37	1.87	1.78	1.97	2.02
Intra-EC trade	153	160	209	209	208	224	254	308	376	402
Share of total imports (%)	62.3	61.0	60.4	58.9	56.9	58.5	53.6	53.2	59.2	58.9

(1) EC10; 1982-83
(2) Estimates

Table 6: Switchgears
Breakdown of world production by principal producer, 1990

(%)	High tension switchgears	Low tension switchgears
EC	35	35
USA	28	24
Japan	26	20
Other	11	21

Source: CAPIEL

REGIONAL DISTRIBUTION

The largest EC producer is Germany, with production estimated at ECU 20 billion in 1991 (roughly 42% of the EC total), followed by France, with ECU 12 billion (26%). Within the various subsectors of the electrical machinery industry, the picture is similar. Germany is the largest producer in the transformer industry, as well as in high-tension and low-tension switchgear. Germany also leads in intra-EC exports of transformers (20% of intra-EC trade), as well as in extra-EC exports (29% of total EC exports).

In the field of high tension switchgear, the production share of the German firms has been declining during the last decade from 42% of total EC production in 1980 to 36% in 1990, mainly to the benefit of Italy, which increased its production share from 14% to 17% during the same period. In the same subsector, the German share of exports in total EC exports declined during the last decade from 36% in 1980 to 30% in 1990. French firms, in contrast increased their market share from 30% in 1980 to 44% in 1990.

ENVIRONMENT

Environmental concerns regarding the production processes are not of major importance for this industry. In the past, the use of PCB to isolate the wires in the body of transformers represented an environmental danger, but this practise ceased during the 1980s.

It is likely, however, that the industry will benefit indirectly from increased concerns about emissions damaging the environment. Carbon power plants, for example, may be substituted with cleaner energy generating methods.

REGULATIONS

Of particular importance to this industry is Directive 89/392, dealing with the standardisation of health and safety requirements of machines. Machinery must conform to these standards to be eligible for the EC label.

OUTLOOK

Prospects for the electrical machinery industry in the EC are characterised by moderate growth overall during 1992 and 1993. Those subsectors of the industry which are closely related to industrial investment activities will continue to suffer from the low propensity of companies in manufacturing to increase their production capacities. In line with the expected economic recovery, demand for this group of products is expected to increase in later years. New markets in developing countries in the short-to medium-term, and in Eastern Europe in the medium-term, will provide stable demand growth in the future. Demand from developed countries, on the other hand, is expected to grow only moderately. Competition from

Table 7: Switchgears
Breakdown of production by Member State, 1990

(%)	High tension switchgears	Low tension switchgears
Belgique/België, Luxembourg	3.0	1.1
Danmark	0.0	0.5
BR Deutschland	36.3	42.4
Hellas	0.0	7.1
España	5.2	0.2
France	27.5	27.9
Ireland	0.0	0.1
Italia	17.1	10.0
Nederland	2.3	1.8
Portugal	0.0	0.5
United Kingdom	8.6	8.4
EC	100.0	100.0

Source: CAPIEL

Table 8: Electrical machinery
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	1.7	2.8
Production	1.4	2.5
Extra-EC exports	3.7	3.7

Source: BAK

outside the EC is expected to increase, particularly from the East Asian NICs and Japan.

Subsectors related to the building and expansion of power plants and distribution systems will experience moderate demand growth also. Recent investments in the expansion of electricity networks have led to overcapacities in EC countries; demand for new equipment is therefore expected to decline. Demand for replacement equipment, on the other hand, is expected to be stable. The trend towards more efficient use of energy is an additional factor for slower growth in the next years. Within the EC, new demand can be expected from the Southern European countries and from Ireland, with the building of infrastructure and high-tension links. New demand is also likely to come from the East Asian NICs, Eastern Europe and China. But competition on these markets will restrict the outlet possibilities of EC producers. In Eastern European markets, competition stems from Poland, Bulgaria and the CSFR, which are important manufacturers in the field of high-voltage transformers. In China and East Asian markets, Japanese companies will also be strong competitors.

Within the EC, competition is also expected to increase, as common technical standards and liberalisation aspects foster increased trade between EC member countries, but also ease penetration by non-European competitors.

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Electrical equipment for industrial use

NACE 343.1

Most products in the electrical equipment for industrial use sector are used as intermediate inputs for other industries; demand is therefore highly sensitive to economic and business cycles, and can fluctuate widely. Demand was weak in the early 1990s, and is expected to remain so through 1993, when investment-led growth should revitalise demand in Western Europe and other developed countries.
The industry has been restructuring into fewer, larger firms, although a number of small firms remain in niche markets. Firms must maintain their ability to respond quickly to changes in market demand. The competitive position of the EC remains good, but the trade balance surplus is deteriorating.

INDUSTRY PROFILE

Description of the sector

The sector of electrical apparatus, appliances and equipment for industrial use comprises a number of subsectors:

- electrical equipment related to internal combustion engines, to motor vehicles and other means of transport and to traffic;
- electrical industrial and laboratory furnaces, ovens and other types of heating equipment;
- equipment, machinery and materials for electric welding and cutting of metals;
- hand held electrical tools;
- other electrical apparatus, appliances and equipment for industrial use.

Activities are spread among a large number of producers, some specialised, others active in a number of subsectors. In the absence of centralised sources of information and of meaningful statistical material on production and trade, analysis must be done on subsectors, rather than the sector as a whole.

Main indicators

In 1991, total consumption of welding equipment in Germany, France, Italy, the United Kingdom, Spain and the Netherlands was 870 million ECU. About half of the total represents arc welding equipment, 40% represents resistance welding equipment, and a little over 10% is other types of equipment, such as laser and electron beam machines. Germany was the largest consumer (44% of the total), followed by France (22%) and Italy (16%). No data are available on production, consumption and employment in the industry as a whole. In 1991, extra-EC exports for welding equipment were approximately 371 million ECU, compared to power tools export of around 439 million ECU.

Recent trends

Total extra-EC exports grew from 3.2 billion ECU in 1988 to 3.6 billion ECU in 1991, an average yearly increase of 4% in nominal terms. During the same period, extra-EC imports increased from 2.1 billion ECU to 2.85 billion ECU, an average yearly increase of 10.6%. The trade balance remained positive over the period, but the surplus has been declining. Intra-EC trade measured by imports grew at an average rate of around 8% per year during the same period, and represented over two-thirds of total imports in 1991.

Both exports and imports of welding equipment grew strongly in the 1980s. Extra-EC exports grew at an average rate of 4.2% per year from 1982 to 1991, while extra-EC imports grew at an average rate of 10.5% during the same period. As a result, the trade balance, while positive, has been deteriorating rapidly. Intra-EC trade accounts approximately for 60% of total imports of EC member countries.

Trade in power tools also experienced fast growth over the period 1982 to 1991. Extra-EC imports grew 10.4% per year on average, while extra-EC exports grew 6.6%. The trade balance is negative, and the deficit has worsened from a negligible level in 1987 to about 260 million ECU in 1991.

Foreign trade

Extra-EC exports in electrical machinery remain well above extra-EC imports, leading to a strongly positive trade balance. The surplus has been dwindling, however, as import growth consistently outstrips export growth. The share of intra-EC imports out of total imports has remained about 60%.

Destinations of exports are widely spread, with no dominant trading partner. The EFTA countries are the largest block of importers of EC products, as well as the largest exporters to the EC.

Extra-EC imports of power tools increased from about 380 million ECU in 1986 to some 740 million in 1991, representing an average yearly increase of 14% in value. During the same period, extra-EC exports increased at a much slower pace, 4% per year. Imports come mainly from the EFTA countries, especially Switzerland, and also from Japan. EFTA is the largest destination block for exports, absorbing 37% of the total. Germany is by far the largest source of intra-EC trade (52% of the total), followed by the UK (19%).

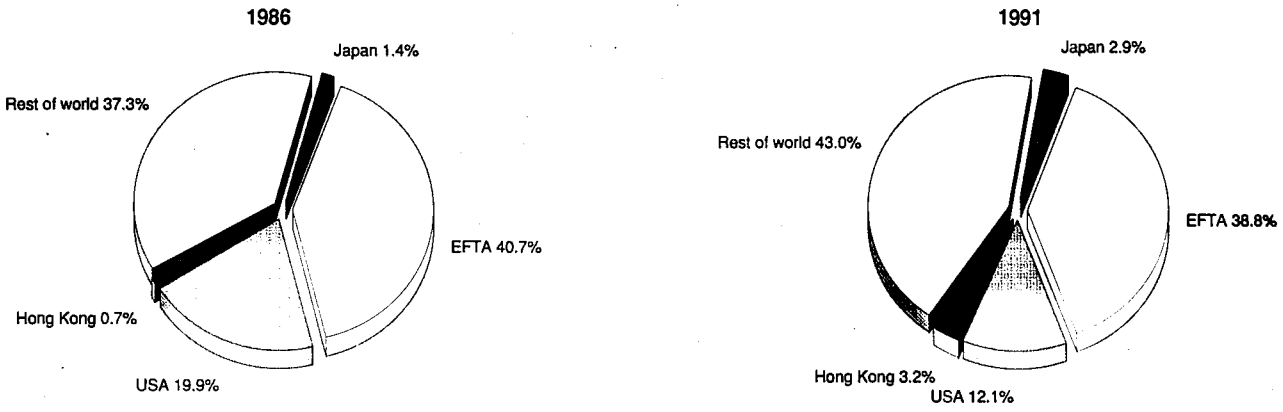
Extra-EC imports of welding equipment grew from about 170 million ECU in 1986 to some 313 million ECU in 1991, an annual growth rate of 13%. Extra-EC exports, on the other hand, grew by only 1.8% per year. The sources of extra-EC imports are EFTA, with 40% of the market in 1991; Japan with 15% and the US with 10%. As with power tools, extra-EC exports of welding equipment are much more widely spread, with EFTA countries, the largest client block, absorbing only

Table 1: Electrical equipment for industrial use
External trade at current prices

(million ECU)	1988	1989	1990	1991(1)
Extra-EC exports	3 212	3 479	3 416	3 595
Extra-EC imports	2 107	2 421	2 541	2 847
Trade balance	1106	1058	875	748
Ratio exports/imports	1.52	1.44	1.34	1.26
Intra-EC trade	4 633	5 216	5 506	5 816
Share of total imports (%)	68.7	68.3	68.4	67.1

(1) Estimates
Source: Eurostat

Figure 1: Power tools
Destination of EC exports



Source: Eurostat

22%. Regarding intra-EC trade, Germany is the largest supplier (38% of the total), followed by Italy (18%) and France (13%).

MARKET FORCES

Demand

Apart from the subsector of power tools, whose demand is determined to a large extent by private household expenditure, all of the products of the electrical machinery sector are either intermediate goods used as inputs in other industries, or investment goods used to increase production capacities or production efficiency. Even welding consumables (filler materials) are not actually consumed but are used in connection with the production of durable investment or consumer goods such as cars and ships. Demand for the products of the sector, therefore, is determined mainly by the evolution of production of a large number of client sectors, primarily those that purchase investment goods.

For example, for electric equipment related to internal combustion engines, motor vehicles and other means of transport, demand is determined by the level of production of transport equipment, and by replacement needs.

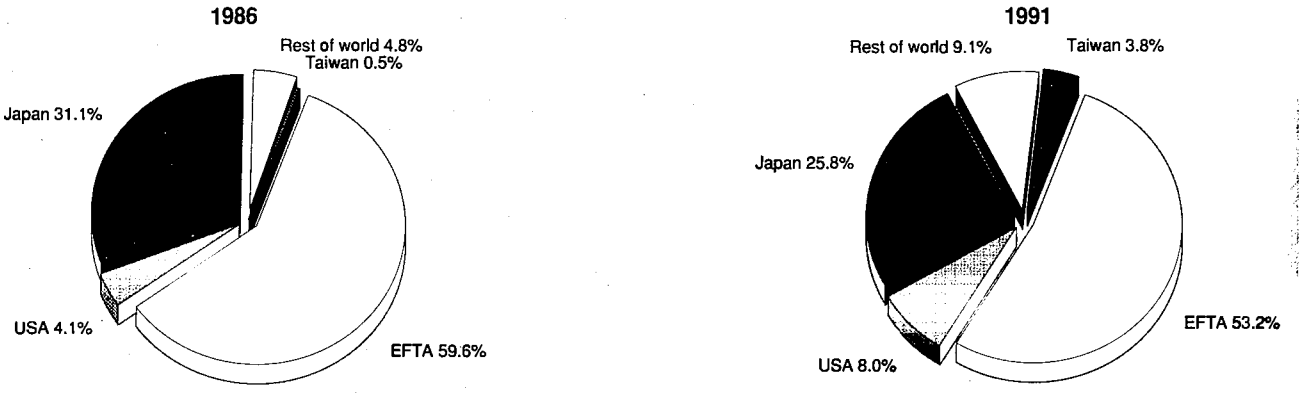
For furnaces and ovens, demand is related mostly to the construction or re-equipping of certain types of manufacturing plants, as well as of levels of R & D activity.

The largest source of demand for welding equipment and materials is the transport industry (the construction of cars, ships, pipelines etc.) but a wide range of other activities such as the production of cans, cross-wire products and steel constructions can also have an effect.

Demand for electrical tools is driven mainly by small scale manufacturing, arts and crafts, hobbies and do-it-yourself activities.

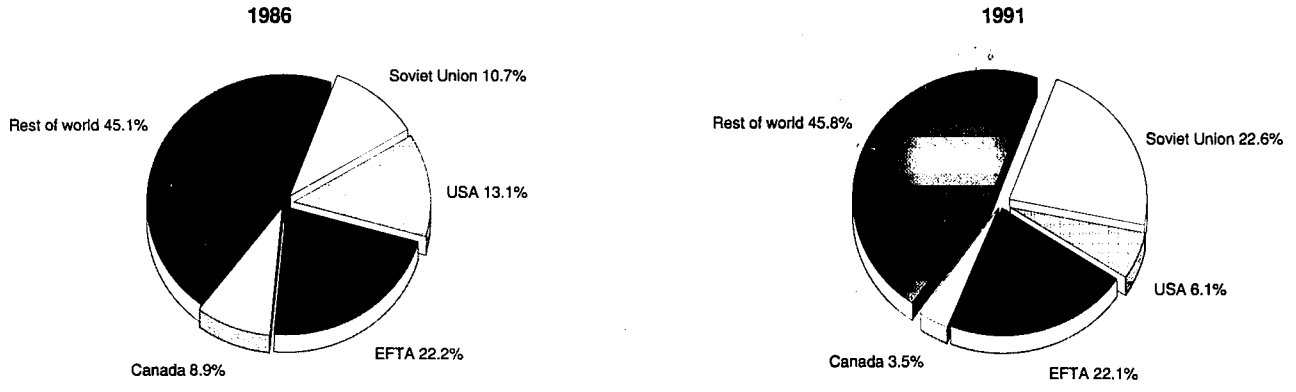
For most products of the sector, swings in the general level of economic activity will cause even wider swings in demand. As economic growth falters, the first affected are the investment goods industries. A renewal of aggregate demand will bring about shortages in production capacity and trigger sharp increases in investments. Thus, the fast pace of economic growth which characterised most of the developed world during the second half of the eighties also brought fast growth in demand for electronic equipment for industrial use. The world-wide slowdown in economic activity, which started in 1990 and is widely expected to last until the end of 1992, caused sharp drops in demand for all the goods of the sector.

Figure 2: Power tools
Origin of EC imports



Source: Eurostat

Figure 3: Welding equipment
Destination of EC exports



Source: Eurostat

Supply and competition

The EC is a long-standing leader in most of the subsectors of the industry, with a large number of firms catering to the needs of client industries. Competition is intense within the EC, but less so outside. Many of the products and types of equipment are custom-made according to the specific needs of the client industry, which increases the importance of geographical proximity and cooperation between supplier and user over pricing. For mass-produced products such as power tools, however, competition from low cost producers is potentially dangerous.

In welding equipment, especially in equipment for car assembly lines, EC-based producers usually have an advantage over potential suppliers from other countries. On the other hand, "transplant" production facilities are almost always equipped by in-house suppliers of the parent company. For example, Japanese car transplants in the UK buy all of their equipment from their home country. The same is true for European car transplants in other parts of the world, such as Latin America.

Price and profit trends in the industry follow the business cycle. In periods of fast demand growth, prices and profits are high, as production runs into capacity constraints. Shrinking markets heighten competition, and cause prices and turnover to drop, and profits to plunge.

Production process

For most of the sector's products, raw materials and energy represent a small portion of production costs. R&D is a very important input, as products must adjust to changes in production processes in the client industries. A major part of the labour force is skilled.

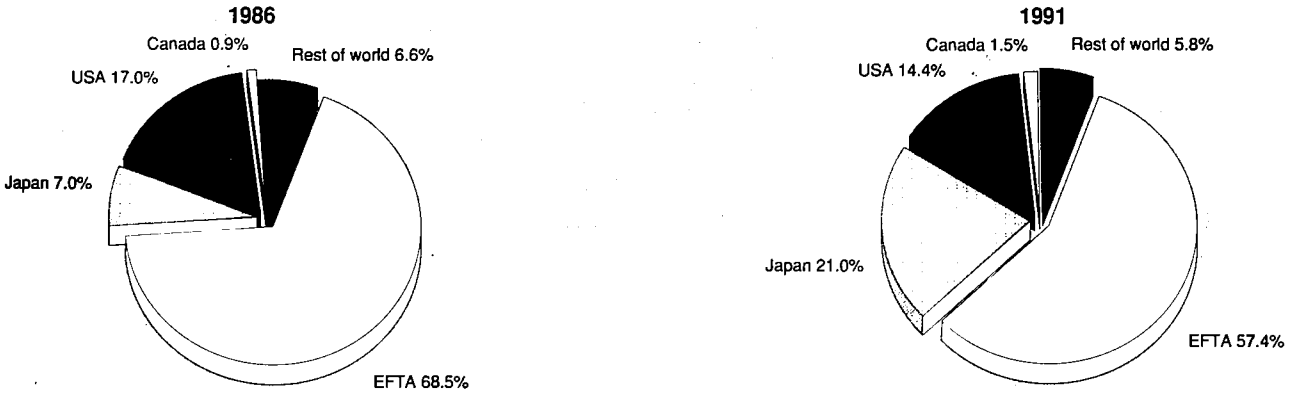
Technological change is evolutionary rather than revolutionary. The adoption of major innovations, such as laser cutting/welding technologies or electron-beam welding is held back by difficulties on the part of client industries to master new, untested production processes, as well as by other problems, such as the high cost of certification when a new technology is being introduced.

INDUSTRY STRUCTURE

Companies

Industry has been undergoing a restructuring process, with smaller firms merging into larger ones, both domestically and internationally. Within each subsector of the industry there are a small number of large integrated firms, often active in

Figure 4: Welding equipment
Origin of EC imports



Source: Eurostat

Table 2: Power tools
Trade by Member State, 1991 (1)

(thousand ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	9 392	1 278	275 409	99	7 729	17 380	860	57 544	13 800	861	54 367	438 719
Extra-EC imports	32 036	12 973	241 865	6 072	33 860	111 072	3 528	84 054	68 518	5 549	97 412	696 939
Trade balance (2)	-90468	-32243	228805	-19245	-67143	-234741	-8077	-50190	-70208	-23610	9241	-258220
Ratio exports/imports (2)	0.15	0.05	1.59	0.01	0.21	0.14	0.13	0.73	0.46	0.05	1.06	0.63
Intra-EC trade	74 443	20 992	101 492	13 300	51 660	160 561	5 781	104 597	61 401	19 184	47 891	661 302
Share of total imports (%)	69.9	61.8	29.6	68.7	60.4	59.1	62.1	55.4	47.3	77.6	33.0	48.7

(1) Estimates
(2) Calculated using world data for the individual countries and extra-EC data for the EC total
Source: Eurostat

other sectors, in addition to smaller more specialised firms, which are strong in a particular field or in a niche-market.

The welding equipment subsector is divided into two fields: arc welding and resistance welding. In the arc welding field, where individual machines are of relatively small value but consumption of filler-materials represents a large part of welding cost, sales are usually made through a network of distributors. There are about half a dozen major companies which are the result of the consolidation process carried out over the 1980s: ESAB (S/UK), SAF (F), Lincoln (USA), with Messer-Griesheim (D), Oerlikon (CH). Hobart & Miller (USA) is also a major player in the European market. Further consolidation has been taking place in the early 1990s.

In the resistance welding field, the number of significant firms is much larger. A number of companies have grown out of the resistance welding field and into automation, and are mainly involved in the production of transfer lines used for the assembly of automobiles. These companies include: Sciaky (F), the major independent in Europe, Renault Automation (F), KUKA (D), Comau (I), a subsidiary of Fiat, Lamb-Technikon and Stadco (UK). Comau operates in other fields of activities as well, such as machining operations.

Another group of companies in the resistance welding field make more standard machines, such as classic spot welders, projection, seam welders or various types of specialised equipment. These comprise a number of very large companies (500 workers and more), including Sciaky, Comau and Renault Automation, and a large number of smaller companies in the range of 150 workers who sub-contract more of their work. Most of the firms in the industry operate internationally.

Strategies

The sector of electrical equipment for industrial use is strongly affected by economic cycles, with demand rising in times of investment-led growth, and plunging in times of slow growth. Firms in the sector must therefore be organised in ways which enable them to respond quickly to fluctuations in demand. R & D is an important factor in maintaining competitiveness, as is close cooperation with client sectors, to better adapt products to client needs and to build up customer loyalty.

ENVIRONMENT

Production processes in the sector of electrical equipment for industrial use have few environmental effects: energy consumption is low, emission of noxious fumes or other pollutants is negligible.

Recycling in the industry is rarely a problem, since the industry produces relatively low volume, high value added products, with a large share of recyclable metals in their materials composition. For the arc welding industry, fumes represent a problem at the user end, due to the special composition of the different types of electrodes used in the welding process. The danger is not to the environment but to the workers; aeration systems, filters, and masks are used to combat the problem.

REGULATIONS

The only regulations concerning the industry are those concerned the homogenisation of norms across the EC. Only standard components, such as transformers, electrodes and cables, are affected. Most of the equipment produced by the industry is highly specialised and built to satisfy specific requirements; there is little scope for imposed normalisation. Some types of equipment produce electro-magnetic radiation and the EC Commission is working on a regulation to reduce its possible negative effects on workers and the environment.

In addition, Directive 89/392 deals with the standardisation of safety and health requirements for machines throughout the EC.

Table 3: Welding equipment
Trade by Member State, 1991 (1)

(thousand ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	49 014	12 279	155 610	3 030	34 753	123 002	504	44 626	19 788	5 214	102 624	550 444
Extra-EC imports	32 628	16 689	287 025	15 076	37 509	102 928	8 989	79 844	92 200	2 175	134 390	809 453
Trade balance (2)	204 532	-27 820	-31 043	-22 957	-22 883	71 760	-26 734	-134 556	-137 611	-3 292	-28 362	-158 966
Ratio exports/imports (2)	2.11	0.45	0.94	0.37	0.84	1.21	0.22	0.53	0.51	0.90	0.91	0.93
Intra-EC trade	150 266	34 263	259 358	21 173	101 513	237 092	25 380	208 346	187 417	30 636	179 3591	434 803
Share of total imports (%)	82.2	67.2	47.5	58.4	73.0	69.7	73.8	72.3	67.0	93.4	57.2	63.9

(1) Estimates
(2) Calculated using world data for the individual countries and extra-EC data for the EC total
Source: Eurostat

Table 4: Power tools
External trade in current value (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	228	257	301	355	363	371	397	439	449	439
Extra-EC imports	261	284	316	317	373	392	498	556	606	697
Trade balance	-32	-26	-15	38	-9	-21	-101	-117	-157	-258
Ratio exports/imports	0.88	0.91	0.95	1.12	0.97	0.95	0.80	0.79	0.74	0.63
Intra-EC trade	282	278	350	382	405	464	521	584	641	661
Share of total imports (%)	52.0	49.5	52.5	54.6	52.1	54.2	51.2	51.2	51.4	48.7

(1) EC10; 1982-83
(2) Estimates
Source: Eurostat

Table 5: Welding equipment
External trade in current value (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	247	263	277	309	341	333	394	333	315	371
Extra-EC imports	133	139	167	174	167	201	250	273	266	312
Trade balance	114	123	110	135	173	132	144	60	48	59
Ratio exports/imports	1.86	1.89	1.66	1.78	2.03	1.65	1.58	1.22	1.18	1.19
Intra-EC trade	221	199	258	285	308	296	391	424	424	444
Share of total imports (%)	62.4	58.9	60.7	62.1	64.8	59.5	60.9	60.8	61.4	58.7

(1) EC10; 1982-83"
(2) Estimates
Source: Eurostat

Table 6: Electrical equipment for industrial use
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.4	3.2
Production	2.3	3.1
Extra-EC exports	2.5	3.5

Source: BAK

OUTLOOK

The outlook for the industry of electrical equipment for industrial use is closely related to the outlook for its client industries.

The car industry has not been experiencing rapid growth since the end of the 1980s, and is not expected to recover significantly until the end of 1992. After that time, however, prospects are rather good, particularly in the longer run once the Eastern European market revitalises, after the mid 1990s. This in turn will foster growth in the subsectors related to the automobiles industry such as electrical components for motor vehicles and in the welding industry.

Demand for traffic related equipment has remained strong in a number of EC countries, mainly France, Spain and Germany, thanks to wide ranging railroad development projects. This is expected to continue in future.

Demand for other types of equipment is expected to benefit from the general recovery of business investment in the EC which is expected from 1993 onwards.

Demand and consumption for products will start growing slowly in 1993 and will reach relatively high growth rates in later years. Production is expected to grow at similar rates, as both extra-EC imports and exports should follow similar growth paths as demand. In the longer run, export growth should outstrip import growth, due to the development of demand in Eastern Europe.

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The Committee of Associations of European Transformer Manufacturers / Comité des associations de constructeurs de transformateurs du Marché Commun (COTREL). Address: c/o FABRIMETAL, Rue des Drapiers 21, B-1050 Brussels; tel: (32 2) 510 2521; fax: (32 2) 510 2561; and,
Zentralverband Elektrotechnik und Elektronikindustrie (ZVEI). Address: Stresemannallee 19, Postfach 701261, D-6000 Frankfurt/Main 70; tel: (49 69) 630 2232; fax: (49 69) 630 2317.

Batteries and accumulators

NACE 343.2

The industry of batteries and accumulators has benefited from a favourable economic climate during the last decade. Increased demand for portable electronic equipment and booming sales of motor vehicles provided the industry with a stable growth path, although much of the demand for batteries and accumulators has been filled by imports, resulting in a negative trade balance.

The battery industry is highly concentrated; the top four producers account for 80% of the market. The accumulator market is less concentrated, but the competitive nature of the industry as well as the innovative requirements of client industries demand such high R&D costs that small companies are forced to merge to stay competitive.

East Asian competition in accumulators has been growing stronger on a price basis. EC environmental regulations could force EC producers to raise prices to cover costs, weakening their competitivity in relation to East Asian suppliers.

INDUSTRY PROFILE

Description of the sector

The batteries and accumulators industry can be subdivided into two main subsectors: the production of primary batteries, which are not rechargeable; and the production of rechargeable batteries, that is, accumulators.

There are six types of primary non-rechargeable batteries: zinc carbon batteries, which were the first dry batteries and are still in use today; alkaline manganese batteries, which have a longer life than zinc carbon batteries; mercuric oxide batteries; silver oxide batteries; zinc air batteries; and lithium batteries.

There are two main types of accumulators: lead acid batteries and nickel cadmium batteries.

Accumulators can be further subdivided into three types, depending on their use. Drive batteries are used to operate electric motors to propel vehicles, in particular handling equipment, but also electric cars. Stationary batteries, used mainly for the operation of emergency devices such as alarm and control systems, as back-up in case of power-breaks. Starter batteries, are used in motor vehicles to provide electric power until the internal combustion motor has been started.

Main indicators

Total sales of starter batteries in the EC rose by 2.3% per year from 1982 to 1990, and reached 47 million units by the end of the period. Domestic sales of European producers (including EFTA countries) increased by 1.6% on average during this period, with demand from car manufacturers (34% of domestic sales in 1990) the most significant force. In 1990, direct sales to car manufacturers declined by about 3.2%, but sales to other customers continued to increase, up to 4.7%. Imports from non European countries, excluding imports by Western European producers, increased by 4.5% per year during the 1980s, to reach 30% of total sales, compared to 15% in 1980. Intra-EC trade also increased, stimulated by competition between EC member countries, mainly with the establishment of the common market. As a consequence of the strong price competition from abroad, and in view of the overcapacities in the sector, it can be expected that prices will decline in the next few years.

In 1990, the primary battery industry employed roughly 15 000 people in Western Europe, in a total of 10 factories. In the accumulator industry, about 40 000 people were employed in roughly 80 factories. As a result of the slowing production growth and the need to increase productivity and to reduce costs in the face of stiffening competition world-wide, employment levels are expected to keep falling into the mid-1990s.

Foreign trade

Extra-EC trade in batteries and accumulators increased rapidly during the last decade. While exports grew by roughly 2% per year in value from 1985 to 1991, imports increased at an annual rate of about 13% for the same period. Thus, while extra-EC imports equalled only about 80% of exports in 1985, the balance turned negative by 1987, and imports exceeded exports by over 40% in 1991. Nearly all countries within the EC increased their imports by double digit growth rates each year by the end of the 1980s. The most important importers in the EC are Germany (35% of total EC imports in 1991), the United Kingdom (16%), France (13%), the Netherlands (11%) and Italy (10%). These countries together represent about 86% of total extra-EC imports.

Intra-EC trade also increased rapidly from 1985 to 1991, by roughly 8% per year.

MARKET FORCES

Demand

Demand for the products of the industry as a whole increased considerably during the 1980s. Different types of products respond to different demand patterns, however. The volume of the market of non-rechargeable primary batteries grew by about 2% per year on average at the end of the 1980s. Primary

Table 1: Starter batteries
Main indicators at current prices (1)

(thousand units)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Domestic sales by Western European producers (2)									
-to car manufacturers	9 337	9 649	9 452	10 035	10 198	10 745	11 032	11 962	11 576
-to other customers	20 434	21 035	19 922	21 731	20 955	22 159	20 554	21 111	22 105
Imports (3)	9 502	9 993	10 707	11 256	11 495	12 888	12 880	13 153	13 584
Total sales	39 273	40 677	40 081	43 022	42 648	45 792	44 466	46 226	47 265

(1) Austria, Belgium, Denmark, Germany, Spain, Finland, France, United Kingdom, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland
(2) Including imports by battery manufacturers
(3) Excluding imports by battery manufacturers
Source: EUROBAT

Table 2: Batteries and accumulators
External trade at current prices

(million ECU)	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	489	463	403	449	479	508	550
Extra-EC imports	392	401	444	539	629	640	809
Trade balance	97	61	-41	-89	-150	-131	-259
Ratio exports/imports	1.25	1.15	0.91	0.83	0.76	0.79	0.68
Terms of trade index (2)	100.0	100.9	103.6	107.2	107.6	108.3	103.8
Intra-EC trade	881	904	960	1 049	1 204	1 306	1 435
Share of total imports (%)	69.2	69.3	68.4	66.1	65.7	67.1	63.9

(1) Estimates
(2) Includes electrical apparatus and appliances for industrial use
Source: Eurostat

batteries are used in high-fidelity equipment (50%), games (20%), lighting (11%), watches and alarms (11%), and photo equipment (8%).

Product innovations using nickel and cadmium resulted in batteries which are lighter and live longer (5 to 10 years) than the traditional storage batteries. In 1989, an estimated 9 million units of rechargeable batteries were sold in Europe.

Among accumulators, the largest market by far is for starter batteries, mainly used for motor vehicles. In Western Europe, this market represented some 45 million units by the end of the 1980s, about one third of which were used in new motor vehicles, and the remaining two thirds were mostly used as replacements in older motor vehicles.

Supply and competition

The most important producers of batteries and accumulators in the EC are Germany, Italy, the United Kingdom and the Netherlands. Outside the EC, the most important producers and strongest competitors are the United States and Japan. Since the most important producers of primary cell batteries have production facilities in EC countries, competition from outside the EC is not increasing significantly. In the field of accumulators, on the other hand, competition has been rising, particularly from Japanese, South Korean and Indonesian firms. Products from these countries are especially competitive in terms of price as a result of lower unit costs, including subsidised raw materials and an export-dumping policy, particularly in East Asian countries, according to EC producers. The fact that production of these products requires little skilled labour apparently represents an important comparative advantage for these countries, which have plentiful unskilled labour.

Production process

The relatively low level of sophistication of the production process eases automation efforts.

The performance development of portable electrical equipment, which requires a portable source of electricity, was made possible by product innovations in the field of batteries. The short-lived zinc-carbon battery has been partially substituted for by alkaline batteries, with a life three times longer; the latter accounts now for roughly 40% of the market in the EC. Even newer developments are in zinc-air and lithium batteries.

Rechargeable batteries (accumulators) are increasingly used in portable electric and electronic equipment, particularly in equipment which require relatively large amounts of energy such as computers, tools, and appliances. Demand for accumulators has been booming since 1985, when nickel-cadmium rechargeable batteries came on the market for the general public. The annual growth in sales is estimated at 15% to 20%.

INDUSTRY STRUCTURE

Companies

There are about 12 firms which produce primary batteries in Western Europe, the four largest of which cover about 80% of the market. These firms include the US based Duracell in the United Kingdom, Varta in Germany, Philips in The Netherlands and the US based Ralston Energy Systems in Switzerland. Other important manufacturers are the American Kodak, and the Japanese Sanyo and Matushita.

There are about 25 firms producing accumulators in the EC. The most important are Varta in Germany, the French company Saft and CEAC (jointly owned by the Italian company Fiat and the French Alcatel Alsthom), Hawker in the United Kingdom.

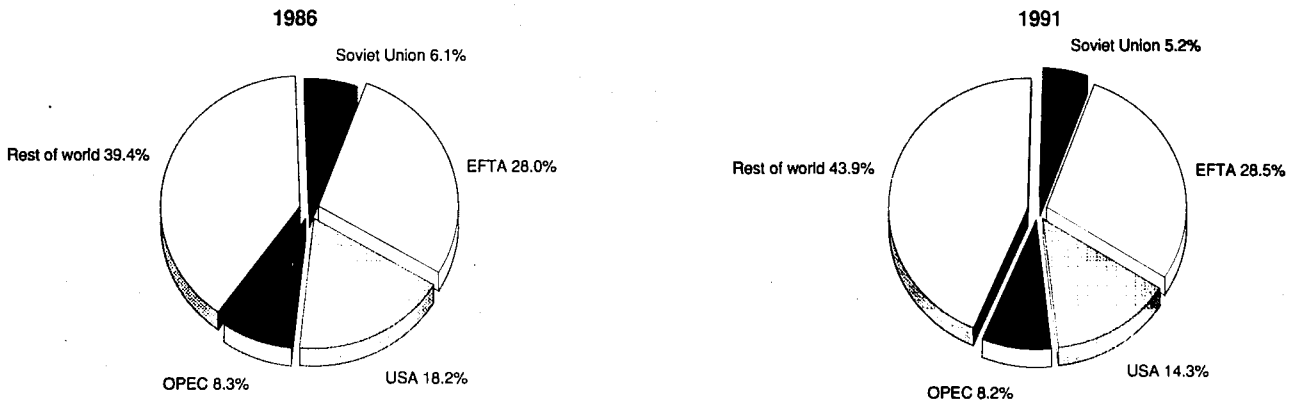
The largest firm in the EC is Varta, which is active in both primary batteries and accumulators; this company has 35 subsidiaries spread over the world. The group realises roughly

Table 3: Batteries and accumulators
External trade by Member State,1991

(million ECU)	B/L	DK	D	GR	E	F	IRL	I	NL	P	UK	EC
Extra-EC exports	49	12	156	3	35	123	1	45	20	5	103	550
Extra-EC imports	33	17	287	15	38	103	9	80	92	2	134	809
Trade balance (2)	205	-28	-31	-23	-23	72	-27	-135	-138	-3	-28	-259
Ratio exports/imports (2)	2.11	0.45	0.94	0.37	0.84	1.21	0.22	0.53	0.51	0.90	0.91	0.68
Intra-EC trade	150	34	259	21	102	237	25	208	187	31	179	1435
Share of total imports (%)	82.2	67.2	47.5	58.4	73.0	69.7	73.8	72.3	67.0	93.4	57.2	63.9

(1) Estimates
(2) Calculated using world data for the individual countries and extra-EC data for the EC total
Source: Eurostat

Figure 1: Batteries and accumulators
Destination of EC exports



Source: Eurostat

40% of its turnover in portable batteries, 27% in starter batteries and nearly 23% in storage batteries for industry. All firms in the industry are operating at least on the European market and many of them are operating globally.

Strategies

The EC industry is characterised by surplus production capacity, and by strong and growing competition from outside the EC. These factors together will continue to push prices down. To combat the squeeze on profits, companies have had to rationalise production to increase efficiency and reduce costs. In particular, efforts are oriented towards more concentration, in order to profit from economies of scale. The American Ralston (based also in Switzerland) for example, has taken over the French firms Wonder and Mazda. Companies are also investing with the goal of penetrating new, expanding markets. Examples are the German firm Varta, which is establishing subsidiaries in countries as diverse as Finland, Argentina, Mexico, Brazil and Singapore, and the French Saft, which is doing the same in Korea and Finland, from which they hope to penetrate markets in East Asia and Eastern Europe. In order to counteract competition from firms from outside the EC, some of which are highly competitive in terms of technology (USA and EFTA in particular), EC firms must increase R&D efforts, with a view towards bettering the quality of products. Improvements can be made in the direction of longer-life or in the context of environmental concerns.

Smaller companies are forced to operate in niche markets, which are very demanding in terms of technology and quality. These firms may face difficulties with the financing of R&D expenditures; cooperation in this field could offset these costs.

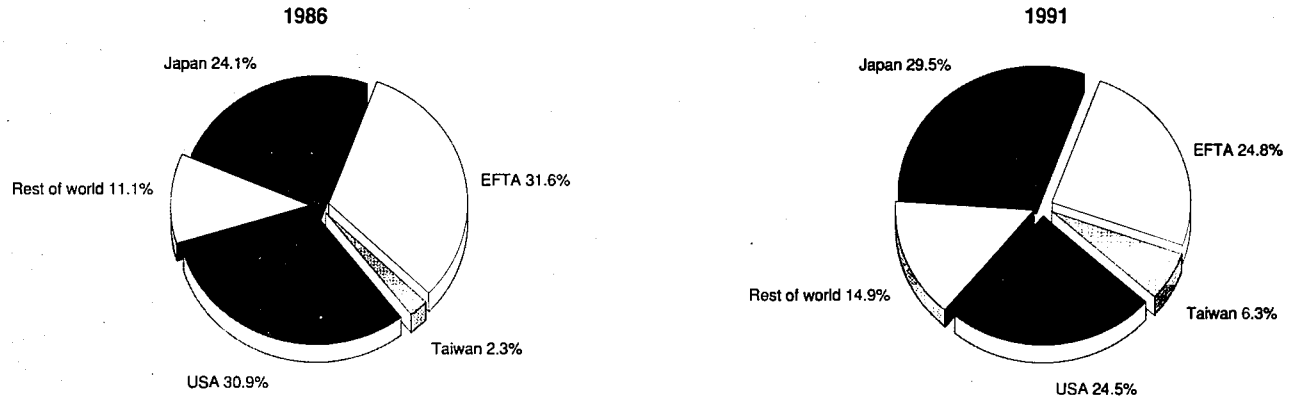
REGIONAL DISTRIBUTION

Within the EC, the main producers are Germany, Italy, the United Kingdom and the Netherlands. This is also where the most important firms are located. In rechargeable batteries, the leading EC producer is Saft (France); the biggest producers in the world, however, are the Japanese companies Sanyo and Matushita. In primary dry cell batteries, the world's largest producer is the American Duracell.

ENVIRONMENT

Some of the most important product innovations in the industry over the last few years have taken place in the context of the environment. The reduction of the heavy metals content

Figure 2: Batteries and accumulators
Origin of EC imports



Source: Eurostat

of non-rechargeable batteries is of primary concern. Mercury has been used traditionally in both saline and alkaline batteries. Two EC directives in 1982 and 1984 require the reduction of mercury waste, which is harmful to the environment. Since 1985, producers of primary batteries in the EC have cut the amount of mercury discharged from batteries to the environment by almost 50%, and plan to reduce this by another 84% by 1992. The reduction in mercury waste has been the result of two developments: the 97.5% reduction of mercury in alkaline-manganese batteries, compared to 1985 levels, which eliminated the need to collect these batteries separately; and the replacement of mercuric-oxide batteries (containing 30% mercury) by zinc-air batteries (around 1% mercury) and lithium batteries (0% mercury).

Other environmental efforts are oriented towards recycling batteries. Some Member States have already introduced separate waste collection for primary batteries containing mercury. In 1991, the EC Commission proposed a directive concerning batteries containing harmful substances, requiring producers to take back used batteries, so that the materials can be recycled. The required low energy and low emissions recycling techniques are not available at the moment, however, except for lead recycling. In the field of lead-acid accumulators the recycling quota is already close to 100%; in nickel-cadmium batteries it is about 60%. In addition to the technological aspects of the problems, the use of recycled materials in batteries is likely to increase production costs, with a corresponding increase in price. If international competition does not face the same requirements, EC producers could lose price competitiveness

OUTLOOK

Prospects for the industry are quite favourable for the early to mid-1990s. Increased use of portable electronic equipment is expected to bring about increases in demand for batteries and accumulators. In the field of primary batteries, demand growth is further stimulated by the development of better, longer lasting products, such as the relatively new lithium batteries, which last about seven times longer than ordinary batteries. The trend towards miniaturisation of appliances, requiring smaller and more powerful batteries, will further feed demand growth in the future. In the field of accumulators, the development of demand is not expected to be as favourable as in primary batteries in the short term, until sales of new cars start growing again. In the medium term, however, demand for accumulators should increase fed both by growing sales of new motor vehicles and by growing demand for replacement batteries. The challenge of competition from extra-EC countries, especially East Asia, will have to be met by increasing rationalisation efforts, as well as by fast rates of product improvement, fed by intensive R&D investments.

Table 4: Batteries and accumulators
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.5	4.0
Production	1.0	3.0
Extra-EC exports	4.0	6.0

Source: BAK

Written by: BAK
This industry is represented at the EC level by: Association of European Dry Battery Manufacturers (EUROPILE) and Association of European Accumulator Manufacturers (EUROBAT). Address: P.O. Box 5032, CH-3001 Bern; tel: (41 31) 922 1333; fax: (41 31) 21 69 61.

Domestic electrical appliances

NACE 346

EC production growth has slowed since the end of 1988, but was boosted in 1991 by the reunification of Germany, which enabled both German manufacturers to significantly increase production and other European manufacturers to increase sales within Germany. This one-time special growth has now lost momentum, and growth is expected to return to 1989 and 1990 rates.

As technological improvements continue to impact favourably on productivity, employment in the industry is likely to fall. Over-capacity, which has been a feature of recent years, will lead to continuing consolidation through M&A activity. The greatest movement in this area in recent years has been in Spain, where, as tariffs have been eliminated in line with integration within the EC, the majority of remaining independent companies have been acquired by major European manufacturers.

INDUSTRY PROFILE

Description of the sector

NACE 346 covers the manufacture of electrical appliances generally intended for domestic use. It included the following articles: microwave ovens; cookers (free-standing and built-in); dishwashers; home laundry products (including washing machines); spin-dryers and tumble dryers; refrigeration products (refrigerators and freezers); personal care products (hair dryers, etc.); small kitchen appliances; vacuum cleaners; irons; heating products.

Main indicators

In 1991, the value of EC production of electric domestic appliances amounted to about 24 billion ECU.

In 1990, the overall European market was distorted by the reunification process in Germany, which significantly inflated that market and therefore increased Germany's share of the total market to twice the size of the markets of the United Kingdom, France and Italy, all of which were similar in size. The Spanish market size was around half of the size of the three countries above.

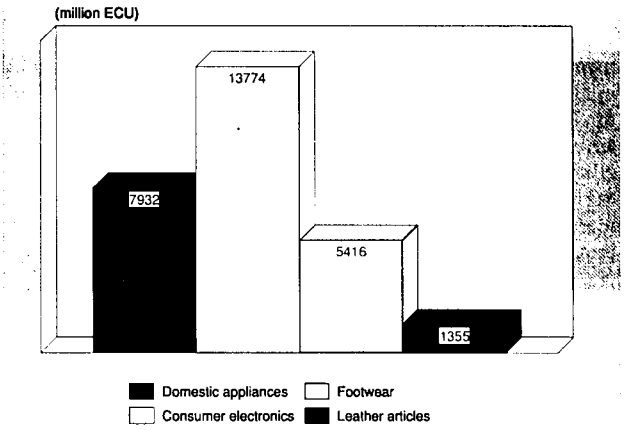
In production terms the German industry in 1990 remained the largest, representing around 36% of EC production, followed by Italy at 25%, the United Kingdom and France each with 12% and Spain with 7%.

International comparison

In major product areas, particularly in home laundry and refrigeration products, the EC remains a net exporter by value. In small appliances and microwave ovens, the level of imports from the Far East remains high, in recent years from South Korea, Taiwan and China rather than, as in earlier years, from Japan.

EC production and apparent consumption are both considerably higher than in the USA and Japan. However, Japanese production growth was higher than that of the EC or the USA in 1990 and 1991. EC growth was slow in those years, while the USA experienced negative growth.

Figure 1: Domestic electrical appliances Value added in comparison with other industries, 1991



Source: Eurostat

MARKET FORCES

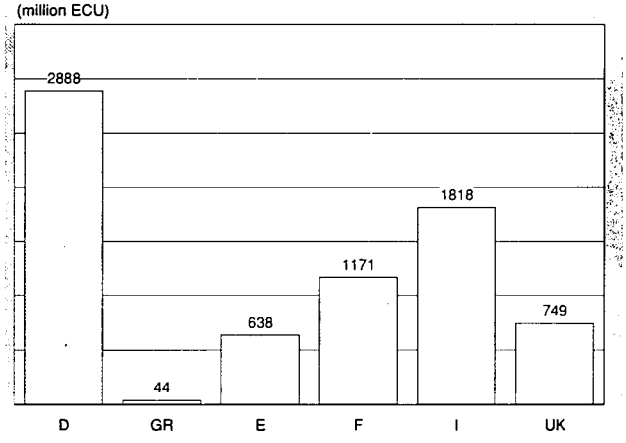
Demand

Unlike the sectors of electrical equipment and telecommunications, which are driven by investment, domestic appliances depend on consumer demand and building activity. An important factor in consumption trends over the 1980s and early 1990s has been the degree of market saturation, which, for many products, has increased over the last decade. In 1989, 98% of households owned refrigerators, 89% owned washing machines, and 88% owned vacuum cleaners. Ownership of freezers and dishwashers is lower, and growth shows some variability, but overall both grew significantly from 1980 to 1989.

At high penetration rates, most products are purchased as replacements. However, socio-economic factors such as an increase in single person households have kept the number of households making first purchases growing.

The proportion of extra-EC exports to production remained steady from 1982 to 1991, at around 12%. The EC maintains a positive trade balance which has varied a bit due to variable imports, but which was slightly down in 1991 compared to 1982. Although international trade is highly competitive, trans-

Figure 2: Domestic electrical appliances Value added by Member State, 1991



Source: Eurostat

Table 1: Domestic electrical appliances
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Apparent consumption	13 422	13 903	15 232	14 965	16 068	17 167	19 507	20 475	21 179	23 217
Production	14 223	14 747	16 018	15 756	16 823	17 700	19 972	21 195	22 198	23 949
Extra-EC exports	1 540	1 667	1 858	1 991	2 095	2 108	2 332	2 791	2 939	3 028
Trade balance	802	843	786	791	755	533	464	720	1 019	732
Employment (thousands)	263.5	254.2	245.0	232.4	227.2	224.8	233.3	230.5	229.3	230.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 2: Domestic electrical appliances
Average real annual growth rates (1)

(%)	1982-85	1986-91	1982-91
Apparent consumption	0.2	5.1	4.0
Production	0.0	4.6	3.5
Extra-EC exports	4.2	5.5	4.6
Extra-EC imports	11.0	10.4	10.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Domestic electrical appliances
Breakdown by product line, 1991

(million units)	Apparent consumption	Production	Extra-EC exports
Refrigeration products	16.5	16.3	2.6
Home laundry products	13.3	14.7	1.7
Cookers	N/A	9.3	N/A
Dishwashers	3.8	4.3	0.6
Microwave ovens	6.7	3.4	0.3
Vacuum cleaners	18.4	14.1	2.4
Irons	N/A	N/A	4.5
Total white goods	N/A	48.0	N/A

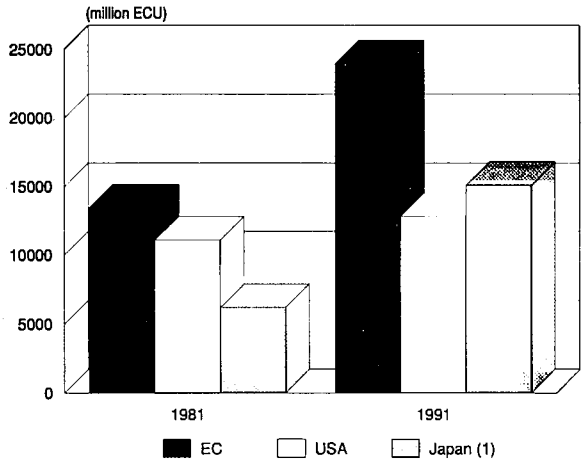
Source: CECED, Eurostat

Table 4: Domestic electrical appliances
Trends in household equipment rates

(%)	1980	1985	1987	1988	1989
Refrigerators	93	96	96	97	98
Freezers	30	37	43	43	41
Washing machines	79	86	88	88	89
Dishwashers	14	20	22	22	23
Vacuum cleaners	75	79	82	82	88

Source: CECED

Figure 3: Domestic electrical appliances International comparison of production at current prices, 1991



(1) 1990
Source: Eurostat, Census of Manufacturers, SEMA

portation costs keep foreign trade a small part of production and consumption. Three of the four most important markets for EC goods are located in Europe (Austria, Switzerland and Sweden). For EC imports, over 30% come from EFTA countries, followed at a distant second by China which provides 14%.

Supply

The domestic appliance industry is relatively highly concentrated compared to other industries; mass production methods and economies of scale are particularly important aspects in the manufacture of these types of products. Over the last three decades, industry concentration has increased, with a decline in the number of manufacturers which can be seen in Figure 6.

In the United Kingdom and France, the retail sector is increasingly dominated by hypermarkets and major chains, leading to a squeeze on margins at both the retail and manufacturing ends of the business. In other EC countries, the market remains in the hands of independent retailers, although mail-order companies with retail outlets, such as Quelle in Germany, are prominent.

INDUSTRY STRUCTURE

Companies

The enterprise with the largest market share is based outside the EC: Electrolux of Sweden. However Electrolux production is mainly within EC countries, as are all the other major enterprises. Most of the major enterprises market more than one brand-name. In particular, Electrolux markets the Zanussi brand through Europe, Arthur Martin in France, Tricity Bendix in the United Kingdom, Zanker in Germany, and Ibelsa and Domar in Spain. Whirlpool, who completed the purchase of the Philips major appliance business in 1991, still uses the Philips brand name in some countries, and the Bauknecht and Ignis brand in most countries.

Strategies

Consolidation of the industry through acquisitions and mergers, which was a feature of the 1980s, will continue through the 1990s. This decade will also see a number of large enterprises pooling technical information, particularly in meeting the requirements of environmental standards or regulations.

ENVIRONMENT

There is as yet no overt pressure from consumers on environmental issues, but the Domestic Appliance industry has a high profile with consumers, and therefore current environmental concerns impact strongly on the industry. Although domestic refrigeration products are not heavy users of CFCs (4.3% of Montreal Protocol base figure), the elimination of CFCs by end 1998, now advanced to 1996, presents the industry with major design and production problems.

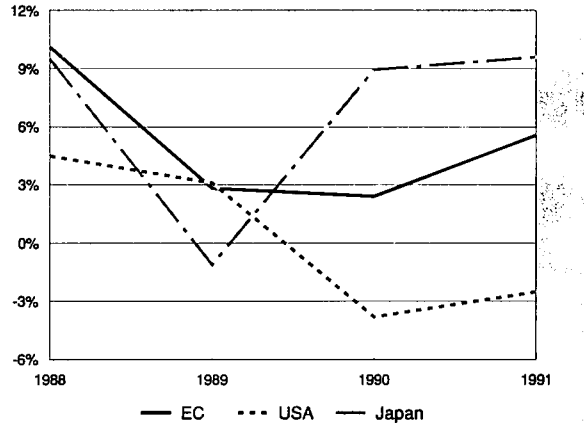
The need for substitute products within a short time-scale that use materials satisfying flammability, toxicity, and carcinogenic criteria while maintaining a long economic life to satisfy consumers, is blocking other technological advances.

For home laundry products and dishwashers, the proposed eco-labelling schemes are setting challenges in the area of energy and water consumption and detergent usage.

OUTLOOK

The Domestic electricalal appliance industry relates closely to general economic circumstances. The major selling appliances operate in a mature market, and thus are reliant on general consumer confidence. Many products, in particular long-life products such as cookers and refrigerators and freezers, experience growth or slump in direct relationship to home

Figure 4: Domestic electrical appliances International comparison of production growth at constant prices



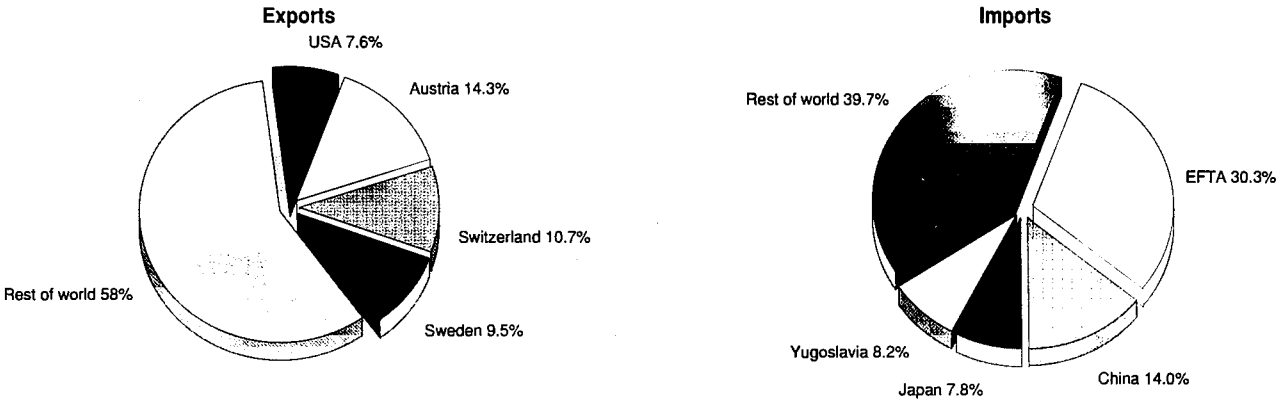
Source: Eurostat, Census of Manufacturers

Table 5: Domestic electrical appliances EC market shares of the largest enterprises

Firm	Country	(%)
Electrolux	S	20
Bosch-Siemens	D	14
Whirlpool	USA	13
Thomson Electroménager	F	12
A.E.G.	D	5
Candy	I	5
Merloni	I	4
Miele	D	4
G.E./Hotpoint	UK	4

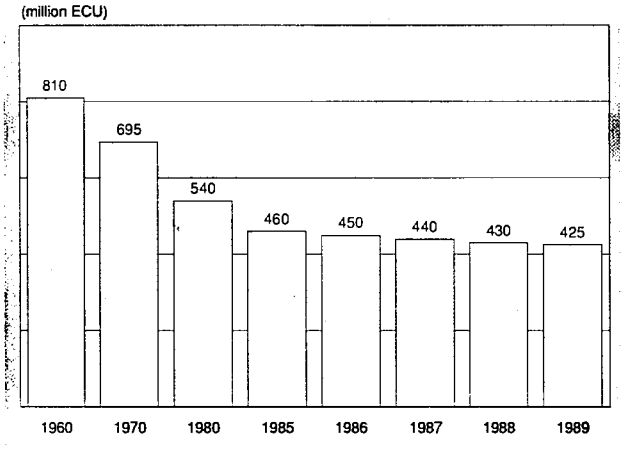
Source: CECED

Figure 5: Domestic electrical appliances
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Figure 6: Domestic electrical appliances
Number of EC manufacturers



Source: Eurostat

movements. Thus forward forecasts are only able to mirror overall economic conditions.

Nevertheless overall growth will occur through the 1990s with the continued growth of home ownership of dishwashers and microwave ovens, which have not yet reached the mature market state. Some manufacturers have been looking for a new growth market in air-conditioning products, but this is now more problematic due to environment related restraints.

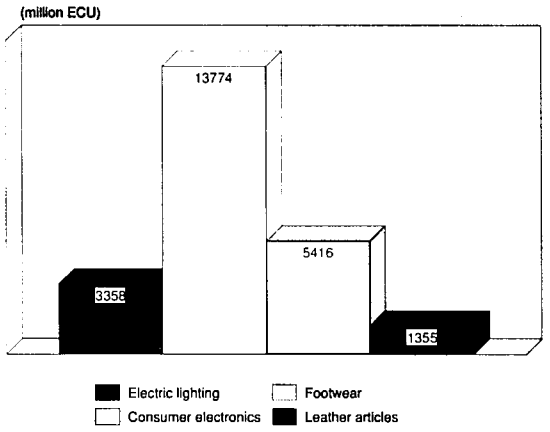
Numbers of people in the industry employed in the industry will remain static or decline marginally as growth is matched by improved productivity and further rationalisation.

Written by: CECED
The industry is represented at the EC level by: European Committee of Manufacturers of Electrical Domestic Equipment / Conseil Européen de la Construction Electrodomestique (CECED). Address: c/o AMDEA, 8 Leicester Street, London WC2H 7BN; tel: (44 71) 437 0678; fax (44 71) 494 1094.

Electric lighting
NACE 347

After suffering a decline in production at the beginning of the 1980s, the EC electric lighting industry experienced fast growth in the second half of the decade. This was mainly the result of increased construction activity since 1986 which led to fast rises in demand for new lamps and lighting equipment. Competition from the East Asian NIC's has been increasing during the last few years, with the result that these countries have considerably increased their market share in the EC to the detriment of the more traditional sources of imports such as the EFTA countries, the USA and Japan.
Prospects in the medium-term are quite favourable, as demand will be stimulated by increased construction activity, as well as by product innovation.

Figure 1: Electric lighting
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The electric lighting industry can be divided into two main subsectors:

- electric lamps which includes incandescent lamps, discharge lamps and dual lamps, as well as the catch-all group of "other electric lamps";
- electric lighting equipment, which comprises indoor electric lighting equipment, special purpose electric lights, portable lights, outdoor lights, spotlights (excluding lights for motor vehicles) and parts for electric lights.

Main indicators

The EC electric lighting industry experienced fast growth in production and apparent consumption over most of the last decade. In 1991, about 16% of EC production was sold outside the EC. The share of extra-EC imports has been consistently low, below 12%, over the last decade, with a jump to 12.6% in 1991. The trade balance, however, which showed steady growth throughout the 1980s, declined in 1991 and is expected to decline further in 1992.

Germany had by far the highest value added in the industry in 1991; nearly three times the value added of the second biggest producer, the United Kingdom.

Recent trends

Production at constant prices rose during most of the 1980s, but decreased in 1991. It has still shown faster growth than production for manufacturing in general, however. Employment has been variable since 1982, but growth has been above growth for manufacturing since 1986

Demand for products of the electric lighting industry, measured in terms of apparent consumption at constant prices, increased considerably during the 1980s, particularly so in the second half of the decade. The development of demand was reflected in a similar rise in production over the same period. Extra-EC imports increased at a slightly faster pace than demand, but extra EC exports developed less favourably. As a result, the industry's trade balance has been deteriorating since 1985.

Foreign trade

Extra-EC exports increased 5.4% per year in value from 1982 to 1991; imports from outside the EC, on the other hand, increased by nearly 11% per year on average during the same period. The most important market for EC producers is the EFTA, which purchased nearly 40% of extra-EC exports in 1991. The United States, with 11% of the EC exports, and Japan, with 6%, are far behind. Exports to developing countries, including the East Asian NICs, declined by over 20% between 1985 and 1991. The largest percentage of imports still come from the EFTA countries, at about 27% of the total, but, in general, imports from the traditional suppliers have been declining in general, to the benefit of the developing countries; the latter have seen their imports into the EC double from 1986 to 1991 to reach 24% of the total at the end of that period.

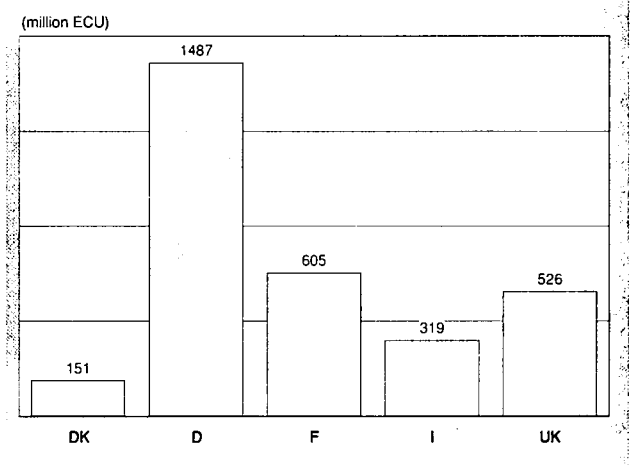
Trade between EC member countries, measured in terms of intra-EC imports, increased by 11% per year from 1982 to 1991; the volume is more than twice as large as imports from outside the EC.

MARKET FORCES

Demand

Demand for the products of the electric lighting industry is determined by two main factors: replacement demand, and demand for the equipment of new buildings, dwellings and development projects. The first source of demand is relatively insensitive to economic cycles, although the pace of growth of disposable income, as well as technological developments

Figure 2: Electric lighting
Value added by Member State, 1991



Source: Eurostat

Table 1: Electric lighting
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	3 484	3 564	3 947	4 450	4 809	5 381	6 207	7 186	7 522	7 774	7 803
Production	3 916	4 020	4 522	5 097	5 366	5 834	6 647	7 643	7 982	8 115	8 127
Extra-EC exports	821	866	1 042	1 158	1 107	1 063	1 175	1 323	1 314	1 319	1 344
Trade balance	432	456	575	648	557	453	440	457	460	340	324
Employment (thousands)	94.3	89.2	89.3	91.9	90.3	92.6	95.0	101.3	103.0	102.2	101.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Electric lighting
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.3	7.5	6.4
Production	4.3	5.6	5.2
Extra-EC exports	3.9	0.4	1.6
Extra-EC imports	3.0	11.3	8.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Electric lighting
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	821	866	1 042	1 158	1 107	1 063	1 175	1 323	1314	1319
Extra-EC imports	389	410	467	510	551	610	735	866	853	979
Trade balance	432	456	575	648	557	453	440	457	460	340
Ratio exports/imports	2.11	2.11	2.23	2.27	2.01	1.74	1.60	1.53	1.54	1.35
Terms of trade index	95.6	102.0	98.7	100.0	104.1	104.8	110.2	105.2	112.8	110.1
Intra-EC trade	1 062	1 179	1 288	1 497	1 739	1 924	2 121	2 389	2556	2639
Share of total imports (%)	70.8	71.6	70.9	72.5	74.4	74.0	72.3	71.5	73.0	70.9

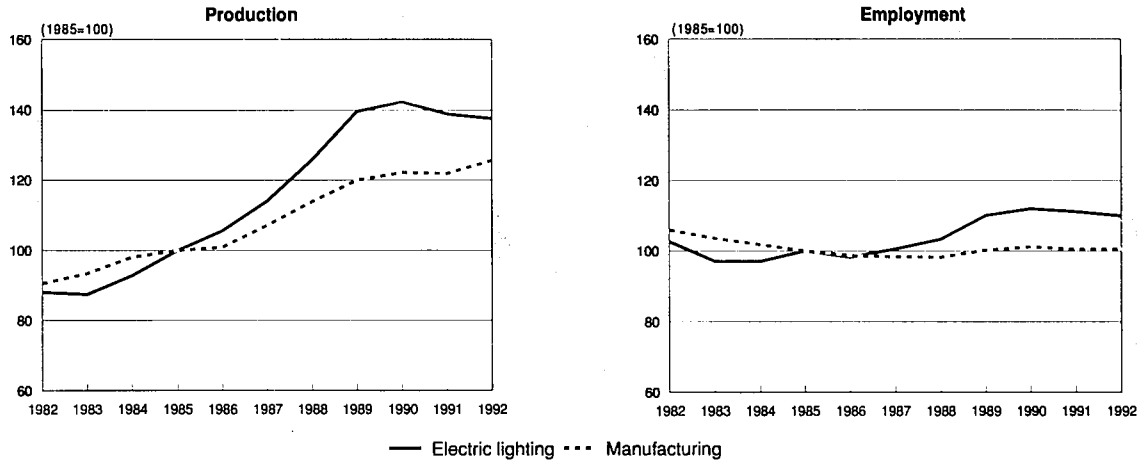
(1) Estimates
Source: Eurostat

Table 4: Electric lighting
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	25.3	27.2	28.1	27.9	29.4	30.9	33.0	32.6	33.4	32.9
Productivity index	90.7	97.6	100.6	100.0	105.4	110.7	118.2	116.8	119.9	117.9
Unit labour costs index (2)	82.7	88.7	96.2	100.0	106.2	111.5	118.5	124.3	131.5	N/A
Total unit costs index (3)	73.6	79.2	87.0	100.0	108.5	112.0	126.7	140.6	143.8	150.8

(1) Value added per person employed (1991 prices); excluding Denmark
(2) Based on labour costs per person employed at current prices
(3) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Electric lighting
Production and employment indices compared to EC manufacturing



1992 are estimates
Source: Eurostat

and fashion trends, can affect replacement rates to a certain extent.

The second source of demand, on the other hand, is highly cyclical, tied closely to the business cycle, and in particular to its effects on the level of building activity. Thus, electric lighting industry demand benefited considerably from the boom in the EC construction industry which took place in the second half of the 1980s. Similarly, demand is expected to suffer from the downturn in construction activity which hit the EC in 1991, and should continue to decline through 1992 and part of 1993.

As previously mentioned, product innovation may prove to be an important source of additional demand. The trend towards more efficient use of energy has brought about increased demand for low voltage discharge lamps and for compact fluorescent lamps; halogen lamps have increasingly gained acceptance in private households, after having been initially developed for industrial and outdoor uses.

Supply and competition

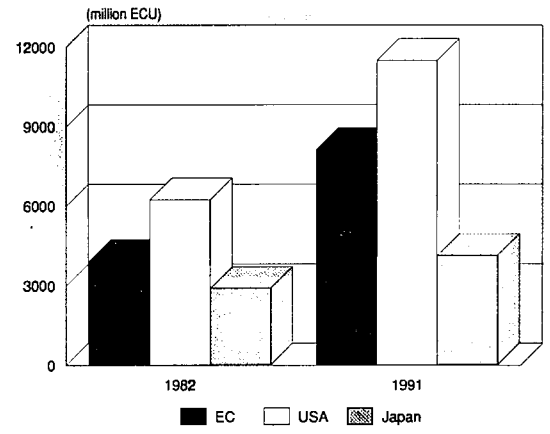
Among the Triad countries (the USA, the EC, and Japan) the USA is the most important producer of electric lighting equipment and lamps, with about 48% of total production in 1991, followed by the EC, with about 34%; and Japan with roughly 17%. As mentioned, extra-EC imports from outside the EC increased at a significantly higher rate than extra-EC exports. In particular, imports from Taiwan increased from 2.5% of total extra-EC imports to roughly 12% in 1991; China also managed to increase its market share in the EC. Imports from Japan, China and other East Asian countries increased particularly in the field of halogen lamps.

This does not indicate that EC firms have been losing competitiveness in all markets, however. There is a wide range of European produced lamps, especially compact fluorescent lamps and metal halide lamps, that have significantly increased exports. Similarly, high quality design luminaires from Europe have also shown export growth to many countries including Japan. Trade between EC member countries enjoyed fast growth as well during the last decade, at a rate of roughly 4% per year in real terms.

Production process

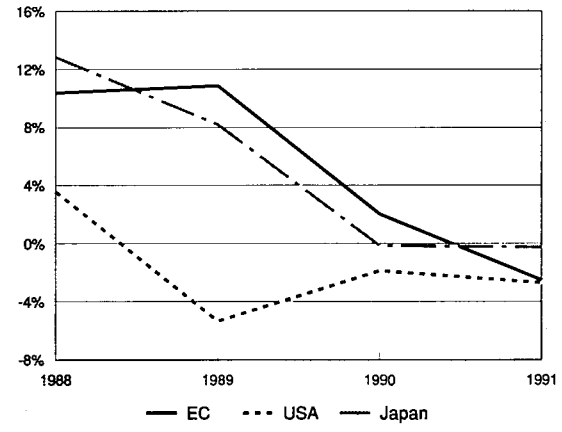
At the beginning of the 1980s the industry was characterised by significant declines in employment, following increased

Figure 4: Electric lighting
International comparison of production at current prices



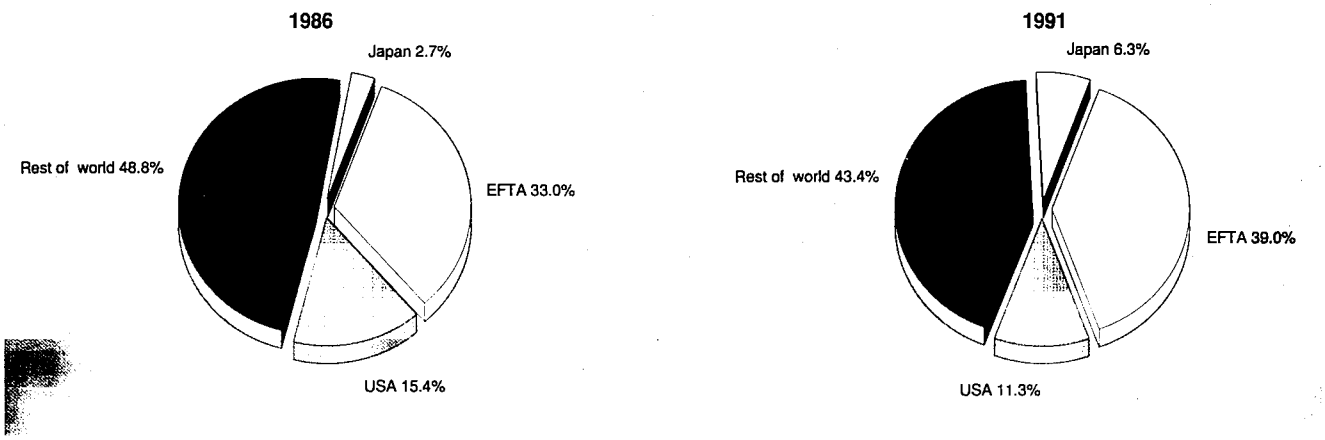
Source: Eurostat, Census of Manufacturers

Figure 5: Electric lighting
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Electric lighting
Destination of EC exports



Source: Eurostat

efforts of firms to reduce production overcapacities and to adjust to declining demand during that same period. Total employment in the EC declined by roughly 5% during the period 1982 to 1986. In the second half of the 1980s, on the other hand, the rise in demand and in production was accompanied by a slow rise in employment of 1.4% per year. In 1991, total employment in the industry reached 102 000. Spain was most deeply affected by decreases in employment: from 1982 to 1989, employment fell about 53% percent from its 1982 level. In the other countries (with the exception of Portugal), the work force increased during the period 1982 to 1991. Productivity, on the other hand, increased by roughly 3% during the same period, as the increase in output (in terms of value added), was stronger than the increase in employment growth.

INDUSTRY STRUCTURE

Companies

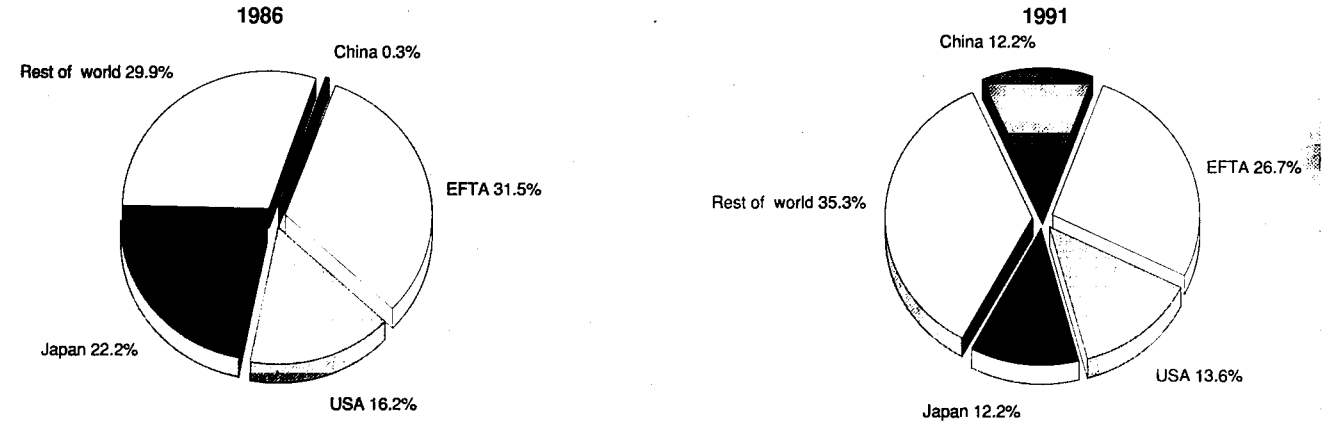
In the field of electric lamps, EC production is dominated by a small number of large firms which are able to profit from economies of scale and to muster the substantial resources necessary for R&D activities. All of these firms operate internationally. The most important firm in that sub-sector is Philips (NL), which plays a central role in assuring the dominant position of the Netherlands in the EC electric lamps sector. Another important firm is the Osram (D), a division of Siemens. General Electric (USA) bought the European firms Thorn EMI (UK) and Tungsram (Hungary) in the late 1980s. The fourth largest lamp company is Sylvania, which is a part of GTE (USA). Sylvania Europe will become part of a new company, Sylvania Lighting International, which will be owned by an investment group led by Citicorp.

In the subsector of electric lighting equipment, production is much more fragmented, and many of the firms operate regionally or locally. The most important firms are Siemens, Trilux and AEG in Germany, Philips in the Netherlands and Thorn Lighting in the United Kingdom. Important firms in other countries are Zumtobel (Austria) and Lithonia and Cooper, the two largest producers in the USA. Sylvania is also active in electric lighting equipment under various brand names.

Strategies

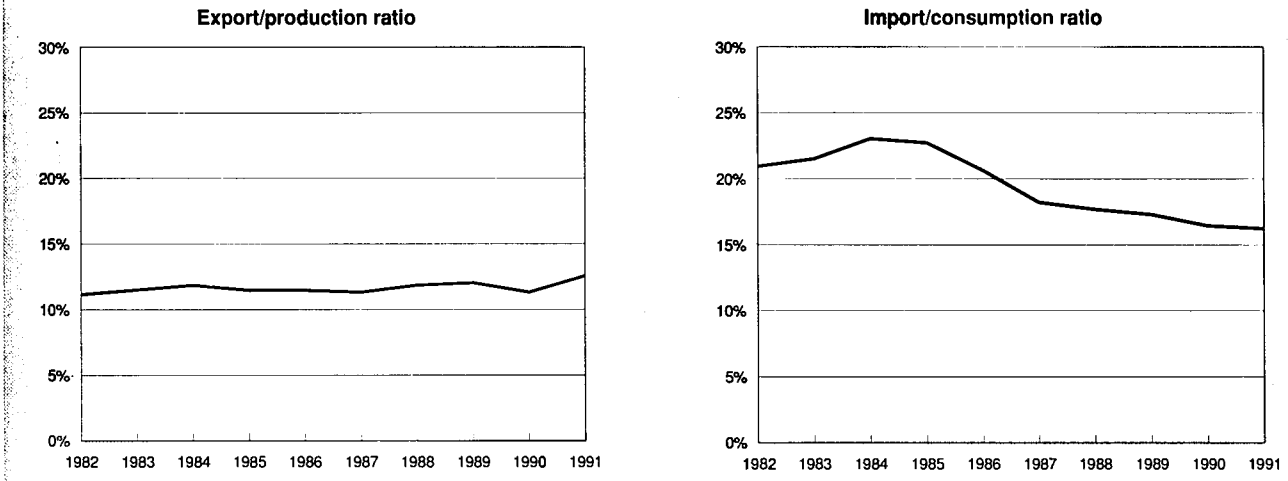
Europe is the leader in the field of technologically advanced products, both in new lighting technology and in luminaire

Figure 7: Electric lighting
Origin of EC imports



Source: Eurostat

Figure 8: Electric lighting
Trade intensities



Source: Eurostat

design, and is successfully exporting to the USA, Japan and other countries. EC firms in the electrical lighting industry are faced with stiff competition in the field of less technologically advanced products, by competitors from the East Asian NIC's and from China. The most important advantage of the latter is on the cost side, as costs of labour, raw materials and energy are lower than in EC countries. Consequently, EC firms must intensify efforts to improve production efficiency, to compensate for unit cost advantages in lower value added products, presumably through increased substitution of labour by capital, especially increased automation. Efforts have to be expended in quality improvement, as well. In the field of technologically advanced products, on the other hand, EC firms must increase R&D expenditures, to maintain competitiveness with other industrialised countries. Efforts in this field are already apparent, as shown by the increase in intra-EC investment, which doubled between 1980 and 1988. Consequently, the above mentioned trend towards increased size of firms is likely to continue in the 1990s. The concentration process will probably be accompanied by a reduction of the labour force in the industry.

REGIONAL DISTRIBUTION

The most important producer within the EC is Germany (West), with about 38% of total EC production (excluding the Netherlands, for which no data are available), followed by France with roughly 20%, the United Kingdom with about 17% and Italy with 10%. The most important intra-EC exporter is Germany (West), with about 30% of the total; followed by Italy (27%), and Belgium and France (12% each). Germany and France are the most important markets for other EC countries' exports, each accounting for about 20% of total intra-EC trade.

REGULATIONS

The penetration of the EC market by halogen lamp imports from Japan, China and other Eastern countries, has stimulated the EC Commission to impose provisional anti-dumping duties as high as 85.4% on halogen lamps imports from Japan for 1990.

The most important regulation in preparation concerns the harmonisation of norms applicable to electrical equipment, which has been undertaken by the EC Commission. This should have a positive impact on intra-EC trade, but will also strengthen competition from abroad, as foreign competitors will no longer have to adapt their products to different national systems.

Table 5: Electric lighting
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.3	3.5
Production	2.0	3.2
Extra-EC exports	1.9	3.6

Source: BAK

OUTLOOK

The outlook for the electric lighting industry in the short-term is characterised by slow production growth, as investment activities of firms, as well as residential construction, are expected to stay flat during 1992 and 1993 in the EC as a whole, as well as in the United States and Japan.

In the medium-term, however, demand and production are expected to recover their previous high growth rates, as the general economic upswing and increased construction activity, along with product innovation, restimulate demand. Recent R&D efforts of EC firms are oriented towards electronically regulated lighting devices, towards improvements in light emitting efficiency and colour rendering and towards reducing still further the size of electric lamps. In the low technology end of the product range, competition from developing countries is likely to keep increasing.

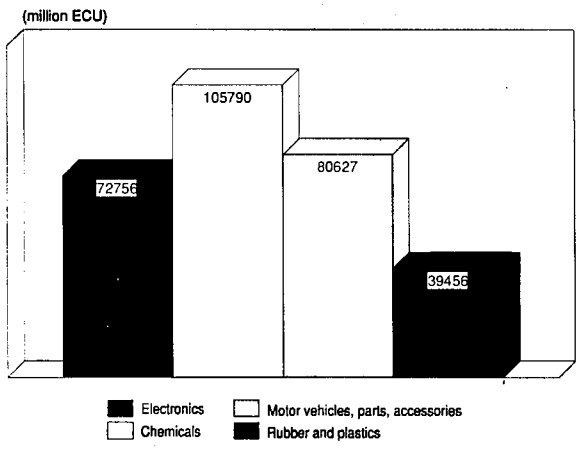
Written by: BAK
The industry is represented at the EC level by: European Lighting Council (ELC). Address: Boulevard Lambermont 432, B-1030 Brussels; tel: (32 2) 245 0032; fax: (32 2) 245 8523.

Electronic engineering

NACE 33, 344, 345

The EC is now one of the major markets for electronic goods. With declines in their home markets, Japanese and American manufacturers have placed increased emphasis on developing market shares in Europe. Industry subsectors (consumer electronics, computer and office equipment and telecommunications equipment) are beginning to merge as new technologies and products are developed. European manufacturers, therefore, are facing increased competition in their traditional markets and the industry has undergone major changes in the form of acquisitions, reduced profits and rationalisation measures. In order to ensure future competitiveness on a global level, EC manufacturers are cooperating on joint ventures and research programmes while the EC is attempting to put fair competition legislation in place.

Figure 1: Electronic engineering
Value added in comparison with other industrial sectors, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The electronics industry comprises computers and office equipment (NACE 33), telecommunications equipment (NACE 344), electronic components (NACE 345) and consumer electronics (NACE 345.1 and 345.2). Computing and office equipment includes computer hardware, peripherals, software and a range of office equipment from electronic cash registers to dictation equipment.

Telecommunications equipment includes radio communications, radar, medical equipment and measuring equipment as well as the obvious products, such as public switching and mobile communications.

Consumer electronics encompasses electronic components, audio-visual equipment (professional and consumer) and recorded music. The electronic components subsector comprises active, passive and electro-mechanical components.

Main indicators

Apparent consumption and production of electronic goods have consistently increased over the period 1982 to 1991, showing compound annual growth rates of 9.6% and 8.7% respectively (see Table 1). Extra-EC exports increased from 1982 to 1985, experiencing an 8% drop and then resumed growth to 1991. The compound annual growth rate for extra-EC exports over the period is 9%. Employment has experienced slight growth, with a compound annual growth rate of 0.7%. Computer and office equipment represents the largest proportion of consumption, production and extra-EC exports, followed by consumer electronics (see Table 2).

Recent trends

The main indicators have all grown in constant terms. Consumption, production and extra-EC exports have all almost doubled from 1982 to 1991 (see Figure 3). Employment has increased by 106% over the period.

Downturns in 1991 shown by consumer electronics consumption and production have been more than compensated for by increases in components, telecommunications and computer and office equipment.

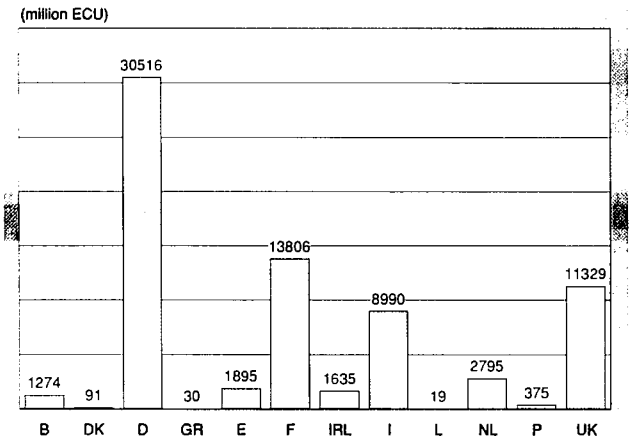
International comparison

The international structure of the electronic goods market varies greatly from one NACE to another. For example, consumer electronics production is dominated by Japanese manufacturers, while computer and office equipment production is dominated by American and Japanese suppliers. In semiconductors, Japanese companies dominate key semiconductor technologies. Europe is of growing importance as a market for world suppliers. It now represents the largest consumer electronics market and second largest computer and office equipment market after the USA. Europe is also a major manufacturer of telecommunications equipment and consumer electronics.

Foreign trade

Extra-EC imports have grown more than extra-EC exports over the period 1982 to 1991. The data show a compound annual growth rate of 12.5% and 9.0%, respectively (see Table 4). The resulting trade balance is increasingly negative and stood at -26.5 billion ECU in 1991.

Figure 2: Electronic engineering
Value added by Member State, 1991



Source: Eurostat

Table 1: Electronic engineering
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	84 684	97 446	114 933	127 842	131 346	141 527	163 995	179 040	185 572	193 506	203 481
Production	78 978	89 478	105 231	118 896	121 890	128 930	144 301	156 217	162 191	166 965	174 341
Extra-EC exports	14 093	16 047	20 934	25 062	23 037	23 682	24 908	27 789	28 334	30 574	32 634
Trade balance	-5 706	-7 968	-9 702	-8 946	-9 456	-12 597	-19 694	-22 823	-23 381	-26 542	-29 140
Employment (thousands)	1 440	1 441	1 487	1 507	1 513	1 519	1 521	1 552	1 554	1 532	1 530

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BIS Strategic Decisions estimates
Source: Eurostat

Table 2: Electronic engineering
Breakdown by major sectors of the industry, 1991

(million ECU)	Apparent consumption	Production	Extra-EC exports
Electronic components (1)	22 112	14 012	5 400
Computer & office equipment (2)	62 377	48 512	9 907
Telecommunications equipment (3)	26 780	27 136	5 424
Consumer electronics (2)	51 702	38 536	8 399

(1) BIS Strategic Decisions estimates
(2) Estimates are used if country data is not available
(3) BIS Strategic Decisions estimates, except for extra-EC exports
Source: Eurostat, Eurostrategies ESTEL

Table 3: Electronic engineering
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	9.7	6.7	7.7
Production	10.9	5.1	7.0
Extra-EC exports	13.4	3.5	6.7
Extra-EC imports	7.9	9.5	9.0

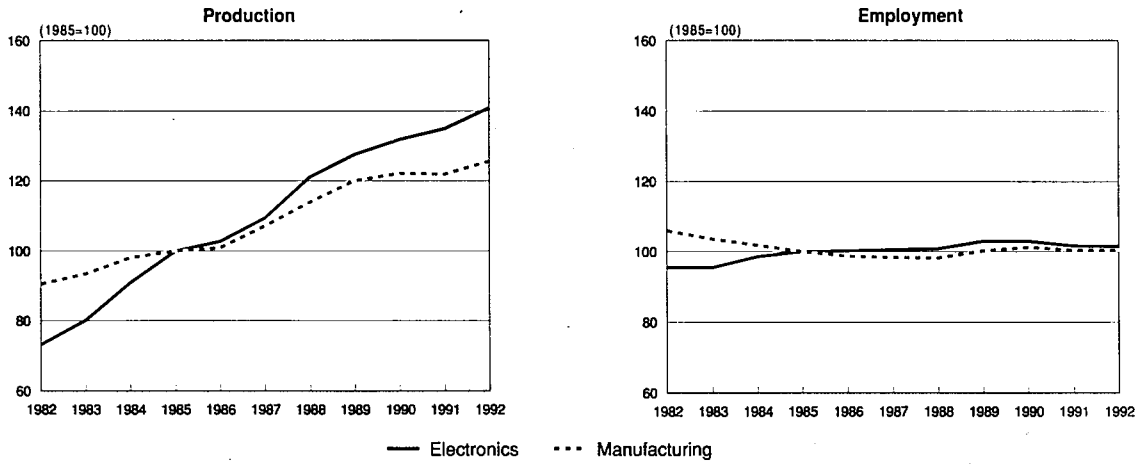
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Electronic engineering
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	14 093	16 047	20 934	25 062	23 037	23 682	24 908	27 789	28 334	30 574
Extra-EC imports	19 799	24 015	30 637	34 008	32 493	36 278	44 602	50 612	51 715	57 115
Trade balance	-5 706	-7 968	-9 702	-8 946	-9 456	-12 597	-19 694	-22 823	-23 381	-26 542
Ratio exports/imports	0.71	0.67	0.68	0.74	0.71	0.65	0.56	0.55	0.55	0.54
Terms of trade index	111.9	110.6	103.2	100.0	104.4	107.1	106.5	100.2	105.1	101.8
Intra-EC trade	17 919	21 502	27 367	32 938	33 691	36 696	41 454	48 463	52 471	54 866
Share of total imports (%)	46.7	46.4	46.3	48.4	50.2	49.6	47.7	48.4	49.9	48.6

(1) Estimates
Source: Eurostat

Figure 3: Electronic engineering
Production and employment indices compared to EC manufacturing



1992 are BIS Strategie Decisions estimates
Source: Eurostat

Intra-EC trade has increased at a compound annual growth rate of 13.2% to its current value of 54.9 billion ECU. Production is positively and linearly correlated with extra-EC exports, as is consumption with extra-EC imports.

The main destinations for extra-EC exports are the EFTA countries and the USA, which account for 48.1% of total exports in 1991 (see Figure 6). Japan only receives 3.5% of total exports, an increase in percentage terms of almost 1% since 1986.

MARKET FORCES

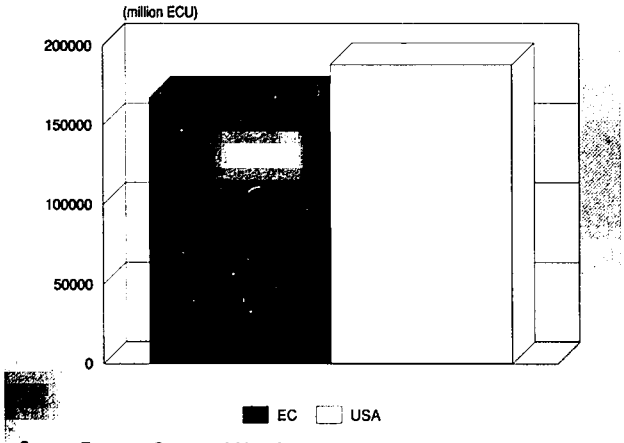
Demand

The electronic goods industry has a wide customer base. Consumers account for the majority of sales of consumer electronics, whereas sales to professional organisations are small. In the telecommunications and components sectors, both private and public companies are the main purchasers, with relatively few sales to consumers. The computer and office equipment sector acts as an intermediary in this respect as both consumers and businesses demand such products.

The electronic goods industry is heavily dependent on general market conditions. Recession and a reduction in general income levels mean that consumers have less money to spend and businesses face cost cutting in the form of capital expenditure (on telecommunications, computing and office equipment) and inventory (of components). Despite this, the electronics industry has seen growth in demand in 1991, albeit less than in previous years (4.3% as opposed to a compound annual growth rate of 9.6% from 1982 to 1991). The opening up of Eastern Europe has contributed to this (with increased demand for components and equipment) as well as increased demand in the telecommunications sector from less developed EC members wishing to update networks. The only sector presently suffering is consumer electronics, which has seen a decline in consumption from 1990 to 1991.

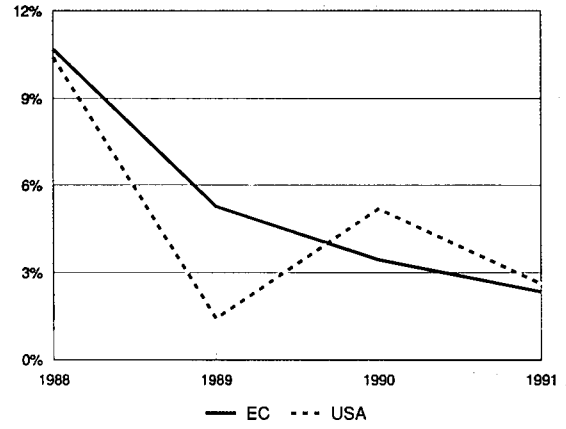
Products for consumers and businesses alike are becoming more sophisticated. Product downsizing, increased intelligence and increased functionality in the allocated space are common in all areas of the electronic goods industry. Notebook and laptop computers, three function fax machines (incorporating fax, telephone and answering machine) and palm size camcorders have all appeared on the market. Innovation, in response to more demanding customers, is stimulating de-

Figure 4: Electronic engineering
International comparison of production at current prices, 1991



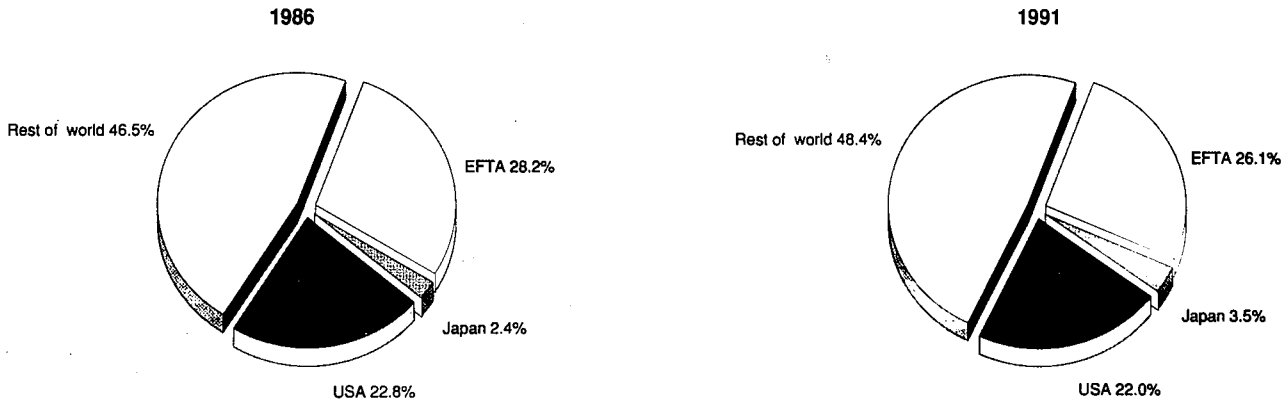
Source: Eurostat, Census of Manufacturers

Figure 5: Electronic engineering
International comparison of production growth at constant prices



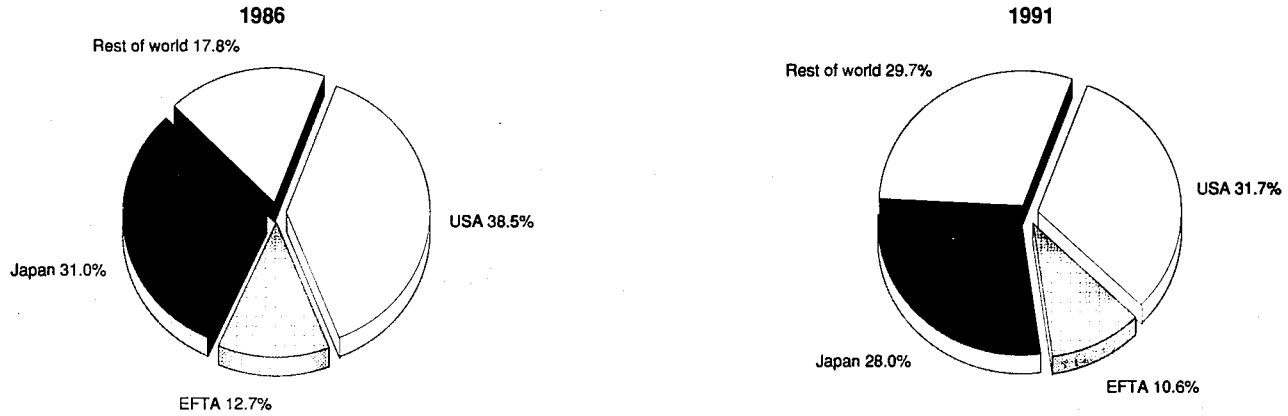
Source: Eurostat, Census of Manufacturers

Figure 6: Electronic engineering
Destination of EC exports



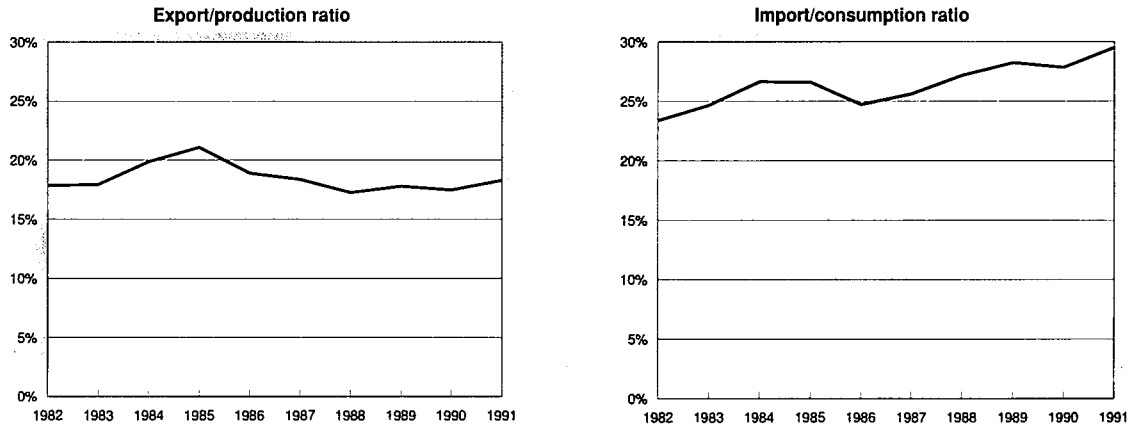
Source: Eurostat

Figure 7: Electronic engineering
Origin of EC imports



Source: Eurostat

Figure 8: Electronic engineering
Trade intensities



Source: Eurostat

mand. Growth in demand is expected to come from value added and new categories of products. For example, portable computers in the computing and office equipment sector, European cellular standards in telecommunications and CD-I in consumer electronics. These will in turn influence products supplied by the components industry.

The convergence and interworking of three industry subsectors is occurring as manufacturers aim to provide sophisticated products for their customers. Software capability plays an increasingly important role in all electronic goods. Areas which would have previously been the domain of telecommunications or computing companies only are now being addressed by suppliers from other sectors. Examples of this are mobile communications and the home office which are being targeted by the consumer electronics industry and new products which merge computer and telecommunications technologies. The components industry has traditionally been dependent on the success of the other electronic goods subsectors as well as the automotive, industrial and military sectors.

Supply and competition

The supply of electronic goods is affected by a reduction in product life cycles, prices and margins. Product prices have decreased for many consumer electronics goods, telecommunications products aimed at the consumer, components and computing equipment. The depreciation of the yen and dollar has increased the competitiveness of Japanese and American suppliers. Production costs (particularly labour) tend to be higher in the EC than in the Far East. Japanese companies are frequently cited as having the advantage of vertical integration and are key suppliers in the components, consumer electronics and computing markets. However, most top European players in electronics components, such as Philips and Siemens, are vertically integrated to a degree.

Some American and Japanese manufacturers have established manufacturing bases within the EC or bought out organisations in order to maximise their presence in the Single Market. Japanese manufacturers tend to rely more on offshore manufacturing sites. Southern European countries (Spain for example) are becoming attractive locations for investment because of the relatively low labour and establishment costs.

Production process

The manufacture of electronic goods in Europe tends to rely on components sourcing. Traditionally, EC manufacturers have had to source components in the Far East and this has presented a barrier to EC competitiveness. Both consumer electronics and the components industry have become more capital-intensive over the years.

Production technology has become more advanced with increased automation. The case of printed circuit board production provides an example where productivity of the European electronics industry has improved overall. Improved design processes facilitate shorter product development times.

INDUSTRY STRUCTURE

Companies

Public and private organisations are active in the electronics goods sector. In each of the industry subsectors, two or three of the world's top ten players are European. These are Siemens-Nixdorf, Olivetti and Group Bull in the computer and office equipment sector, Philips and Thomson in the consumer electronics sector, Alcatel and Siemens in telecommunications equipment and Philips, SGS Thomson and Siemens in components.

Each company tends to have specific strengths within their marketplace; in telecommunications equipment this is transmission and public switching (this is where Alcatel's strengths lie) and in consumer electronics it is colour television (CTV) with Thomson as a European leader.

Table 5 concerns only the computer industry. The figures include such segments as hardware, software, services maintenance, etc.

Strategies

European manufacturers in this industry are seeking to achieve and enhance their global positioning compared to Japanese and American companies. Joint ventures, alliances and takeovers have been commonplace between European companies and between American or Japanese and European companies. Partnership agreements and European research ventures aim to give EC manufacturers a good base of technological leadership. In the components arena, alliances between users and suppliers of semiconductors are becoming more important for survival.

EC investment showed a compound annual growth rate of 12.6% from 1982 to 1988. The only setback to investment occurred in 1987 when it decreased by 7%. Investment has concentrated on R&D for new technology and product diversification.

The electronic goods industry worldwide has undergone rationalisation in recent years. In 1991, major players suffered losses, were forced to make large redundancies and, in some cases, reorganise.

ENVIRONMENT

There have been fewer direct pressures for legislation concerning ecological issues in the electronics goods industry compared to other industry sectors. However, manufacturers are beginning to respond to growing concerns and are introducing measures to ensure they produce environmentally friendly products.

Table 5: Electronic engineering
Top 25 world firms in information technology, 1991

(million ECU)	Revenue
IBM	50 718
Fujitsu	15 602
NEC	12 363
Digital	11 491
Hewlett-Packard	8 657
Hitachi	8 321
AT&T	6 593
Unisys	6 457
Siemens-Nixdorf	5 899
Apple	5 243
Olivetti	4 884
Groupe Bull	4 786
Toshiba	4 129
Matsushita	4 091
Canon	3 028
EDS	2 959
Sun	2 788
ICL	2 670
Compaq	2 640
Xerox	2 365
Seagate	2 154
NTT	2 012
Nihon Unisys	1 948
Microsoft	1 837
Andersen Consulting	1 824

Source: Datamation

Specific issues being addressed are the ability to recycle products (computer keyboards for example) and the use of safe raw materials and components. Germany has been particularly instrumental in this environmental consciousness.

The component industry has perhaps seen the most change in this respect. Consumer, computing and telecommunications products now demand safe components with the use of CFCs in semiconductors and printed circuit boards largely eliminated.

REGULATIONS

EC regulations concerning the electronic goods industry differ with each of the industry subsectors considered. In all cases, the main concern is to bring the 12 Member States into line with one another. In telecommunications, for example, the UK is at present the most liberalised market while the telecommunications infrastructure is less developed in countries such as Greece, Ireland and Portugal. In consumer electronics, recorded music royalties and reproduction rights are not similar in all countries (and may even be absent). In computer and office equipment software, protection rights are of concern.

The EC also provides funding for Member States, collaborative technology research programmes and individual European manufacturers in order to improve the competitiveness of the industry for the future. It also recognises the need to ensure parts availability for the success of all electronic goods industries. By regulating subsidies given by national governments to companies, the EC aims to encourage fair competition.

OUTLOOK

The future of the electronics goods industry depends on its response to the challenges it is currently presented with. Specific opportunities are presented by new and advanced technologies. For example, Integrated Services Digital Network (ISDN), satellite communications and high definition television (HDTV) offer a platform for European companies to become global leaders, given sufficient investment and development in their early stages. The former Eastern Bloc countries present attractive market opportunities because of their proximity and relatively untapped potential.

Table 6: Electronic engineering
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	4.5	4.7
Production	3.8	3.9
Extra-EC exports	6.1	6.4

Source: BIS Strategic Decisions

The convergence of products and target markets means that barriers between industry subsectors are being eroded. Hence companies traditionally involved in one subsector face increased competition and must prove capabilities in new areas. This in turn may necessitate a continued emphasis on co-operation and partnership between organisations. The decline in home markets and opening up of European markets will ensure that Japanese and American companies still remain a force to be challenged.

Written by: BIS Strategic Decisions

Electronic components
NACE 345

The electronics components market has experienced moderate growth worldwide in the past, however the world recession has had a noticeable effect on the components industry as users of components trim inventories and hesitate to replenish them. The threat from Japanese firms has continued to grow (particularly in the area of semiconductors) as Japanese investment has continued unabated. This outlook may have changed by the mid-1990s as most key Japanese semiconductor producers have announced cuts in investment due to poor results, higher capital costs and overcapacity risks. Industry players continued to seek alliances as a means to impose their standard, particularly in the key areas of microprocessors and Digital Signal Processors (DSPs). In particular, alliances were announced between IBM and Siemens, and between Philips and Thomson. The JESSI research programme continued on schedule. Future products will doubtlessly increase added value within the electronic components industry as even higher degrees of integration are attained.

INDUSTRY PROFILE

Description of the sector

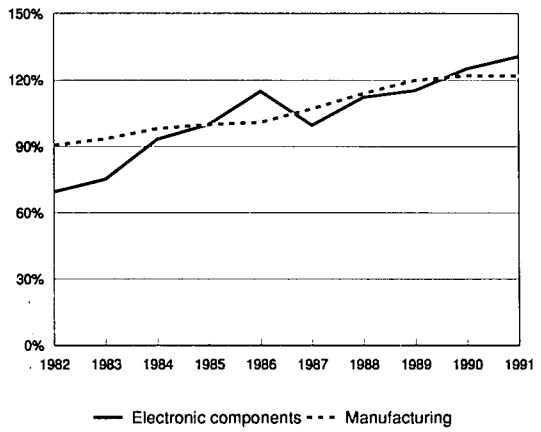
The electronic components industry comprises three broad categories: active, passive and electro-mechanical components. Passives comprise mainly resistors, capacitors and wound components, whereas electro-mechanical components include relays, switches, keyboards and printed circuit boards. Active components comprise semiconductors (integrated circuits and discrete semiconductors) as well as valves and tubes. Virtually every electronic system manufactured, whether for telecommunications, computing, or any other application, comprises components from all three families.

The components industry is entirely dependent upon the industries downstream, which use electronic components, such as the telecommunications, computing and consumer electronics industries. In addition, upstream links are vital to the semiconductor industry, in that access to the best semiconductor technology is crucial to continued growth; in this regard, Europe is particularly vulnerable, as most leading fabrication equipment suppliers are either Japanese or American.

Downward vertical integration is the rule rather than the exception in the semiconductor industry, as evidenced in companies such as Philips, Siemens and GEC Plessey. The significant exception is Thomson. Worldwide, virtually all major players are vertically integrated, including Japan's Matsushita, NEC and Fujitsu and the United States' Motorola and Texas Instruments. The only significant American semiconductor manufacturer not vertically integrated is Intel, whose microprocessor products form the core of many personal computers, and who consequently have a strong strategic position of added value.

Whereas the world semiconductor industry is highly concentrated among a small number of key players, both passives and electro-mechanical components form much more fragmented industries. European firms manufacturing either passives or electro-mechanical components tend to be small, and cater to niche markets. In addition, certain components such as printed circuit boards, are primarily manufactured for captive consumption and merchant sales come as an added source of revenue to the manufacturer.

Figure 1: Electronic components
Production index compared to EC manufacturing



1991 are BIS estimates
Source: EECA, Eurostat

Main indicators

Since 1982, apparent consumption has risen at a steady pace, with the exception of the semiconductor recession of 1987. However, for 1991, estimates are for slowed consumption growth of 2%, with renewed growth in 1992 as a result of the electronics industry finally leaving a recessionary period in mid-1992. In addition, the trade deficit has recently diminished in recent years, in part due to increased European plant construction by foreign manufacturers. Employment figures prior to 1990 are unavailable. Due to downsizing, in particular at Siemens and Philips, the 1990 figure of 242 200 employees is unlikely to have grown significantly.

Recent trends

Employment in the electronics components industry declined in the 1980s due to a variety of factors including higher levels of component integration, higher productivity, mergers of companies, and loss of market share to foreign manufacturers.

Consumption growth in electronics slowed down in the latter half of the 1980s to a compound annual growth rate of 5.2% for the period 1986 to 1990, compared to 14.3% for the period 1982 to 1985. This was due to several factors including a decline in the European share of world components consumption, a decrease in prices, and increased systems integration leading to demand for fewer components. Growth in production followed a similar trend, with an additional factor: loss of European share in components production. Consequently, whereas production had grown by an average annual rate of 12.9% in the period 1982 to 1985, growth declined to only 4.6% in the period 1985 to 1991.

Both exports and imports saw steady growth throughout the period 1982 to 1990, and, indeed the rate of growth in exports rose slightly through this period. One factor for this dual growth is the increased specialisation of active components manufacturers meaning lessened technological independence of any geographic region. In addition, the growth rate of imports declined slightly from the rate of 13.6% between 1982 and 1985 to 4.9% between 1985 and 1991. This was notably due to increased investment in European production capability on the part of non-European manufacturers.

International comparison

Intra EC trade in 1991 represented 45% of all imports into the EC. This figure remained almost constant over the period 1982 to 1992. The trade deficit grew between 1982 and 1989, peaking in 1989 at 8720 million ECU. It has since declined and stood at 8100 million ECU in 1991.

Table 1: Electronic components
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	9 465	10 915	15 682	16 491	17 436	16 686	18 732	20 984	21 679	22 112	24 544
Production	6 767	7 545	9 721	10 535	11 934	10 205	11 591	12 264	13 345	14 012	14 993
Extra-EC exports	2 633	2 441	3 348	4 195	3 594	3 064	4 705	4 879	5 193	5 400	5 724
Trade balance	-2 698	-3 370	-5 961	-5 956	-5 502	-6 481	-7 141	-8 720	-8 334	-8 100	-9 551
Employment (thousands)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	242.2	235.0	244.0

(1) BIS Strategic Decisions estimates
Source: EECA

Table 2: Electronic components
Breakdown by product line, 1990

(million ECU)	Apparent consumption	Production	Extra-EC exports
Printed circuit boards	3 238	2 719	298
Integrated circuits	6 539	1 990	1 801
Connectors	1 856	1 643	657
TV and monitor tubes	1 798	1 477	169
Discrete semi-conductors	1 910	1 047	611
Capacitors	1 380	953	288
Film circuits	868	646	170
Inductors	887	632	206
Switches and relays	777	629	391

Source: EECA

Table 3: Electronic components
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	11.4	5.4	7.4
Production	12.9	4.6	7.3
Extra-EC exports	9.3	4.4	6.0
Extra-EC imports	13.6	4.9	7.7

Source: EECA, Eurostat, BIS Strategic Decisions

Table 4: Electronic components
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 633	2 441	3 348	4 195	3 594	3 064	4 705	4 879	5 193	5 400
Extra-EC imports	5 331	5 811	9 309	10 151	9 096	9 545	11 846	13 599	13 527	13 500
Trade balance	-2 698	-3 370	-5 961	-5 956	-5 502	-6 481	-7 141	-8 720	-8 334	-8 100
Ratio exports/imports	0.49	0.42	0.36	0.41	0.40	0.32	0.40	0.36	0.38	0.40
Terms of trade index	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Intra-EC trade	4 005	4 564	5 755	7 212	7 594	7 482	9 693	10 755	10 777	10 796
Share of total imports (%)	42.9	44.0	38.2	41.5	45.5	43.9	45.0	44.2	44.3	44.4

(1) BIS Strategic Decisions estimates
Source: EECA

Foreign trade

Extra-EC exports have grown from representing 2663 million ECU in 1982 to 5400 million ECU in 1991. A small proportion of exports were destined for countries which are leaders in electronics in their own right. In 1991, 21.9% of exports were destined for the United States, followed by exports to Japan which accounted for 3.1% of exports. Eastern Europe, now accounts for 2.3% of EC components exports in 1991. This figure should grow rapidly, with the liberalisation of Eastern Europe and the relaxation of COCOM regulations. Exports to the rest of the world account for 72.7%.

EC trade balance in monolithic digital integrated circuits, 1990-91

Though Japan only accounted for 3.1% of EC exports, it did account for 25.1% of EC component imports. Taking into account Japanese-built semiconductor plants in Europe, the trade imbalance may be considered to be even more extreme. This is due in part to Japanese dominance of key semiconductor technologies combined with the fact that Europe masters few of the component technologies Japan lacks. The USA accounted for 26.0% of imports in 1991, compared to its share of 21.9% of EC exports. Taiwan and Singapore accounted for a significant proportion of EC component imports, with Taiwan accounting for 7.3% in 1991 and Singapore 5.8%. It should be noted that European companies such as Philips and Thomson have invested in plants in these countries.

Table 5: Electronic components
Breakdown of EC trade by type of component, 1990-91

(million ECU)	1990	1991
All components		
Extra-EC exports	10 426	11 470
Extra-EC imports	11 461	12 743
Ratio exports/imports	0.91	0.90
Active components		
Extra-EC exports	4 370	4 767
Extra-EC imports	6 641	7 362
Ratio exports/imports	0.66	0.65
Passive components		
Extra-EC exports	1 182	1 170
Extra-EC imports	1 452	1 590
Ratio exports/imports	0.81	0.74
Electro-mechanical components		
Extra-EC exports	4 874	5 534
Extra-EC imports	3 368	3 790
Ratio exports/imports	1.45	1.46

Source: Eurostat (Comext), EC Commission

Table 6: Electronic components
EC trade balance in semiconductors, 1989-91

(million ECU)	1989	1990	1991
Discrete semiconductors	-195	-237	-209
Integrated circuits	-2 211	-1 617	-2 049
Opto-electronics	-64	-59	-107
Total	-2 471	-1 913	-2 365

Source: Eurostat (Comext), EC Commission

Table 7: Electronic components
EC trade balance in monolithic digital integrated circuits, 1989-91

(million ECU)	1989	1990	1991
Microprocessors	-362	-369	-503
Other	-876	-905	-977
Memories	-893	-675	-891
Total	-2 131	-1 949	-2 371

Source: Eurostat (Comext), EC Commission

MARKET FORCES

Demand

The main users of electronic components are Original Equipment Manufacturers (OEMs). They manufacture systems for a range of end markets, including telecommunications, automotive, industrial, computing, consumer and military. The health of the components industry is directly linked to the state of the OEM markets using electronic components.

Growing sophistication of end-markets has several implications for components markets. Overall, increased 'intelligence" placed within such systems as automotive or military will favour the use of electronic components, particularly integrated circuits such as microprocessors and Digital Signal Processors. At the same time, there is a strong trend to increase the degree of integration, so as to reduce size while increasing functionality of systems. Consequently, there will be an increased use of integrated circuits, often in the form of custom ICs, often known as Application Specific Integrated Circuits (ASICs), while the use of more traditional components, such as passive devices or printed circuit boards will be reduced. Printed circuit boards will inevitably continue to be used, as they are a vital part of an electronics system, however, they will be smaller, and a higher density of components will be placed upon them through the use of such techniques as multiple layers.

If one analyses the end-markets for components by electronics industry sector and by sector trends, it is possible to understand which components will be of more or less strategic importance.

In telecommunications, the advent of GSM (Global System for Mobile Communications) mobile telephony will require Digital Signal Processors. Broadband integrated system digital networks (ISDNs) will require components capable of switching and processing data at extremely high speeds. Both of

Table 8: Electronic components
Top 20 Western European semiconductor firms, 1990

Company (million ECU)	Rank	Sales	European market share (%)
Philips	1	1 048.1	10.8
Siemens	2	874.8	9.0
SGS-Thomson	3	824.0	8.5
Motorola	4	694.2	7.2
Texas Instruments	5	578.0	6.0
Intel	6	564.4	5.8
Toshiba	7	444.6	4.6
NEC	8	378.4	3.9
National Semiconductor	9	370.2	3.8
AMD	10	247.7	2.6
Hitachi	11	247.7	2.6
ITT	12	210.5	2.2
GEC Plessey Semicond.	13	196.9	2.0
Telefunken	14	193.3	2.0
Samsung	15	172.4	1.8
Fujitsu	16	157.9	1.6
Harris	17	150.6	1.6
Mitsubishi	18	122.5	1.3
Analog Devices	19	93.5	1.0
LSI Logic	20	77.1	0.8

Source: Dataquest Europe Ltd

these trends will favour the growth in Gallium Arsenide technology.

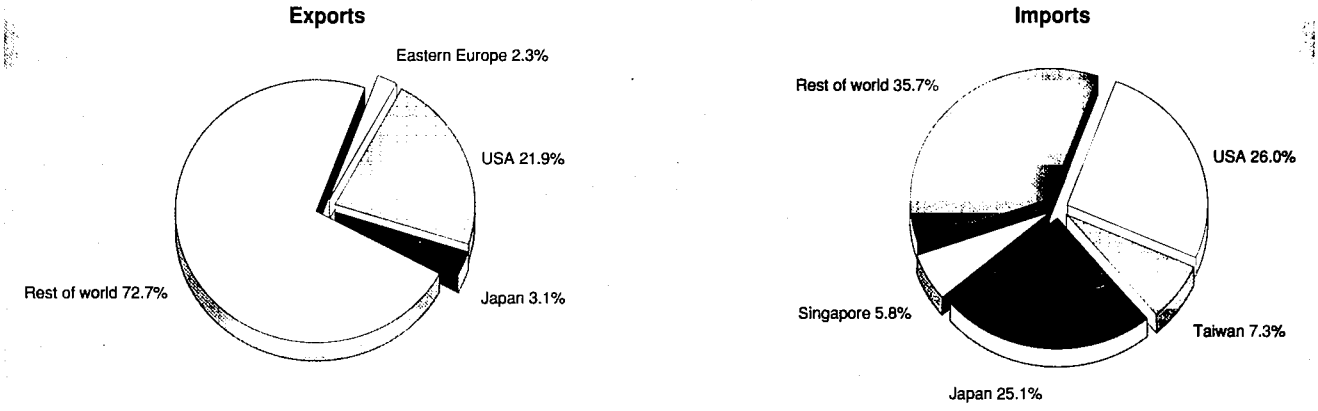
In computing, both microprocessors and memories will continue to be vital, as computers incorporate more and more processing power as well as memory. In addition, the growing popularity of small portable devices favours growth in integration and the use of integrated circuits with low power consumption.

In automotive systems, microprocessors and Digital Signal Processors show increased penetration, particularly in the area of Anti-lock Braking Systems (ABS). These microprocessors will lag behind those used in personal computers, but will nevertheless evolve in sophistication as automotive manufacturers use electronic sophistication as a basis for product differentiation.

Consumer electronics will require electronics of a sophistication never seen before in consumer electronics, particularly in High Definition Television (HDTV) and Personal Product applications. Personal Products are a new area of consumer electronics where computing and telecommunications are converging into small, intelligent products, requiring microprocessors and memories. HDTV, the emerging new standard in television, requires large memory devices as well as extremely fast Digital Signal Processors.

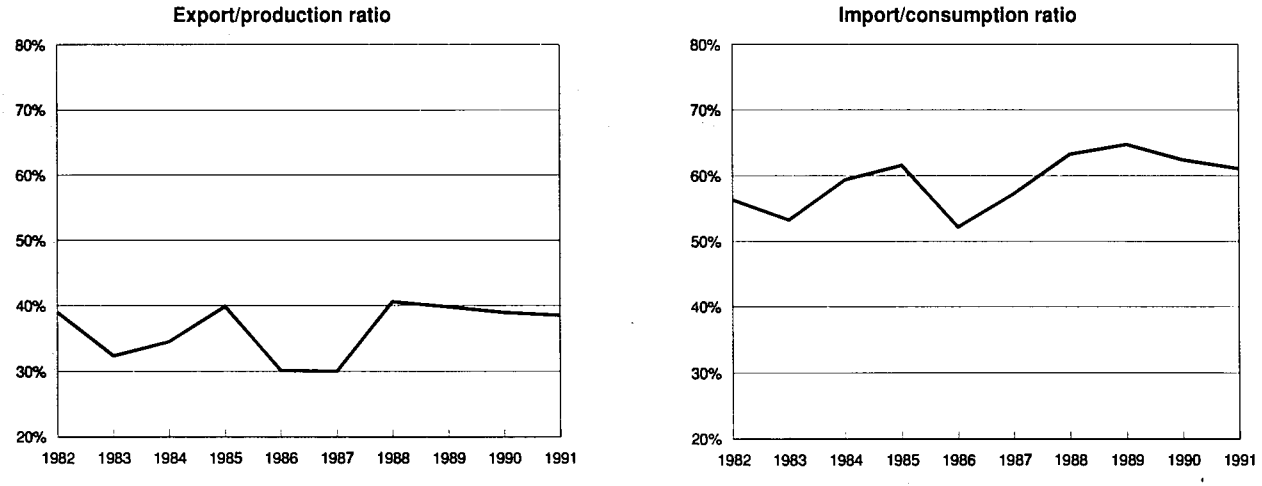
Components are extensively used in military systems of all types, ground, air or sea-based. Though defence procurement growth is now slowing, this will likely not be apparent in components procurement for defence applications, due to the ever-growing technical sophistication being integrated into systems.

Figure 2: Electronic components
Destination of EC exports and origin of EC imports, 1990



Source: EECA

Figure 3: Electronic components
Trade intensities



1991 are BIS estimates
Source: EECA

Eastern Europe is emerging as a prime market for European components production. This market has grown from nought to more than 3% of EC exports between 1989 and 1991. By the year 2000, Eastern Europe should represent a quarter of the world's consumption of components and European firms are well positioned to export to this new market.

Supply and competition

It is important to note key differences in the components industry between active components (in particular integrated circuits) and passive or electro-mechanical components.

Passive and electro-mechanical components, while continuing to evolve, are in general more mature markets than integrated circuits, which continue evolving at much higher rates, attracting higher levels of investment. Indeed, integrated circuits continue to absorb system functionality previously provided by other components as fewer and fewer passive or electro-mechanical components are used relative to integrated circuits.

Furthermore, it is in integrated circuits and other active devices such as discrete semiconductors that the EC is best able to export. Ninety percent of EC integrated circuit production is exported, whereas only 11% of printed circuit board production is destined for export. One should be careful in interpreting these figures, however, in the sense that it is also some of the less exportable components such as passives that the EC is most self-sufficient. For instance, in printed circuit boards, the EC produces 76% of its internal consumption requirement whereas it produces only 3% of its consumption in integrated circuits.

It is clear that integrated circuits represent a much more international market, with higher levels of imports and exports worldwide, than do other components, such as passives, which are more local.

It is clear that the integrated circuit industry is the component sector most vital to the future health and growth of any electronics industry. Though Europe has several large semiconductor producers, competition from foreign manufacturers is extremely strong, as evidenced by the fact that Europe's IC production is only equivalent to 31% of its internal consumption. Furthermore, a significant proportion of this production is represented by European plants built by such American producers as Motorola and Texas Instruments, and Japanese producers including Fujitsu and NEC.

Production process

The production process is complex, and has many upward and downward dependencies. Upward dependencies consist primarily of buyers of electronic components, who play a large role in determining both future designs and the methods used to fabricate components; this is particularly true in the case of integrated circuits. Downward dependencies include the supply of manufacturing equipment and the choice of manufacturing location. The semiconductor manufacturing equipment market is dominated by American and Japanese players; ready access to their latest equipment types is determinant in developing new, competitive products. Manufacturing location will play a large role in determining competitiveness; even such a capital-intensive industry, cost of skilled labour can be a critical success factor. Consequently, certain European players such as SGS Thomson and Philips have chosen to locate facilities in Southeast Asia to take advantage of relatively inexpensive labour.

INDUSTRY STRUCTURE

Companies

The passive and electromechanical components industry is largely fragmented in Europe, with national markets frequently being dominated by a national supplier, particularly in the case of passives and printed circuit boards. In other cases, foreign suppliers have strong positions in Europe (frequently gained by local manufacture), as is the case with capacitors from Sprague, an American company which enjoys a large European market share.

Key European semiconductor players include Siemens (Germany), Philips (Netherlands) and SGS Thomson (France-Italy), all of whom are among the leading manufacturers worldwide. In addition, Europe has several medium-sized integrated circuit manufacturers including Matra MHS (France) and GEC Plessey (UK). All of these manufacturers (with the exception of SGS Thomson) are to some extent vertically integrated, and enjoy the benefits of captive markets and directed product development. The Japanese now have a slight lead in the world semiconductor market, and all of their major representatives are vertically integrated, as well as offering a broad product line. The only major players in the world semiconductor industry which are not vertically integrated are Thomson and Intel (USA). Intel enjoys the advantage of dominating the key microprocessor market.

Strategies

Strategies in the components industry vary widely depending on whether one is examining the active, passive or electromechanical components sectors. These strategies are of course largely dependent on the end markets' evolution, as electronics manufacturers' global dimension grows and industry rationalisation continues.

In both passives and electromechanical components there has been a tendency to grow through merger and acquisition, thereby gaining economies of scale and the ability to serve global players in each of their locations. The sole major exception to this is the printed circuit board industry, where smaller regional players continue to dominate.

In the semiconductor, and more generally the active components industry, the notion of 'critical mass' has become key, where 'critical mass' can be defined either as minimum market share, or production capacity necessary to compete. In effect, the semiconductor industry has become extremely capital intensive, and vast production volumes are now generally necessary in order to amortise a new product or production facility.

Alliances and mergers have also become commonplace, as players enter into partnerships to conduct research and development work, build production facilities, or act as a second-source for each others' products. In addition, technological alliances are becoming critical between users and suppliers of semiconductors. Key alliances tend to gravitate around new microprocessor technologies, as in the alliance involving Apple and Motorola, or SGS Thomson, IBM, and Bull.

An alternative strategy is that practised by some of the smaller semiconductor companies, whereby they specialise in so-called 'niches' (i.e. market segments which are possibly too small to be profitably exploited by larger players). This is the case of European Silicon Structures (ES2) and Matra Harris Semiconductor (MHS).

REGIONAL DISTRIBUTION

Traditionally, both Japan and the south-western United States were key semiconductor production areas. The Newly Industrialised Countries in Southeast Asia (South Korea, Taiwan, Hong Kong and Singapore) have become favoured sites for new semiconductor facilities, due to low costs and highly educated workforces. Japanese and American manufacturers of a variety of components, including semiconductors and passive devices, have found it advantageous to establish production facilities in Europe, particularly in southern regions.

For European and American enterprises, Southern Europe has been attractive for setting up manufacturing plants due to the relatively cheap labour and set-up costs without a reciprocal loss of expertise. Though Eastern Europe may prove to be a cost-effective site to locate new semiconductor facilities, the current strain on capital, combined with possible overcapacity, hinders development in this region for the near future.

ENVIRONMENT

The components industry is a heavy user of a variety of chemicals in production. This has led to environmental concerns, particularly in the case of CFCs, of which the semiconductor industry has been a heavy user. Generally speaking, industry players are phasing out use of CFCs and other dangerous chemicals in a self-regulated fashion.

REGULATIONS

Few regulations exist with regard to the trade of electronic components. Key concerns are often expressed in terms of treaties or practice. In particular, defence issues have tended to limit the export of many advanced semiconductors to Eastern Europe under the COCOM regulations; however these controls are now rapidly being lifted.

OUTLOOK

The short-term outlook for the European components industry is positive. As the world electronics industry leaves a recession, inventories should start to be developed again.

The long-term future of the European components industry will depend partially on the industry itself, and partially on the industries it supplies, namely the automotive, telecommunications, computing, consumer electronics, and defence industries.

Should the European electronics industry remain healthy, which it is likely to do so in at least some sectors, then the outlook is positive for European component manufacturers. This is especially true for those semiconductor manufacturers whose fortunes are tied to those of larger OEMs, such as Philips or Siemens. However, this health is dependent on OEMs recognising that the success of the underlying components industry is vital to their own longevity. Under this scenario, growth in production should be of the order of 4% compound annual growth for the period 1992 to 1996.

Programmes to link component supplier and user product development already exist, whether government sponsored or privately initiated. These vertical alliances are critical, not only to ensure a commercial outlet for European components production, but to ensure relevant new component product development. In addition, the JESSI programme of research and development, linking various European semiconductor manufacturers, has been proceeding on schedule to develop new semiconductor technologies to keep European companies competitive.

In addition, a healthy European manufacturing equipment industry is also vital to components industry. Traditionally, European components manufacturers have had purely commercial relations with their equipment suppliers. Now, initiatives such as JEMI (Joint Equipment Manufacturers Initiative) are underway.

The period 1992 to 1996 should see continued building of foreign-owned fabrication facilities in Europe. However, this growth will not be as rapid as previously expected, due to an increased cost of capital to Japanese manufacturers, coupled with the risk of overcapacity problems now becoming apparent.

Table 9: Electronic components
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	6.0	3.0
Production	8.0	4.0
Extra-EC exports	9.0	5.0

Source: BIS Strategic Decisions

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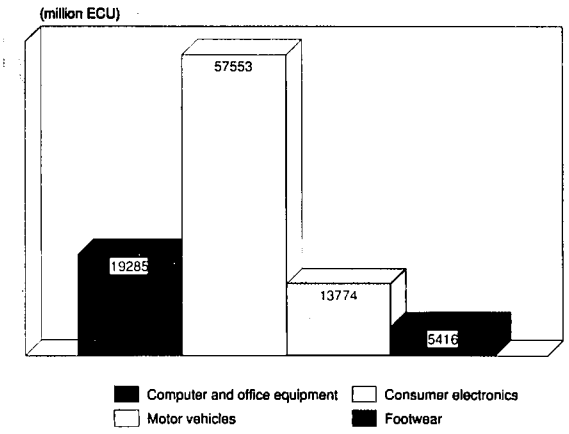
The industry is represented at the EC level by: European Electronic Component Manufacturers Association (EECA). Address: Rue d'Arlon 69-71 Bte 8, B-1040 Brussels; tel: (32 2) 230 9630; fax: (32 2) 230 9605.

Computer and office equipment
NACE 33

Although the European computer and office equipment industry has experienced hard times in recent years, in the 1990s Europe may still become the fastest growing market in the world. The top three European computer manufacturers, Siemens, Olivetti and Bull are adapting to the new conditions of the market.
Important technological developments such as downsizing and system integration have changed the rules of the industry and contributed to the "commoditisation" of computer and office equipment. Faced with fierce competition from American and Japanese manufacturers, European companies are now pursuing strategic alliances and partnerships on common European research programmes with other industry players.

Figure 1: Computer and office equipment Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

This industry manufactures different categories of products: hardware (portables, notebooks, microcomputers, minicomputers, workstations, mainframes, network equipment, etc.), peripherals (printers, disks, screens, keyboards, etc.), software (packages and applications, information systems, systems engineering and services, etc.) and office equipment (electronic typewriters, electronic calculators, electronic cash registers, electronic accounting machines, dictation equipment, etc.). The data provided by Eurostat in the figures and tables correspond to hardware only.

Main indicators

Since 1982, apparent consumption and production of computer and office equipment have grown at a steady pace. Since 1990, consumption growth has been higher than production, resulting in an increased trade balance deficit. Extra-EC exports which had slowed in 1990 compared to 1989, thrived again in 1991 (+8%) (refer to Table 1). However, these exports account for only 20% of European production.

Employment dropped in 1991, registering the highest decrease for 10 years. This was mainly due to an economic recession prompted by a cautious attitude from employers. Employment is expected to be on the rise again in 1992, however.

Recent trends

In constant prices, all main indicators are higher than those for overall manufacturing. The computer and office equipment industry is thus one of potential growth. The average real annual growth rates of apparent consumption, production, extra-EC exports and imports prices were much higher during the 1982 to 1985 period than from 1986 to 1991. Price decreases in 1986 were largely responsible for the slower rate of inflation in the industry during the latter period. Overall, from 1982 to 1991, average annual growth rates were quite high for all indicators and have exceeded 10% (except for extra-EC exports) (refer to Table 2).

International comparison

The computer and office equipment and electronics industry combined account for 5% of Europe's GDP, compared to 5.5% in Japan and 6.2% in the United States. The US industry is experiencing a declining domestic business but is thriving in Europe. In 1989, the United States had a trade surplus of about 3400 million ECU, which is presently eroding.

The Japanese computer and office equipment industry is booming, both on the national and foreign markets (notably Europe). In 1989, Japan had a trade balance surplus with Europe of about 18200 million ECU. Production in Japan covers 140% of consumption (compared with 80% in Europe).

In 1989, the United States was the world's leading producer of computer and office equipment, followed by Japan and Europe. In terms of consumption, the United States was again positioned first, and Europe second. Peripherals are mainly manufactured in Japan (40% of world production) and to a lesser extent in the United States (25%). European production is only 15%.

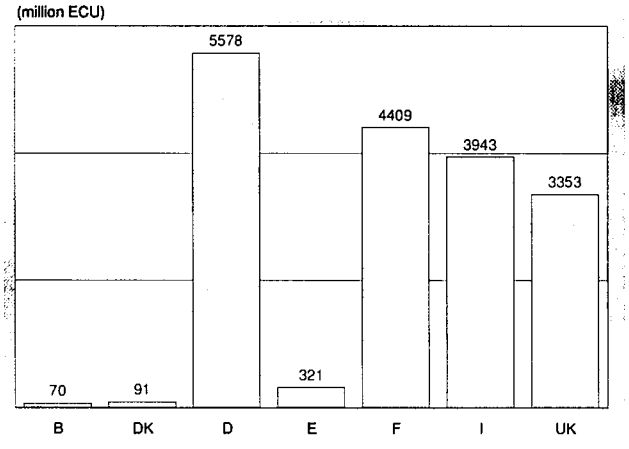
Of the ten leading computer and office equipment firms on the world market, five are American, three are Japanese, and two are European.

Foreign trade

Extra-EC exports and imports have grown steadily since 1982. In 1991, extra-EC exports accounted for one-half of extra-EC imports. The share of extra-EC imports to total imports remained quite stable over the past ten years.

From 1986 to 1991, EC computer and office equipment exports to the United States remained quite stable, while EC exports

Figure 2: Computer and office equipment Value added by Member State, 1991



Source: Eurostat

Table 1: Computer and office equipment
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	23 432	28 592	36 464	42 514	42 068	43 817	53 364	57 636	59 370	62 377	67 781
Production	19 968	24 091	30 115	36 381	36 158	36 340	42 609	45 519	46 865	48 512	52 083
Extra-EC exports	3 669	4 612	6 525	8 316	7 753	7 752	8 211	9 327	9 190	9 907	10 502
Trade balance	-3 464	-4 501	-6 349	-6 133	-5 910	-7 477	-10 755	-12 117	-12 505	-13 865	-15 698
Employment (thousands)	210.8	216.0	231.4	252.1	251.8	246.0	265.9	269.8	270.8	261.3	250.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BIS Strategic Decisions estimates
Source: Eurostat

Table 2: Computer and office equipment
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	16.6	7.0	10.1
Production	21.1	5.3	10.4
Extra-EC exports	23.3	3.1	9.4
Extra-EC imports	14.4	8.9	10.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Computer and office equipment
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	3 669	4 612	6 525	8 316	7 753	7 752	8 211	9 327	9 190	9 907
Extra-EC imports	7 133	9 113	12 875	14 448	13 663	15 229	18 966	21 444	21 695	23 772
Trade balance	-3 464	-4 501	-6 349	-6 133	-5 910	-7 477	-10 755	-12 117	-12 505	-13 865
Ratio exports/imports	0.51	0.51	0.51	0.58	0.57	0.51	0.43	0.43	0.42	0.42
Terms of trade index	111.9	110.7	102.5	100.0	101.5	104.8	106.4	98.2	103.5	100.2
Intra-EC trade	7 353	9 665	12 910	16 231	16 044	17 443	19 191	23 047	24 443	25 616
Share of total imports (%)	50.7	51.4	50.0	52.8	53.9	53.3	50.3	51.8	53.0	51.8

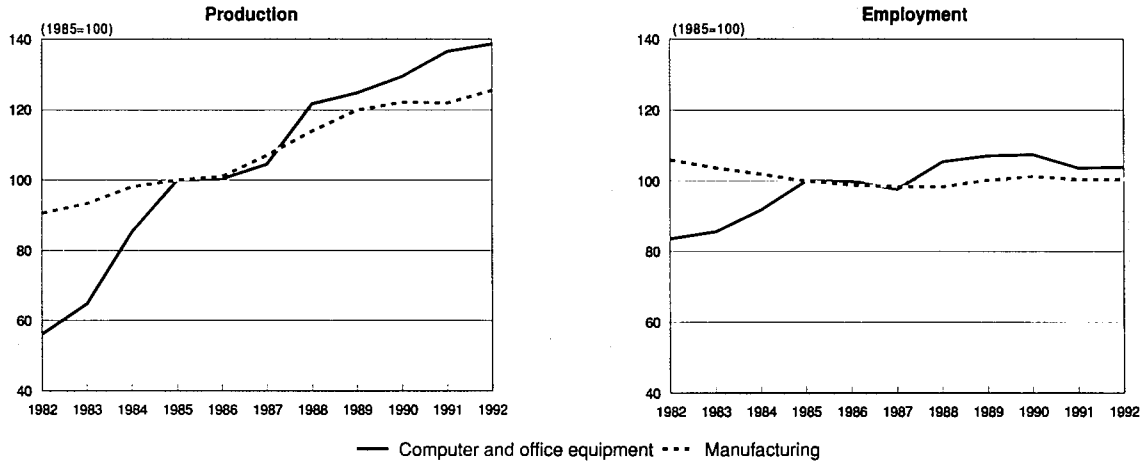
(1) Estimates
Source: Eurostat

Table 4: Computer and office equipment
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	50.9	53.1	56.9	59.4	61.6	67.6	70.0	66.7	68.8	73.8
Productivity index	85.7	89.5	95.9	100.0	103.7	113.9	117.8	112.3	115.8	124.3
Unit labour costs index (2)	83.0	87.1	93.2	100.0	105.6	113.0	115.2	117.5	121.9	N/A
Total unit costs index (3)	59.5	71.0	90.4	100.0	96.7	98.5	112.1	121.5	129.0	149.0

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
(3) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Computer and office equipment
Production and employment indices compared to EC manufacturing



1992 are BIS Strategic Decisions forecasts
Source: Eurostat

to the EFTA countries dropped slightly (refer to Figure 6). EC exports to Japan remained marginal. The EFTA countries represented the main destination of EC exports, but in 1991 the United States was not far behind. In 1986 and 1991, most EC imports came from the United States (refer to Figure 7). Japan, however, increased its share of EC imports, whereas the United States exported less in 1991 than in 1986 (a 10% decrease). The Member States' imports from the EFTA countries are low and decreased between 1986 and 1991. It is important to mention that the Four Dragons (South Korea, Taiwan, Hong Kong and Singapore) are increasingly taking market shares in Europe. Taiwan, for example, increased its exports to the EC by about 7 points between 1986 and 1991. EC imports from Singapore also expanded during this period.

Intra-EC trade has more than tripled over the last ten years. Over that period of time, intra-EC trade experienced higher growth than that of extra-EC exports and production. Consumption increased substantially from 1982 to 1991, and extra-EC imports more than tripled. As a result, extra-EC imports accounted for nearly one-third of consumption over the period. However, the extra-EC imports to consumption ratio has been on the rise, particularly since 1987.

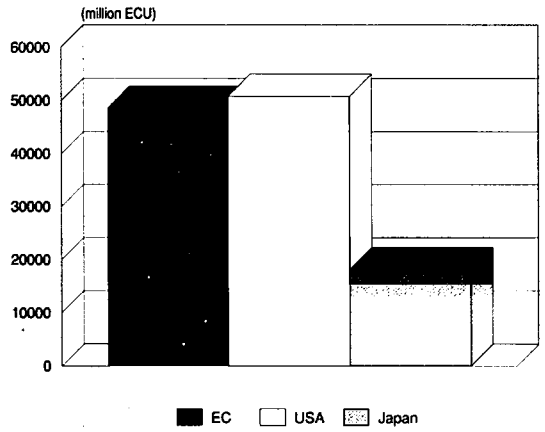
MARKET FORCES

Demand

Demand at both the European and global level has a high potential for growth. Private and public companies as well as public markets are important market segments. Public-sector purchases make up about 15% of the European computer market and accounted for 600 billion ECU in 1990. Such purchases tend to be for rather heavy, expensive equipment.

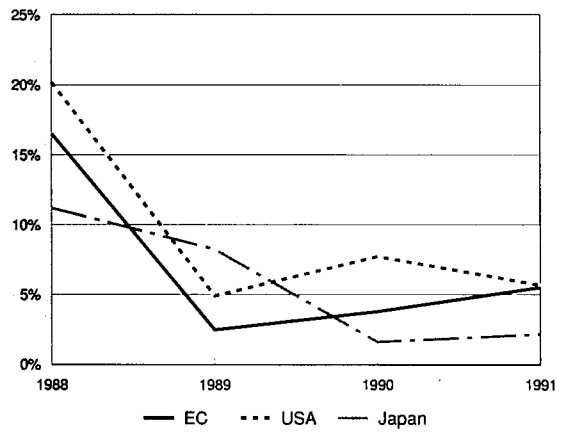
Orders are mainly for large computers and they have created captive and protected markets. These public markets have contributed to the survival of national competition. As private companies want access to the most innovative products, they are the most demanding in terms of price conditions, delivery dates and after-sales service. Individual consumers represent a mass consumption market which requires high performance in terms of quality and price. The market is highly competitive and requires rapid innovation. Because of the experience acquired by end-users (whose demand is definitely moving towards more sophisticated systems) the European computer market is changing from one based predominantly on hardware towards a market focused on software and services. Customers

Figure 4: Computer and office equipment
International comparison of production at current prices, 1991



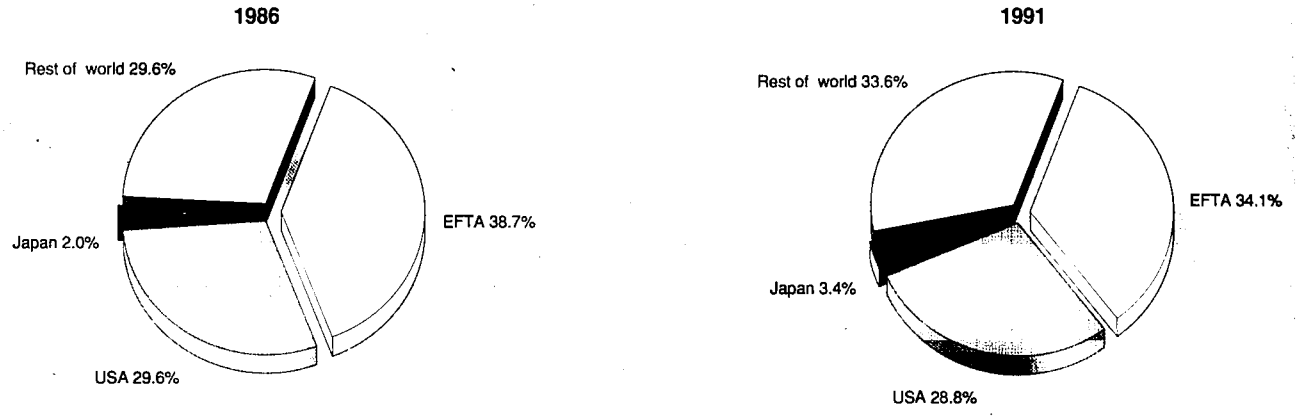
Source: Eurostat, Census of Manufacturers

Figure 5: Computer and office equipment
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Computer and office equipment
Destination of EC exports



Source: Eurostat

are putting increasing pressure on distributors. Some consumers even buy their computer and office equipment on the used equipment market. Sales for the second-hand market, however, remain marginal. Furthermore, after having led a computerisation race in which they bought considerable amounts of equipment, customers have now adopted a more thoughtful approach.

This shift in market demand had a definite impact on the electronics industry, particularly on component manufacturers. Product innovation is of great importance in the computer and office equipment industry; innovation stimulates demand as preferences emerge towards new categories of products.

Downsizing makes it now possible to have "the power of a mainframe on the desk". In fact, this downsizing phenomenon pervades the full range of computers. Mid-range computers now surpass the capability of mainframes manufactured only a few years ago. Powerful PCs and LANs (Local Area Networks) are replacing mid-range computers, and mainframes are being replaced by more specialised mid-sized computers. Downsizing has had a strong impact on prices. The average world price of a workstation fell by around 8% in 1990 and is expected to continue falling.

Portable computers represent the fastest growing segment of the market. By 1995, one out of four PCs purchased should be portable. Local Area Networks, which enable users to have their computers interconnected, are also growing in demand.

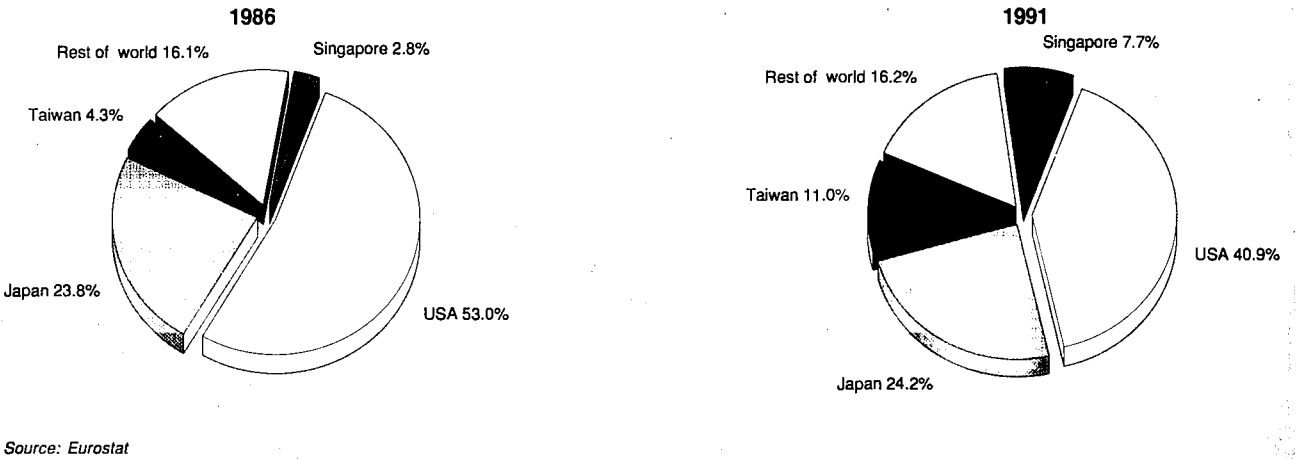
Market demand has induced software producers to make their software compatible. The ability to integrate software is very much desired by customers. The customer wants to be sure that what is purchased will be compatible not only with the vendor's products but also with others; Microsoft's Windows 3.0 is one example. Compatibility between other operating systems (OS/2, Unix...) is expected to develop in the near future.

Supply and competition

Internal EC competition is still active, particularly regarding public markets. Despite the advent of the Single Market, Europe remains a series of small markets, each with its own leading computer firm. More standardised systems have made it easier to enter the market but more difficult for vendors to differentiate products, leading to thinner margins for manufacturers.

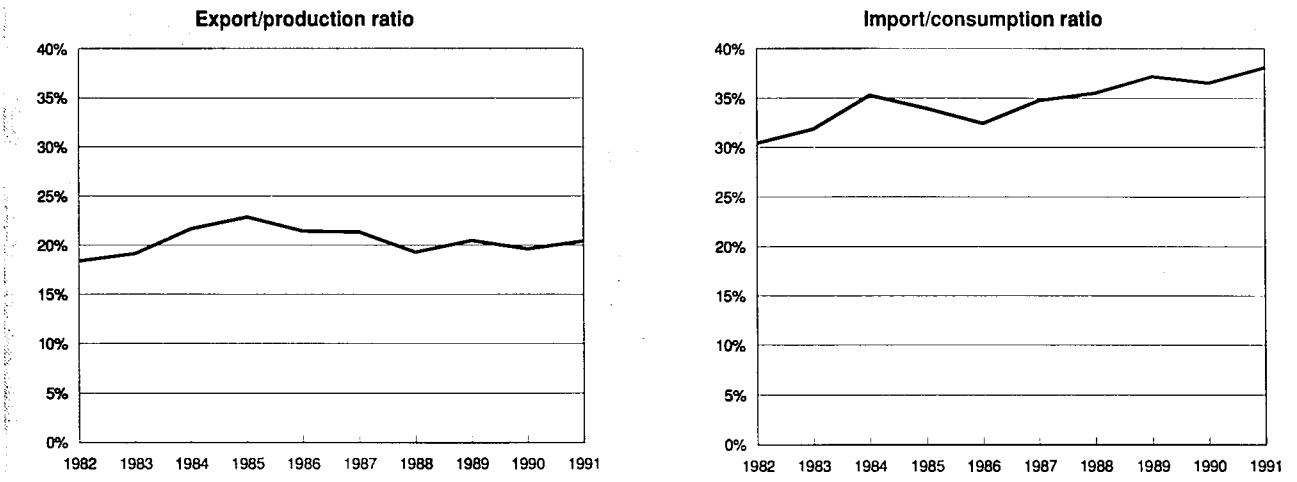
This also means that hardware companies are being forced to move into new areas such as computer software and services. Therefore, hardware manufacturers are no longer simply competing with each other, but with existing software providers, computer services companies (software houses, etc.), and even the telecommunications groups as well. EC manufacturers have

Figure 7: Computer and office equipment
Origin of EC imports



Source: Eurostat

Figure 8: Computer and office equipment
Trade intensities



Source: Eurostat

lost their degree of competitiveness in an industry where American and Japanese suppliers are tough competitors.

A comparison of European and American computer equipment reveals striking price disparities. For example, a PC costs twice as much in Europe as in America. This ratio is even higher for applications, which sometimes cost three times more in Europe.

Moreover, the depreciation of the yen and the dollar have contributed to the degree of competitiveness of Japanese and American goods on the European market. The printers' market, for example, is dominated principally by US and Japanese companies. Among the leading 10 laser printer makers in Europe in 1990, not one company is European. This is also true for matrix printers. European software, however, is still competitive, although Japanese firms are becoming increasingly difficult to compete with. European computer makers have endeavoured to increase productivity by drastically reducing the number of employees. Again, labour productivity has increased but not as much as that of US companies.

Prices on an overall basis are decreasing and margins are tightening. Besides downsizing and open systems, which have made prices collapse in some segments, Europe has had to face falling demand and fluctuating foreign exchange rates. Components prices have fallen and, due to falling demand, manufacturers have chosen price competition rather than increasing their margins. PC prices have plummeted: from March 1991 to March 1992 they fell by as much as 50%. Even new products are faced with price cuts: the price of portables, for example, is falling far faster than costs.

In addition, product life cycles are becoming shorter. The life cycle of a micro-computer, for instance, no longer exceeds 1 year. Value-added resellers (VARs) are thriving in Europe and are trying to obtain the lion's share of the distribution market.

Production process

European production in 1991 hardly covered 80% of European consumption (refer to Table 1). Since European users are giving priority to US or Japanese-made information systems, the European industry tends to be below its production capacity.

In 1991, productivity largely exceeded its level of 1985 (refer to Table 4). It increased considerably from 1986 to 1987, but then dropped in 1989 compared to 1988. For ten years, unit labour costs have been on the rise. Total unit costs experienced a higher increase.

European production of computer equipment is weak and has for certain products disappeared altogether. The production of hard disks, for example, is no longer ensured by European firms. This is partly due to the lack of European components sourcing, as European manufacturing tends not to be profitable. A large part of the peripherals industry production now occurs in the US and Japan. In 1989, US firms accounted for 58% of computer equipment and 8% by Japanese companies. For these products, European production only reaches about 15%.

In Europe, vertical integration is relatively limited compared with American and Japanese companies. Some companies have tried in the past to integrate upstream activities by producing components for their own needs; because of a lack of a sufficient internal market, they were not able to reach the critical size thresholds of production and sustained investment levels.

Any production that requires the manufacture of printed circuits (peripherals, computers and office equipment) is mostly done by subcontractors. Part of this activity is carried out in South Asian countries. Producing in Europe is nevertheless attractive in certain geographical areas. Component construction is strong in Ireland and Scotland because companies benefit from low taxes and local government incentives.

INDUSTRY STRUCTURE

Companies

Nearly 6000 enterprises operate in the computer and office equipment sector in Europe (refer to Table 5). Only 3.6% of enterprises account for 92.8% of the industry's turnover, showing a high concentration in the industry.

European firms had an overall market share of about 40.2% in 1989, whereas US and Japanese companies had respectively 56.5% and 3.2%. The three main European computer and office equipment suppliers, Siemens-Nixdorf in Germany, Olivetti in Italy and Groupe Bull in France, are seeing their positions erode on the European market. On the other hand, the industry in general is facing a downturn on the world market and US and Japanese companies are also entering a difficult period. In the first decrease since 1978, the micro-computer market dropped 3% in Japan in 1991 while PC sales decreased about 8%. For Siemens-Nixdorf, the largest European-based computer company, it has taken longer than

Table 5: Computer and office equipment
Breakdown by size of enterprise, 1988 (1)

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	5 171	87.4	6.6	3.4
20-99	530	9.0	7.0	3.8
More than 99	213	3.6	86.4	92.8

(1) Estimates
Source: Eurostat

expected to integrate the Nixdorf company. Although its turnover reached 5.9 billion ECU from October 1990 to September 1991, losses were about 380 million ECU. In 1991, Olivetti's turnover was approximately 5.6 billion ECU, but losses reached about 217 million ECU.

Groupe Bull's sales in 1991 reached 4.8 billion ECU while losses were about 480 million ECU. 1200 people were dismissed in 1990, 1600 in 1991 and another 1100 people are to be dismissed by the end of 1992, bringing employment at La Compagnie des Machines Bull to approximately 13460 in France.

Strategies

In the past, the industrial strategies of European companies did not sufficiently exist on the EC dimension. However, they presently exploit the possibilities of cooperation with other European partners more deeply, particularly through European research programmes. Due to their lack of competitiveness, European computer makers base their strategies upon two dimensions: they can reach product marketing agreements and form strategic alliances with powerful partners, but they can also seek help from the EC through research programmes like Esprit, Jessi, Eureka, etc.

In 1991, an agreement was signed between La Compagnie des Machines Bull and NEC in which NEC took 4.7% of Bull's capital and Bull had access to the Japanese technology for large computers. Groupe Bull also reached a broad agreement with IBM last year. In signing this agreement, IBM pledged to provide its French counterpart with Risc microprocessors (chips which are the heart of computers) that will represent one of the largest sectors of the market for the 1990s. IBM holds 5.7% of Bull's capital.

Table 6: Computer and office equipment
Market shares by major product category in Western Europe, 1991 (1)

FirmShare		(%)
Personal Computers	IBM	18.8
	Compaq	9.3
	Apple	8.0
	Olivetti	5.5
	Others	58.4
	Market (million ECU)	22 213
Workstations (2)	Sun	26.0
	Hewlett Packard	24.0
	Digital	16.0
	IBM	12.0
	Others	22.0
	Market (million ECU)	2 939
Computers (2)	IBM	31.0
	Siemens-Nixdorf	8.0
	PC Compatibles (3)	7.0
	Bull	5.0
	Others	49.0
	Market (million ECU)	22 916

(1) Market figures are not additive (there are double counts)
(2) Provisional figures
(3) Multi-user PC's and PC workstations
Source: Dataquest Europe Ltd

Olivetti has clearly demonstrated two aspects of its strategy: the search for partnership and a new orientation towards services. The company recently signed an important agreement with Andersen Consulting to find new outlets in services in the banking, distribution and public administration sectors. Olivetti has also recently signed a partnership agreement with Canon. This joint venture is aimed at manufacturing 700 000 ink jet printers and includes R&D collaboration.

The three main computer manufacturers have also announced the creation of a common company aimed at creating extensive trans-European networks. The objective of this new structure is to harmonise the computer networks of the Member States.

US computer manufacturers (IBM, DEC, HP) have adopted a globalisation strategy to increase their presence on foreign markets (especially in Europe) by maintaining significant manufacturing and R&D operations in Europe.

Hewlett-Packard, for example has R&D operations in France (in Grenoble). After acquiring Mannesmann-Kienzle in December 1990, DEC extended its influence in Europe in 1991 by acquiring Philips Systemes Informatiques, a specialist in services and solutions to the banking sector, and CGE Composants, its main mini-computers' distributor.

As a result of the Japanese market stagnation, NEC, the second largest computer manufacturer in Japan, has decided to postpone the building of a PC manufacturing plant in Germany. Japanese suppliers are focusing on software production. Moreover, they are tackling the European market, notably with ICL, which now belongs to Fujitsu.

These strategic alliances are likely to continue in the future since they often represent the only potentially successful strategy for companies in the sector. At present, European computer makers spend almost as much as their US and Japanese competitors on capacity investment (respectively 9.5% and 8% of turnover). In order for the EC not to be absent from the supercomputers market, has decided to invest about 1 billion ECU, beginning in 1995. However, only 300 million ECU has been planned for the Esprit phase II. Europe's needs represent 30% of world sales. The United States and Japan are actively preparing for this scientific, technical and commercial challenge by investing heavily in this area.

ENVIRONMENT

The computer and office equipment industry is not strongly involved in ecological issues. However, pressure from the EC and socio-economic trends have induced European manufacturers to take care of the environment. Germany in particular, is leading the European ecological effort. Siemens-Nixdorf, for example, has recently marketed a keyboard which can be entirely recycled.

Table 7: Computer and office equipment Market shares by country of all systems, 1991

Company		Share (%)
BR Deutschland	IBM	34
	Siemens-Nixdorf	21
	PC Compatibles (1)	7
	Digital	6
France	IBM	25
	Bull	17
	Digital	10
	SNI	7
Italia	IBM	50
	Bull	8
	Olivetti	7
	Digital	7
United Kingdom	IBM	20
	ICL	16
	Digital	14
	PC Compatibles (1)	8

(1) Multi-user PC's and PC workstations
Source: Dataquest Europe Ltd

REGULATIONS

The standardisation of computer and office equipment at the European level is mainly represented by organisations such as the CEN (Committee of European Standardisation) and the Committee of European Electrotechnical Standardisation (CENELEC).

The computer and office equipment industry not only follows their official (*de jure*) standards, but also the standards, which are not recognised by these competent organisations although they lead the market (*de facto* standards). The latter have emerged from the users' desire to have heterogeneous computer sites and to be able to free themselves from relying on a single manufacturer.

The series of alliances and mergers, which had already started before 1991 with the Siemens-IBM alliance and the acquisition of ICL by the Japanese manufacturer Fujitsu, tends to put the EC in a difficult position: which is the status of EC companies which are now under American or Japanese control? ICL, which had started to participate in various R&D European programmes, had to withdraw from three Jessi programmes in 1991 because it no longer was a European company. Eventually, the European Commission decided that ICL could participate in the second phase of the RACE programme.

The twelve Research Ministers have finally suggested that a code of good behaviour should be adopted for EC help for those companies whose major capital is not European. On the other hand, the European Commission is also controlling the subsidies European companies receive from their national governments. Recently, French government equity injections into Groupe Bull have drawn the EC's attention.

Nearly 870 million ECU were planned for the Bull and Thomson groups. The concern of the European Commission is to check the conformity of French aid to the Rome Treaty and more specifically its compliance to European fair competition rules. France and the EC eventually came to a political compromise in which Groupe Bull will have to accept a restructuring plan aimed at ensuring financial stability and independence from the State.

In May 1991, the EC Council of Ministers also passed a directive on computer programmes protection which will was implemented by all EC Member States on the 1st of January, 1993. The text is aimed at protecting software against piracy. Software copying is authorised but is limited to the perspective of programmes' ability to interface with other systems. By adopting this directive, the EC intends to reduce royalties.

The share of EC resources dedicated to research in Esprit reaches 3.5% and is expected to rise to 6% in 1997. The Maastricht agreement is likely to provide the EC with a quicker legislative process for the implementation of the fourth programme, which will probably combine the Esprit's traditional activities with more targeted objectives on some key IT technologies. The EC also considers the initiative taken by Groupe Bull, Siemens and Olivetti to create a European software institution. As for Eureka, the programme accounts today for 521 projects which represent a global amount of about 12 million ECU. 121 new projects have been created in 1991, among which 14 are dedicated to electronic data processing.

OUTLOOK

Apparent consumption between 1992 and 1996 is expected to evolve positively at 5.9% compound annual growth rate. Production and extra-EC exports will grow a little slower. The industry needs to adapt to the growing importance of applications and services. Efforts are being undertaken by European manufacturers to increase competitiveness, notably by their participation toward a new generation of research programmes and attention to customer needs.

The emergence of new products in the industry has led to a technology merger between computer and office equipment and telecommunications; companies which were making telephone handsets are now moving into computers, and vice-versa. AT&T, for instance, has recently bought the Dataid company. Technologies in those industries are converging.

Table 8: Computer and office equipment Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	5.8	5.9
Production	5.1	5.3
Extra-EC exports	6.2	6.2

Source: BIS Strategic Decisions

Written by: BIS Strategic Decisions
The industry is represented at the EC level by: European Association of Manufacturers of Business Machines and Information Technology (EUROBIT). Address: Lyoner Strasse 18, D6000 Frankfurt/Main 71; tel: (49 69) 660 3530; fax: (49 69) 660 3510.

Telecommunications equipment
NACE 344

The telecommunications equipment industry has experienced high growth rates globally with the EC being no exception. Supply is very concentrated in three particular zones: the USA, Europe and Japan. Although the USA is the most established and liberal services market, EC advantages include the benefits gained from the convergence of the 12 Member States and the resulting strength of standardisation and liberalisation of markets; Alcatel of France is the world's largest telecommunications supplier, leading USA's AT&T. The Japanese industry is becoming more competitive and continuing with large R&D investments. As the focus of the equipment industry changes from domestic to worldwide, players are jockeying to reach the ultimate goal of being a "Global Player".
Future products and technologies will concentrate on value added services and equipment, mobile communications, intelligent networks and visual communications, with greater potential to optimise the yet untapped residential markets.

INDUSTRY PROFILE

Description of the sector

Any analysis of the telecommunications equipment market cannot be looked at in isolation; there are strong links to the telecommunications services sector, and many overlaps with other sectors of the electronics industry. For example, one finds within the industry upstream links with components, aerospace and software and downstream links to network operators, value added service providers, installers and retailers. Many firms are also involved in both the electronics and the telecommunications markets. European examples include Alcatel, Siemens and Ericsson (a major supplier to the EC of Swedish origin), with Motorola, IBM and Hitachi representing the USA and Japan.

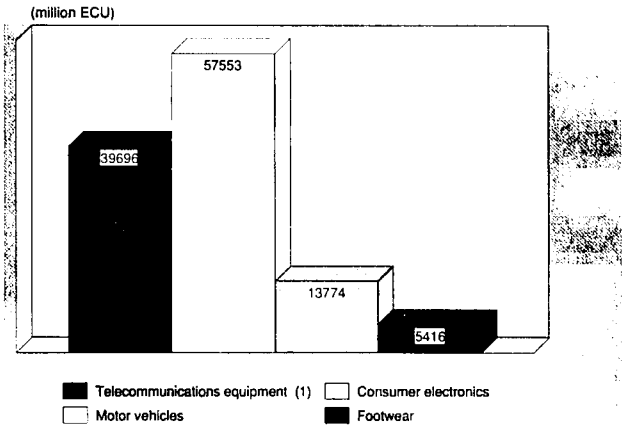
Telecommunications equipment main product categories are public switching, transmission, terminals, private switching, data communications and mobile communications. The technological advances towards full digitalisation has meant that the telecommunications industry has become a multi-product industry with the scope of equipment ranging from the provision of voice through telephone sets to image communications via video conference facilities.

Note that NACE 344 includes, in addition to the manufacture of telecommunications equipment, the manufacture of electrical and electronic measuring equipment, recording equipment and electro-medical equipment. Unless otherwise noted, however, the data in this monograph refer to the manufacture of telecommunications equipment alone. Furthermore, caution must be exercised when comparing pre-1988 and post-1988 figures due to the change in nomenclature for NACE 344 in 1988. The transition from the Nimexc trade nomenclature to the Combined nomenclature also means that pre-1988 trade figures cannot be compared with post-1988 trade figures.

Main indicators

The EC accounts for around 25% of the world's telecommunications equipment market. In 1990, public switching was the largest market by value in consumption, while terminals represented the highest revenues from extra-EC exports. Mobile and data communications are expected to be growth areas especially since the EC standardisation agreements for the pan-European digital GSM and ISDN (Integrated Services Digital Network).

Figure 1: Telecommunications equipment Value added in comparison with other industries, 1991



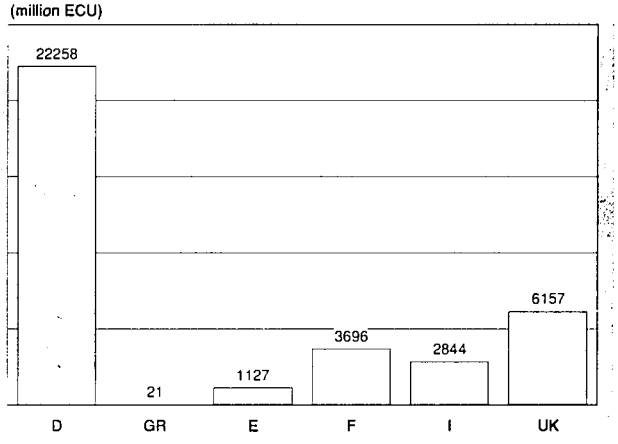
(1) Includes electrical and electronic measuring and recording equipment, and electro-medical equipment
Source: Eurostat

From 1982 to 1991, consumption in the EC rose at an average annual rate of 4.0% in real terms, with growth rates for individual years reaching as high as 12% (between 1983 and 1984). Production growth was slightly lower over the eighties averaging 2.7% per year (Table 3). EC exports expanded at an even slower rate of 2.2% between 1982 and 1991, which includes a sharp decline between 1985 and 1986 of 9.8%. Nevertheless, the EC's trade balance in nominal terms has risen since 1989. Employment in the EC telecommunications industry fell steadily from 1982 to 1991, a trend which is expected to continue.

Recent trends

Growth in telecommunications equipment markets in the last decade has moved hand in hand with that of telecommunications services. The market in the 1980s grew in line with the development of new services and network modernisation. The 1990s will be characterised by a growth in demand for value added and alternative services to be supported on more flexible networks.

Figure 2: Telecommunications equipment (1) Value added by Member State, 1991



(1) Includes electrical and electronic measuring and recording equipment, and electro-medical equipment
Source: Eurostat

Table 1: Telecommunications equipment
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(1)
Apparent consumption	15 136	16 302	18 250	20 184	20 307	21 555	22 848	23 229	25 532	25 962	26 780
Production	16 987	18 153	19 995	21 754	21 548	22 584	22 939	23 339	25 829	26 345	27 136
Extra-EC exports (2)	3 522	3 795	4 404	4 770	4 304	4 615	3 787	4 663	4 558	5 215	5 424
Trade balance (2)	1 851	1 851	1 745	1 570	1 241	1 029	91	110	297	383	356
Employment (thousands)	340	329	315	294	286	279	270	261	255	252	250

(1) BIS Strategic Decisions estimates, except for 1991 trade data estimated by Eurostat
(2) A change of trade nomenclature in 1988 makes a comparison of pre-88 and post-88 figures hazardous
Source: Eurostrategies ESTEL, Eurostat

Table 2: Telecommunications equipment
Breakdown by product line, 1990

(million ECU)	Apparent consumption	Production	Extra-EC exports
Switching	8 149	8 283	707
Transmission	5 247	5 814	1 316
Terminals	4 528	4 011	1 931
Other	7 608	7 721	604

Source: Eurostrategies ESTEL, Eurostat

Table 3: Telecommunications equipment
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	5.8	3.1	4.0
Production	4.7	1.7	2.7
Extra-EC exports	3.5	1.5	2.2
Extra-EC imports	10.0	8.9	9.2

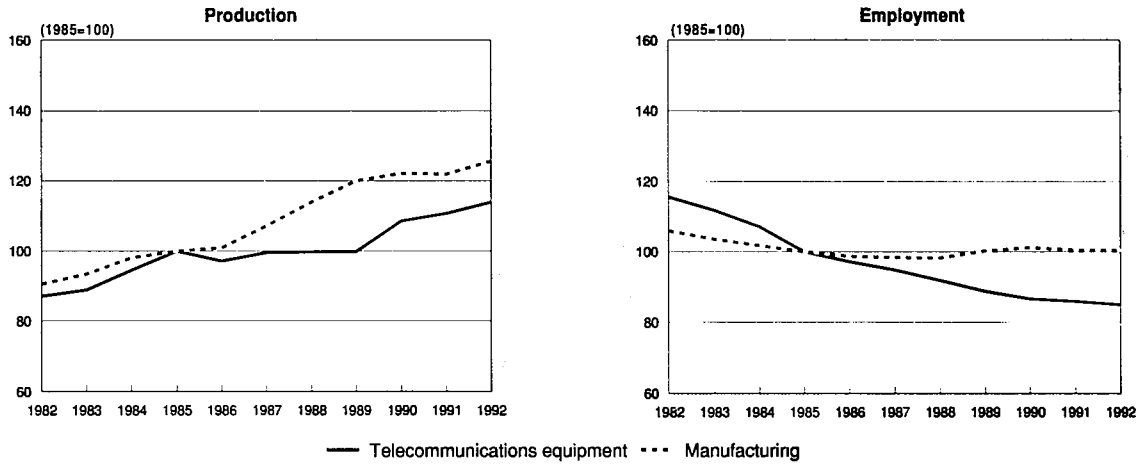
Source: Eurostrategies ESTEL, Eurostat, BIS Strategic Decisions

Table 4: Telecommunications equipment
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	3 522	3 795	4 404	4 770	4 304	4 615	3 787	4 663	4 558	5 215
Extra-EC imports	1 671	1 945	2 659	3 200	3 063	3 586	3 696	4 552	4 261	4 831
Trade balance	1 851	1 850	1 745	1 570	1 241	1 029	91	111	297	384
Ratio exports/imports	2.11	1.95	1.66	1.49	1.41	1.29	1.02	1.02	1.07	1.08
Terms of trade index (2)	117.7	113.9	105.5	100.0	107.5	112.4	108.6	106.2	110.8	110.2
Intra-EC trade	1 760	1 896	2 282	2 557	2 891	3 089	3 294	4 159	4 162	4 366
Share of total imports (%)	51.3	49.4	46.2	44.4	48.6	46.3	47.1	47.7	49.4	47.5

(1) A change of trade nomenclature in 1988 makes a comparison of pre-88 and post-88 figures hazardous; 1991 estimates
(2) Includes electrical and electronic measuring and recording equipment, and electro-medical equipment
Source: Eurostat

Figure 3: Telecommunications equipment
Production and employment indices compared to EC manufacturing



1992 are BIS Strategic Decisions estimates
Source: Eurostrategies ESTEL, Eurostat

Compared to overall manufacturing, employment in the telecommunications equipment industry experienced a rapid decline in the early 1980s mainly due to productivity improving developments in manufacturing and the high number of mergers and acquisitions in Europe.

EC production of telecommunications equipment grew more quickly in the earlier part of the eighties than the latter half although the industry experienced an upturn in 1990 which continued into 1991. This upturn can partly be attributed to the former Eastern block countries which are in desperate need of telecommunications equipment, and also to the mobilisation of those countries in Europe such as Greece, Portugal and Italy which are having to upgrade their networks in order to come into line with other EC countries.

With a compound annual growth rate in consumption between 1982 to 1991 of 4.0% and production growing at only 2.7%, extra-EC imports increased at a rapid rate, averaging 9.2% per year over the same period. Contributors to this growth include the surge of liberalisation in the early to mid-80s, especially in the UK. As markets opened up for telecommunications equipment, more and more companies began to share new technologies through joint venture (Alcatel of France-Qualcomm of the USA in the satellites area) or buyouts (Northern Telecom of Canada and STC of the UK in PABX).

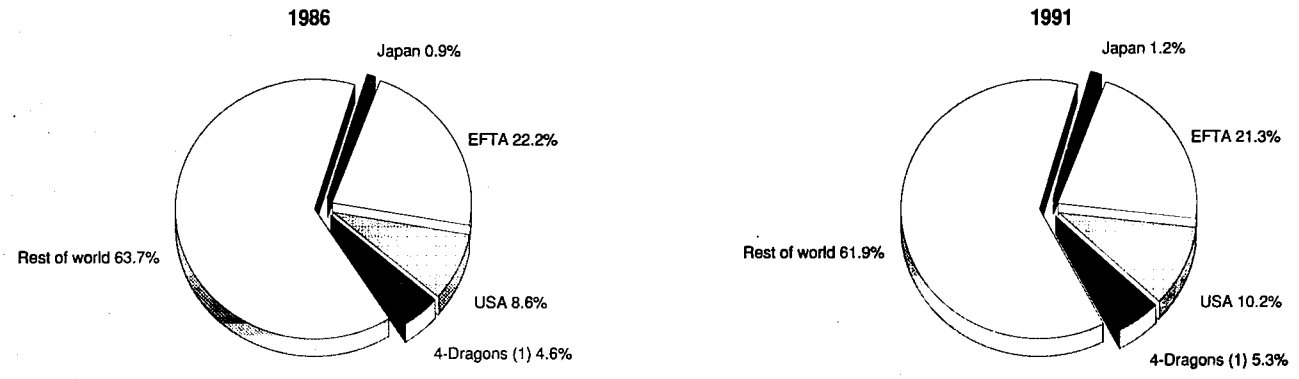
Foreign trade

The EC's trade balance in telecommunications equipment has increased steadily over the last several years. The majority of exports are destined to the EFTA countries which had a 21.3% share of the total in 1991 (refer to Figure 4). The USA, the EFTA countries, the Four Dragons (South Korea, Taiwan, Hong Kong and Singapore) and Japan made up 38.1% of all EC exports; conversely, these same regions represented 84.9% of all EC imports.

The EC trade deficit with Japan reached 1192 million ECU in 1991. Japan imports very little EC equipment and accounts for only 1.2% of EC exports in 1991 (Figure 4). As illustrated by EC imports in 1991, Japanese equipment was the most important, representing 26.0% of all imports, ahead of equipment from the EFTA countries representing 22.8% and American equipment at 25.0% (refer to Figure 5).

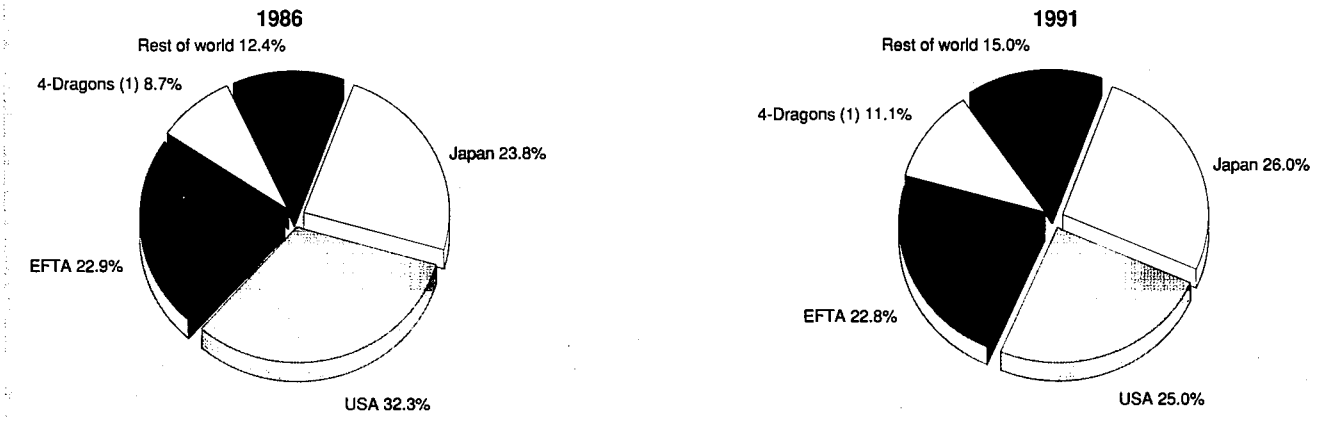
EC exports worldwide were concentrated on terminal and transmission equipment representing 41.4% and 26.5%, respectively, of the value of all 1991 exports. Terminal equip-

Figure 4: Telecommunications equipment
Destination of EC exports



(1) Hong Kong, Singapore, South Korea and Taiwan
Source: Eurostat

Figure 5: Telecommunications equipment
Origin of EC imports



(1) Hong Kong, Singapore, South Korea and Taïwan
Source: Eurostat

ment, however, was also the EC's most imported telecommunications product, accounting for 59.2% of imports in terms of value. Japan once again exported the most terminal equipment to the EC, representing 30.7% (879 million ECU) of the value of all imported terminals.

Of this 879 million ECU, 65.2% is accounted for by fax machines and parts. Not surprisingly, Japanese exports to the EC are strong in fax machines where synergies exist between this type of terminal equipment and consumer electronics.

MARKET FORCES

Demand

The three key end markets for telecommunications equipment are the public telephone operators, businesses and residential consumers.

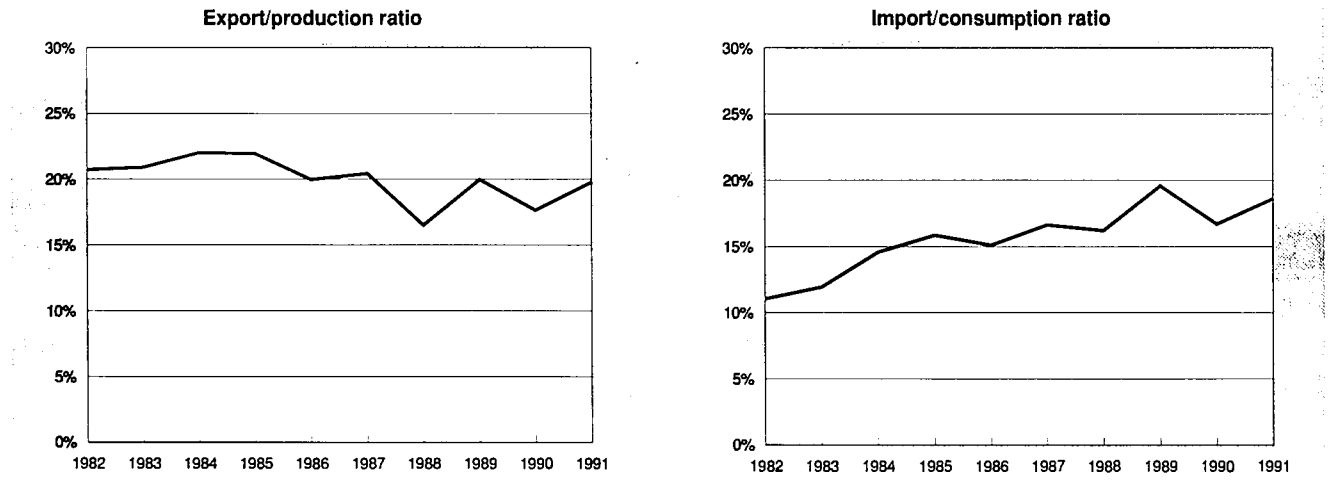
Operators are large buyers of all types of equipment, notably switching and transmission infrastructure. They also act as re-sellers for terminal equipment. This customer base, however, is fragmenting. In particular, service liberalisation is increasing the number of fixed and mobile network and service providers. Telecommunications operators no longer dominate the private equipment market so that distribution channels have become more complex. Furthermore, a growing proportion of user terminal equipment is coming to resemble consumer electronics in terms of design, manufacturing techniques, pricing and distribution which threatens the share of EC manufacturers of this market.

Business consumers use a range of equipment, from PABX to modems, as well as other customer premises equipment, to conduct their business. Demand for equipment for business users arises from the need to carry out the company's activities. Since the early 1980s, facsimile machines and telephones with a high number of functions (callback, repeat dialling, etc.) have become indispensable tools for business.

A number of large companies may have outright agreements with a manufacturer to buy directly from them rather than through the channel of the public telephone operator.

It is increasingly important for European business to be able to use the same terminal equipment in several countries. In response to this need and others, the players in the EC equipment makers market are agreeing to manufacturing equipment

Figure 6: Telecommunications equipment
Trade intensities



Source: Eurostrategies ESTEL, Eurostat

Table 5: Telecommunications equipment
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	30.5	32.4	33.1	34.6	34.9	36.9	39.5	39.7	41.8	44.5
Productivity index	87.9	93.5	95.6	100.0	100.8	106.5	114.0	114.5	120.8	128.4
Unit labour costs index (3)	82.9	90.3	92.5	100.0	104.0	113.1	120.3	126.3	136.2	N/A
Total unit costs index (4)	68.0	76.4	88.3	100.0	101.7	110.5	126.5	135.2	140.2	151.7

(1) Includes electrical and electronic measuring and recording equipment, and electro-medical equipment
(2) Value added per person employed (1991 prices); excluding Denmark and Portugal
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

under the same standards. The GSM (Global System for Mobile Communications) digital cellular standard is one of the initiatives that is moving industry in this direction.

Residential users historically have been buyers of telephone sets, but the value of the home market has seen recent expansion, notably as cordless hand sets substitute for or augment fixed telephones and as more sophisticated terminal equipment, such as facsimile machines, extends its presence. Residential users are also becoming more enthusiastic about having more than one telephone. In most households, there are normally at least two telephone sets, and functions, such as repeat dialling, are standard features rather than options. Residential users, however, tend to have a lower replacement/new purchase rate than businesses.

Residential users usually buy directly from the operator. However, in markets where telecommunications equipment supply has been liberalised following EC policy, consumers are able to buy directly from retailers. These trends will increase. In terms of price elasticity of demand, consumer products, such as telephone handsets, are more price sensitive than business/professional products. This has led to the proliferation of cheaper cordless terminals in many EC countries.

The rate of product innovation within the telecommunications equipment market has resulted in the continual introduction of new services and technologies onto the market, at times causing buyer confusion. Ever improving integration technologies allow for the production of multi-function platforms/terminals. Such equipment as faxes aimed at the home office worker can encompass three functions on the one small terminal (fax machine, telephone and answering machine).

Supply and competition

Manufacturers in France, Germany and UK are not only competing against each other in telecommunications equipment markets but also with the rising competition from outside the EC. Telephone handsets, for example, are mass manufactured in East Asia, especially in South Korea, at prices and quality standards which are acceptable to the final consumer. Another technology, mobile communications terminal equipment, will in the long term become attractive to consumer electronic suppliers (a technology area traditionally dominated by the Japanese).

Compared to East Asia, EC labour forces are generally more expensive to employ. European production costs tend to be higher due to three main reasons:

- European manufacturing is less automated than in Japan (although catching up);
- economies of scale are lower in Europe while the cost of labour is generally higher;
- government aid to telecommunications companies in Japan is significant, enhancing their ability to compete.

To ensure that EC manufacturers continue to be competitive in the telecommunications equipment market as it goes global, many companies have been forging joint ventures to profit from the know-how and distribution channels of other companies.

Non-EC manufacturers, notably the Japanese and Americans, have been carefully watching the Single European Market and have been preparing for some years to have a foothold in the market when it becomes liberalised. The UK has a large base of Japanese manufacturing companies who have achieved vertical integration in their production of both consumer goods, components as well as telecommunications equipment (e.g. Panasonic). AT&T, the USA giant, has established a manufacturing plant in Spain as has Ericsson. These corporate presences have had a very positive effect on Spain's intra-EC trade balance. Other means of entering the Single European Market include takeovers such as Northern Telecom's takeover of STC in the UK.

Pricing trends vary considerably across the telecommunications equipment markets. Mass market products, such as mobile terminals, have been subject to significant price reductions as a result of scale of economies in production and marketing, and mature technologies. However, niche market products, such as VSAT terminals, which are sold to the business sector, cannot take advantage of volume production techniques, and prices therefore tend to remain fairly stable.

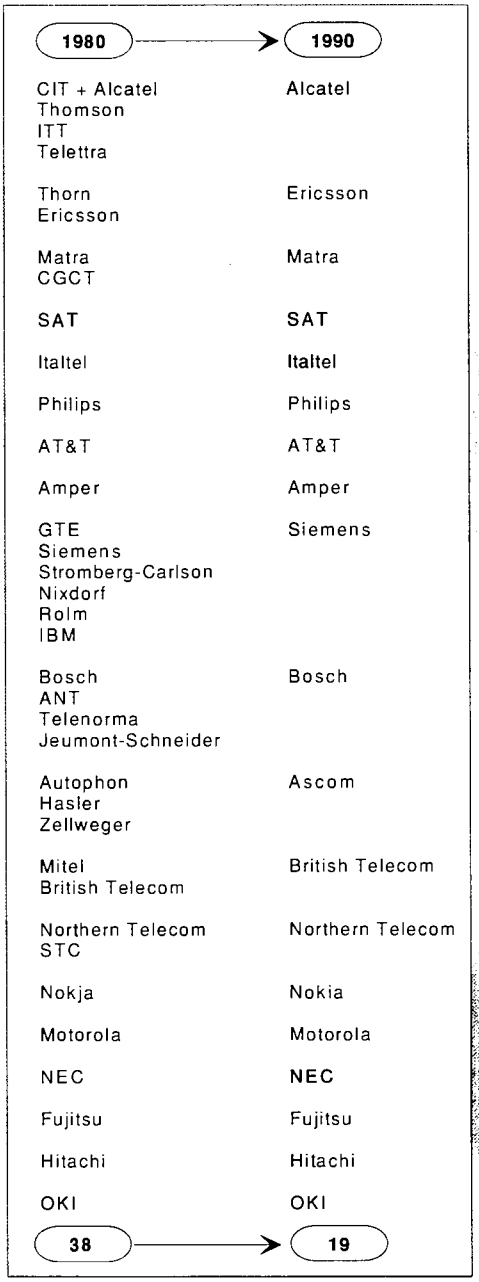
Production process

In the development of telecommunications equipment, parts obtained from upstream industries or new technological developments in complementary industries affect the product innovation and the efficiency of telecommunications equipment.

The emergence of fibre optics has enabled formerly copper based networks to be upgraded to fibre optics, enabling the infrastructure to support new, value added services such as SDH and ATM technologies. These technologies represent strong business opportunities for vendors in the switching and transmission market. Network infrastructure based on Synchronous Digital Hierarchy (SDH) has just begun to be installed by public operators in order to replace or supplement existing plesiochronous systems. Asynchronous Transfer Mode (ATM) is emerging as the key technology for broadband, multimedia communications and will be used for both public and private networks.

New network technologies enable the provision of an increasing number of value added services, such as voice processing and electronic messaging, and intelligent networking functions such as freephone and personal numbering.

Figure 7: Telecommunications equipment Concentration in the worldwide telecommunications industry



Source: BIS Strategic Decisions

INDUSTRY STRUCTURE

Companies

Among the largest telecommunications firms are companies such as Alcatel, AT&T, Siemens, Northern Telecom, NEC and Ericsson. Towards the end of 1991, Alcatel overtook AT&T as the world's number one manufacturer through its latest acquisitions. Of the world's top six, two firms are accounted for by EC manufacturers: Alcatel (number one) and Siemens (number three). AT&T in second place, with Northern Telecom fourth, NEC fifth and Ericsson in sixth position.

Alcatel's strengths lie in transmission and public switching. The company has a strong presence in continental Europe but a weakness in the UK market. It is trying to penetrate the UK through the acquisition of cable and PABX companies. AT&T is heavily reliant on its domestic US market and has been forging alliances with EC manufacturers as a means of finding a European outlet for its products and to conforming to European technical standards. Siemens is particularly strong in public switching and transmission. Siemens in particular risks strong competition from Japanese manufacturers who are strong in data communications terminals.

Strategies

Players in the industry have recognised the need to alter their strategies to operate with a more global perspective in order to survive and expand outside their own domestic and EC markets. Serious threats are posed to some manufacturers in technologies which are closely linked to consumer electronics, such as the production of data communications equipment and handsets (including mobile communications terminals), and where competition from Japanese manufacturers is fierce.

The approaches taken to minimise the effects of competition and to build upon strengths have concentrated the telecommunications equipment industry. Two major forces behind these strategies are the need to share the vast R&D needed to develop key public network equipment (i.e. new switches) and the desire to acquire a local manufacturing base as a competitive advantage in selling to the (usually) state-owned telecommunications operators. Large companies are slowly absorbing both smaller and other large companies, alliances are being formed to profit from established distribution channels and customer base, and the sharing of technology.

Public bodies such as ETSI (European Telecommunications Standards Institute) have been vigorously trying to establish, and promote globally, EC standards. ETSI has been active in setting norms for a European ISDN system, mobile and personal communications, intelligent networks and terminal equipment.

The rate of EC investment in telecommunications equipment averaged 14.8% per year between 1982 and 1988, peaking in 1985. Investment slowed subsequently and declined by 1.9% in 1987. With the liberalisation of EC markets, manufacturers and bodies have realised that they need to spend on investment in order to ensure their competitiveness against new entrants in the Single Market. The objectives of investment include market diversification, taking advantage of market opportunities (due to the deregulation of the regulatory environment), and technological advancement.

REGIONAL DISTRIBUTION

The region of the Four Dragons (South Korea, Taiwan, Hong Kong and Singapore) is a mass market producer of mainly consumer equipment. Japanese and American industries have been moving into Europe to set up manufacturing plants for terminals and infrastructure.

For European and American enterprises, southern Europe has been attractive for setting up manufacturing plants due to the relatively cheaper labour and set-up costs without a reciprocal loss of expertise. As the barriers come down in Eastern Europe, there are likely to be more cost opportunities to be manufacturing locally in order to take advantage of unsatisfied local demand.

Already some 20 joint ventures for the manufacture of public network equipment have been formed in the CIS and Eastern Europe. Siemens and Alcatel have been the most aggressive with AT&T and Northern Telecom following. Initially these ventures will target the national and regional market but inevitably their existence will intensify global competition and, for the EC market this is likely to lead to the re-location of elements of production to these countries.

Table 6: Telecommunications equipment
Leading worldwide producers of telecommunications equipment, 1991

(million ECU)	Country	Telecom sales	Telecom sales/ overall sales (%)
Alcatel NV	EC	14 454	91.8
AT&T	USA	8 337	16.4
Siemens	EC	7 980	22.4
Northern Telecom	Canada	6 596	100.0
NEC	Japan	6 010	26.5
Ericsson	Sweden	5 751	93.9
Robert Bosch	EC	3 867	23.6
Motorola	USA	2 925	30.7
Fujitsu	Japan	2 405	14.9
IBM	USA	2 109	4.0
Ascom	Switzerland	1 741	100.0
Philips	EC	1 603	6.5
Italtel	EC	1 452	94.7
Nokia	Finland	1 305	42.2
Oki	Japan	1 107	27.1

Source: CEC-DGXIII

ENVIRONMENT

The telecommunications equipment industry has not experienced any real problems in terms of ecological issues. There are no specific concerns particular to this industry which are not also found in others. There are concerns on the use of CFCs in semiconductors, but that is an issue which is being regulated by the components industry. There are fears of danger to health through over exposure to high frequencies but this is only caused by prolonged exposure at very high rates. Laying of cables and other transmission equipment has in the past posed an environmental problem, but these issues are usually resolved through agreement with local bodies and environmental groups.

REGULATIONS

As the EC moves closer to the Single Market, the European Commission, in partnership with National Regulatory Authorities, is attempting to regulate the services industry in the 12 Member States based on the model proposed in the 1987 EC Green Paper on Telecommunications and subsequently accepted. This model includes the:

- limitation of special and exclusive rights of telecommunications operators to the provision of network infrastructure and public voice telephony:
- unrestricted provision of all value added services;
- the complete liberalisation of the terminal equipment market;
- the introduction of the Open Network Provision programme to establish common conditions for network access including interfaces, tariffs and supply conditions;
- the creation of ETSI to promote EC-wide standards; and,
- the separation of the regulation of telecommunications services from operation.

Within the EC, procurement of equipment by the public telephone operators should become more open in the long run because of measures such as Directive 90/531 on procurement by companies with special rights. Telephone operators will be obliged to move to open public procurement for contracts above 600 000 ECU.

The technological divisions between the northern and southern countries of the EC is clearly visible. Penetration rates of the basic telephone line in countries such as Spain, Portugal, and Greece do not match those of France, Germany, the UK or the Netherlands. The UK is the most liberalised with free competition in both the telecommunications equipment market and in services and public network operations.

In order to aid these countries, the European Commission has for a number of years put into place such programmes as STAR, whereby funds are made available to a Member State on the basis that the money will be used to improve, extend and update the telecommunications architecture within a specific period of time. The role of ETSI is to produce 'European' telecom standards (ETS) and promote their use within the member countries and to coordinate a European view on global standards.

OUTLOOK

The future for EC equipment manufacturers rests on their abilities to effectively combat increased competition in the market following full liberalisation. The comfortable relation-

Table 7: Telecommunications equipment
Number of main telephone lines by Member State (1)

(Main telephone lines per 100 population)	1980	1991
EC	25	43
B	24	40
DK	42	58
D (2)	26	49
GR	23	39
E	18	31
F	25	49
IRL	13	27
I	21	38
L	35	48
NL	33	47
P	10	21
UK	29	46

(1) Source:ITU/CEC estimates as at January 1
(2) Excludes former East Germany. At 1/1/91 there were an estimated 12 main lines per 100 population in the former German Democratic Republic.

Table 8: Telecommunications equipment Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	4.0	5.5
Production	4.0	5.5
Extra-EC exports	5.0	6.5

Source: BIS Strategic Decisions

ship which existed in the early 1980s between indigenous equipment manufacturers and operators is rapidly disappearing. European based suppliers are increasingly under threat from new suppliers who have the benefit of experiencing similar but earlier upheavals in their national markets.

Equipment manufacturers will experience the same fight for survival not only in European but global markets. Gradually, markets will become oriented towards the survival of the fittest as new entrants from other fields such as consumer electronics begin to take advantage of the proximity of technologies to enter the telecommunications markets. By the year 2000 (if not earlier), those manufacturers experiencing continued success will need to become global players to survive as the traditional barriers expand beyond geographic limits.

Ultimately the balance of power between consumers and suppliers will begin to change. Market deregulation, new players, the changing business environment and the globalisation of trade will be the key factors affecting this change.

Significant opportunities are offered by developing technologies such as ISDN and broadband communications, personal and satellite communications. East European country markets for basic network equipment are being addressed by establishing local production. Low cost terminal equipment markets in these countries will be dominated by far-eastern companies, possibly in joint ventures with local suppliers. For EC suppliers, more sophisticated network infrastructure or terminals represent a potentially large opportunity in these countries.

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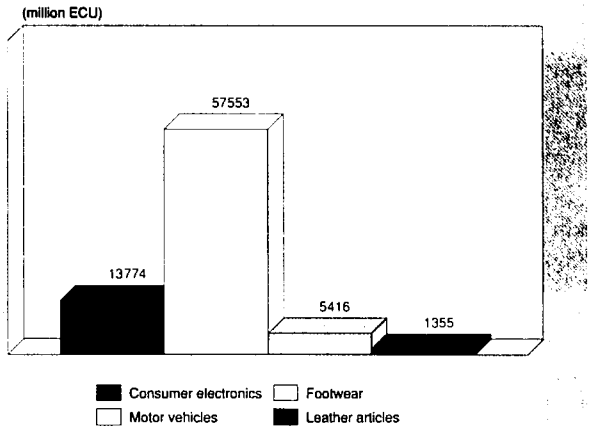
Consumer electronics
NACE 345.1, 345.2

The consumer electronics industry has been subject to harsh trading conditions with recession leading to both a decline in sales and production and declining prices and profits. This has in turn resulted in the closure of plants and in some cases severe rationalisation of company structures and ownership. Mergers, acquisitions and alliances have been commonplace and joint ventures are now seen as the way forward to develop effective new global products for a more sophisticated user base.
Competition still comes mainly from Japan (which is particularly dominant where new technologies are concerned), while European manufacturers still rely heavily on mature products. Increased legislation is a feature of the Single Market, particularly in the areas of high-definition television (HDTV), recorded music, environmental issues, fair competition and encouraging the future success of the European consumer electronics industry.

Figure 1: Consumer electronics
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

In the past, the main products of this industry have centred on audio-visual products for domestic use including video equipment such as television sets, VCRs, video cameras and camcorders, audio equipment, (from hi-fi to compact disc players used in the home and car), and accessories for this equipment (NACE 345.1). The consumer electronics indsutry also encompasses "brown goods" such cable terminals and pay TV decoders. Although discs, cassettes and CDs, whether blank or recorded are part of NACE 345 (NACE 345.2), these products are not included in the data provided by the industry association EACEM. A separate chapter on music recording appears elsewhere in this book.

Recent years have seen the gradual merging of consumer electronic equipment with equipment from other sectors. Because of major technological advances, equipment that was once only for business use is now approaching the price range of the consumer. Consumer equipment manufacturers realise the extent to which their future success relies on advances made in the computing and telecommunications industries. For this reason, joint ventures between companies previously associated with consumer equipment only and other sectors are beginning to emerge. Many leading European companies currently involved in consumer electronics also have divisions dedicated to telecommunications, components, computing or office equipment.

Main indicators

European consumption and production of consumer electronics goods grew steadily over the period from 1982 to 1991 at a compound annual growth rate of 8.4% and 6.5% respectively, with only a minor drop in consumption from 1990 to 1991 (refer to Table 1). Extra-EC exports also grew (with a compound annual growth rate of 13.1%). Over 75% of extra-EC exports by value are of CTVs (colour televisions). In 1991, production was valued at 38.5 billion ECU, consumption at 51.7 billion ECU and extra-EC exports at 8.4 billion ECU. Employment declined at a compound annual growth rate of -0.6%.

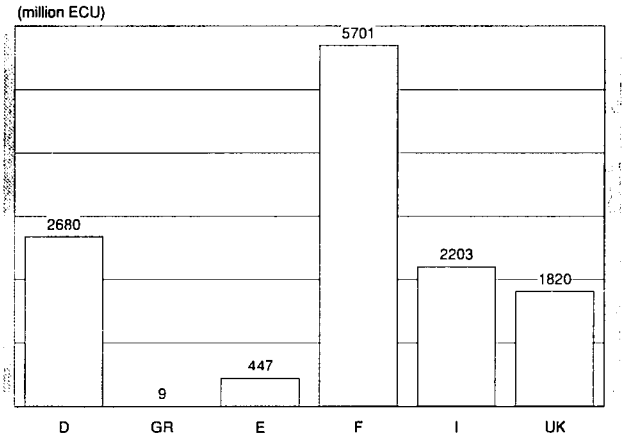
Recent trends

In constant terms, apparent consumption nearly doubled in the period 1982 to 1991. Overall productivity has increased, with production increasing 160% while employment declined to 95% of its 1982 value. Despite these developments, extra-EC imports were still necessary to meet demand and grew by over 250% in real terms. A significant proportion of imports are audio products and newer items, such as camcorders which are traditionally dominated by Japanese brands and European manufacturers have been less successful.

International comparison

Companies located in Japan were the main producers of consumer electronics goods for the world market, with an estimated 43% of total production. Japan controls over 99% of its domestic production and accounts for 20% of production in the USA and 27% of production in Europe. The EC manufactures 15% of all consumer electronics goods while the USA produces 13% of the total. Europe is now the second largest market for consumer electronics in the world, after the USA. Growth in Japanese consumption slowed in recent years as the market for audio and video products saturates, forcing manufacturers to place more emphasis on the US and Europe for sales. Both the US and EC are net importers of consumer goods. Japan exports over 50% of its consumer electronics production. This is likely to fall as the trend towards overseas production bases continues and exports to China decrease.

Figure 2: Consumer electronics
Value added by Member State, 1991



Source: Eurostat

Table 1: Consumer electronics
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	25 057	28 894	31 568	32 884	36 483	39 659	44 908	49 490	52 056	51 702	54 188
Production	21 847	24 532	27 617	29 151	30 033	31 899	34 783	38 299	40 614	38 536	40 389
Extra-EC exports	2 779	2 963	3 705	4 460	5 623	5 936	6 577	7 399	7 959	8 399	8 985
Trade balance	-3 210	-4 362	-3 951	-3 733	-6 450	-7 761	-10 125	-11 191	-11 442	-13 166	-13 799
Employment (thousands)	397.6	402.8	390.9	384.3	374.5	377.5	371.7	376.3	383.7	378.8	380.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BIS Strategic Decisions forecasts
Source: Eurostat

Table 2: Consumer electronics
Main indicators excluding music recording

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Apparent consumption	13 487	13 318	12 925	14 304	18 550	19 201	21 055	20 968	22 792	22 860
Net exports	-3 637	-5 254	-5 117	-5 409	-6 439	-6 675	-8 149	-8 725	-9 662	-10 543
Production	9 850	8 064	7 808	8 895	12 111	12 526	12 906	12 243	13 130	12 317
Employment (thousands)	146.5	145.5	134.2	133.7	131.0	126.6	123.0	129.0	119.0	115.0

(1) Estimates
Source: EACEM

Table 3: Consumer electronics
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	5.5	7.6	6.9
Production	7.2	4.5	5.4
Extra-EC exports	9.6	11.4	10.8
Extra-EC imports	1.7	17.5	12.0

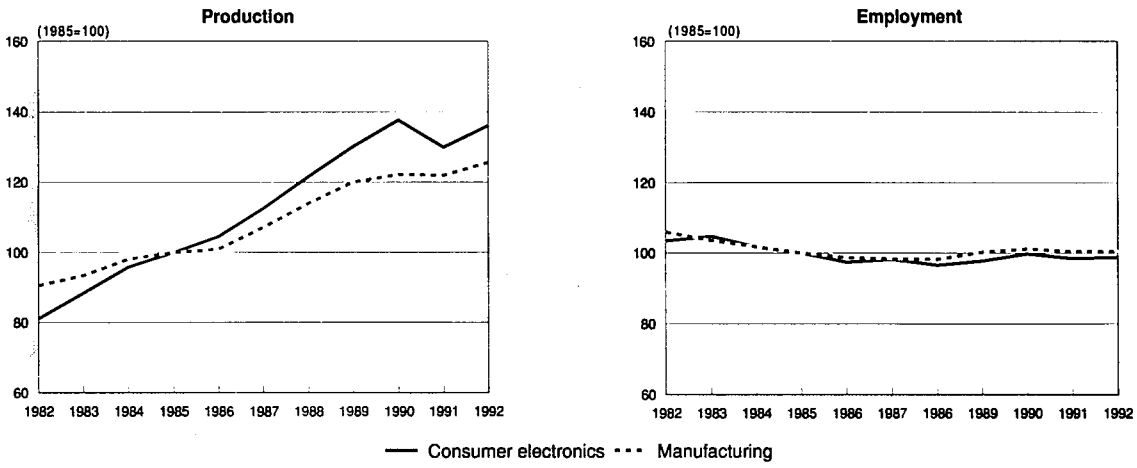
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Consumer electronics
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 779	2 963	3 705	4 460	5 623	5 936	6 577	7 399	7 959	8 399
Extra-EC imports	5 990	7 325	7 656	8 193	12 073	13 696	16 702	18 590	19 401	21 565
Trade balance	-3 210	-4 362	-3 951	-3 733	-6 450	-7 761	-10 125	-11 191	-11 442	-13 166
Ratio exports/imports	0.46	0.40	0.48	0.54	0.47	0.43	0.39	0.40	0.41	0.39
Terms of trade index	106.5	106.6	99.9	100.0	106.6	106.1	106.4	99.8	105.0	98.7
Intra-EC trade	4 468	5 135	5 905	6 863	10 864	11 797	14 222	16 191	17 936	18 916
Share of total imports (%)	41.7	40.2	42.6	44.8	46.1	45.3	45.5	45.9	47.5	46.1

(1) Estimates
Source: Eurostat

Figure 3: Consumer electronics
Production and employment compared to EC manufacturing



Source: Eurostat

Table 5: Consumer electronics
Breakdown by product line, 1991

(thousand units)	Production (1)
Colour televisions	20 374
Car radios	16 159
CD players	13 480
Video tape recorders	11 067
Video camcorders	3 273

(1) Estimates
Source: EACEM

Table 6: Consumer electronics
Principal producers of colour televisions and video tape recorders

(% of total market)	1990	1991
Colour televisions (1)		
EC production	70	N/A
Extra-EC imports	40	45
of which,		
Singapore	8.0	7.0
Thailand	2.6	5.3
South Korea	4.0	4.7
Turkey	4.0	4.7
Malaysia	1.6	4.6
China	4.0	3.0
Hong Kong	2.5	2.6
Japan	3.0	1.7
Video tape recorders		
EC production	58	60
Extra-EC imports	52	51
of which,		
Japan	28	23
Austria	13	14
Singapore	5	7
South Korea	5	6

(1) 1991 estimates
Source: EACEM

Foreign trade

Intra-EC trade increased approximately 17% per year over the period 1982 to 1991 (refer to Table 7). Imports from outside the EC have grown more than exports, leaving an increasingly negative trade balance, which in 1991 was valued at -13.2 billion ECU.

EC production of consumer goods has not kept pace with consumption and the increasing gap between the two has lead to larger imports. Japan remains the prime country of origin for EC imports, occupying approximately 36% of the total imports by value (refer to Figure 7). However, very few EC products are destined for Japan (refer to Figure 6). The EFTA countries and the USA were the main destinations for exports, accounting for 26% and 15% of the total exports, respectively.

MARKET FORCES

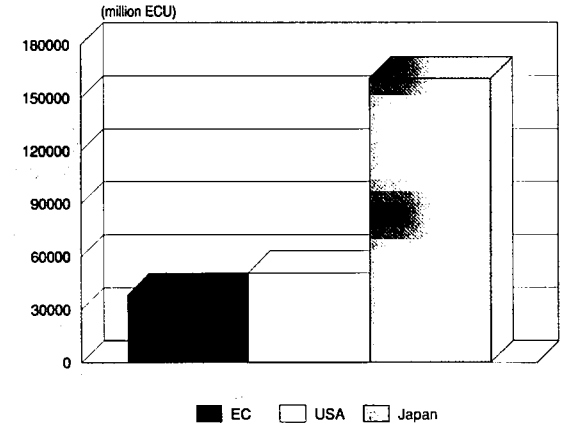
Demand

The definition of this NACE sector rests purely on its end user - the consumer. In many ways, the redefinition of the product range has occurred because of more sophisticated buying preferences and demand for new types of equipment. Products are moving away from purely technical commodities to lifestyle products. There is growing demand to offer intelligent products which can help with repetitive tasks. On the other hand, market saturation and advances in technology are also forcing manufacturers towards redefinition of the sector. In the past, the consumer electronics industry relied on advances made in other sectors, but this situation is beginning to change. Suppliers are investing in R&D to create new technologies for the consumer and to create demand for new business opportunities, for example, with CD-I (compact disc-interactive) and advanced television.

Traditionally the consumer electronics sector has been concerned with hardware. New products and increased sophistication means that software now plays a major role in the future success of the sector. Companies are therefore trying to increase capabilities in this area through joint ventures and buy-outs.

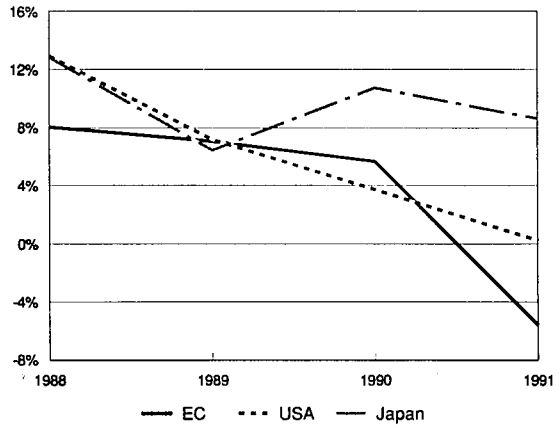
Europe represents approximately one-third of total world demand. Demand for consumer electronics in the EC fell by 0.7% in 1991. This occurred despite hopes that Eastern Europe would contribute to continued growth. The four largest markets (Germany, France, Italy and UK) contribute 75% of total ex-

Figure 4: Consumer electronics
International comparison of production at current prices, 1991



Source: Eurostat, Census of Manufacturers

Figure 5: Consumer electronics
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

penditure. Because of low labour rates, Spain has been an important production base and has increased opportunities for component suppliers which presently import most parts.

Southern European markets are most likely to grow in traditional product ranges in the future simply because penetration is generally lower than in northern European countries.

Demand for consumer goods is heavily dependent on general income levels. Depressed market conditions and reduced disposable incomes have resulted in decreased consumption. The only exception to this has been the boost from former East Germany, where low quality imports have been readily purchased. The main export destination of EC production is the EFTA countries. Eastern Europe has played a major part in consumption growth. However, this growth has been dominated by low quality imports.

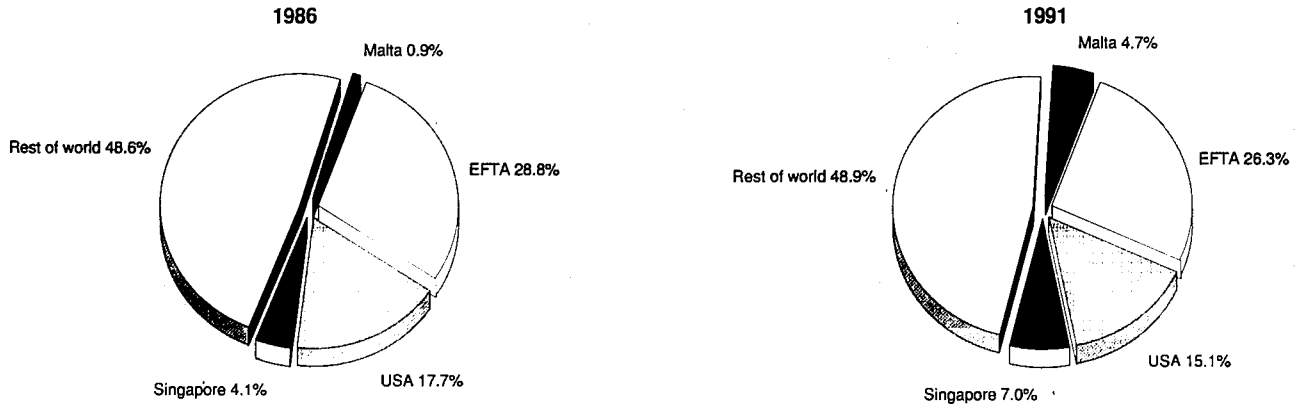
Western European players are believed to have an advantage in supplying to Eastern Europe because of geography, trade relationships and transport costs. Japanese players are seeking to address this market through West European bases. Asian manufacturers are concentrating on Eastern Europe while building higher quality models for the EC market. The Japanese economy has suffered, with slow growth in consumer electronics demand, and this area remains of low priority for EC exports. Furthermore, the Japanese consumer electronics market remains very restrictive, allowing only marginal access to European as well as South Korean manufacturers.

Supply and competition

Intra-EC competition is most readily seen in the CTV market where European suppliers are strong. European brands are genuine leaders in most European markets. Players in the consumer electronics market face extreme competition. Success in the market will be based on brand strength, new technology developments and manufacturing to suit regional demand. In response to such competition and development of the Single Market, some companies have decided to adopt pan-European branding, rather than individual brands for individual countries. Key European players in the market have always adopted European or world brands, supported by local brands where necessary.

Japanese companies dominate this sector worldwide. The only EC companies which appear in the top twelve consumer electronics companies worldwide are Philips and Thomson at third and sixth places, respectively. Korean manufacturers are the only others to appear on this list. Companies from the USA are scarcely represented in this sector. Despite rising manufacturing costs in Hong Kong, Taiwan, Singapore and Korea,

Figure 6: Consumer electronics
Destination of EC exports



Source: Eurostat

Table 7: Consumer electronics
Structure of imports and exports excluding music recording, 1991

(million ECU)	Exports from EC	Imports to EC	X/M (%)
Japan	40	5 960	0.7
Republic of Korea	16	1 046	1.5
China	2	870	0.2
Austria	319	867	36.8
Singapore	48	853	5.6
Malaysia	9	707	1.3
USA	287	690	41.6
Taiwan	27	422	6.4
Hong Kong	38	307	12.4
Thailand	7	251	2.8
Turkey	40	202	19.8
Brazil	13	98	13.3
Total extra-EC	2 200	12 743	17.3
of which,			
EFTA	995	1 111	89.6

Source: EACEM

European labour and manufacturing costs are still much higher. There is also a shortage of skilled labour in the EC. The industry's shift from labour-intensive to capital-intensive operations as a whole may provide increased opportunities for EC players to be successful on a world scale, but this shift relies on sufficient resources and capital.

Japanese manufacturers have the benefits of economies of scale, and may have vertically integrated manufacturing. Many of the world's top consumer electronics companies are also the prominent players in the components and computing markets. The key to the strength of the Japanese is the vertical integration of the consumer electronics industry as a whole, with close cooperation at the technical development stages and component supply. In Europe, mergers and acquisitions have not facilitated improved scale economies and financial returns. The depreciation of the yen and dollar in relation to European currencies and less favourable financing conditions have not been beneficial to European manufacturers.

Reliance on innovation and pursuit of standards involves considerable risk on the part of suppliers. Again, Japanese companies have an advantage because of their substantial R&D and production resources, and a high degree of technical expertise.

Competitiveness also varies with the product considered. The main EC players have strengths in mature technologies, for example CTV. Newer products, such as camcorders, are particular strengths of the Japanese and Korean suppliers. European manufacturers are attempting to redress this balance by concentrating on future technologies in new areas and aiming to develop innovative new products.

The EC Commission is attempting to improve the situation for its consumer electronics manufacturers with industrial support policies and the improvement of competitive operational conditions and infrastructures. This encompasses stimulating demand, research and training. Reliance on the component industry, and the increasing need for manufacturers to source supplies from East Asia means that parts availability in Europe must also be addressed.

Japanese companies face tougher conditions in their domestic territory with slowed growth. It is likely that this will mean increased emphasis on other regions. Declining exports from Japan suggests that this may be achieved through offshore sites. Japanese consumer electronics companies have proved themselves to be dedicated to expansion and investment (including local investment) throughout Europe.

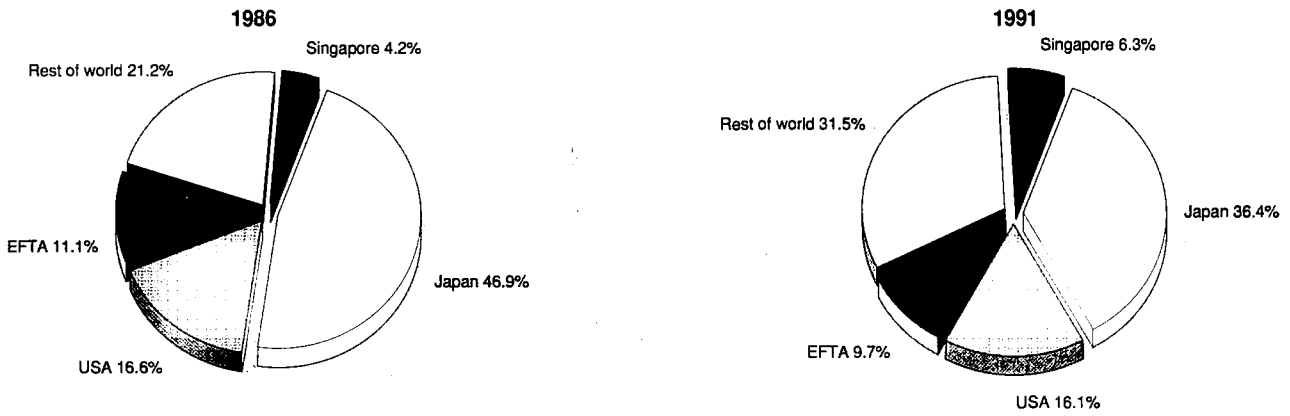
The market has been characterised by pressure on prices and this downward trend is expected to continue. For example, videocassette prices decreased 15% in 1990 but have now stabilised in certain EC countries where margins have been reduced greatly. Profits have declined substantially because of reduced margins and the heavy investment needed for future success.

Table 8: Consumer electronics
Equipment rate of EC households at the end of 1991 (1)

(%)	B(2)	DK	D	F	I(2)	NL(2)	UK
Colour TVs	90	98	95	92	82	94	95
Video tape recorders	42	41	51	50	28	49	65
Camcorders	6	5	9	9	5	9	6
CD players	27	25	31	25	9	45	30
Hi-fi (2)	76	N/A	75	N/A	20	90	80

(1) Estimates for 1991 figures
(2) 1990 figures
Source: EACEM

Figure 7: Consumer electronics
Origin of EC imports



Source: Eurostat

Production process

As existing products reach maturity in the market, the consumer electronics industry is constantly seeking to expand and redefine its product portfolio. New products, such as virtual reality and multimedia systems, will soon be offered in Europe. Costs associated with the production of new products, such as CD-I, HDTV (High Definition Television) and LCD TV are still relatively high because of the cost of R&D and the development of adequate standards. These are expected to reduce with time.

Software development is now emphasised to improve technology and systems, such as audio and image signal processing, speech interfaces and fuzzy logic. Digital technology is also of increasing importance. The development of Mini-disc and Digital Compact Cassette, like CDs, is likely to revolutionise the recording media market. DCC has potential for near perfect digital sound while allowing existing analogue cassettes to be played on the equipment.

The design process has been improved in recent years. Manufacturers are using CAD and ASICS to develop new products and designs. More efficient manufacture of the components and the products themselves has facilitated product miniaturisation, which has become common as products have developed.

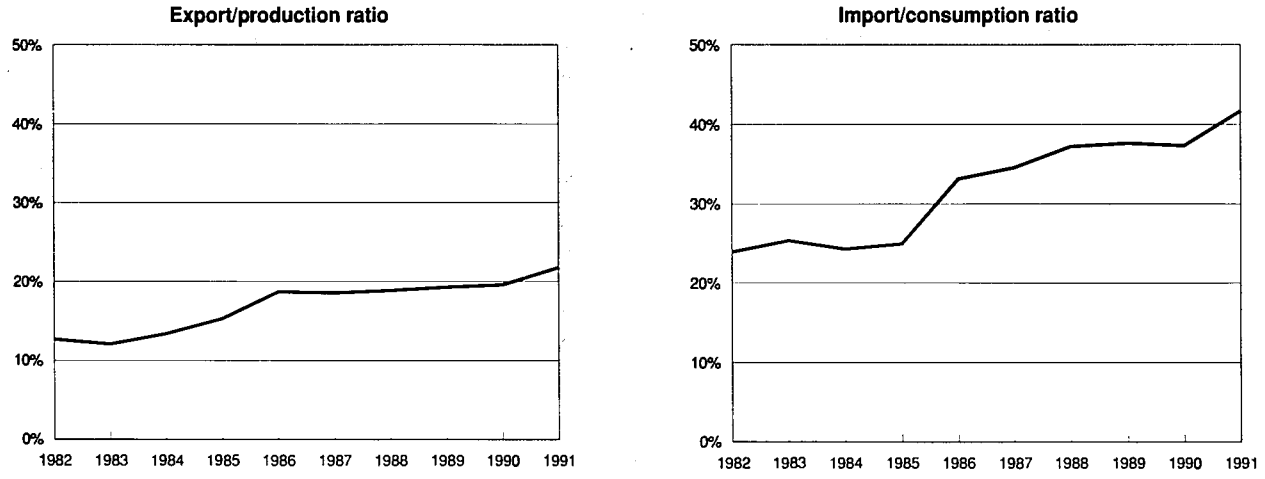
INDUSTRY STRUCTURE

Companies

The number of enterprises in the consumer electronics industry has been declining on average by 20% per annum. There are presently almost half the number of companies as in 1987. This has partly been due to mergers and acquisitions. There are now approximately 170 production plants throughout Europe.

As stated previously, the main players in this market often have divisions dedicated to consumer electronics, telecommunication activities and computing. Public and private sector organisations are active in this sector, with increasing emphasis on private organisations. The main EC players in hardware are Philips, Thomson, Grundig, Nokia and Blaupunkt, respectively.

Figure 8: Consumer electronics
Trade intensities



Source: Eurostat

The top EC consumer electronics industries vary with product line. CTV sales in the EC are dominated by EC manufacturers. Philips, Thomson and Nokia respectively hold the top positions and together account for around 45% of sales. Local manufacturers, such as Finlux in Finland and Seleco in Italy, hold a significant proportion of sales in their own country. In VCRs, Philips and Thomson hold approximately 20% of the market with the remainder of the market being held by Japanese companies. Major players in the camcorder market are all Japanese, with Sony, JVC and Panasonic as prime suppliers. Regarding videocassettes, 3M, BASF, TDK, Sony and Maxell are the main players.

Strategies

Consumer electronics suppliers face challenges of increased competition, saturation of the market for existing product ranges and expansion into new product areas, new legislation and customer pressure. Responses to these challenges are varied.

Most of the major companies (for example, Philips and Thomson) have stated their intention to pursue new product areas such as home office and telecommunications equipment. Distribution has also been particularly emphasised. While the consumer has identified a need for high quality products, manufacturers have identified a need for increased commitment to customer service and see the distribution chain as a means of achieving this.

Most of the major EC companies have undergone radical restructuring in an effort to counteract declining profits. There has been considerable lay-offs and factory closures in the process. Many CTV production plants have closed in recent years. Mergers, acquisitions and alliances all characterised the industry in 1991.

The main strategy for European manufacturers has been co-operation and joint ventures. European manufacturers are trying to gain the support of broadcasters and stimulate the availability of D2MAC and widescreen programming. The EC and some individual governments also recognise the importance of this to the European consumer electronics industry and are providing investment funds.

Investment by consumer electronics companies is relatively high. EC companies spend a similar percentage of turnover as their Japanese counterparts. However, in actual terms this is only half as much expenditure as the Japanese. Investment has centred on new product development, R&D and related technologies, such as LCD for HDTV and laptops.

The main players have the resources to commit to such large scale and sometimes long term investments although there has been a trend for European R&D funding by a number of manufacturers and governments. The Japanese have invested heavily in EC production facilities to ensure a secure base for the Single Market. This base has traditionally been in the UK (40% of all Japanese investment in the EC is in the UK) but companies are now beginning to invest in Spain as a new base for manufacturing facilities.

REGIONAL DISTRIBUTION

Production is highly concentrated in the main markets of the EC: France (35% of total production and 31% of total consumption), Germany (20.5% of total production and 23.3% of total consumption), Italy (15.6% of total production and 17.8% of total consumption) and the UK (15.1% of total production and 14.4% of total consumption).

ENVIRONMENT

Manufacturers in this industry sector have started to consider the environmental impact of both production and disposal of products. In Germany, legal constraints have instigated working groups on the discarding of electronic equipment and several manufacturers have ensured environmental safety of raw materials and components. For example, CFCs are no longer used to manufacture printed circuit boards nor are cadmium and mercury used in batteries. EC laws and recycling targets will force suppliers to produce easily recyclable and biodegradable products. This may in turn lead to increased prices of between 1% and 10% which are likely to be passed on to the consumer.

REGULATIONS

Regulations will be introduced by 1994 to limit interference when equipment is attached to the mains supply. This is obligatory for all suppliers of consumer equipment and may necessitate redesign of the power supply stage. A higher production cost will be associated with this. Laws concerning waste disposal have already been introduced in Germany and in France.

The advent of the Single Market has lead to the need to review recorded music laws and blank recording media laws. Several countries (such as France, Germany, Portugal, Spain and Italy) have introduced home taping royalties for hardware and tape sales. This is likely to cover all EC member states by 1993. Reproduction rights are also being addressed by the EC Commission to ensure similar durations of protection (50 years) and thus foster uniform competition between EC countries. The right of a producer to control rental is another issue. France, Portugal, Spain and the UK currently have legislation to control rental. Performance royalties are not given in certain EC countries (Belgium, Greece, Luxembourg, the Netherlands and Portugal). With the increase in public access to recorded music products, it is likely that this will also be addressed by EC legislation.

EC directives on HDTV have been issued in an attempt to encourage broadcasters to adopt D2MAC, with proposed funding, and to encourage adoption of a pan-European HDTV standard. Technological advances are likely to cause further review of existing legislation, particularly with Digital Audio Broadcasting and DCC. Industry leaders announced in 1989 the "Serial Copy Management System". This system recommends that first generation digital recordings of CDs, pre-recorded Digital Audio Tapes and digital broadcasts would be allowed but not second generation copies. A EC Commission proposal on the use of SCMS is being prepared.

OUTLOOK

The consumer electronics industry's future hinges on its development and successful marketing of new technologies. Without these the industry will become more dependent on replacement sales of mature technologies in a saturated marketplace. HDTV provides the long-term opportunity.

Table 9: Consumer electronics
Expected real annual growth rates

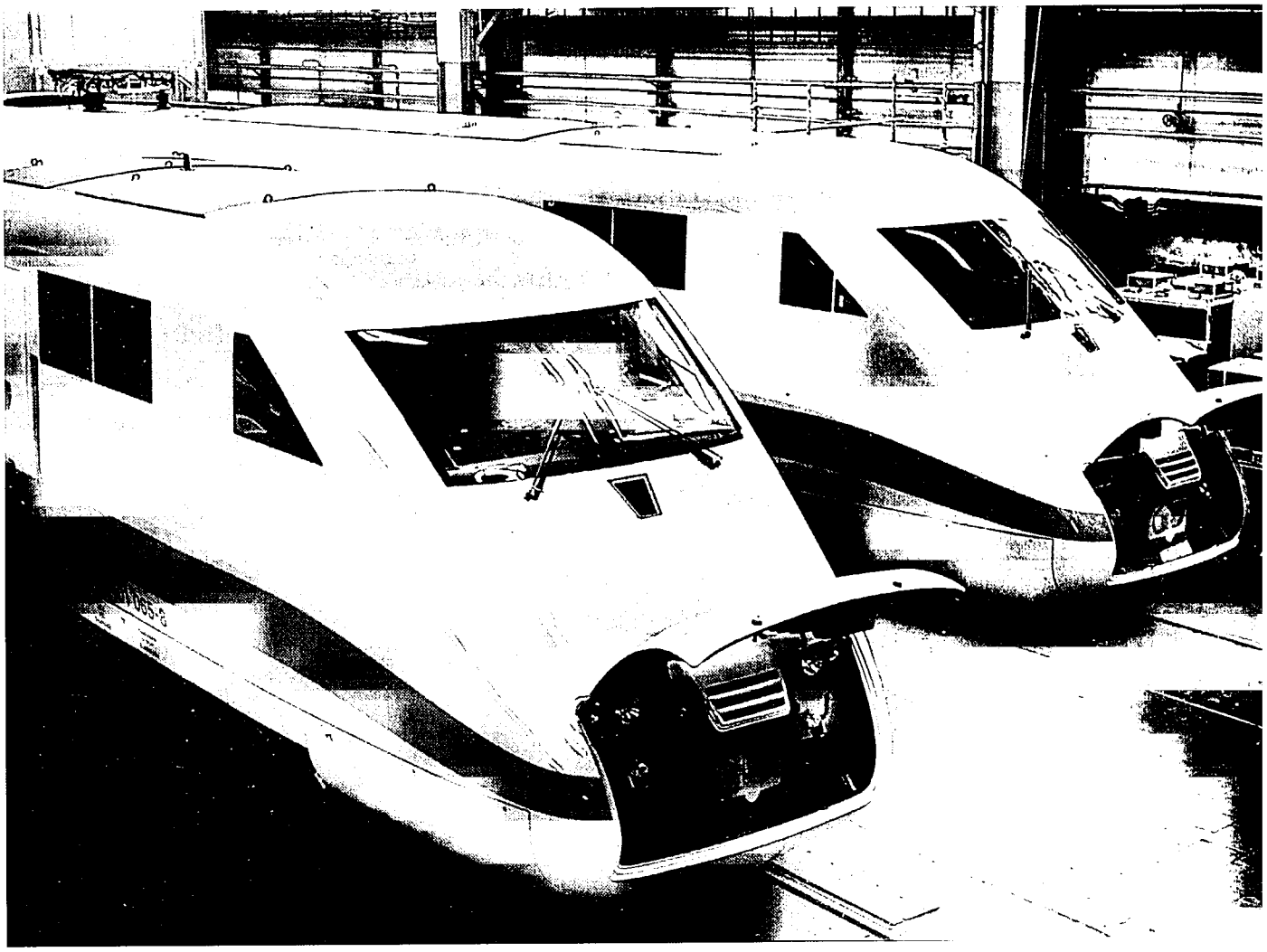
(%)	1992-93	1992-96
Apparent consumption	5.0	4.3
Production	5.6	4.8
Extra-EC exports	7.0	7.0

Source: BIS Strategic Decisions

Significant opportunities are offered by Digital Audio Broadcasting and DCC. However, the EC must work to define legislation to protect revenues and discourage piracy. EC manufacturers have many obstacles to overcome in order to

remain successful on their home territory and increase penetration of world markets. This necessitates significant investment in new technologies, development of appropriate standards and ensuring that other raw material supplies, particularly components, are freely available in Europe.

Written by: BIS Strategic Decisions
The industry is represented at the EC level by: European Association of Consumer Electronics Manufacturers (EACEM). Address: Rue d'Arlon 69-71, B-1040 Brussels; tel: (32 2) 230 50 10; fax: (32 2) 230 96 08.



Transport equipment
NACE 35, 36

The transport equipment sector is one of the largest industries in the EC and has significant influence over other sectors such as ferrous metals and rubber and plastics. After experiencing a downturn in 1990 and 1991 amidst a worldwide recession, the transport industry is poising itself not only for economic improvement but also for changes brought about in the movement toward the Single Market.
Given that the motor vehicle industry is unquestionably the largest subsector of transport equipment, increasing import penetration (particularly from Japan) will play a very important role in the health of the industry as a whole.

INDUSTRY PROFILE

Description of the sector

According to the NACE classification, the transport equipment sector covers the following subsectors:

- motor vehicles (NACE 351 and 352);
- motor vehicle parts and accessories (NACE 353);
- shipbuilding (NACE 361);
- railway rolling stock (NACE 362);
- mopeds and motorcycles (NACE 363);
- aerospace equipment (NACE 364).

In terms of production, the most important sector by far is the motor vehicle industry (including parts and accessories), which accounted for nearly three-quarters of the output of the transport equipment sector overall in 1991.

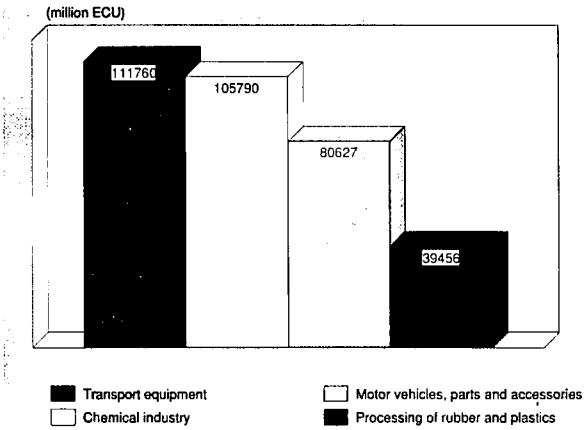
Note that there is no clear consensus as to the composition of the parts and accessories sector for motor vehicles. NACE 353 which corresponds to motor vehicle parts and accessories underestimates the size of an industry which presently manufactures components included under sectors such as electrical and electronic equipment.

Main indicators

After maintaining production growth rates (at constant prices) above 5% between 1987 and 1989, the transport equipment industry grew only 1.3% in 1990 and contracted 1.0% in 1991. A worldwide slump in demand for transport equipment had an even greater negative impact on extra-EC exports. The downturn was particularly strong in the motor vehicle industry, the largest subsector of transport equipment. Exports of luxury cars in particular to the United States were hampered by a number of factors. The most obvious include a recession in the United States, a declining US dollar, and a new 10% luxury tax placed on automobiles with an invoice price above 30 000 US dollars. Such a downturn in overseas demand caused a near halving of the sector's trade surplus as extra-EC imports increased by 20.5% in 1991; such import growth occurred mainly in the aerospace and motor vehicle sectors.

With an output (in terms of value added) of nearly 41% of the EC total, Germany is by far the largest producer within the EC. The three largest producers behind Germany are France, the UK, and Italy, in descending order of value added contribution.

Figure 1: Transport equipment
Value added in comparison with other industrial sectors, 1991



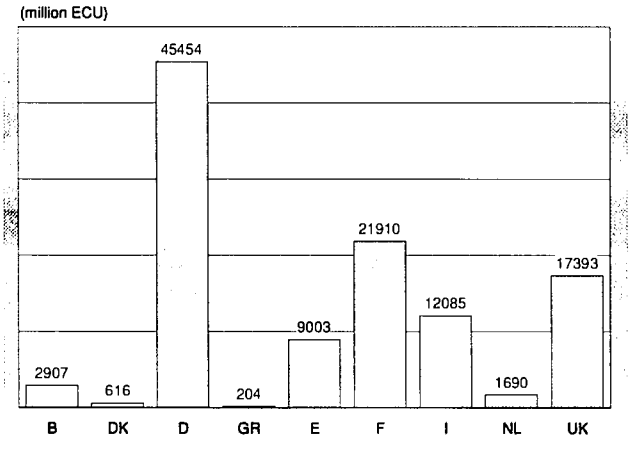
Source: Eurostat

Recent trends

Given that the motor vehicle industry is the largest component of the transport sector, it is not surprising to find that similarities in production and employment data for motor vehicles and the transport sector exist; the 3.2% average annual growth rate in production of the transport equipment sector is just slightly below the annual 3.6% rate of growth of the motor vehicles industry over the period 1982 and 1991. This contrasts with the declines in production registered by the shipbuilding and railway rolling stock industries. Motor vehicle parts and accessories was the fastest growing industry over the ten period with average annual increases in production in real terms of 4.6%.

In 1991, however, both the motor vehicles and the motor vehicle parts and accessories industries suffered production declines of more than 2.5% compared to 1990. Weak demand at home and from export markets produced this sharp downturn. Moderate growth in the aerospace industry, the second largest subsector of the transport equipment sector, helped to counter the situation in the motor vehicle industry, allowing

Figure 2: Transport equipment
Value added by Member State, 1991



Source: Eurostat

Table 1: Transport equipment
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (2)
Apparent consumption	159 959	170 576	174 412	192 433	212 929	234 791	264 867	302 432	317 129	332 050	341 075
Production	182 728	192 050	200 446	219 818	235 400	256 786	280 715	316 685	331 288	339 858	346 078
Extra-EC exports	36 945	37 512	44 235	46 303	43 837	44 178	44 765	49 531	51 555	52 882	54 178
Trade balance	22 769	21 473	26 034	27 385	22 470	21 994	15 848	14 253	14 159	7 809	5 003
Employment (thousands)	2 994	2 872	2 790	2 710	2 653	2 628	2 598	2 625	2 661	2 629	2 590

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Transport equipment
Breakdown by major sectors of the industry, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Motor vehicles	194 895	201 542	25 131
Motorcycles	7 670	5 452	627
Railway rolling stocks	9 812	4 774	1 341
Aerospace industry	50 391	48 379	15 124

(1) Estimates are used if country data is not available
Source: Eurostat

Table 3: Transport equipment
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.6	6.1	4.6
Production	1.4	4.1	3.2
Extra-EC exports	-0.1	-2.6	-1.8
Extra-EC imports	0.1	10.4	6.9

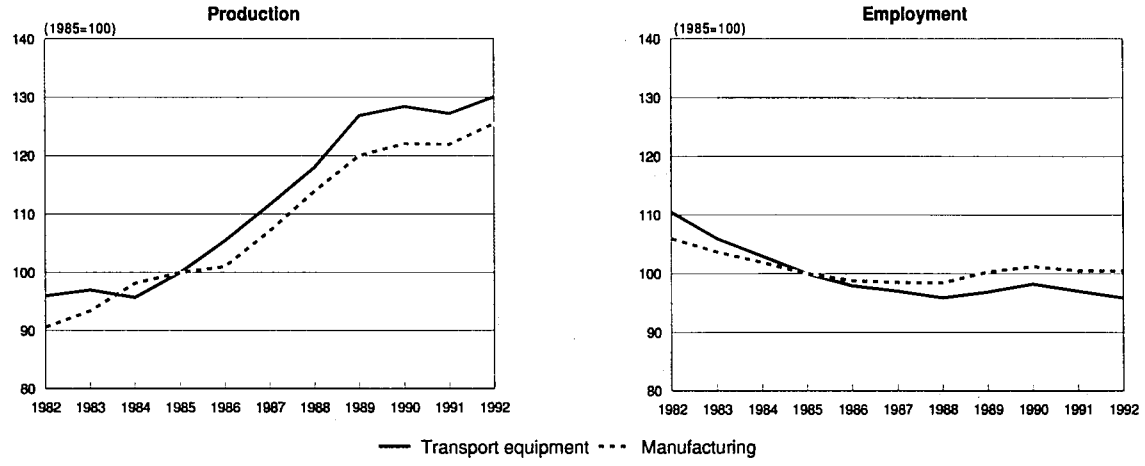
(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Transport equipment
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	36 945	37 512	44 235	46 303	43 837	44 178	44 765	49 531	51 555	52 882
Extra-EC imports	14 176	16 038	18 201	18 918	21 367	22 184	28 917	35 278	37 396	45 074
Trade balance	22 769	21 473	26 034	27 385	22 470	21 994	15 848	14 253	14 159	7 809
Ratio exports/imports	2.61	2.34	2.43	2.45	2.05	1.99	1.55	1.40	1.38	1.17
Terms of trade	105.7	107.9	100.8	100.0	101.9	101.9	96.5	96.4	102.7	102.1
Intra-EC trade	40 568	43 970	46 182	51 435	57 408	65 206	73 096	90 086	96 083	109 341
Share of total imports (%)	67.6	68.0	66.4	69.5	71.3	72.7	69.1	70.0	69.4	68.8

(1) Estimates
Source: Eurostat

Figure 3: Transport equipment
Production and employment indices compared to EC manufacturing



Source: Eurostat

production growth of transport equipment sector overall in real terms to continue its expansion.

International comparison

The EC remains the world's largest producer of motor vehicles and railway rolling stock. The EC's aerospace industry has made great improvements over the last decade. Production and exports have attained significant gains in comparison to the USA, the world's largest aerospace producer.

In 1991, EC production (in current prices) of transport equipment was almost double that of 1982. By contrast, US production in 1991 was only 40% greater than 1982 production. Japanese production more than doubled over the same period, reflecting Japan's ability to penetrate markets worldwide, particularly in the motor vehicles subsector.

Foreign trade

The near tripling of extra-EC imports (in value) over the past decade significantly reduced the EC trade surplus, which peaked in 1985. Swings in currency values (mainly between European currencies and the US dollar) since 1985 have made imported goods relatively cheaper compared to their domestic counterparts.

Since 1986, the transport equipment sector experienced a number of major shifts in both the destination of extra-EC exports and the origin of extra-EC imports. Japan accounted for an increasing share of EC exports in 1991 compared to 1986 while export shares to the EFTA and OPEC countries remained stable. A notable decline in the export share to the USA can be mainly attributed to a substantial devaluation of the dollar during this period. By the same token, the USA increased its share of extra-EC imports from 23% in 1986 to 35% in 1991, mainly to the detriment of import shares for the EFTA countries and Japan.

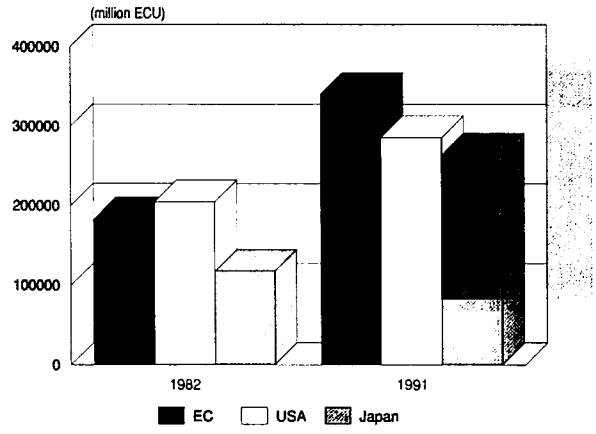
After experiencing a near halving of the trade surplus in 1991, a slowdown in import growth for 1992 should maintain the transport sector's trade surplus, albeit a smaller surplus than in 1991.

MARKET FORCES

Demand

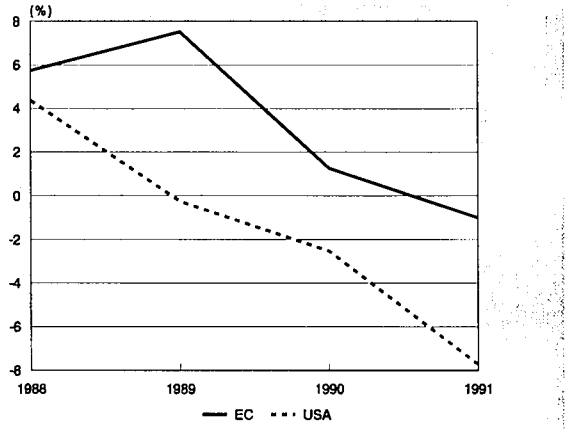
Demand in the different subsectors can be attributed to a wide variety of factors as certain forms of transportation are close substitutes for each other (travelling by car versus rail

Figure 4: Transport equipment
International comparison of production at current prices



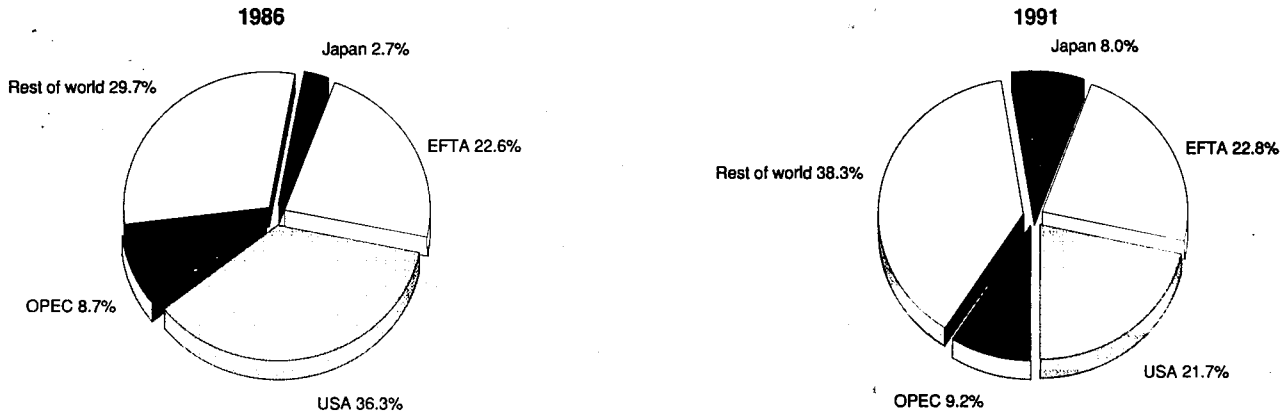
Source: Eurostat, Census of Manufacturers

Figure 5: Transport equipment
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Transport equipment
Destination of EC exports



Source: Eurostat

or air travel, for example). Furthermore, an increased awareness of transportation's impact on the environment on the part of the general population may also affect demand as increased use of public transportation reduces emissions and traffic congestion.

Supply and competition

As a whole, the EC transport sector is fully capable of meeting the demand for transport among its Member States. In fact, the EC maintains a trade surplus (albeit declining) in transport equipment on an annual basis. Declines in the EC trade balance are most noticeable in the motor vehicle and aerospace subsectors.

In the motor vehicle industry, Japanese competition clearly constitutes the main challenge faced by European producers over the next two decades. In response to such competition, EC car manufacturers need to further implement so-called lean production techniques in order to at least maintain market shares.

The profits to turnover ratio shows the European transport industry improved its profitability between 1982 and 1991. The effects of the worldwide recession, however, have diminished a previously positive trend which peaked in 1989. The most notable rise and subsequent fall in this trend occurred in the aerospace subsector, which experienced a considerable drop in orders for both civil and military aircraft.

Production process

As rationalisation and innovations in automated production techniques continue to be applied to the production process, employment in the sector continues to dwindle, with only slight upturns occurring in 1989 and 1990. The chronic downward trend continued in 1991 is not expected to change in the near future.

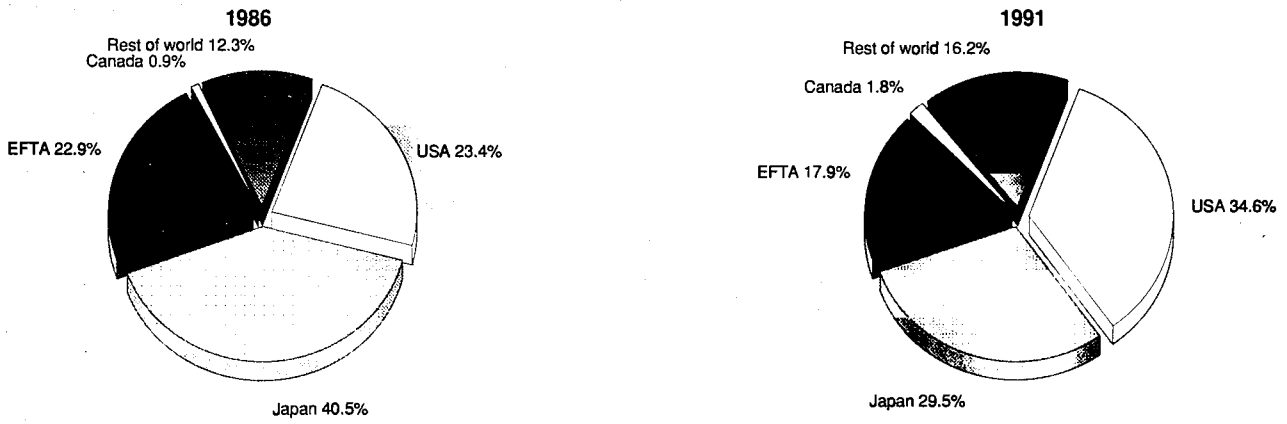
Innovations in the production process are particularly noticeable in the motor vehicle industry, where new techniques such as just-in-time production and increased emphasis on quality control are reducing production times and allowing for greater cost-effectiveness.

INDUSTRY STRUCTURE

Companies

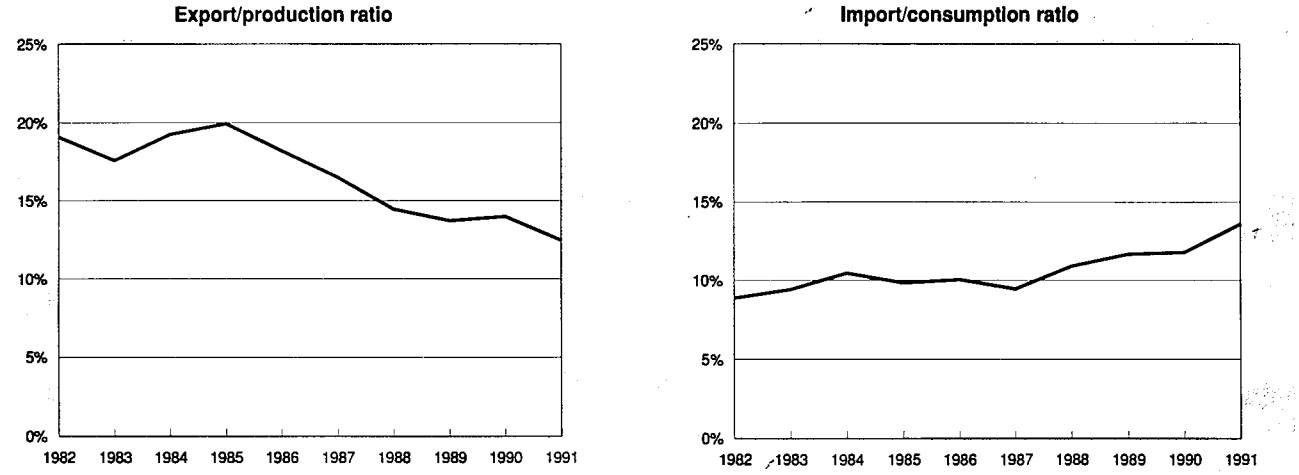
The transport equipment sector is well represented among the leading European companies. Daimler-Benz, which is the leader in terms of turnover, is the third largest industrial com-

Figure 7: Transport equipment
Origin of EC imports



Source: Eurostat

Figure 8: Transport equipment
Trade intensities



Source: Eurostat

pany in Europe. The sector is considerably concentrated as the top 6% of the companies (i.e. companies with more than 99 employees in 1988; see Table 5) accounted for 94% of the transport equipment industry's turnover.

Some of the leading corporations in this sector have interests in various industries. Many of the large volume car manufacturers, such as Renault, Fiat and Daimler-Benz, also have interests in the truck industry. Peugeot SA produces mopeds, motorcycles and bicycles, whereas both Fiat and Daimler-Benz are involved in both the motor and aerospace sectors. In addition, British Aerospace now holds a majority stake in Rover Group. At the time of the Rover Group takeover by British Aerospace, much was made of the opportunity for the two companies to enjoy industrial synergy. Although there does not seem much evidence of this synergy in general, companies with dual interests are at least able to allocate risks across their diversified branches.

Strategies

Although the EC can still lay claim to some of the largest transportation companies in the world, a strong movement towards international cooperation between EC manufacturers and American and Japanese companies is quite prevalent.

In the motor vehicles industry, a number of mergers have occurred, in particular between the large mass-producers and smaller luxury car makers. Some examples include Fiat's takeover of Alfa Romeo, Ford's purchase of Jaguar and General Motors' 50 % stake in Saab's car division. Apart from outright mergers, a cooperative agreement between Volvo and Renault through complex cross-shareholdings has made Volvo/Renault the world's largest truck producer.

Collaboration has not taken place solely between EC producers, however. In recent years, there have been a number of collaborative ventures or cooperative agreements between EC companies and Japanese or American organisations. The Japanese motor industry's superior standing in certain areas of the production process has led to a steady stream of joint manufacturing agreements, for example, General Motors' arrangement with Isuzu to jointly produce vans in the UK, and the much-publicised Rover-Honda tie-up which has now been existence for over ten years.

In terms of cooperation between US and EC companies, the aerospace sector is the unquestionable leader. This cooperation is essentially taking place between aerospace engine manufacturers (MTU and Pratt & Whitney or General Electric and Snecma, for example). It is also worth mentioning the contribution of out-sourcing, particularly between US companies to the Airbus programme as well as of European companies to some of the Boeing and McDonnell-Douglas programmes.

Although cooperation among companies has occurred, outright mergers and acquisitions activity are still somewhat limited in industries such as aerospace where governments of respective Member States still have a controlling interest (particularly in the production of military equipment). Given the advantages of scale economies and large R&D expenses, however, some very important mergers and acquisitions have occurred in the aerospace industry. Such a development is quite pronounced in Germany, where much of the aerospace industry is performed by divisions under Daimler-Benz which were acquired through mergers and acquisitions.

Table 5: Transport equipment
Breakdown by size of enterprise, 1988 (1)

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	22 955	81.4	3.8	3.1
20-99	3 537	12.5	5.9	2.7
More than 99	1 705	6.1	90.3	94.2

(1) Estimates
Source: Eurostat

Table 6: Transport equipment
The 10 largest companies in the EC, 1991

Company	Country	Turnover (million ECU)	Employment	Net profit (million ECU)
Daimler-Benz	D	46 326	379 252	913
Volkswagen	D	37 211	260 137	538
Fiat	I	36 843	287 957	726
Renault	F	23 802	147 185	441
PSA Peugeot Citroën	F	22 970	156 800	792
Robert Bosch	D	16 383	177 123	241
British Aerospace	UK	15 068	123 200	-144
BMW	D	14 549	74 385	368
Adam Opel (General Motor US)	D	13 238	56 782	524
Ford-Werke (Ford Motor US)	D	10 902	48 171	69

Source: Le Nouvel Economiste

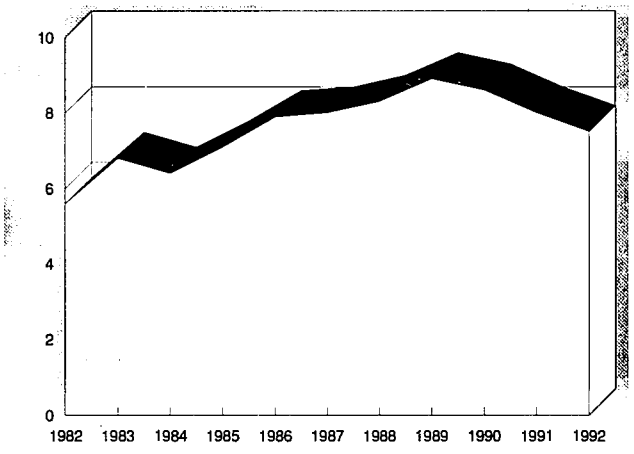
REGIONAL DISTRIBUTION

In 1991, as in previous years, more than 85% of EC production was concentrated in four Member States: Germany, France, the UK and Italy. For motor vehicles, these four countries accounted for 91% of all value added within the EC.

In the aerospace sector, Germany, France, Italy and the United Kingdom produced about 94% of value added in Europe.

The opening of frontiers with Eastern Europe promises to have a significant impact on the distribution of European production facilities, particularly for the motor vehicle industry. For example, many major West European manufacturers have already entered into agreements with East European producers, in anticipation of future rewards. Opel (a subsidiary of General Motors), Volkswagen, and Mercedes-Benz have all set up production units in former East Germany. In addition, Volkswagen has also acquired a large stake (to become a majority stake by 1995) in Skoda (the largest Czech car manufacturer) and has signed a joint venture agreement with BAZ (the second largest Czech auto company).

Figure 9: Transport equipment
Pre-tax profits to turnover of the industry (1) (2)



(1) Profitability is measured by the % share of the industry's operating surplus divided by the value of production
(2) For BR Deutschland, France, Italia and United Kingdom only
Source: DRI Europe

ENVIRONMENT

Transport has been one of the main targets of environmental regulations for several years. Transport services account for one-quarter of total carbon dioxide emissions (carbon dioxide is the main gas responsible for the so-called "greenhouse effect").

Given the strong "technological" link between carbon dioxide emissions and energy consumption, heavy energy users such as the aerospace and motor vehicle industries are likely to be under attack over the course of this decade. This could be to the benefit of some of the smaller transport subsectors like rail.

In the area of personal transport, increasing congestion in most towns and cities, coupled with growing environmental awareness should benefit the moped and motorcycle industry, as well as the public transport equipment sector.

In the long term, the kind of solution adopted to solve the global warming problem is of major importance, given that it could lead to a significant shift in production between certain branches of the sector.

REGULATIONS

Increasing penetration of Japanese motor vehicles will have a substantial effect on the sector as a whole. An agreement made in 1991 between the EC and Japan called for a complete opening of the European market to Japanese vehicles by the year 2000. During the agreement's interim period through 1999, the share of Japanese car makers will be progressively raised. Japanese producers have promised to refrain from a rapid adjustment of their penetration rates in what are presently the most protected markets, France and Italy.

OUTLOOK

The European auto industry has experienced rather difficult conditions during the past two years, conditions which are not expected to change in the near future. Following a 1% fall in 1990, car sales increased by 3% in 1991, a result entirely accounted for by the short-term explosive demand in the former East Germany. During the 1990's, European producers will face a series of important challenges ranging from Japanese competition to environmental pressures and the development of the East European market. The restructuring of the industry will continue and important lay-offs are expected.

Despite a recent downturn in the aerospace subsector, growth is expected to be encouraged by both a rapid growth in air

Table 7: Transport equipment
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	0.6	2.3
Production	1.2	2.6
Extra-EC exports	4.6	5.2

Source: DRI Europe

traffic and the need for airlines to replace their ageing fleets. Such a forecast also assumes that airlines will be in a favourable position to make such investments.

Prospects for the railway rolling stock industry are somewhat different, with problems stemming more from the demand than from the supply side as world demand remains sluggish. Sales in Europe will be somewhat spurred by investments in a European high speed rail network, the upgrading of the Italian and East German networks, and increased environmental concern which puts more emphasis on the development and expansion of efficient transport networks. In addition, an expected hike in oil prices will likely raise the cost of travelling (by car or by air, in particular), making rail travel a more affordable form of transportation.

Overall, production growth in the transport equipment sector is expected to average 2.6% per year to 1996, weaker than the more than 4% annual rate of growth over 1985 to 1991.

Written by: DRI Europe

Motor vehicles
NACE 351

The motor vehicle industry is the largest European industry with a value added of more than 7 billion ECU. Following remarkable growth during the latter half of the 1980's, which was extended by a burst of demand in the former East Germany following reunification, the EC motor vehicle markets are now experiencing a downturn. Establishment of the Single Market will have particularly strong effects on the truck industry as restrictions on the road haulage industry are reduced between Member States.

INDUSTRY PROFILE

Description of the sector

NACE 351 covers the manufacture and assembly of motor vehicles and the manufacture of motor vehicle engines. Motor vehicles include passenger cars and commercial vehicles. All the volume motor vehicle manufacturers also operate on the commercial vehicle market. Several vehicle manufacturers such as Rover, Mercedes-Benz, Rolls-Royce, and (to a lesser extent) Fiat are part of large diversified groups with activities in the aerospace, electronic, defense or financial services industries. All the vehicle manufacturers also operate upstream in the part and accessories sector.

Main indicators

In 1991, the turnover of the EC motor vehicle industry for the first time exceeded 200 billion ECU. Due to restructuring, employment steadily decreased over most of the 1980s, but was still close to 1.2 million in 1991.

Extra-EC exports account for more than 12% of the sector's turnover. The industry is a net exporter and an important contributor to the EC's current account surplus; however, this contribution fell significantly during the second half of the 1980s and particularly in 1991.

As is evinced in Table 5, the trade position of the EC varies according to the different segments of the industry. The EC is a net exporter of cars but a slight net importer of both light and heavy commercial vehicles.

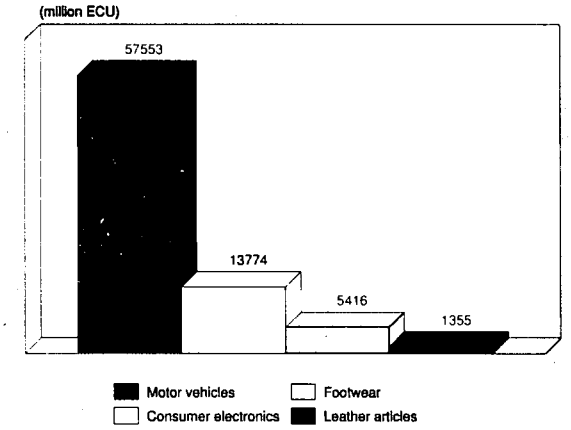
Germany is by far the largest European producer (it is important to keep in mind that "German production" refers to production taking place in Germany, including that of subsidiaries of foreign companies but excluding the output of foreign subsidiaries of German companies). It accounts for about half of the value added generated in the EC, a share which is more than three times larger than that of France, the second EC producing country. Other important producers are the United Kingdom, Italy and Spain. Thanks to heavy foreign investments, Spain is actually producing more vehicles than the UK or Italy, but a large share of its industry still consists of assembly operations.

Recent trends

After five successive years of growth, the industry entered a downturn in 1990. With the exception of Germany, all the largest European markets confronted stagnation or serious drops in new vehicle registrations. In 1991, the slide continued and even accelerated, but was compensated in part by a burst of sales in former East Germany following unification. Owing to its cyclical nature, the industry grows faster than the manufacturing average during expansion phases but is hit more severely during recessions.

The level of direct employment in the EC motor vehicle industry reflects the restructuring which has been taking place since the early 1980s. Overall, approximately 390 000 (18%) jobs were lost in the industry between 1980 and 1987. In contrast to France and the UK, which were the hardest hit, the Federal Republic of Germany managed to increase employment by 68 000 jobs. Productivity improvements have continued since 1987, though lay-offs have been somewhat cushioned by a rapid growth in production.

Figure 1: Motor vehicles
Value added in comparison with other industries, 1991



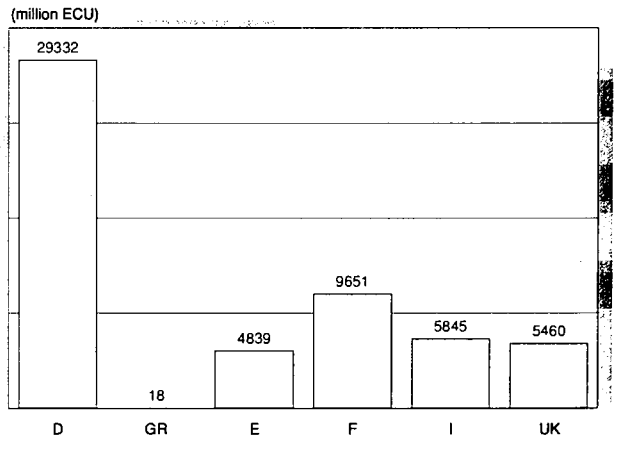
Source: Eurostat

International comparison

With sales of about 12.6 million units in 1991, the EC market for passenger cars represents 37% of world sales. The EC is the largest car market in the world, well ahead of North America and Japan. With an output exceeding 12.9 million units, the EC is also the world's largest producer, ahead of Japan and North America. Fuelled by the strength of its domestic market, the European lead on North America has been expanding over the past years. On the other hand, Japanese production has been progressively catching up over the same period.

Between 1987 and 1991 period, total vehicle production (i.e. including commercial vehicles) rose in volume by 8% overall in the EC, 20% in Japan and dropped by 11% in the US.

Figure 2: Motor vehicles
Value added by Member State, 1991



Source: Eurostat

Table 1: Motor vehicles
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Apparent consumption	86 914	98 425	102 758	112 686	127 033	145 133	162 859	182 272	187 655	194 896	204 583
Production	100 006	110 431	116 828	128 924	141 187	158 980	173 858	193 187	199 622	201 543	212 034
Extra-EC exports	19 049	19 393	22 494	25 664	25 697	26 220	25 173	26 525	27 915	25 132	27 261
Trade balance	13 092	12 007	14 069	16 238	14 154	13 848	10 999	10 915	11 967	6 647	7 451
Employment (thousands)	1 333	1 310	1 288	1 247	1 220	1 214	1 196	1 192	1 196	1 184	1 176

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Motor vehicles
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.1	5.6	5.1
Production	3.6	3.7	3.7
Extra-EC exports	3.2	-5.5	-2.7
Extra-EC imports	7.6	7.8	7.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Motor vehicles
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	19 049	19 393	22 494	25 664	25 697	26 220	25 173	26 525	27 915	25 132
Extra-EC imports	5 957	7 387	8 425	9 426	11 544	12 372	14 174	15 610	15 948	18 485
Trade balance	13 092	12 007	14 069	16 238	14 154	13 848	10 999	10 915	11 967	6 647
Ratio exports/imports	3.20	2.63	2.67	2.72	2.23	2.12	1.78	1.70	1.75	1.36
Terms of trade	103.7	101.6	99.7	100.0	103.2	107.9	102.2	106.4	111.9	110.0
Intra-EC trade	26 095	28 900	30 180	34 738	39 765	45 050	47 713	56 569	61 864	68 042
Share of total imports (%)	81.4	79.6	78.1	78.6	77.5	78.4	77.1	78.3	79.5	78.6

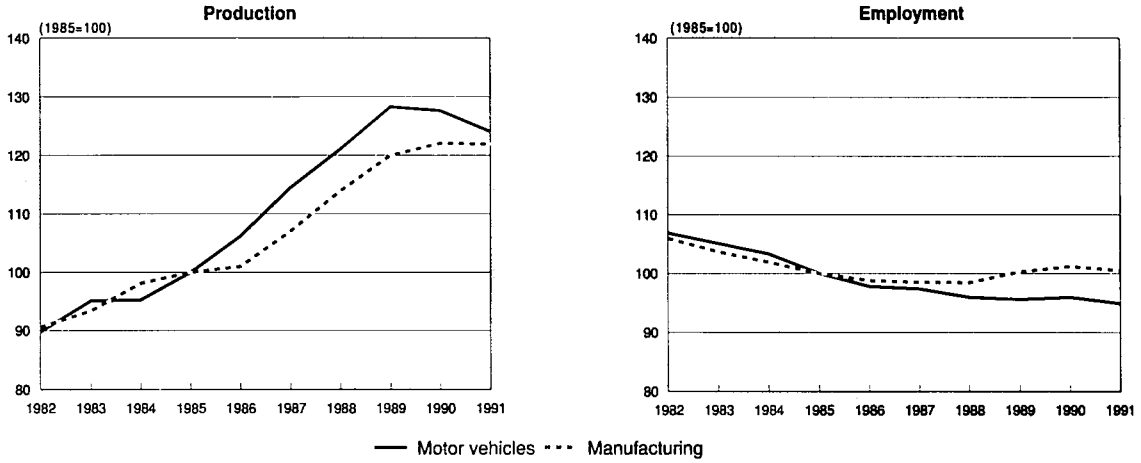
(1) Estimates
Source: Eurostat

Table 4: Motor vehicles
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	37.0	38.4	37.4	40.1	42.8	46.5	48.1	49.3	49.1	48.8
Productivity index	92.2	95.6	93.1	100.0	106.6	115.7	119.9	122.8	122.2	121.5
Unit labour costs index (3)	78.2	82.7	91.3	100.0	112.6	123.1	136.8	141.4	142.7	N/A
Total unit costs index (4)	76.8	84.9	88.4	100.0	114.0	126.5	138.9	154.3	160.3	164.4

(1) Excluding the United Kingdom and Denmark
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed in current prices
(4) Excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Motor vehicles
Production and employment indices compared to EC manufacturing



Source: Eurostat

Foreign trade

Exports of motor vehicles are relatively diversified compared to imports. Three regions, the EFTA countries, North America and developing countries, account for more than three-fourths of extra-EC exports. In the mid-1980s, North America was the most important export market for the EC and the major outlet for the European luxury car output. Following the decline of the dollar and the American recession, demand for luxury cars plummeted and imports from the EC plunged. With a share of 20% in 1991, North America is now a less important market than the EFTA with 32% or developing countries with 24%. Japan remains a relatively minor destination for European production, but its share of extra-EC exports has increased rapidly in recent years, reaching 12.5% in 1991.

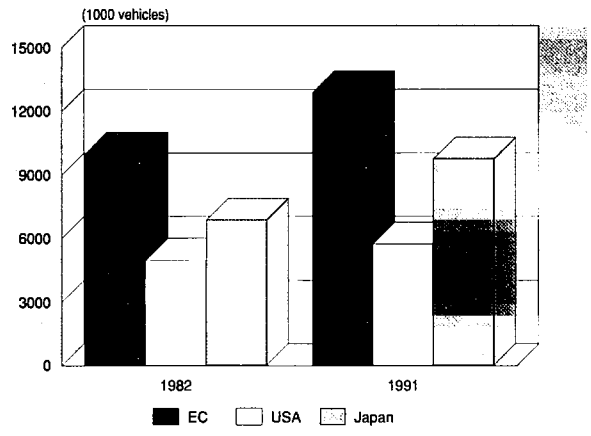
Imports of motor vehicles into the EC originate mainly from Japan, a country with whom the EC is running a 7 billion ECU trade deficit. Though the share has decreased somewhat over the past years, Japan still accounts for 56% of all extra-EC imports. The share of imports from Japan highlights the importance of the present under valuation of the Yen with respect to European currencies. With 24% of imports of motor vehicles into the EC, EFTA countries remain well behind Japan. Though its share increased recently to 5.5%, North America is a rather minor source of imports to the EC. However, to a large extent this reflects the high level of local production achieved by the European subsidiaries of US vehicle manufacturers.

MARKET FORCES

Demand

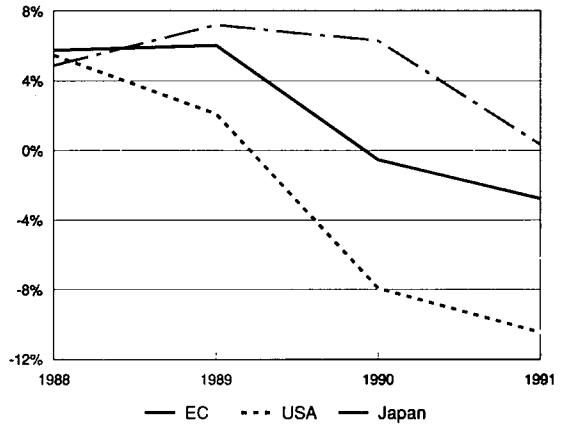
The demand for passenger cars is characterised by a combination of short term cyclical fluctuations and long term growth. From just over 3 million units in 1960, the demand for passenger cars in the EC has enjoyed considerable growth, to pass the 12 million unit mark in 1989. Growth has been almost uninterrupted between 1960 and 1974, when the impact of the first oil shock caused registrations to decline by 14.3%. The growth pattern then resumed until the second oil crisis at the end of the 1970s signalled a two year decline for car demand. During the early 1980s, the EC motor vehicle industry suffered a period of relative stagnation, followed by a recovery in the latter half of the decade to push total sales over 12

Figure 4: Motor vehicles
International comparison of car production



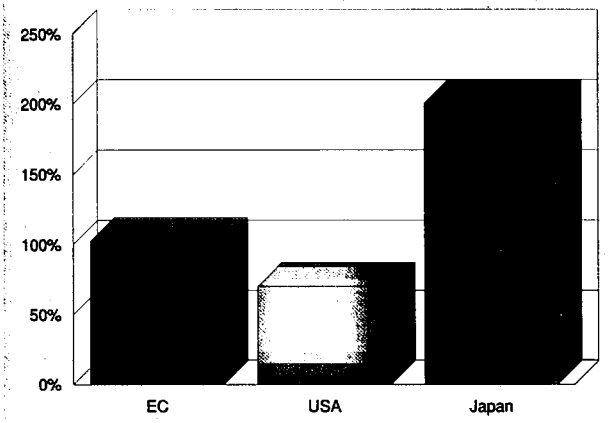
Source: DRI Europe

Figure 5: Motor vehicles
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Motor vehicles
Ratio of production to domestic sales, 1991



Source: DRI Europe

million units. After five successive years of growth between 1984 and 1990, the industry again experienced lower sales in 1990 and 1991. Apart from Germany, all of the volume markets posted stagnating or diminishing sales in 1990 and total Community demand dropped by 1%. The UK and Spain were the hardest hit with a drop in registrations of nearly 13% each. In 1991, the decline accelerated and UK sales plummeted by 20%, while Spanish and French registrations each plunged by more than 10%. Sales in Germany following unification compensated for losses in other countries as total EC sales actually increased by 3%. German registrations surged by 37%, aided by demand in former East Germany estimated at 700,000 units. Such demand, however, will be much weaker during the coming years with the demand overhang created by supply shortages in the former German Democratic Republic reduced.

In the short run, consumer demand for cars depends mainly on personal income and wealth not to mention business and consumer confidence. These factors account for the cyclical nature of sales over the past two decades. Economic downturns are generally triggering important slumps in new car registrations. In the medium and long term however, demand for cars will continue to rise and car penetration (i.e. car parc per capita) will continue to increase especially in the Member States where it is presently low. Average car ownership figures vary widely across countries, exceeding 450 units per 1000 inhabitants in Germany (in the western Länder) and in Italy but falling short of 320 units per 1000 inhabitants in Spain and short of 160 units in Greece.

Sales of commercial vehicles exhibit an even greater fluctuation than sales of cars. The truck market underwent dramatic slumps in the mid-1970s and early 1980s. The second half of the 1980s were marked by a sustained growth which was first fostered by the need to replace the fleet built up in the late 1970s and later spurred by an increase in fleet capacity. In 1990 and 1991, the industry experienced a slump with a 6.2% and 15.4% drop in new registrations (Germany excluded). As in the case of cars, the downturn was compensated in 1991 by a jump of German sales following unification. East German demand, however, will soften considerably in the coming years as the initial replacement of East German vehicles is completed.

Table 5: Motor vehicles
Breakdown by product line, 1991

(1000 units)	Production	New registration
Cars	12 886	12 580
Light trucks 6 tonnes	1 252	1 257
Trucks 6 tonnes	252	257

Source: DRI Europe

Long term truck demand depends essentially on the health of the road haulage industry which in turn is related to two main factors:

- the growth of the most important end markets for transport services such as the food, drink, tobacco, construction, metal, and wholesale distribution industries;
- the competitive edge of road haulage with respect to other transport modes. Over the past two decades, the road haulage sector has consistently gained market shares to rail or inland waterways; the trend is expected to continue over the 1990s.

Several upcoming structural changes in the EC's economy may have an important effects on the demand for trucks. The Single Market has already and will continue to foster intra-EC trade. The Single Market also entails a further restructuring of European industry into larger commercial units. These two elements imply additional demand for transport services, including road haulage. On the other hand, the planned deregulation of the road haulage industry is expected to step up the efficiency of the existing fleet as a result of the introduction of cabotage and the eradication of supply restrictions. A more efficient fleet implies that less trucks will be required to ship a given quantity of goods.

Supply and competition

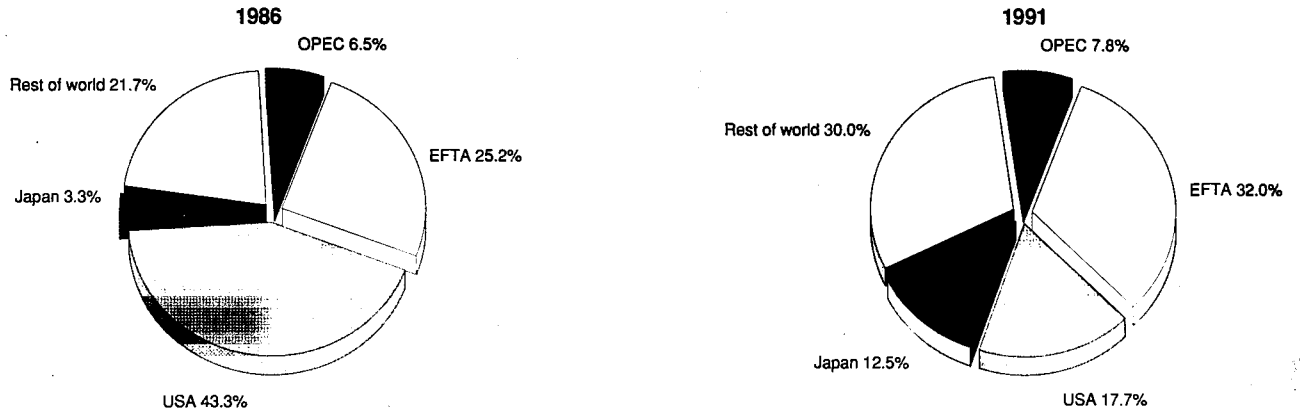
The late 1970s and early 1980s were marked by some uncertainty in the wake of the second oil crisis, and fears concerning overcapacity. Most companies experienced a period of consolidation and restructuring. Intensifying competition, (from Japanese companies and rapidly evolving Pacific Basin companies) caused EC manufacturers to make substantial changes to their production processes and cut costs. Revolutionary cost-effective Japanese techniques, known as lean production techniques, were paramount in causing producers to re-evaluate their systems.

The main objectives of reducing unit production costs, improving productivity, allowing greater flexibility and increasing research and development expenditures were achieved by various means. The rationalisation of operations, with substantial lay-offs, and the increasing use of common platforms for several models helped minimise costs. Simultaneously, the introduction of flexible manufacturing systems and "just-in-time" management were directly adopted from the Japanese, leading to a substantial reduction in the number of component suppliers. This development is in turn contributing to the restructuring and the increased consolidation taking place in the automotive supply sectors.

Following the rapid expansion of demand during the second half of the 1980s, most of the European producers have found themselves short of capacity by the end of the decade. Plummeting sales on most of the volume markets in 1990 and 1991, however, have taken some pressure off production capacities. Germany is a major exception and local manufacturers had difficulties keeping up the pace with surging domestic sales. As a result, German car imports increased by 20% in 1990 and nearly 50% in 1991.

Whereas Japanese motor vehicle manufacturers concentrated most of their marketing efforts in North America during the 1980s, their priority will shift to the European market during the 1990s. Japanese competition certainly constitutes the main challenge faced by European producers over the next two decades. To meet Japanese production standards, EC car manu-

Figure 7: Motor vehicles
Destination of EC exports



Source: Eurostat

facturers will have to undertake another set of restructuring in order to continue to implement the so-called lean production techniques. European producers have made important efforts over the past years to step up productivity, improve quality, reduce stocks. Nevertheless, large differences still exist between European and Japanese efficiency as is evidenced in table 7 (data provided in table 7 are from 1989, and though no update is available yet, European companies are estimated to have partly closed the gap since that year).

Another set of redundancies seems inevitable during the coming years. Mercedes-Benz and Volkswagen have already announced important cuts in their labour force for the coming years. Meanwhile, other manufacturers estimate that they will have to reduce their workforce substantially if they are to meet Japanese productivity standards by the end of the century.

It is worth noting that the European Commission put forward several proposals in May 1992 in order to increase the competitiveness of the EC auto industry. These mainly include higher R&D spending and special funds for professional training and reconversion.

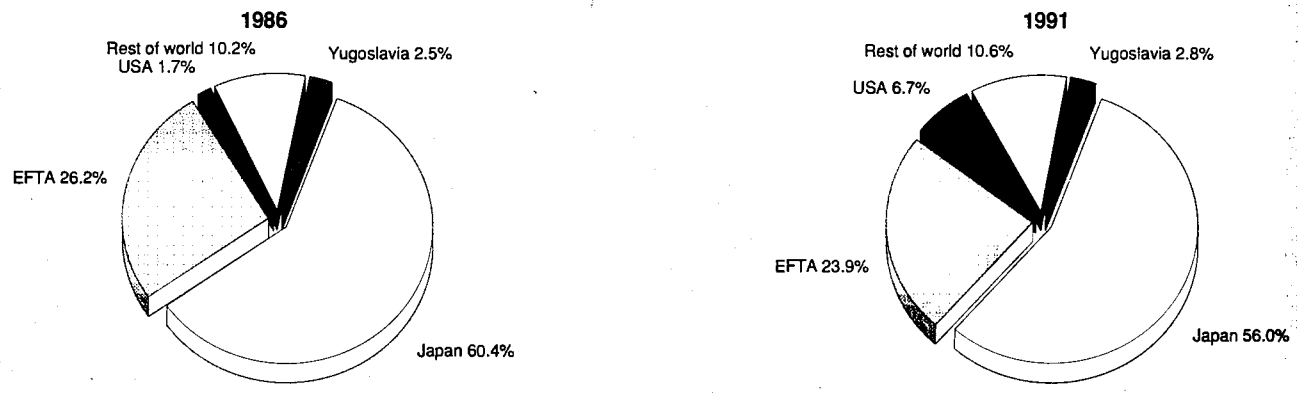
The financial performance of the EC vehicle manufacturers improved markedly during the second half of the 1980s. After combined losses of 2.2 billion ECU for the period 1981-84, the period 1985-87 saw motor vehicle companies realising a net profit of 10.6 billion ECU, and from 1987 onwards, almost all companies have been operating profitably. This turnaround was principally the result of a succession of good years for the EC passenger car and truck markets, but was also assisted by the long period of restructuring in the late 1970s and early 1980s.

As a result of the downturn, results deteriorated considerably in 1990 and 1991 as all major motor vehicle manufacturers reported drops in profits. Given manufacturers' much improved financial health, however, the situation is much less dramatic than it was during the beginning of the 1980's. However, necessary restructuring might put a strain on the financing capacity of the industry once again.

Production process

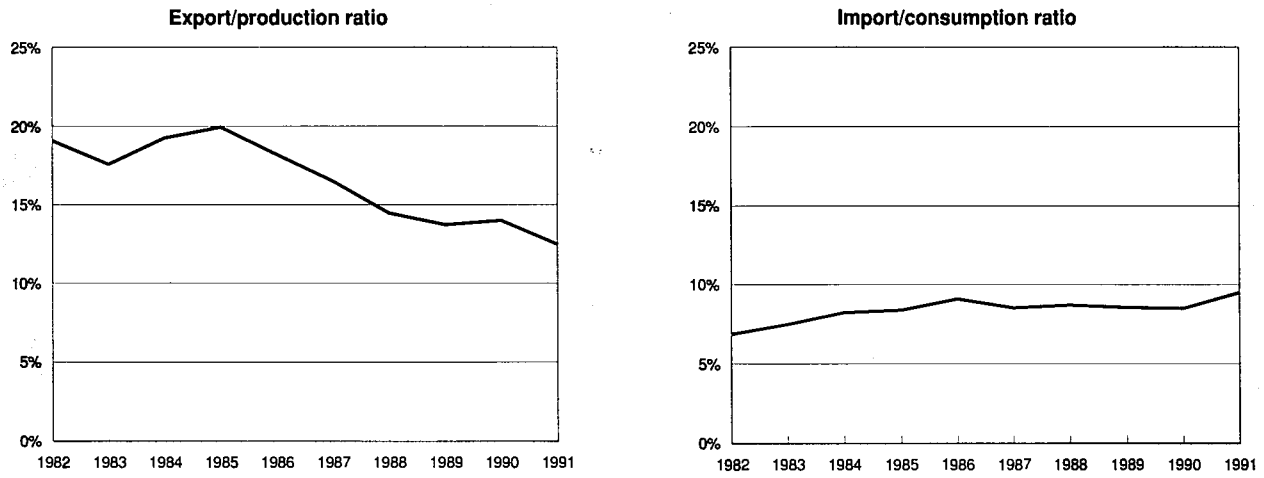
In terms of the production process, the implementation of lean production constitutes the most thorough structural

Figure 8: Motor vehicles
Origin of EC imports



Source: Eurostat

Figure 9: Motor vehicles
Trade intensities



Source: Eurostat

change faced by European manufacturer during the coming decade. Lean production is seen by many analysts as a revolutionary method with consequences as important as the shift from craft to mass production initiated by Henry Ford in the early 20th century.

Lean production was implemented by Toyota during the 1950s and the 1960s and has been now progressively adopted, (though to various degrees) by all Japanese manufacturers. It is based on a set of techniques aimed at higher quality with a lower per unit requirement of all inputs, namely labour, capital, inventories and time. Furthermore, increased flexibility should allow the profitable production of smaller series. As a result, the output is improved both in terms of quality and diversity. Lean production applies both to the production process and to the product development phase. In the mid-1980s, development time for a new car averaged 46 months for Japanese manufacturers against about 60 months for American and European producers. Product cycles average about 4 years for Japanese models against 6 to 10 years for European models. For several years, European car manufacturers have started to implement some elements of lean production such as just in time, quality management, quality circles or closer links with upstream suppliers. It is important to keep in mind that lean production demands more than the mere implementation of a few new management techniques. It is a continuous improvement process which mainly runs bottom up, requiring total commitment from the shop floor and completely new forms of labour management with a combination of more skilled labour and increased responsibilities at the shop floor level.

Table 6: Motor vehicles
Financial performance of the main EC manufacturers in Europe, 1991 (1)

(million ECU)	Turnover
Fiat (2)	20 071
PSA	22 879
Ford Europe	16 029
GM Europe (3)	18 881
Renault (3)	22 691
Volkswagen	30 807

(1) Automotive activities only
(2) Estimated sales in Europe
(3) Includes other products such as military equipment, satellites, etc.
Source: 1991 annual reports and DRI Europe

INDUSTRY STRUCTURE

Companies

In the car industry, the 6 largest companies account for 75% of total sales in Western Europe. Nevertheless, the industry's market power is hindered by the presence of several players with very similar strengths and sizes. The market shares of the volume car-makers range between 10% and 16%, with most of them clustering at about 12%. Given its size, the industry exercises substantial market power on its upstream suppliers.

The truck industry posts a concentration rate similar to that of the car industry though the market leader of both the light and heavy segments enjoy higher shares than in the case of the car industry. In the light trucks segments, 6 firms account for more than 70% of the production in Western Europe. That share rises to over 85% in the case of heavy trucks. In addition, the market position of the heavy truck leader, Mercedes-Benz, is particularly strong as the company accounts for one-third of European sales.

In 1991, as during the two previous years, the Volkswagen Group turned out to be the leader of the European market. The German manufacturer stepped up its lead on its usual challenger, the Fiat group which was handicapped by its dependence on a weak domestic market. Volkswagen posted a share of the West European market close to 16% (against 12.5% for Fiat). One of 1991's surprises was the strong performances of two American subsidiaries, Ford Europe and General Motors Europe, which both increased their share of the European market. With a 12.04% share of European sales, General Motors Europe is now very close to PSA, the third largest group with 12.07%.

In the light commercial vehicle (LCVs up to 6t GVW) market, Renault held onto market leadership in 1991. The French group was followed by PSA, Ford, and Volkswagen (in that order). Thanks to the new market in former East Germany and to the launch of a new model, Volkswagen achieved a considerably higher production level than in previous years. Mean-

Table 7: Motor vehicles
Productivity of car assembly plants, 1989 (1)

	Japanese in Japan	Japanese in North America	American in North America	Europe
Productivity (hours/vehicle)	16.8	21.2	25.1	36.2
Quality (assembly defects/100 vehicles)	60.0	65.0	82.3	97.0

(1) Automotive activities only
Source: IMVP World Assembly Plant Survey

while, PSA experienced a downturn in market share of approximately 14%.

Mercedes-Benz dominates the heavy end of the truck market. In 1991 it accounted for more than 30% of EC truck production (over 6t GVW). It was followed by Fiat/IVECO with 15%.

Strategies

During the second half of the 1980s, concentration increased which was marked by the nearly completed disappearance of luxury auto manufacturers as independent producers. Fiat took over Alfa Romeo, Ford acquired Jaguar and General Motors took a 50% stake in Saab Automobile. Trucks makers have not been much less active in terms of take-overs as is evidenced by the merger of British Leyland and DAF or the control of Spain's Enasa by Fiat/Iveco.

Acquisition is not the only form of alliances. Several companies have resorted cooperation of one form or another, especially for the production of commercial vehicles and vehicles components. Ford and Iveco have joined forces in the UK, while Peugeot and Fiat manufacture vans together. In addition, several links have been or are being established with Japanese manufacturers. Honda has an equity stake in Rover of the UK, and several joint-ventures have been set up between Volvo and Mitsubishi in the Netherlands, between Volkswagen and Suzuki and between Ford and Nissan in Spain. The most ambitious cooperation experience set up so far is that between Renault of France and Volvo of Sweden. The agreement (which was signed in 1990) concerns both the truck and the car divisions of the two companies and involves substantial cross-share holding.

ENVIRONMENT

Since the early 1970s, EC legislation has controlled the emission of both unburned hydrocarbons and carbon monoxide. In 1978, oxides of nitrogen also became subject to control. In 1987, the "Luxembourg Compromise" of 1985 finally became law as a result of the Single European Act. It provided for the implementation of very tight emission standards for passenger cars within the period 1988-1993. While the limit values for models equipped with engines above 1400 cc. displacement were an integral part of it, the Luxembourg Compromise left the limit values for a second step in emission requirements for small cars to be the subject of further discussions between the Member States. Particulate emissions of diesel engines were also not of part of the compromise.

For the manufacturers, the technical changes required to meet these regulations were substantial, with the consequence of higher costs for both producers and consumers. For the most part, catalytic converters were required, creating a need for unleaded gasoline. In fact, a separate EC directive, requiring Member States to make sure that unleaded petrol was widely available by the end of 1989 (lead itself being regarded as a pollutant), was issued in 1985.

In 1988, particulate limit values for diesels were adopted. In 1989, the second step in emission requirements for small cars was defined in such a way that three-way catalyst technology would become necessary also for this category of vehicles. At that time the Council made the application of the new directive mandatory in each Member State. Previously, Member States retained the option of delaying the implementation of emission directives. In June 1991, the new European driving cycle was introduced and a single set of limit values for all passenger car categories was adopted. By December 1992, the European Commission is also due to propose new emission limits for 1996.

As far as trucks are concerned, more stringent standards were adopted in 1991 which will apply two steps in 1992 and 1996. The norms regulate emissions of unburned hydrocarbons, carbon monoxide, nitrogen oxides and particulates and correspond, as far as their severity is concerned, to the current US standards.

The issue of carbon dioxide emissions (which add to global warming) is still under consideration, and different regulatory options to control these emissions are being examined at present. At the moment, there are no specific technological methods to reduce carbon dioxide emissions from cars, other than improving the fuel efficiency of their engines and reducing their weight. Road transport is estimated to account for around 20% of total European emissions.

A further consequence of growing public consciousness of the problems caused by motor vehicles to the environment has been the negative press reports given to the diesel engine. Attention to the effect of diesel engines is founded on their high particulate emission levels. In fact, because of their greater economy, diesel engines do have a positive part to play in the environment debate. The diesel issue is particularly relevant to the truck industry which is completely reliant on this form of fuel.

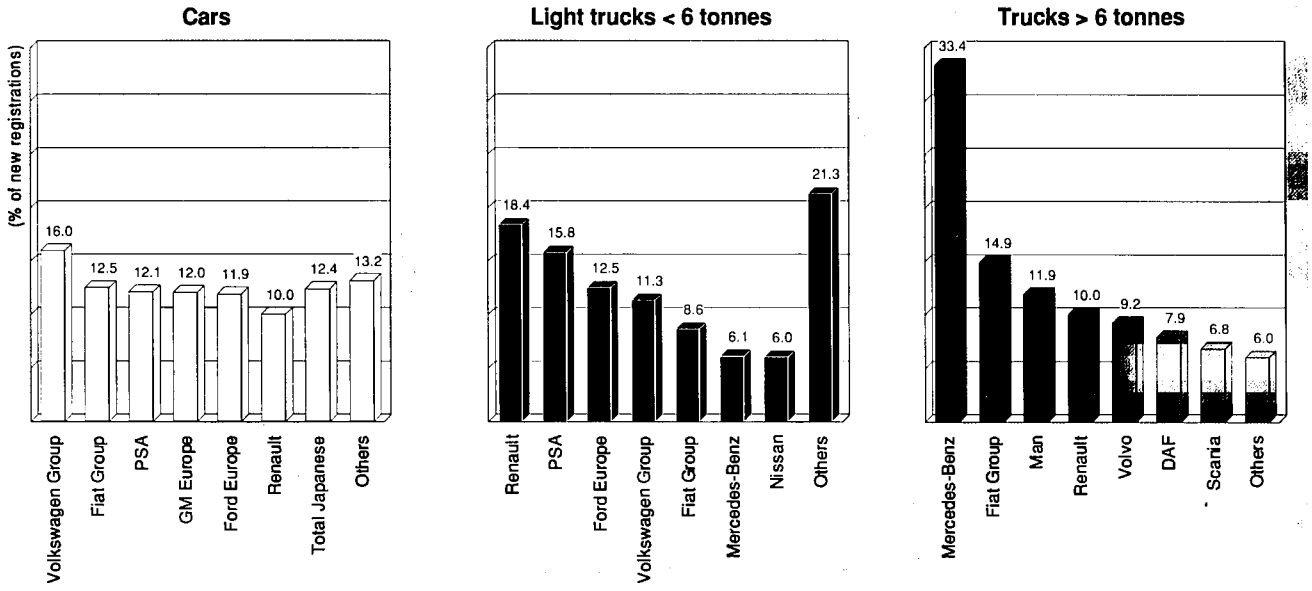
In addition to the measures against air pollution, the noise level of motor vehicles including motorcycles and mopeds, which constitute another major environmental hazard, has been covered by EC regulations since the 1970s.

More recently, waste is increasingly seen as a major environmental nuisance resulting from the use of motor vehicles. Given the large number of cars scrapped each year, manufacturers are seriously working on the problem of their disposal and some of them have already set up recycling plants.

EC TRADE POLICY

Until the end of 1992, various EC countries have imposed their own individual quota systems. Broadly speaking, Japanese imports account for 3% of the French market, 11% of the UK market, and below 1% of the Spanish and 2% of the Italian markets. In 1991, Japanese car sales amounted to approximately 10% of the EC market. In July 1991, the EC and Japan reached an arrangement on the access of Japanese vehicle manufacturers to the EC market. Under this arrangement, the EC market will be fully opened to Japanese producers after the year 1999. During the 1990's, Japanese manufacturers will exercise moderation in exporting vehicles to the EC market. EC and Japanese officials will meet twice a year to monitor

Figure 10: Motor vehicles
Market shares in Western Europe, 1991



Source: Eurostat

the arrangement. Based on existing assumptions, the EC has provided some indicative numbers of Japanese penetration in 1999. Assuming a 15.1 million unit market in 1999 (including cars and light commercial vehicles up to 5 tonnes), Japanese exports to the EC could reach 1.23 million units with transplant production at 1.2 million units, resulting in a global market share of about 16%. In addition, specific targets will be set for the exports of Japanese vehicles to the presently protected markets: France, the UK, Italy, Spain and Portugal.

EASTERN EUROPE

Much of the development of the East European motor industry got under way during the 1960s when most of the current production capacity and product designs and technology were developed and licensed. Much of this development occurred with the assistance of West European companies, notably Fiat in the Soviet Union and Poland, and Renault in Romania. Although there was a marked increase in activity and output during the 1970s, political and economic reasons led to a slowdown in the pace of expansion during the 1980s.

The opening up of Eastern Europe has led to a strong revival of interest from the Western automotive manufacturers, both in terms of a potentially huge markets, and also as a low-cost production base. Eastern Europe and the former Soviet Union constitute a market of 370 million consumers with low levels of per capita car ownership. In addition, production levels have failed to satisfy consumer demand, with 5 to 10 year waiting lists not uncommon. It will, however, take some time before Eastern demand translates into additional sales for Western producers. So far, Eastern demand for Western cars has been constrained by the poor shape of local economies, by current account imbalances and high import tariffs aimed at protecting local industries. Second-hand cars have constituted most of the recent imports from the West.

Many major West European manufacturers have already entered into agreements with Eastern Bloc producers, in anticipation of future rewards. Opel, Volkswagen, and Mercedes-Benz have all set up production units in former East Germany. In addition, Volkswagen has also acquired a large stake (to become a majority stake by 1995) in Skoda (the largest Czech car manufacturer) and has signed a joint venture agreement with BAZ (the second largest Czech auto company). Meanwhile, Mercedes-Benz was establishing links with Liaz and Avia (two Czech truck manufacturers) and General Motors was investing in Hungary and Poland for the assembly of cars and the production of engines. Fiat has acquired a 30% stake into VAZ (a Russian auto company). The Italian group has also acquired a majority stake into FSM (a Polish auto company) and is negotiating with Tatra (a Czech car manufacturer).

The major impact on production is not likely to be realised until the beginning of 1994. By 1995, total production in Eastern Europe (excluding the former Soviet Union) is forecast to be slightly more than 960 000 units. In comparison, production for 1990 was 800 500 units and in 1991 was estimated to have dropped to 636 000 units.

OUTLOOK

The European car industry has experienced rather difficult conditions during the past two years which is not expected to change in the near future. Following a 1% fall in 1990, car sales increased by 3% in 1991, a result entirely accounted for by the short-term explosive demand in former East Germany. East German sales excluded, the EC car market would have dropped by 3% that year. Several volume market such as France, the United Kingdom or Spain will pick up again in the near future. Nevertheless, this increase will be more than compensated for by a drop in German demand. Overall EC registrations are likely to fall by about 1% in 1992 before picking up again in 1993. A strong rebound of the market will however not take place before 1994, when German sales head up again and the EC market crosses the 13 million unit barrier.

During the 1990s, European companies will continue to face a series of important challenges ranging from Japanese competition to environmental pressures as well as to distribution as a result of potential modifications in the EC legislation concerning exclusive distribution practices. The restructuring of the industry will continue implying, most certainly, a further reduction in employment levels.

Table 8: Motor vehicles
Annual growth rates in number of vehicles

	1992	1993	1992-96
Cars:			
New registrations	-1.1	1.1	2.8
Production	0.3	4.6	3.5
Commercial vehicles:			
New registrations	0.7	3.1	3.1
Production	1.7	4.1	4.3

Source: DRI Europe

The van and light truck market also suffered from lower sales in 1990 and 1991. The market will resume as of 1992 and is set for steady progress during the coming years. In particular, sales will benefit from increasing demand for new image-conscious products such as off-road vehicles, minivans and pick-ups. Most of the major EC manufacturers have now embarked on plans to produce one or more of this type of product, and although volumes are not initially projected to be very high, the outlook for growth is promising.

With regard to the heavy truck market, the sharp surge in demand in the late 1980s was partly a result of investments made by the road transport industry in anticipation of the Single Market. Markets such as Belgium and the Netherlands, which are major players in the haulage industry, have enjoyed exceptionally strong growth. There have been numerous new entrants to the business, causing competition to intensify and margins to tighten. This buoyant period was followed by a sharp contraction in 1990 and 1991 when the market shrunk by nearly 9%. The outlook, however, is less upbeat than for light trucks. Sales will continue to drop in 1992 and stagnate in 1993 and 1994 before increasing slightly in 1995.

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Motor vehicle parts and accessories

NACE 353

The motor vehicle parts and accessories industry employs about the same number of people (approximately 1 million) as the motor vehicle industry it supplies. Unlike the motor vehicle industry, the parts and accessories sector presently includes a sizeable number of small firms; however, greater industry concentration is expected as trends in vehicle production techniques increasingly demand a tighter integration with the parts and accessories industry.
The business climate for parts and accessories is strongly tied to the cyclical performance of the motor vehicle sector. Hence, the foremost competitive threat to the EC motor vehicle industry, Japan, also poses similar challenges to the parts and accessories sector.

INDUSTRY PROFILE

Description of the sector

The parts and accessories market is traditionally broken down into two main segments. The first is the market for original equipment manufacturers (OEM), that is the parts that car manufacturers buy from specialised producers for assembly into their vehicles. The second is the replacement market which comprises parts destined for repairs and automotive accessories.

The precise coverage of the component industry in terms of products is difficult to assess. Data which corresponds to NACE 353 (parts and accessories for motor vehicles) is too narrow in its coverage as its excludes for instance most of the electrical and electronic components that are so important in vehicle manufacturing today. Furthermore, existing statistics which are based on the production of companies of more than 20 employees understate the value of production of the fragmented parts and accessories industry.

A study carried out for DGIII, also sourced in this monograph, covers a wider range of products than the strict NACE definition.

Main indicators

With a turnover estimated at almost 100 billion ECU, the EC parts industry represents about half of the size of the auto industry. In terms of employment, however, the parts and auto industries are much closer in size with each exceeding 1 million workers.

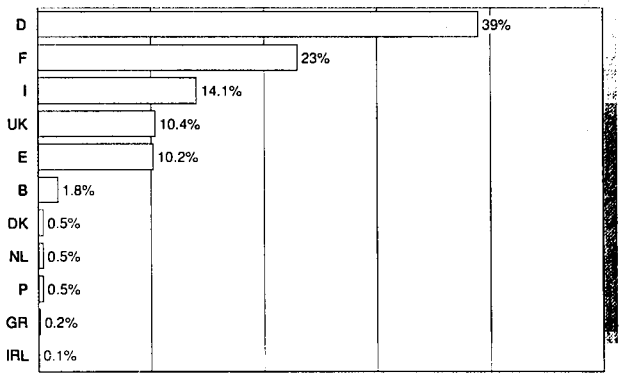
Within the parts and accessories sector, independent manufacturers account for nearly 90% of both production and employment, the remaining 10% stemming from subsidiaries of vehicle manufacturers.

Turning to the breakdown of production by Member States, leading vehicle producing countries are also leading parts producers. Germany accounts for nearly 40% of EC turnover. It is followed by France, Italy, the UK and Spain. Similar rankings can be observed in the auto and parts industries. This is explained by a frequent geographical clustering of parts manufacturers in proximity to vehicle production sites.

Recent trends

Over the 1980s, the industry has been expanding somewhat faster than its main industrial end-market, the auto industry. It has grown consistently between 1982 and 1990 before dipping in 1991, following a downturn in the car market.

Figure 1: Motor vehicle parts and accessories Distribution of production by Member State, 1991



Source: PRS, BCG, Commission Services

Productivity improvements have been marginally faster than improvements for the manufacturing industry on average. They have been achieved thanks to rapidly expanding production rather than lay-offs, and as a result, employment was still higher in 1991 than in 1982. The industry has not recently suffered from the type of painful restructuring endured by car manufacturers during the first half of the 1980s.

International comparison

Once relatively sheltered from foreign competitors, EC component suppliers are now facing increased domestic, European and worldwide competition. This trend, which is tracing a new international division of component production, is fostered by several factors:

- The creation of the Single Market is forcing European suppliers to intensify cross-penetration of each others' markets.
- The increased internationalisation of EC car producers implies geographically enlarged supply bases, with a tougher competition prompting a constant search for lower cost purchasing alternatives.

Table 1: Motor vehicle parts Structure of EC production by component type, independent manufacturers

Component type	% of total
Body parts	18.1
Electrical parts (2)	15.6
Engine parts	11.8
Interior parts	10.8
Drive train	7.3
Braking	6.4
Suspension	5.9
Wheels (1)	5.5
Fuel systems	4.4
Cooling systems	3.3
Exhaust systems	3.3
Transmissions	3.0
Steering	2.5
Others	2.3

(1) Excluding tyres
(2) Excluding electronics
Source: PRS, BCG, Commission Services

Table 2: Motor vehicle parts
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	5.4	8.0	7.1
Production	4.3	4.8	4.6
Extra-EC exports	1.3	-9.7	-6.2
Extra-EC imports	3.5	4.7	4.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Motor vehicle parts
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	6 247	6 383	7 547	8 186	7 770	7 923	5 487	5 686	5 441	5 685
Extra-EC imports	1 226	1 286	1 565	1 685	1 863	2 079	2 408	2 736	2 785	3 212
Trade balance	5 021	5 096	5 982	6 501	5 907	5 844	3 079	2 950	2 655	2 473
Ratio exports/imports	5.10	4.96	4.82	4.86	4.17	3.81	2.28	2.08	1.95	1.77
Terms of trade	98.3	98.4	95.7	100.0	102.3	102.2	97.9	100.0	91.9	88.9
Intra-EC trade	5 965	6 463	7 492	8 488	9 803	11 545	11 393	12 905	13 708	14 008
Share of total imports (%)	82.9	83.3	82.7	83.3	84.0	84.7	82.5	82.5	83.1	81.3

(1) Estimates
Source: Eurostat

- Japanese investments for car assembly plants within the EC are also drawing the attention of Japanese component makers on the European market.

The latter development in particular has been seen as a major threat to the EC component industry. Use of just-in-time and close links with suppliers (typical of the Japanese car industry) require the proximity of component plants and auto assembly plants. The risk exists that Japanese component makers will follow the Japanese car manufacturers move to the EC, first supplying the Japanese transplants and later competing with EC component makers as their potential transplant supply base remains too limited to allow profitable operations. This is what occurred in the US where Japanese component makers established more than 300 plants during the 1980s. The European situation is, however, different for several reasons:

- The European independent component industry is larger than the American one (which suffers from the high degree of vertical integration with vehicle manufacturers).

- The European industry is considered to be more competitive than its American counterpart.

There is presently little Japanese parts investment in Europe (about 50 companies) and the pace of future Japanese expansion within the EC will be slower than that which took place in the US during the past decade. The Japanese component industry, however, has several serious competitive advantages over its European counterpart. Although smaller than the EC industry (0.5 million people compared with 1 million people), the Japanese component industry is much less fragmented and already benefits from the tiered structural shape which the EC industry is presently constructing. Aside from the 40000 sub-contractors who form the second and third tiers of the pyramidal structure of the Japanese industry, there are 310 first tier component suppliers, compared to 3200 companies in Europe. The average size of enterprises is 900 people compared with the European average of 270. 45% of the Japanese firms employ more than 500 people, compared with only 10% in Europe.

Japanese companies have close organisational and financial links with vehicle manufacturers, and most of them are attached to groups around a major manufacturer. For instance, Nippondenso (the largest Japanese component producer) is partly owned by Toyota. Many component producers are owned by more than one vehicle producer. This system has resulted in an industry which is more specialised and concentrated than the European industry.

According to a study undertaken for the EC Commission, the EC industry remains competitive with Japan in terms of technology, but suffers from several disadvantages such as:

- lower labour productivity

- lower product quality

- lower stock turns

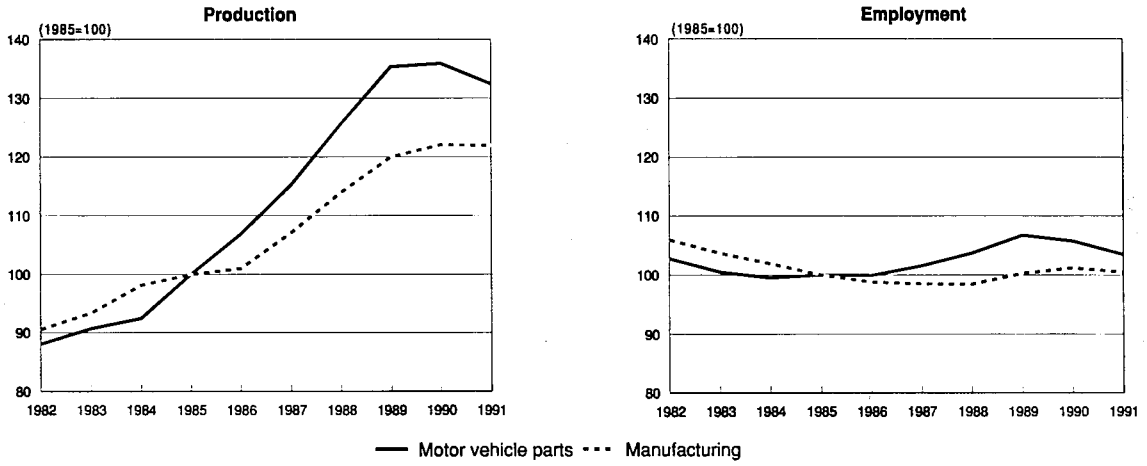
- slower design and development cycles.

Several European component producers, however, have interests in the Japanese industry, such as Bosch (which has a minority stake in Nippondenso).

Foreign trade

The internationalisation of the industry has been a determining factor in the substantial increase in foreign trade experienced since 1980. The expansion of intra-EC trade has been particularly rapid in recent years as intra-EC trade reached the 14 billion ECU level in 1991, a threefold increase compared to 1980. The industry remains essentially intra-EC oriented and intra-EC imports are more than 4.4 times higher than extra-EC imports, a ratio which is usually in the 2 to 2.5 region for most of the engineering and transport industries. Given the difficult nature of defining the industry, a word of caution regarding trade figures is in order. Statistics on trade are not necessarily related to the independent component industry's products but frequently include the movements of the OEM's own in-house products to and from assembly plants across national borders, thus causing significant distortions in the data.

Figure 2: Motor vehicle parts and accessories
Production and employment indices compared to EC manufacturing



1992 are DRI Europe estimates
Source: Eurostat

The industry is a traditional balance of payment earner. After a peak in 1985 when it reached 6.5 billion ECU, the EC trade surplus decreased to almost 2.5 billion ECU in 1991. The second half of the 1980s were marked by a rapid increase in extra-EC imports and a relative stagnation in extra-EC exports. This situation is partly attributable to a change in the classification of trade statistics and, more importantly, to the rapid growth of car demand experienced in Europe between 1986 and 1990. During that period, European parts producers were predominantly busy trying to meet increased demand from the EC car manufacturers. As a result, their export effort remained limited, while imports were boosted by the buoyancy of the EC car market. Nevertheless, the trend was not really reversed in 1990 and 1991 when the European vehicle demand was somewhat weaker. The dwindling European trade surplus certainly signals some of the structural problems presently encountered by the European industry.

Extra-EC exports are relatively diversified in terms of destinations with the EFTA countries and North America respectively accounting for about 27% and 15% of total shipments as developing countries also remain an important end market with a share of more than 35%. In terms of extra-EC imports, flows are more concentrated with 50% of total non-EC supply originating from the EFTA countries, Sweden in particular. With a share of 20%, Japan is the second largest supplier to the EC. The share of trade with North America has dwindled considerably in recent years both in terms of imports and exports. With regard to the EC trade surplus, Germany continues to be the major contributor.

MARKET FORCES

Demand

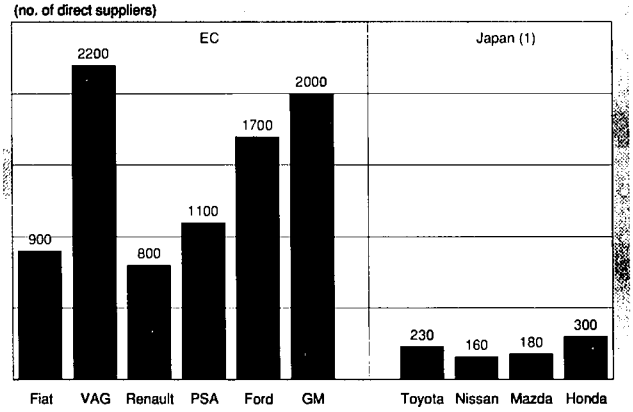
Demand for OEM is, by definition, linked to the level of activity in the automotive production. Some segments of OEM, however, benefit from a faster growth than the auto market in general. This situation corresponds to components whose rate of penetration in vehicles is still on the rise. Such is the case, for instance, of equipment which a few years ago was optional (primarily in the upper car segment) and are now increasingly fitted as standard equipment on most models. Some examples include: electronic fuel injection, anti-lock brakes and air conditioning systems. In addition, original equipment manufacturers have largely benefited from a trend towards increasing outsourcing by vehicle makers.

On the other hand, demand for replacement parts depends on the usage of automobiles and other motor vehicles, as opposed to new sales. Demand is likely to be more stable in this market than in the original equipment market. The replacement parts market differs greatly from country to country. Market features in the various EC countries depend largely on the annual mileage per vehicle, the age of the car parc and the existence of specific legislation with regard to obligatory inspection of vehicles when they reach a certain age.

Supply and competition

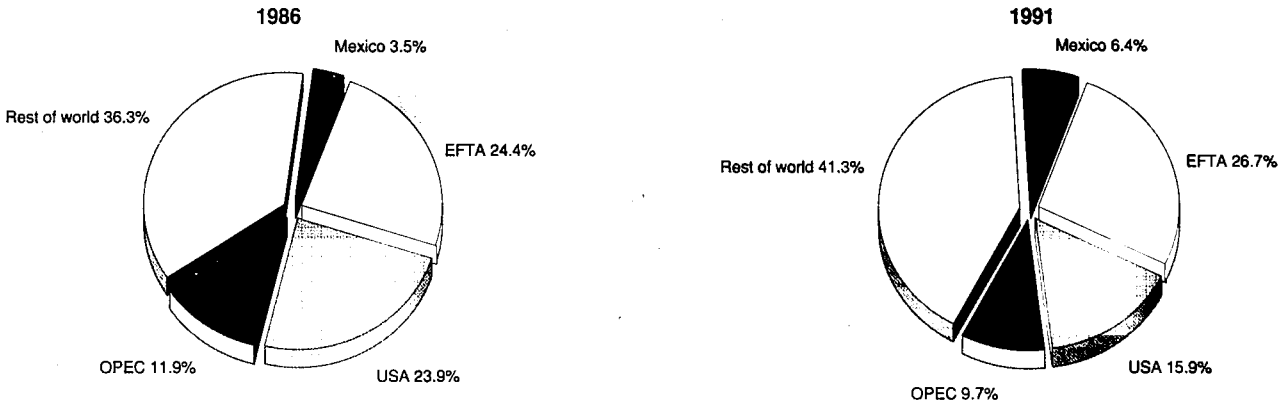
The supply of original equipment is undergoing fundamental structural change. Increasing internationalisation of vehicle manufacturers calls for the emergence of large international (sometimes worldwide) component manufacturers. In addition, the pattern of relationships between manufacturers and suppliers is being substantially modified and a rising share of the value added generated in the auto industry is transferred from vehicle to component manufacturers. To some extent, the balance of power is now shifting from the former to the latter.

Figure 3: Motor vehicle parts and accessories
Direct suppliers to original equipment manufacturers, EC and Japan



(1) Kyoryokukai members, except Honda
Source: PRS, BCG

Figure 4: Motor vehicle parts and accessories
Destination of EC exports



Source: Eurostat

A major reason behind such a change arises from the necessity for car manufacturers to limit investment and resources to essential activities which represent the core of their industry. One method is to increase outsourcing and to pass on the responsibility for product development, manufacturing and quality assurance functions to their suppliers (systems suppliers and/or specialised affiliated companies). Component producers contribute to the competitiveness of the industry, and the two sectors become increasingly interdependent.

Although conceiving, designing and producing in accordance with manufacturers' specifications, the component producer is increasingly technically autonomous. This is typically the case of systems suppliers who possess proprietary technology and product know-how. As a result of these transfers of value added, car manufacturers reduce the number of their suppliers to a smaller number of large producers which will in turn outsource part of their output to smaller companies, the whole supply chain thus posting a tiered structure.

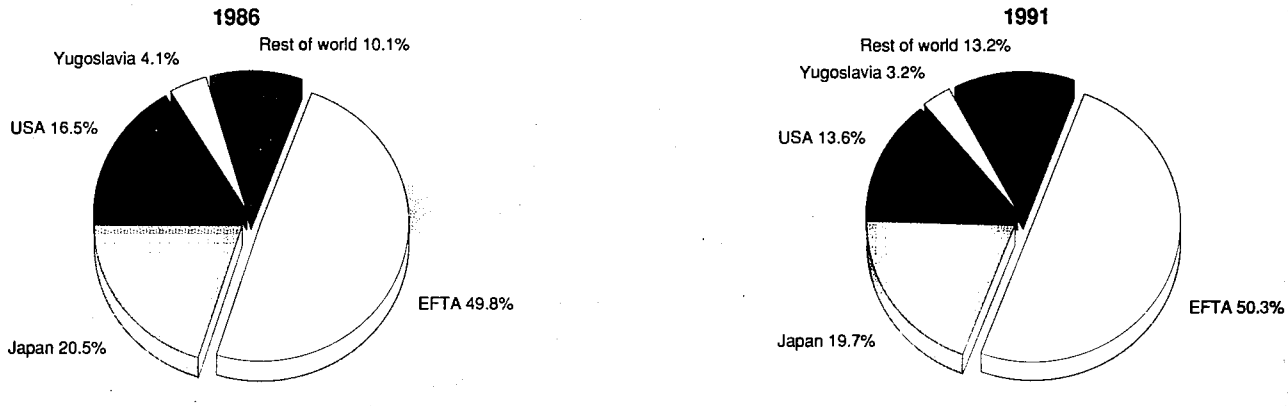
The current pattern with regard to outsourcing practices within the EC automotive industry differs greatly from manufacturer to manufacturer. It is generally accepted, however, that the overall level of outside purchasing carried out by the European car manufacturers (60% to 70% of total component requirements) is more important than in the US industry (40% to 50%) but less than in Japan (around 80%).

Turning to the replacement equipment, it is generally estimated that about 70% of the market supplied by independent parts manufacturers, with the remaining 30% is controlled by the car manufacturers via their distribution and service networks. With regard to the industrial origin of such parts, however, car manufacturers comprise only a 10% share of the market.

Production process

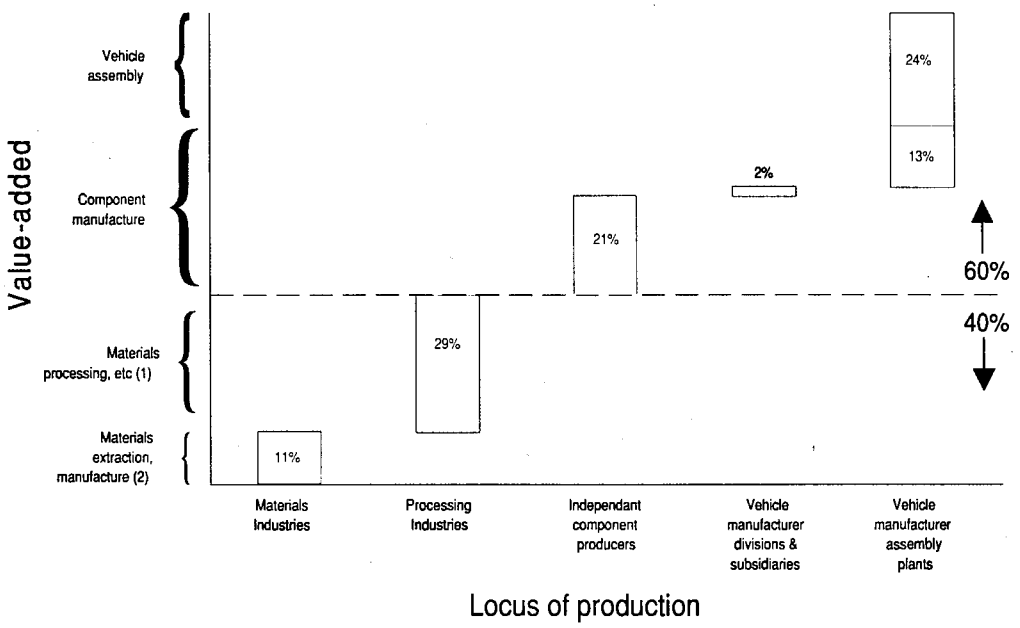
The nature of the automotive products, together with shorter product life cycles, puts increased emphasis on the technological content of automotive parts. Increased use of electronics and new materials leads to increased collaboration with other leading high-tech industries and a sizeable investment in R&D organisations and equipment at all levels of the pyramidal structure of the sector. Once almost exclusively oriented towards applied engineering, the existing R&D resources of the sector are now taking greater initiative in terms of new technologies offering improved performance, fuel economy, emission control, safety and comfort. Black-box engineering is becoming an increasingly standard practice within the industry requiring enlarged R&D functions utilising up-to-date CAD (Computer-aided design) equipment and involve-

Figure 5: Motor vehicle parts and accessories
Origin of EC imports



Source: Eurostat

Figure 6: Motor vehicle parts and accessories
Importance of the EC component industry



(1) Including universal, unfinished and sub-componentry
(2) Including steel, non-ferrous metal, plastic, textile, and paint manufacture
Source: BCG

ment at an early stage of the development process of new vehicles.

The competitive pressure on costs, prices, quality and delivery standards has led the industry to restructure in a parallel manner to the car manufacturers. Automotive parts suppliers compete on the basis of price as well as delivery and quality. The excellence of the Japanese industry in such fields (considered as a major reason for their competitive edge) has generated a trend towards adapting Japanese-type production techniques in order to achieve better control of all factors having a significant bearing on production costs. Just-in-time, zero-defect, CAM (Computer-aided manufacturing), automation, and faster communication systems, are some of the features which have allowed substantial productivity gains while improving flexibility and allowing self quality assurance schemes to be put in place. This process (requiring sizeable investment and a recourse to skilled manpower) is far from being complete, especially among small to medium-sized producers.

INDUSTRY STRUCTURE

Companies

The industry is basically composed of three types of producers:

- the large diversified producer, whose output consists of many products in addition to auto parts (Bosch and Siemens in Germany)
- the larger producers specialising in auto parts (Valeo in France, Magneti-Marelli in Italy)
- hundreds of SMEs producing auto parts on a smaller scale.

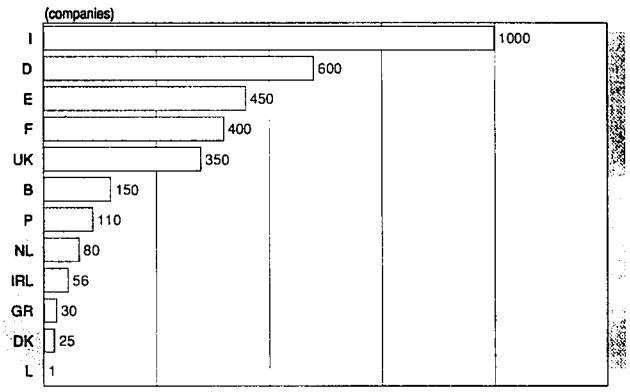
The trend towards more component outsourcing by car manufacturers combined with fundamental changes in the nature of the industry are having a dramatic result on the overall numbers of independent operators present in the industry. Vehicle manufacturers are cutting back on the number of suppliers and committing larger shares of their purchasing requirements to preferred systems suppliers. These systems suppliers outsource part of their work to second or third tier suppliers. Overall, during the past five years, it is estimated that the number of independent companies (previously direct suppliers to the EC car manufacturers) has been reduced by approximately 50%. A large part of this reduction has been achieved via mergers, takeovers and consolidations among previous competitors or companies having industrial synergies, such as Valeo/Neiman and Magneti-Marelli/Solex/Jaeger/Weber.

In spite of the increased presence of large international companies, the original equipment sector continues to be very fragmented. The average size for firms is about 270 people, but 64% of these enterprises employ less than 100 persons. Only 4% of the companies account for 50% of total employment (firms with more than 1 000 employees). This is essentially due to the nationally based nature of parts procurement. Although intra-EC trade has grown to extremely high levels during the past decade, most vehicle manufacturers continue to source largely from their domestic suppliers. For instance, Daimler-Benz procures approximately 90% of its needs from Germany, Renault, about 70% from France, and Fiat, about 85% from Italy.

The independent German industry dominates the European market with about 39% of the total European production (estimated at 79 billion ECU in 1988). This strength comes from the sheer size of the German motor vehicle industry, the importance of the upper market segment, and from strict legislation on car maintenance. The large German firms have played a major role in developing new products as illustrated by Bosch (the world's largest unaffiliated auto parts producer) which is a pioneer in the fields of fuel injection and anti-locking brake systems. Bosch alone is estimated to account for nearly a quarter of German production. The leader's vitality aided many smaller firms and contributed (together with other large firms such as ZF, Fichtel and Sachs, Teves, and VDO) to the unchallenged leadership of Germany within the European ASI.

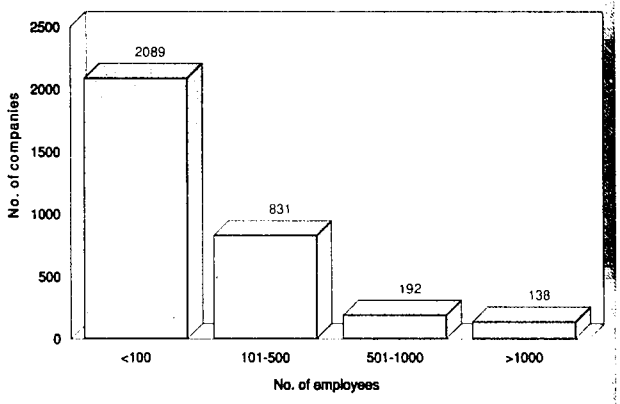
The French industry is the second largest in Europe, with about 23% of the European total. Its structure is still char-

Figure 7: Motor vehicle parts and accessories
Number of suppliers by country, 1988



(1) Estimates
Source: PRS, BCG

Figure 8: Motor vehicle parts and accessories
Number of auto component companies by employee size



Source: PRS, BCG

acterised by a large number of nationally oriented small to medium-sized producers. Major restructuring has taken place in recent years, led by the three international scale emerging groups: Valeo, Epeda-B-Faure and ECIA (PSA group).

The Italian industry (which accounts for about 14% of the European production) is dominated by the Fiat group. The leading producer is Magneti-Marelli (a subsidiary of Fiat) which now has an increased presence in all major European markets. Widely dispersed in the early 1970s, the sector is being tightly restructured under the influence of Fiat.

The UK components industry (10% of the total sector) has been badly hit by the decline of British vehicle production and its excessive dependence on domestic manufacturers. The existence of an important replacement market, however, together with the increased rate of Japanese investment in automotive production activities in the UK, has allowed the large British component producers (Lucas-Girling, T&N and GKN) to restructure and regain vitality in a market with considerable potential.

The Spanish industry has emerged since the late 1970s as another important producer of automotive components, having now reached a size comparable with the UK. Originally developed to comply with local content requirements, the industry has grown considerably since the early 1980s, thanks to the increased importance of Spain as a car manufacturing country. However, most of the components producers present in Spain are subsidiaries of foreign companies.

Strategies

As the Japanese car industry has shown, the necessity for the car manufacturer to rely increasingly on a smaller supply base implies fundamental changes in the structure of the sector. This means an increase in the sharing of high-value added products, faster growing R&D expenditure, and a need for organisations to adapt to new constraints (excellence in quality, delivery and price, not to mention production flexibility). Finally, there is a need to share productivity gains on a continuous basis with car manufacturers and to finance a growing share of productive investments (tooling and specific equipment) necessary for tailor-made products.

In return, car manufacturers are offering longer term purchasing commitments and closer cooperation, both of which contribute to improved stability in mutual relationships.

As a result of this process, the component industry will increasingly be reshaped into a pyramidal structure. First tier suppliers with a worldwide presence, proprietary technology and scale economies will design and supply full systems rather than single components. They will outsource part of their work from smaller second or third tier suppliers. The observed past trend toward increased concentration will continue during the decade but a further radical reduction in the number of independent producers is unlikely since many will survive as second or third tier suppliers.

OUTLOOK

Production and consumption of original equipment will grow at about 4% to 5% per year in real terms over the next 5 years, outpacing vehicle production (less than 3%). The outlook for replacement components is less up-beat with a possible decline of the market in real terms over the next years.

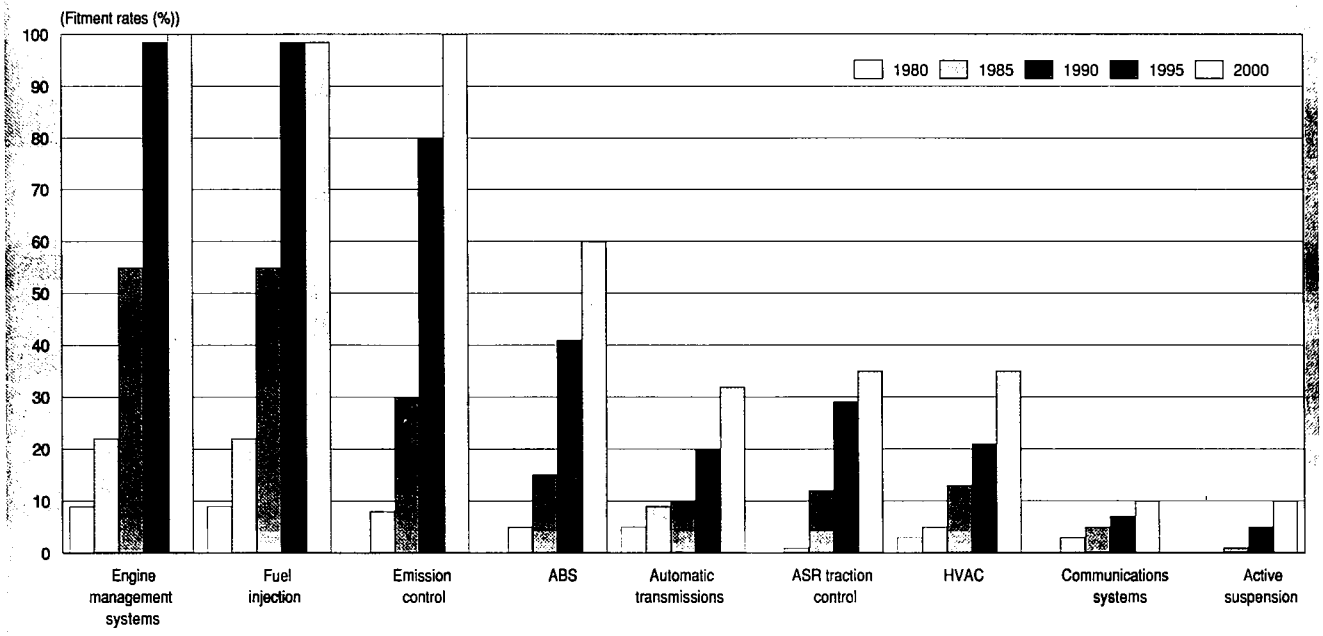
With regard to the original equipment market, most of the growth will result from:

- vehicles increasingly fitted with such standard equipment as automotive electronics, anti-pollution devices and more efficient safety restraint systems;
- the general "up-market" move in car demand with customers demanding more equipment, comfort and power;
- the increase in component outsourcing by car manufacturers with high added value.

With regard to the replacement market, it should be remembered that this segment is governed by the number and the state of vehicles on the road, as well as changes in consumer behaviour. These changes can either come about spontaneously, or be spurred by legislation on vehicle testing or compulsory maintenance. The constitution of the Single Market makes it likely that such measures will spread to countries where they have been absent until now. This, combined with the consumer's desire for safer and more comfortable driving, and the expected growth of the total car park in Europe, implies that there will be promising demand growth in the replacement parts market. On the other hand, technological advances should result in more durable parts and slow replacement cycles. Increased opportunities in East European markets will also have a positive influence on demand for automotive components.

The overall outlook for growth in motor vehicle parts and accessories is good, but major adaptation and competitive efforts from the industry are still required.

Figure 9: Motor vehicle parts and accessories
Historic and forecast fitment rates for specific high-tech components in Europe



Source: PRS

Table 4: Motor vehicle parts
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.9	4.6
Production	2.1	3.1
Extra-EC exports	1.1	2.1

Source: DRI Europe

Written by: DRI Europe
The industry is represented at the EC level by: Comité de Liaison de la Construction d'Equipments et de Pièces d'Automobiles (CLEPA). Address: 93 Rue de Stassart, B-1040 Brussels; tel: (32 2) 511 2919, fax: (32 2) 513 3802.

Mopeds and motorcycles
NACE 363

The decline in EC production of cycles, mopeds and motorcycles in the 1980s stemmed both from shrinking market demand and strong import competition from Japanese products. After much restructuring, it was a leaner and more competitive industry that was able to take advantage of the pick-up in demand in the mid-eighties. Since 1988, EC production of cycles, mopeds and motorcycles has followed a steady upward course.

INDUSTRY PROFILE

Description of the sector

NACE 363 comprises the manufacture and assembly of cycles, mopeds, motorcycles, scooters, and their parts and accessories. In Italy, the manufacture and assembly of cycles, mopeds and motorcycles accounts for about three-quarters of total production, with parts and accessories making up the balance. In France, the share is slightly more than 60% for cycles, mopeds and motorcycles with just under 40% of industry output accounted for by parts and accessories.

The largest component of the industry is the production of mopeds and motorcycles where mopeds are defined as motor driven vehicles of two to three wheels with an engine displacement not exceeding 50cc and a maximum design speed of 50 km/h. Motorcycles are motor driven vehicles with two to three wheels with an engine displacement exceeding that of mopeds.

Main indicators

Production of mopeds and motorcycles stagnated during the first half of the eighties, such that by 1987, EC output had not progressed beyond its level in 1982. In line with the weakness in demand and production growth, employment fell drastically. In the last several years, however, there has been a strong recovery in consumption and production. This increase in demand has benefited imports more than domestic production such that the EC's trade deficit on mopeds and motorcycles has widened considerably since the beginning of the eighties. At close to 49 000 in 1990, employment in the mopeds and motorcycles industry remains at about half its 1980 level.

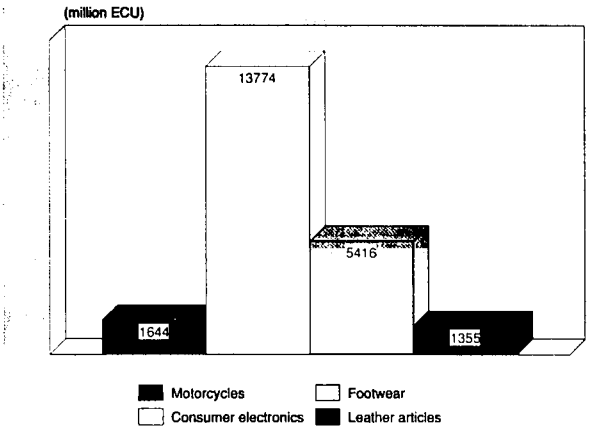
Despite the fact that production volumes for the overall industry as defined by NACE 363 have recovered in the last several years, the actual number of mopeds and motorcycles produced in the EC is still below the levels achieved in 1980.

Italy is the largest producer of mopeds and motorcycles in the EC, twice the size of the next largest producer, Germany. Spain's moped and motorcycle industry, the third largest and the fastest growing in the EC, will soon overtake the number two spot from Germany.

Recent trends

Although very weak in the first half of the 1980s, consumption improved as of 1985, expanding hesitantly at first, before growing by upwards of 10% per year (in real terms) in both 1989 and 1990. Production did not recover as quickly from the downturn in economic activity in the early eighties. After six successive years of declining volumes, it was not until 1989 that production expanded once again. Much of this improvement in output growth was due to the pick-up in home demand as export sales continued to be weak. The stronger

Figure 1: Mopeds and motorcycles
Value added in comparison with other industries, 1991



Source: Eurostat

home demand instead benefited imports. Employment, which by 1988 was but half of the 92 975 employed in the industry in 1980, has remained stable in recent years.

International comparison

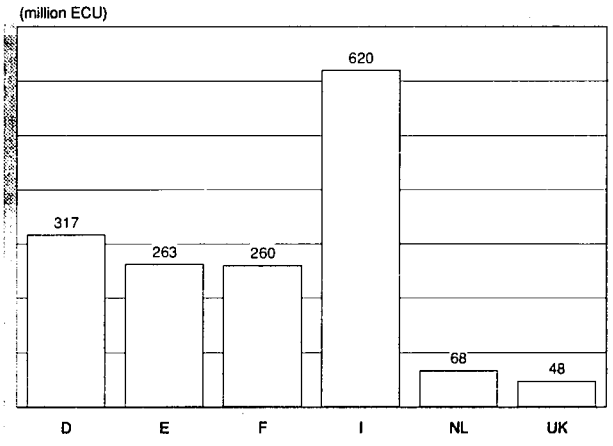
World production of mopeds and motorcycles is dominated by the East Asian NIC's, which held 41% of total world production in 1988, followed by Japan, with 26.2%, Eastern Europe, with 16%, and the EC, with 12.9%.

In fact, the strength of Japan and the EC is understated by these figures. First, a large part of East Asian production is carried out under European and Japanese licenses. Second, while production in Eastern Europe may edge out the EC in terms of number of units produced, the technology of these vehicles is looked upon as outdated. The popularity of mopeds and motorcycles in Eastern Europe has been supported by fact that the alternative, passenger cars, has been prohibitively expensive. Taking these factors into consideration, Japan and the EC are raised to the top of the world ranking.

Foreign trade

In terms of units, about one quarter of all mopeds and motorcycles produced in the EC are sold outside of the EC, with the export/production ratio slightly higher for mopeds

Figure 2: Mopeds and motorcycles
Value added by Member State, 1991



Source: Eurostat

Table 1: Cycles, motorcycles and parts and accessories
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	3 958	3 708	3 754	3 537	3 824	3 969	4 588	5 781	6 704	7 670	8 707
Production	3 489	3 308	3 434	3 351	3 508	3 411	3 816	4 568	5 073	5 453	5 910
Extra-EC exports	435	471	554	609	570	521	542	568	629	627	646
Trade balance	-469	-400	-319	-186	-316	-558	-772	-1 213	-1 631	-2 218	-2 797
Employment (thousands)	80.3	73.3	66.6	61.0	56.3	48.8	47.6	48.6	49.2	48.7	49

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Mopeds and motorcycles
Main indicators by country in volume, 1991

	Sales		Production		Extra-EC exports	
(thousands)	Mopeds	Motorcycles	Mopeds	Motorcycles	Mopeds	Motorcycles
Belgique/België	32	0	42	0	2	0
BR Deutschland (1)	85	144	35	53	2	23
España	266	117	229	92	3	1
France (2)	192	116	303	21	81	1
Italia (3)	495	123	556	235	71	105
Nederland	66	0	26	0	N/A	0
Portugal (4)	35	0	53	0	N/A	0
United Kingdom	12	52	0	3	0	N/A
EC total	1 183	552	1 245	404	159	130

(1) Including former East Germany
(2) Competition motorcycles and three wheelers excluded
(3) Including CKD vehicles and three-wheelers for production; three-wheelers for sales; and CKD vehicles for exports
(4) Imports excluded for sales
Source: Colimo

Table 3: Cycles, motorcycles and parts and accessories
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-9.0	9.4	2.9
Production	-5.6	5.3	1.5
Extra-EC exports	5.3	-6.3	-2.6
Extra-EC imports	-13.5	15.8	5.1

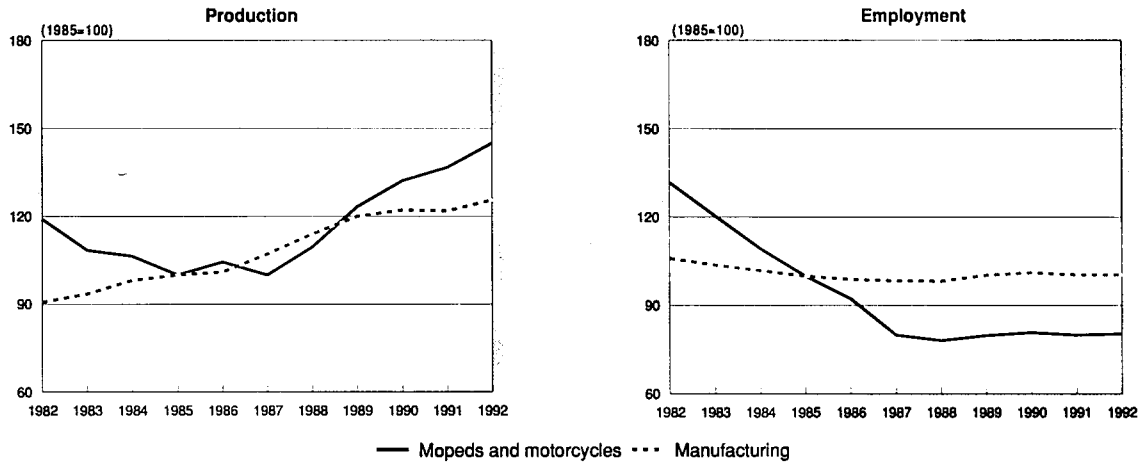
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Cycles, motorcycles and parts and accessories
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	435	471	554	609	570	521	542	568	629	627
Extra-EC imports	905	871	873	795	887	1 079	1 314	1 781	2 259	2 845
Trade balance	-469	-400	-319	-186	-316	-558	-772	-1 213	-1 631	-2 218
Ratio exports/imports	0.48	0.54	0.63	0.77	0.64	0.48	0.41	0.32	0.28	0.22
Terms of trade	113.2	110.6	102.7	100.0	102.9	98.3	94.4	92.7	103.3	102.0
Intra-EC trade	640	680	714	725	783	863	1 004	1 259	1 606	1 680
Share of total imports (%)	41.4	43.8	45.0	47.7	46.9	44.4	43.3	41.4	41.5	37.1

(1) Estimates
Source: Eurostat

Figure 3: Mopeds and motorcycles
Production and employment indices compared to EC manufacturing



Source: Eurostat

than for motorcycles. Italy, as the largest producer, is also responsible for more than two-thirds of extra-EC exports, a share which has increased slightly throughout the 1980s.

Although the EC recorded a trade deficit in 1991, Germany is by the far the largest importer of mopeds and motorcycles in value terms and the largest contributor to the trade deficit for mopeds and motorcycles.

The largest export market for EC producers of cycles, mopeds and motorcycles is the EFTA countries, which account for 40% of extra-EC exports, a share which is slightly up from 1986. The North American market, although the second most important, has declined in importance since 1986, both as a share of total extra-EC exports and in absolute terms. Japan, the OPEC countries, and the EC overseas departments (départments outre-mers) are the fastest growing export markets.

While extra-EC exports were up by only 10% in 1991 over 1986, imports more than tripled in the same five years. Although Japan is the largest supplier of mopeds, motorcycles and parts and accessories, its share of total extra-EC imports has in fact declined since 1986 while imports from the ASEAN countries (Thailand, Singapore, Malaysia, and the Philippines) more than doubled each year between 1986 and 1991.

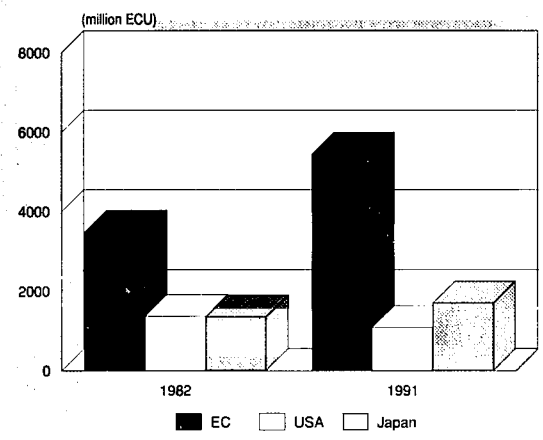
MARKET FORCES

Demand

Consumers are the single most important component of demand for the mopeds and motorcycle industry. Thus overall economic activity, personal disposable income and trends in demographics are the overriding factors in the demand for cycles, mopeds and motorcycles.

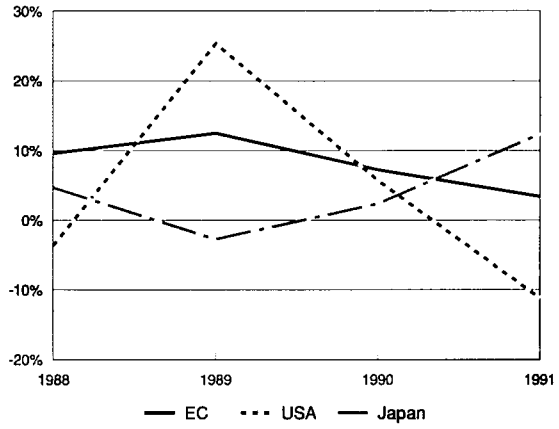
Production weakened in the early to mid-1980s amid faltering demand and the weak economic climate in Europe. Changing demographics reinforced this trend as demand for mopeds and motorcycles by teenagers and young adults in the 1970s gave way to demand for passenger cars in the 1980s. The increased volume of traffic in the cities, and laws aimed at increasing safety requirements for drivers of motorcycles and mopeds also served to reduce the attractiveness of buying a moped or motorcycle. The falling levels of production led to lower direct employment as a result of plant closures and

Figure 4: Mopeds and motorcycles
International comparison of production at current prices



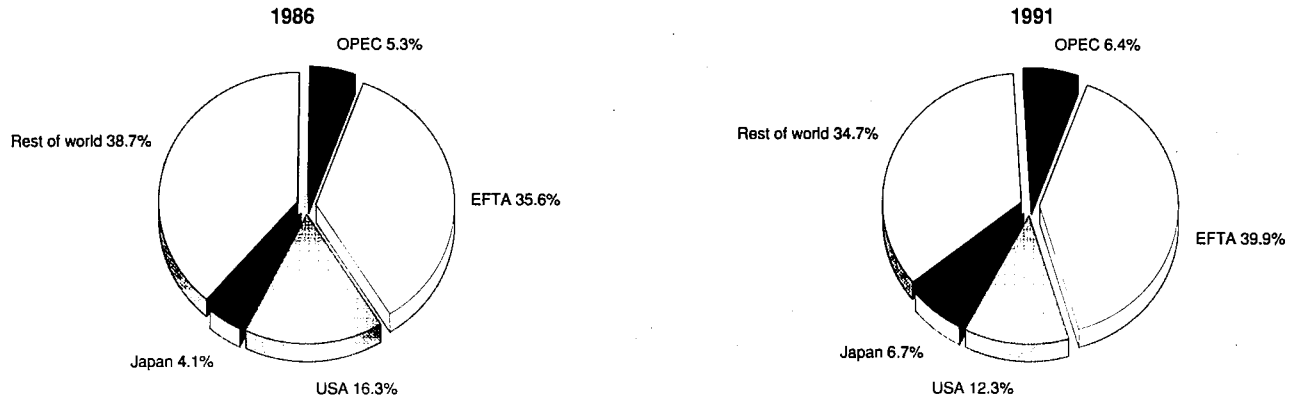
Source: Eurostat, Census of Manufacturers

Figure 5: Mopeds and motorcycles
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Mopeds and motorcycles
Destination of EC exports



Source: Eurostat

restructuring activity, especially in the countries of northern Europe.

In the late 1980s, a stronger economic climate led to a re-surgence in demand for both moped and motorcycles, although production and sales (measured in terms of the number of mopeds and motorcycles) have yet to reach the popularity that they held at the beginning of the decade.

Domestic (i.e. EC) demand is the most important outlet for sales, as less than one-third of production is exported. In fact, since the early 1980s, exports have become a less important component of demand for the EC.

Supply and competition

Within the EC, Italy has maintained (if not consolidated) its dominance as the most important producer of mopeds and motorcycles over the eighties. About half of Italy's production of mopeds and motorcycles (excluding parts and accessories) is destined for export markets beyond the EC. France has a slightly more outward looking orientation with one-quarter of its production of mopeds and motorcycles being exported. Output sales of cycles, mopeds, motorcycles and parts and accessories is destined for foreign markets. Whereas extra-EC exports of motorcycles has declined on average across the EC over the eighties, foreign sales of mopeds have become a more important component of demand for Italy, the dominant producer and exporter of mopeds in the EC.

In terms of international competitors, Japan has the largest share of the EC market. Japanese penetration of the EC market has risen despite import restrictions on Japanese goods in Italy, France, Spain and Portugal. The EC's trade deficit with Japan has more than doubled between 1986 and 1991.

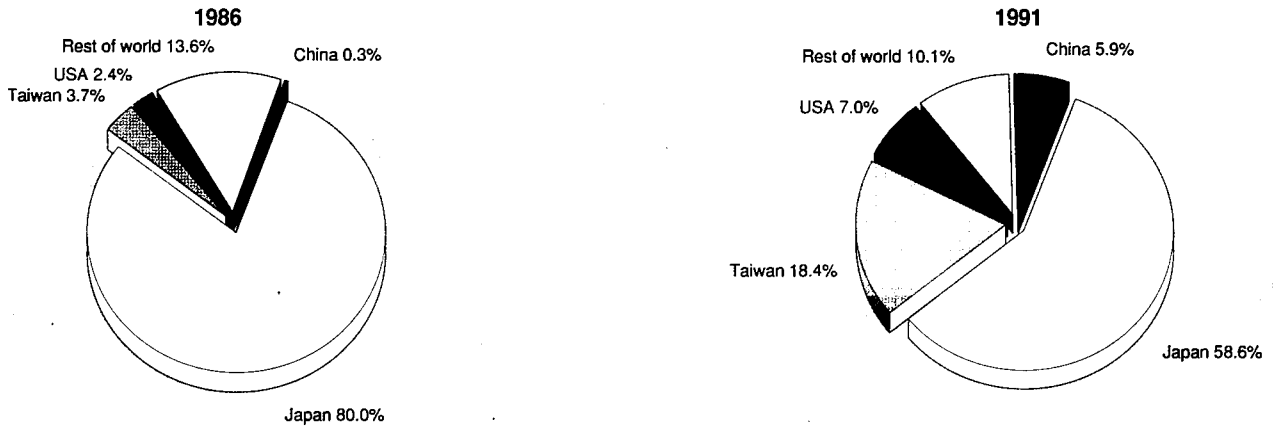
The rise in the share of imports in comes not only from Japan. EC manufacturers have licensed companies in South East Asia, India, the People's Republic of China, Taiwan and the Middle East to produce or assemble European models. This has had the effect of increasing imports to the EC from these countries, and reducing extra-EC exports from the EC.

Production process

Falling levels of production as the eighties progressed have led to lower employment levels in the industry as a result of plant closures and restructuring activity, mostly in the northern European countries. The associated improvements in productivity, however, have increased the industry's competitiveness.

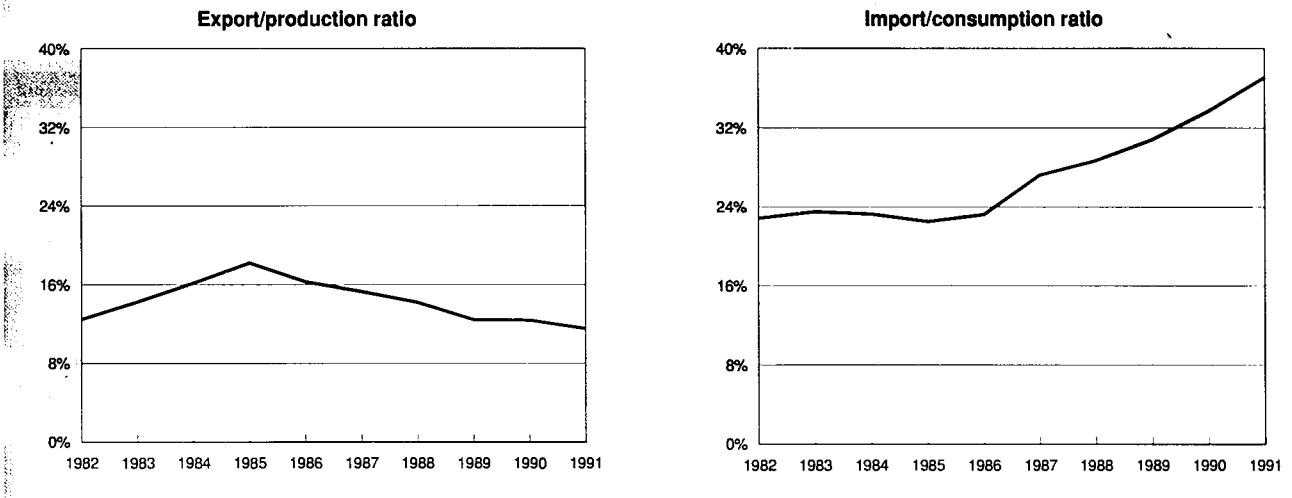
Part of the impetus to improve competitiveness has come from the Single Market as all major EC manufacturers are

Figure 7: Mopeds and motorcycles
Origin of EC imports



Source: Eurostat

Figure 8: Mopeds and motorcycles
Trade intensities



Source: Eurostat

actively pursuing strategies to help them capitalise upon opportunities offered by the new competitive environment resulting from the Single Market. The common standards (licences, legislation, etc.) adopted by the Member States will lead to further rationalisation and automation of the EC manufacturing process. Standards presently differ widely across the EC as illustrated by the number of gears on mopeds, motorcycles of 50cc and less. In Belgium, France and Portugal, automotive gears are required; in Denmark, the maximum number of gears is 2 and in Spain, 4. The opportunities arising from the Single Market will also depend on a common transport policy and the result of trade talks with Japan, especially on the opening of its market and easier access to its distribution network.

The industry is developing new technology both in terms of the design of the vehicle and its construction. The use of CAD/CAM has introduced the use of robotics, laser cutting machines, improved painting systems and more sophisticated quality control systems.

Labour productivity varies, depending on the type of model that is produced by each company. Thus labour productivity ranges from 18 units per employee per year at BMW in 1989, to 102 at Honda, and 122 at Moto Vespa. On average, labour productivity averages around 100 units per employee per year for the biggest companies.

INDUSTRY STRUCTURE

Companies

Fifty-one manufacturers of mopeds and motorcycles in the EC account for about 85% of total EC production, with the remainder being accounted for by Japanese producers. Of the EC producers, more than half are located in Italy. Spain and Portugal are the next most important countries in terms of number of manufacturers, with seven and six respectively.

The moped and motorcycle industry (excluding parts and accessories) is fairly concentrated with the ten largest producers accounting for about 68% of EC production. The size of the enterprises is larger than average in France, Spain, Italy and the Benelux.

In terms of output, Italy again dominates, accounting for 42% of EC moped production, and 78% of EC motorcycle production. Spanish manufacturers hold 20% of EC moped and motorcycle production (excluding parts and accessories), and France, 18%. Japanese manufacturers control 15% of EC mopeds and motorcycle production through licensing agreements and financial holdings in local plants.

The number of domestically owned manufacturers in the EC has remained fairly stable over the last several years. The number of Japanese manufacturers have increased their financial holdings of existing European companies, gradually assuming control.

Table 5: Cycles, motorcycles and parts and accessories
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	21.8	21.7	22.9	23.2	26.9	27.4	29.2	31.4	33.1	33.7
Productivity index	94.3	93.6	98.9	100.0	116.0	118.1	126.0	135.4	143.1	145.7
Unit labour costs index (3)	82.7	86.2	92.5	100.0	100.7	109.7	115.8	120.3	126.1	N/A
Total unit costs index (4)	76.2	80.3	94.6	100.0	115.7	125.8	144.3	160.8	167.6	169.6

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed in current prices
(4) Excluding costs of goods bought for resale
Source: Eurostat

Based on sales, the Italian Piaggio Group is the largest supplier of mopeds and motorcycles on the EC market followed by Peugeot MTC (France), Moto Vespa (Spain) and Derbi (Spain). Piaggio is ranked third at the world level, behind Honda and Yamaha of Japan.

The Piaggio Group includes Piaggio, Gilera, Puch (Austria) and Moto Vespa (the largest producer in Spain). Other important Italian manufacturers are the Cagiva Group (Cagiva, Ducati, Husqvarna and Moto Morini), Aprilia and the Moto Guzzi-Benelli Group, plus a large number of smaller producers.

France's largest producer, Peugeot MTC, is primarily engaged in the manufacture of mopeds and scooters (50cc-80cc). Some Peugeot scooters and 50cc engines are produced under licence by Honda which has a 25% stake in Honda. The second largest French manufacturer, MBK Industrie, a company which is under full control by Yamaha. MBK assembles Yamaha scooters and light motorcycles and manufactures mopeds under Motobécane design.

In Spain, Moto Vespa and Derbi are the main manufacturers accounting for 59% of Spain's production of mopeds and motorcycles. The assembly operations of Honda, Yamaha and Suzuki account for one-third of local production in Spain. Germany's largest producer is BMW, which is focused on the manufacture of motorcycles with large engines. In Portugal, SIS Vehiculos Motorizados LTDA is the largest manufacturer, producing moped equipped with engines either from Fichtel & Sachs (Germany) or Franco Morini (Italy). SIS also assembles Yamaha trail bikes. The second largest manufacturer in Portugal is Famel.

Honda Belgium is the largest producer in Belgium. The company uses parts with a European origin rate of 75%. In the Netherlands, the most important manufacturer, SPARTA BV, produces light mofas. The assembly of mopeds and mofas is carried out by Tomos.

The three largest Japanese producers in the EC are Yamaha, Suzuki and Honda. These companies are targeting the market for motorcycles with engines exceeding 251cc, of which they hold an 82% share of the EC market.

Strategies

Since the early eighties, many European manufacturers have carried out major investment projects to improve their competitiveness, yielding advances in the area of moped, scooter and low capacity motorcycle production. To capitalise on the improved demand outlook at the end of the eighties, companies were undertaking further investment to improve production facilities and devoting resources to developing new models. Investment in R&D to develop new, more advanced and cleaner models is becoming increasingly important in the face of heightened competition. According to a sample of nine moped and sixteen motorcycle manufacturers, R&D spending was equivalent to 3.4% of turnover in 1989, while investment in new capacity reached almost 5% of turnover. BMW spent 8.1% of turnover on R&D in 1989.

In response to the poor economic situation of the early 1980s, a number of companies began to engage in merger and acquisition activity to buy market share and to take advantage of economies of scale in production. For example, the Italian Piaggio acquired the Austrian company Puch, and Cagiva-Ducati merged with Moto Morini and Husqvarna.

In general, however, merger and acquisition activity has been dominated by Japanese companies interested in acquiring a base in Europe. In Spain, for example, Suzuki bought Avello-Puch of Spain in 1986, while the following year, Yamaha bought Babesto. The investments are beginning to show positive returns. Although the Japanese have acquired about 15% of the enterprises in the EC, they accounted for 36% of sales in 1989. Although the top 12 EC producers of mopeds and motorcycles accounted for 94% of total EC output in 1989, they accounted for only 64% of sales in the EC, reflecting the high degree of import penetration. Most of these Japanese producers, however, do perform assembly in Europe.

REGIONAL DISTRIBUTION

Italy is the largest producer of cycles, mopeds and motorcycles in the EC, accounting for about one-third of EC production and employment in the industry. Germany, Spain and France follow in terms of importance. If only the number of motorcycles produced is considered, Spain and France are both larger producers than Germany.

Again in terms of the production of motorcycles alone, the downturn in the industry in the eighties was borne primarily by the industry's largest producers, that is, Italy, France and Germany. Germany suffered such a dramatic decline in output that by 1986, Spain, Portugal and Belgium were all larger producers. Spain, now the third largest producer of motorcycles in the EC, has more than doubled its share of total output since 1980.

Most of these declines in production correspond to shrinking home demand for motorcycles at home as the industry is not particularly export intensive. The steepest declines in sales were registered in the markets of Germany, the United Kingdom, France and Italy.

The fast growing demand for Spanish production of motorcycles comes primarily from the home market. In 1987, sales in Spain exceeded home production for the first time. Along with Spain, the Netherlands is the only other Member State where sales of motorcycles in the early 1990's clearly exceeds that of 1980.

Although extra-EC exports declined considerably since the mid-eighties, France remains the largest EC exporter of motorcycles, measured both in terms of overall units and as a share of its production. Whereas extra-EC exports of motorcycles account for slightly more than a quarter of total production in France, extra-EC exports account for just over 10% of total production of motorcycles in Italy.

ENVIRONMENT

The main environmental considerations which may have an effect on the cycles, mopeds and motorcycles industry are the problems of urban traffic congestion and exhaust emissions. Should more governments introduce restrictions on traffic circulation in the larger cities (Italy has already introduced restrictions in Rome and Milan, for example), demand for cycles, mopeds and motorcycles may be stimulated.

REGULATIONS

Regulations concerning the harmonisation of standards in the industry would allow manufacturers to standardise the manufacture of parts. This could give rise to gains in scale economies and instigate further rationalisation in the industry.

As cycle, moped and motorcycle use increases, however, safety requirements will follow. There are suggestions that the Italian requirement to wear crash helmets in 1986, the introduction of speed limits, and the German requirement to have a licence for mopeds in have all dampened demand for mopeds and motorcycles. Such changes in the regulations, however, are viewed as temporary and will diminish as consumers become more accustomed to the new regulations.

OUTLOOK

The most difficult period for the EC moped and motorcycle industry appears to be over. The rationalisation of the industry which has taken place over the last several years and

Table 6: Cycles, motorcycles and parts and accessories
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	7.6	7.5
Production	4.5	4.3
Extra-EC exports	-1.0	0.0

Source: DRI Europe

a stronger economic outlook (compared to 1990 and 1991 results in particular) should combine to improve the prospects for the cycles, mopeds and motorcycle industry. Future success, however, will depend on the sector's ability to achieve a higher degree of concentration in order to benefit from economies of scale in production and research and development. The development of vehicles that could use standard parts and further concentration on the "two-wheel parts and accessories" segment of the market would continue to bring costs down.

A harmonisation of the EC legislation will play a positive role in the development of more standard products and encourage further restructuring in the sector.

On the demand side, environmental concerns could lead governments to encourage the use of mopeds and motorcycles in urban centres to reduce traffic congestion. Growing health consciousness and the penetration of "mountain" and "city" bikes that have already been popularised in North America, will improve the prospects for demand for bicycles.

While growth in real consumption may pause in 1992, as demand increases in line with an improvement in consumer spending, the outlook for growth in real consumption will strengthen to above 5% to 1996. Imports will take an ever increasing share of this demand, however, thus the forecast for production is not quite as buoyant while employment is expected to stabilise at close to its present level. If government initiatives are introduced to encourage the use of two-wheel vehicles are implemented, the production and sales forecast would be revised upwards.

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Shipbuilding
NACE 361

Contrary to the widely-held belief that Japanese and South Korean shipbuilders are dominant in almost all sectors of the industry, the fact remains that the EC continues as the world leader in the high value added segments of fully cellular container ships and non-cargo vessels.
In sum, however, the EC shipbuilding industry confronts considerable challenges for the near future. Minimal growth in sea-borne trade and a lingering overcapacity in the shipping industry in 1991 worked against the prospect for an immediate upturn in production (at constant prices) or employment. On top of that, the revaluation of the ECU against the US dollar and the yen, and the devaluation of the Korean won have reduced the competitiveness of the EC shipbuilders.
The inclusion of shipyards in former East Germany is prompting debate within the EC with respect to the conformity of subsidy ceilings among Member States.

INDUSTRY PROFILE

Description of the sector

NACE 361 comprises the building and repair of seagoing vessels (NACE 361.1); building and repair of vessels for inland navigation (NACE 361.2); building and repair of boats and yachts (NACE 361.3); painting of ships (NACE 361.4); and ship breaking (NACE 361.5).

Most of the industry is accounted for by the building of seagoing merchant vessels (i.e. NACE 361.1). Given the smaller economic significance of the other subsectors and the limited availability of data, this article refers predominately to trends in the manufacture and repair of seagoing merchant vessels.

Main indicators

In 1991 OECD GNP increased by 1.1%, compared to 2.6% in 1990. Sea-borne trade (measured in tonnes.miles) followed the same pattern with growth of only 1.6% in 1991 after an increase of 4.4% in 1990. Shipbuilding in the EC recorded strong growth in 1990 to exceed 2.7 million compensated gross tonnes (cgt), a 38% increase over 1989, that gave the EC a world production share of just over 23%. However, production declined slightly in 1991 to 2.65 million cgt with a concurrent small drop in world production share to 23%.

The principal product lines, and their corresponding share of EC production (including fishing and non cargo vessels), are as follows: fully container (18.3%); general cargo (18.0%); ferries and passenger ships (7.5%); fishing vessels (8.4%); oil and chemicals carriers (11.1%); and dedicated dry bulk vessels (6.4%).

The production of shipping yards in eastern Germany is concentrated on fishing boats (45%) and cargo ships (35%).

Recent trends

After many years of decline, world ship production began to recover in 1989 and accelerated sharply in 1990. In the EC, production declined steadily from 1983 to 1988. For the first several years, EC production declined more rapidly than world production, so the EC share of total production that was 23.1% in 1980 had fallen to 19.7% in 1986 (former East Germany is included for both years). The EC's share started to improve in 1987 and had reached a comparable 1980 value in both 1990 and 1991.

International freight rate performance varied according to ship-type in 1991, although total employment of the world fleet was very similar to 1990. The Gulf War in early 1991 partially prompted a surge in tanker oil movements and storage. Hence, rates during the first half of 1991 for various tanker sizes, notably VLCC's, Suezmax and Aframax tankers, were the best seen since the early 1970s. However, a significant amount of additional tanker tonnage came onto the market in 1991 approximately 11.5 million deadweight tons (dwt.) was added. This addition of the largest increase in supply since 1977, coupled with high stocks, a reduction in tanker storage, minimal scrapping and a slowing of demand pushed rates down significantly in the second half of 1991. Tanker rates in the first six months of 1992 continued to remain depressed, such that a significant number of tankers were withdrawn from the market (although not fully mothballed) while the number of tankers scrapped witnessed a dramatic rise.

Rates for product tankers followed a similar pattern as that for the crude carriers in 1991, albeit with a slight strengthening of rates at the end of the year. The rates for bulk (and combination) carriers also deteriorated in 1991, but managed to remain more stable than the declines in the tanker rates, despite a fleet increase of 1.7% compared to an increase in demand of 1%.

Developments in other vessel type rates was rather muted. General cargo remained relatively flat, and gas carrier rates declined marginally as the increased supply of new-buildings exceeded demand.

Employment, after falling steadily throughout the eighties appeared to stabilise in 1990, however, the decline continued in 1991 (note that eastern German employment is included for the first time in 1990).

In 1990 the tendency of rising prices for new ships, which started in 1985, has weakened. For certain types of ships, however, in particular the super tankers and gas carriers, prices have continued to be strong. At the beginning of 1991, prices in nominal US dollars rose but stabilised throughout the year for most types of ships. However, in the first half of 1992, tankers prices in European currencies are significantly lower than in 1991.

The weakening tendency for prices of leisure ships, financing difficulties, the widening gap between freight rates obtainable and the price of new ships and the Gulf War have considerably dampened the threat of rising prices in the short term.

Table 1: Shipbuilding
Main indicators for the shipbuilding industry, 1980-1991

(thousand CGT)	1980	1985	1986	1987	1988	1989	1990	1991
Production (1)	2 999	2 959	2 388	2 088	2 020	2 346	2 703	2 651
% of world production (1)	23.7	20.9	19.7	22.6	23.5	23.7	23.2	23.0
Employment (thousands) (2)	124 229	109 242	96 145	79 904	72 460	69 738	68 875	78 424

(1) Includes former East Germany
(2) Includes jobs in naval and para-naval building in France form 1986; includes East Germany in 1991; includes naval dockyards in the Netherlands between 1975 and 1984
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Table 2: Shipbuilding
World production

(thousand CGT)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC (1)	3 568	3 757	3 131	2 959	2 388	2 088	2 020	2 346	2 703	2 651
AWES (2)	4 709	4 832	3 906	3 591	2 927	2 537	2 510	2 781	3 285	3 158
Japan	5 811	4 908	6 951	6 498	5 085	3 795	2 953	3 664	4 456	4 417
South Korea	880	986	1 015	1 633	1 971	1 194	1 505	1 389	1 564	1 730
Rest of world	3 188	2 826	3 127	2 447	2 156	1 719	1 630	2 047	2 351	2 222
Total	14 588	13 552	14 998	14 169	12 139	9 245	8 598	9 881	11 656	11 526

(1) Includes former East Germany
(2) Association of West European Shipbuilders: EC12 plus Finland, Norway and Sweden
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Foreign trade

Within the EC, the most important exporting countries by value and cgt in 1991 were Germany, Spain and France in order of rank. All of the EC Member States continued to post a trade surplus with the exception of Greece, which imports more than it exports due to the concentration of shipping companies in that country.

EC exports in new shipbuildings reached 3 038 million ECU in 1991 compared to 2 988 million ECU in 1990.

MARKET FORCES

Demand

In the last several years, demand for EC manufactured vessels has accelerated from the early to mid-1980's decline, which reached a trough in 1986. However, the volume of new orders, which rose by close to 30% in 1989 in terms of cgt, stagnated in 1990 and data for 1991 indicates that new orders fell to 2.17 million cgt (18.2% of the world total) from over 3.1 million cgt in 1990 and 1989.

In 1991, the largest amount of new orders (measured in thousand cgt) among Member States went to Germany (559), followed by Italy (381), France (328), the Netherlands (297) and Denmark (266).

Germany also dominates the EC shipbuilding industry for order books, especially with the addition of the eastern German yards. In 1991, German order books were close to 1.6 million cgt, well ahead of Italy (1.2 million cgt), Denmark (0.9 million cgt), and Spain (0.7 million cgt).

Supply and competition

Contrary to widespread opinion that an increasing proportion of ships are built in developing countries, the figures reveal that three-quarters of world shipbuilding is carried out by industrialised countries. Japan controls the largest share of world production of shipbuilding, with more than 38% of world production in 1991. The EC is in second place with 23%, followed by Korea with 15%. The share of these three regions has in fact increased since 1976, when Japan, the EC, and South Korea accounted for 66% of total world shipbuilding.

The EC dominates the high added value market of fully cellular container ships and non-cargo vessels with increasing competition from South Korea and Japan, both of whom would like to dominate this segment. South Korea and Japan already dominate dry bulk and tanker shipbuilding.

Scrapping

The scrapping of ships at the end of their usable life is decided not only by the age of the ship but by a combination several factors such as the vessel's operating profit margin, changes

Table 3: Shipbuilding
Development of contract prices for new vessels

(dwt)	shiptype	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
		Nominal prices(million US$)										
80000	tanker	34.5	38.0	24.0	23.0	21.0	18.5	21.0	29.0	38.0	43.0	44.0
250000	tanker	63.0	72.5	50.5	48.5	44.0	37.0	42.5	54.0	73.0	82.0	86.0
400000	tanker	85.0	90.0	61.0	57.0	51.0	44.0	50.5	60.0	88.0	101.0	120.0
96000	oil/ore/bulk	47.0	44.0	30.0	28.0	26.0	22.5	25.5	32.0	44.0	54.0	62.0
120000	bulk carrier	44.0	42.0	26.0	25.0	24.0	20.5	23.0	30.0	39.0	44.0	46.0
125000	LNG carrier	150.0	175.0	150.0	150.0	130.0	130.0	120.0	145.0	175.0	220.0	260.0
75000	LPG carrier	75.0	75.0	53.0	50.0	45.0	42.5	47.5	55.0	61.0	71.0	80.0
		Real price index										
80000	tanker	100.0	100.5	59.7	55.1	48.5	41.5	45.9	61.4	77.8	84.7	82.0
250000	tanker	100.0	105.0	68.8	63.6	55.6	45.4	50.9	62.6	81.9	88.4	87.7
400000	tanker	100.0	96.6	61.6	55.4	47.8	40.0	44.8	51.6	73.2	80.7	90.7
96000	oil/ore/bulk	100.0	85.4	54.8	49.2	44.0	37.0	41.0	49.7	66.1	78.0	84.8
120000	bulk carrier	100.0	87.1	50.7	46.9	43.4	36.0	39.5	49.8	62.6	69.5	67.2
125000	LNG carrier	100.0	106.5	85.8	82.6	69.0	67.0	60.4	70.6	82.4	99.6	111.4
75000	LPG carrier	100.0	91.3	60.6	55.1	47.8	43.8	47.8	53.6	57.5	64.3	68.6
GDP price index	Total	100.0	109.6	116.6	121.1	125.6	129.4	132.5	136.9	141.5	147.2	155.6

Source: CEC/Fearnleys

Table 4: Shipbuilding
Production by type, 1991 (1)

(thousand CGT)	World	EC	% of world total Japan	South Korea
Crude oil tankers	1 624	5.8	46.4	33.2
Chemical carriers	1 649	12.2	54.2	8.6
Bulk carriers	1 552	10.9	60.3	11.4
Combined carriers	264	0.0	0.0	98.5
General cargo ships	1 393	34.2	30.8	1.9
Reefers	393	46.1	28.2	N/A
Full containers	1 486	32.6	29.2	28.1
Roll on/off vessels	95	8.5	27.4	18.9
Car carriers	89	7.9	92.1	N/A
LPG carriers	579	30.5	49.9	19.0
LNG carriers	64	0.0	100.0	0.0
Ferries	515	21.3	32.2	N/A
Passenger ships	527	67.1	8.2	N/A
Fishing vessels	734	30.5	22.3	4.6
Other non-cargo vessels (2)	562	29.6	10.7	1.2
Total	11 526	23.0	38.3	15.0

(1) EC includes East Germany
(2) Note that this category does not include military vessels
Source: AWES

in environmental legislation and quality considerations and the existing market psychology (i.e. the expected return on a vessel. Given the aforementioned criteria, it is not surprising that many shipping firms are deciding to scrap their vessels during the recent downturn in the shipping industry. The average age for vessels is presently a few years higher than it was during the last period of intense scrapping activity during the mid-1980s, a further indication that a considerable number of ships were retained during the favourable economic climate in the late 1980s and have served their useful service life. Four countries (India, Pakistan, Bangladesh and China) dominate the vessel scrapping market.

Labour

Employment in the EC shipping industry has experienced a prolonged period of downsizing due to a number of factors. To begin, the worldwide shipbuilding industry experienced an unprecedented period of expansion during the 1970s in which shipping tonnage was doubled within a ten-year period. The sudden influx of new tonnage resulted in an overcapacity of shipping tonnage which the shipping industry has yet to recover from, despite the fact that a number of ships were prematurely scrapped in the mid-1980s (some after less than 10 years of service). A secondary development was the shift in production centres away from Europe and the USA towards new shipyards in Japan and South Korea. For example, South Korea launched only 0.1% of new ships in 1972, by 1988 that share had blossomed to 17.5%.

The reduction in the EC shipbuilding workforce has only recently been augmented by the inclusion of employment figures for the shipbuilding industry in former East Germany. Apart from this statistical increase, employment within the EC continues to decline and in 1991 stood at slightly more than only one-third of a 1975 total of employment for the present Member States.

Table 5: Shipbuilding
Development of merchant shipbuilding by type of ship

(thousand CGT)	1985	1986	1987	1988	1989	1990	1991
Dry cargo ships	4 457	3 891	3 062	2 885	2 523	3 192	3 456
%	32	32	33	34	26	27	30
Bulk carriers	4 991	3 555	2 093	1 099	1 909	2 536	1 816
%	35	29	23	13	19	22	16
Oil tankers	486	830	646	787	1 138	1 163	1 624
%	3	7	7	9	12	10	14
Other tankers	1 934	1 557	1 193	1 530	1 795	1 906	2 294
%	14	13	13	18	18	16	20
Fishing vessels	669	791	890	1 150	1 117	1 027	734
%	5	7	10	13	11	9	6
Other	1 632	1 515	1 362	1 148	1 399	1 833	1 604
%	12	13	15	13	14	16	15
Total	14 169	12 139	9 245	8 598	9 881	11 656	11 526
%	100	100	100	100	100	100	100

Source: EC Contract/Lloyd's Register of Shipping

Table 6: Shipbuilding
World shipbuilding production 1990/1991

(million CGT)	1990	%	1991	%
AWES (1) (2)	3.29	28.2	3.16	27.4
Japan	4.46	38.2	4.42	38.3
Other European countries	1.23	10.6	1.21	10.5
Other industrialised countries	0.13	1.1	0.09	0.8
Industrialised countries - Total	9.11	78.1	8.88	77.0
Korea	1.56	13.4	1.73	15.0
Other newly industrialised countries	0.52	4.5	0.58	5.1
People's Republic of China	0.30	2.6	0.26	2.2
Other developing countries	0.16	1.4	0.08	0.7
Developing countries - Total	2.55	21.9	2.65	23.0
Total	11.66	100.0	11.53	100.0

(1) Association of West European Shipbuilders: EC12 plus Finland, Norway and Sweden
(2) AWES includes East Germany
Source: AWES Annual Report 1991-1992

INDUSTRY STRUCTURE

Strategies

The number of shipbuilding firms in the EC has been reduced by yards either going out of business or by mergers and acquisitions activity, and many of the remaining shipyards have been forced to find niches in the shipbuilding market in order to survive. The EC shipbuilding industry in general seeks to differentiate itself from its main competitors in Asia by specialising in the construction of ships with relatively high value added rather than relatively simpler dry-bulk vessels or oil tankers. Examples of such ships include dedicated refrigerator vessels ("reefers"), gas tankers, liquid pressurised gas (LPG) and liquid natural gas (LNG) carriers.

The major centre for mergers and acquisitions activity has been the privatisation of shipyards in former East Germany by the Treuhandanstalt, the German agency responsible for privatising former East German industries following reunification. Most of the largest acquisitions have been made Germany's largest shipbuilding group, Bremer Vulkan, however, other firms such as Norway's Kvaerner have also acquired facilities in the new Länder.

ENVIRONMENT

Although oil spills are often considered as the greatest environmental threat posed by the shipping industry as a whole, prevention of oil spills is by no means the only major environmental issue confronting the shipbuilding industry. The shipbuilding industry is presently focused on the painting of ships (NACE 361.4) where paint and coating substances and abrasive blasting done to prepare a painting surface are of particular concern.

A number of paint and coating substances have recently been brought under scrutiny. Paint components Red Lead (Pb3O4) and Zinc Chromate (ZnCrO4) are expected to be banned along with previously discontinued substances such as Cadmium and other heavy metals. Meanwhile, other substances used in such as carbonates, silicates, coal tar, organic chloride compounds and polyurethanes are all suspected to cause specific health hazards. Abrasive blasting is another source of concern because of the vast amounts of hazardous dust which results from the preparation of metal or concrete surfaces before painting.

REGULATIONS

The EC shipbuilding industry is presently witnessing a significant restructuring of government subsidisation as Member States converge toward the Single Market. The acquisition of shipyards in former East Germany has stirred controversy within the EC as other shipbuilders fear being undercut by subsidised shipyards in the new Länder. Proposals from EC industry ministers have requested that eastern Germany cut its capacity by 40 percent. In exchange for this capacity reduction, east German shipyards would be subsidised by up to 36% of orders in 1992, far above the EC subsidy ceiling of 9%. Although such regulations are designed to put the

Table 7: Shipbuilding
New orders in world shipbuilding

(thousand CGT)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC (1)	2 927	2 568	2 209	2 583	2 550	2 310	2 485	3 220	3 143	2 170
AWES (2)	3 489	3 091	2 840	2 887	2 948	3 158	2 719	3 792	3 595	2 432
Japan	4 859	7 389	6 040	4 440	3 432	3 121	3 361	5 880	6 116	4 433
Korea	1 002	2 147	1 181	807	1 352	1 943	1 203	1 671	2 169	2 278
Rest of world	2 183	2 223	1 717	2 187	1 751	1 518	1 844	2 222	2 425	2 772
Total	11 533	14 850	11 778	10 321	9 482	9 740	9 126	13 564	14 304	11 915

(1) Includes former East Germany
(2) Association of West European Shipbuilders: EC12 plus Finland, Norway and Sweden
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Table 8: Shipbuilding
Ships completed by Member State

(thousand CGT)	1987	1988	1989	1990	1991
EC	2 088	2 020	2 346	2 703	2 651
Belgique/België	26	47	36	72	22
Danmark	194	277	287	306	351
BR Deutschland (1)	765	885	847	1002	810
Hellas	7	12	13	46	6
España	328	326	306	365	301
France	208	63	199	114	171
Italia	225	120	285	328	424
Nederland	146	153	172	264	357
Portugal	26	23	46	65	39
United Kingdom	162	113	157	145	170

(1) Includes former East Germany
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

former East German shipbuilding industry on a par with yards in western Germany, a downturn in demand combined with a weak dollar have already raised competition among shipbuilders in western Germany. In addition, yards in eastern Germany must now compete for similar contracts as their previous source of demand, the former Soviet Union has drastically cut orders.

In regard to environmental regulations, the EC and the USA are leading the industry with the preparation of legislation designed to reduce solvent emissions resulting from particular paint substances. Such legislation is expected to be similar to the German TA Luft legislation. Member States such as Denmark and the Netherlands have already initiated programmes designed to reduce solvent emissions.

OUTLOOK

For the immediate future, the outlook for EC shipbuilding industry does not appear to offer any change from the persistent contraction of production and employment. The existing overcapacity in the shipping industry combined with a lingering global recession prevents the likelihood of any immediate boom in demand for new shipbuilding.

On a more encouraging note, in the long-term over half of the current fleet will be over 25 years old by the year 2000 and one-third may need to be replaced during the interim period.

From a long-term perspective, the EC shipbuilding industry will be keenly focused on the development of the next gen-

Table 9: Shipbuilding
Total order book by country at year's end

(thousand CGT)	1985	1986	1987	1988	1989	1990	1991
EC	3 710	3 827	4 451	5 006	6 176	6 850	6 152
Belgique/België	62	60	75	82	148	154	213
Danmark	442	430	474	460	590	928	877
BR Deutschland (1)	1 119	1 282	1 426	1 429	1 974	1 955	1 530
Hellas	120	103	122	117	114	69	73
España	492	528	636	838	854	1004	757
France	383	371	235	380	362	397	557
Italia	346	466	865	904	1 189	1 298	1 191
Nederland	300	196	142	365	415	443	388
Portugal	94	67	108	114	156	182	153
United Kingdom	353	325	370	317	377	419	414
Finland	544	484	991	963	652	589	494
Norway	148	147	137	114	423	464	382
Sweden	182	138	94	39	115	64	24
AWES (2)	4 584	4 595	5 673	6 122	7 366	7 967	7 052
Japan	5 915	3 916	2 919	3 474	5 697	7 495	7 622
Korea	2 579	1 909	2 639	2 343	2 813	3 501	3 924
Rest of world	5 486	5 226	5 325	5 735	6 092	6 683	7 482
Total	18 564	15 646	16 556	17 673	21 968	25 646	26 080

(1) Includes former East Germany
(2) Association of West European Shipbuilders: EC12 plus Finland, Norway and Sweden
Source: World Shipbuilding Databank based on data supplied by Lloyd's Maritime Information Services

Table 10: Shipbuilding
Employment in new shipbuilding

	1975	1980	1985	1986	1987	1988	1989	1990	1991
EC	208 833	124 229	109 242	96 145	79 904	72 460	69 738	68 875	78 424
Belgique/België	7 467	6 523	3 923	2 995	2 548	2 270	2 307	2 377	2 418
Danmark	16 630	11 400	10 200	7 000	7 000	7 300	7 900	8 400	8 600
BR Deutschland	46 839	24 784	22 260	18 184	12 875	14 845	14 732	15 297 (3)	27 763 (4)
Hellas	2 316	2 672	2 000	1 709	1 621	1 855	1 535	550	0
España	N/A	N/A	18 000	18 000	17 300	14 000	12 550	11 940	11 440
France (1)	32 500	22 200	15 053	13 700	8 940	6 850	6 800	6 600	6 100
Ireland	869	750	0	0	0	0	0	0	0
Italy	25 000	18 000	12 000	11 570	9 500	8 428	9 675	9 840	8 299
Nederland (2)	22 662	13 100	6 236	5 400	3 600	3 500	3 500	3 900	4 000
Portugal	N/A	N/A	5 370	5 087	5 020	4 412	4 245	3 845	3 820
United Kingdom	54 550	24 800	14 200	12 500	11 500	9 000	6 494	6 126	5 984

(1) From 1986 on, the figure covers jobs in new shipbuilding, naval and para-naval building
(2) From 1975 to 1984 including naval dockyards
(3) Excluding jobs in ex-GDR's yards
(4) Including 1170 jobs in ex-GDR's yards
Source: EC Commission

eration of shipping vessels which are predominantly being developed in Japan by Mitsubishi Heavy Industries. Although Mitsubishi is the primary developer of the superconductive electromagnetic propulsion (SEMP) vessels, certain EC firms are performing crucial roles in the development of the SEMP project. The most significant contributor is Germany's Motoren und Turbinen Union division of Daimler-Benz, which won a prestigious contract to develop two high-speed engines used to power the SEMP's innovative magnetohydrodynamic (MHD) propulsion system.

Another crucial project for the EC industry is the clean E3 tanker which teams up 5 European yards in an attempt to step up the European share of the very large crude carriers markets.

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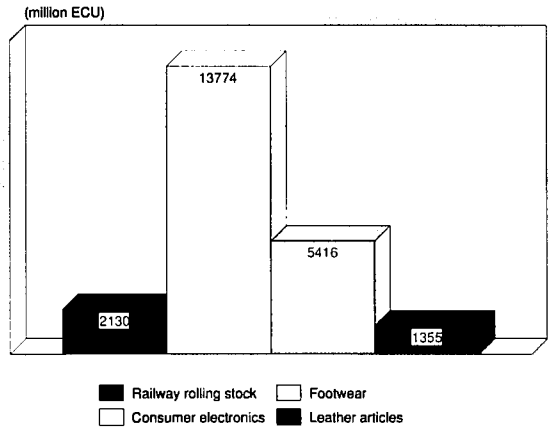
Railway rolling stock
NACE 362

1991 proved to be a good year for the railway rolling stock industry. Production continued the recovery started in 1989. Due to the reunification of Germany, large contracts with the former USSR brought exports to their highest level since 1982, although this cannot be considered a trend. High speed rail projects accounted for much of the demand, but urban and suburban transit projects also played a large part.
The industry has few clients, mostly railroad and public transportation companies, and is completely dependent upon these clients. Products are tailored to these clients, and continuous innovation is necessary to satisfy them and to ensure that the market does not become saturated and EC firms stay competitive internationally. The industry is becoming more concentrated in an effort to be competitive after the implementation of the Single European Market.
Environmental concerns will increase interest in rail as an alternative method of transportation, as it is a relatively low polluting option compared to both air and road travel, particularly if future anti-pollution measures become a hindrance for road transport. In addition, European integration will lead to a more competitive EC market as national governments open bidding procedures to all EC manufacturers to compete.

Figure 1: Railway rolling stock
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The railroad rolling stock industry (NACE 362) includes the manufacture of standard large and narrow gauge railway and urban transport railway equipment. This includes:

- diesel and electric locomotives;
- mainline passenger coaches, metro cars and tramways;
- goods wagons;
- rolling stock equipment;
- fixed track equipment;
- electric signalling, safety and control devices for railways.

The performance of the industry is dependent on the transportation needs and on public policies regarding the development of the railroad lines and purchase of rolling stock.

Main indicators

Apparent consumption decreased in 1991, although production increased due to a sizeable increase in extra-EC exports. However, because of the nature of the large, infrequent contracts the increase in exports cannot be seen as a trend. Imports grew less than exports, resulting in an increase in the trade balance. Employment growth rates were well below those of manufacturing, and also those of other transportation equipment sectors such as aerospace equipment.

No one country dominates production. Germany has the largest proportion of value added, with 25% of the total, but is followed closely by Italy with 24%, the United Kingdom with 21%, and Spain with 20%. These four countries make up almost 90% of value added in the EC.

Recent trends

Production fell continuously from 1982 to 1989, after which it began to recover. Apparent consumption did not follow the trend of production, and was more variable throughout the 1980s due to variability in extra-EC imports and exports. Employment fell steadily from 1982, in line with production.

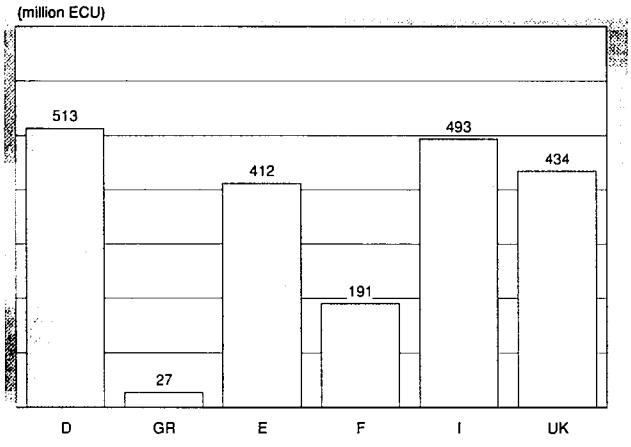
Employment continued to fall in 1991 despite an increase in production, reflecting increasing productivity.

From 1982 to 1991, overall average real annual growth rates were negative. However, the decline of both apparent consumption and production was much more pronounced in the first half of the 1980s than in the latter half. Exports and imports also had stronger showings in the second half of the 1980s. Imports, after falling sharply between 1982 and 1985, recovered to a growth rate high above that of exports from 1985 to 1991, producing a deterioration in the trade balance.

Foreign trade

In general, both extra-EC exports and imports exhibit large variations from year to year, due to the high value nature and irregular delivery of the long-term contracts. In 1991, large exports to the former USSR from Germany, and to some extent from France, caused extra-EC exports to increase by 300%. Such large, extra-EC contracts are very infrequent. These contracts are linked to the integration of Germany. Such a development cannot be seen as an indicator of future exports Rolling stock has a very long life, and may last up to 30 or even 50 years. Intra-EC sales, however, does show a steady increase since 1987, although its share of total sales remained between 60% and 70% throughout the eighties.

Figure 2: Railway rolling stock
Value added by Member State, 1991



Source: Eurostat

Table 1: Railway rolling stock
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	3 622	3 306	3 069	3 467	3 452	3 224	3 447	3 983	4 211	3 812	4 620
Production	4 281	4 093	4 129	4 297	4 195	3 896	4 014	4 257	4 466	4 774	4 869
Extra-EC exports	788	905	1 187	965	856	840	723	410	445	1 341	454
Trade balance	659	786	1 060	830	744	672	567	274	254	962	249
Employment (thousands)	108.5	97.9	91.7	87.6	83.2	71.4	68.2	66.0	72.5	67.7	67.7

(1) Estimates are used if country data is not available, especially from 1989 onwards
However for trade, only 1991 has had to be estimated
(2) DRI Europe estimates
Source: Eurostat

Table 2: Railway rolling stock
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-5.5	-0.9	-2.5
Production	-4.2	-0.8	-2.0
Extra-EC exports	0.7	1.4	1.2
Extra-EC imports	-5.6	9.4	4.2

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Railway rolling stock
Breakdown by product line, 1991

(million ECU)	Locomotives	Passenger coaches	Goods wagons	Total
EC(1)	482.9	918.5	354.5	1 760.9
Belgique/België (2)	2.4	0.0	1.5	3.9
Danmark	4.2	12.6	0.0	16.8
BR Deutschland	136.5	526.6	229.2	892.2
España	53.8	115.7	19.5	188.9
France	286.0	263.3	97.5	646.8
Italia	0.1	0.3	0.0	0.4
Portugal (3)	0.0	3.5	8.3	11.9

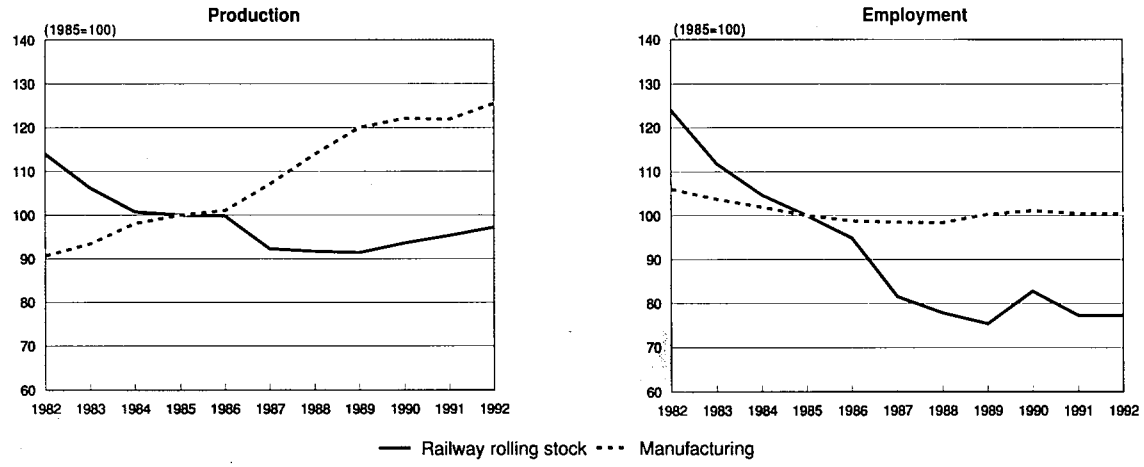
(1) Excluding Hellas, Luxembourg, Nederland, Ireland and the United Kingdom
(2) Data for goods wagons are from 1990
(3) Data for passenger coaches includes bodies
Source: UNIFE

Table 4: Railway rolling stock
Labour productivity and unit costs (1)

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	22.4	23.5	24.1	25.5	25.0	25.9	27.6	30.1	28.4	31.5
Productivity index	87.9	92.0	94.6	100.0	98.0	101.5	108.0	118.2	111.2	123.3
Unit labour costs index (3)	83.1	87.9	93.3	100.0	105.7	116.3	119.3	129.7	123.8	N/A
Total unit costs index (4)	83.5	87.2	89.2	100.0	109.4	116.9	130.0	139.1	126.6	141.4

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed in current prices
(4) Excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Railway rolling stock
Production and employment indices compared to EC manufacturing



1992 are DRI estimates
Source: Eurostat

Destination of EC exports changed significantly from 1986 to 1991, although the figures are distorted as a result of the integration of the East German sales to the former USSR. Exports to EFTA also increased, while the proportion of trade with the OPEC countries (excluding Iran) dropped.

EC suppliers tend to change significantly. Although EFTA is still the largest exporting country to the EC, the opening of Eastern Europe could provide the EC with important new sources of imports such as Czechoslovakia, the USSR, etc.

MARKET FORCES

Demand

The industry has a relatively small number of customers, in national and regional railroad companies, urban transport companies, private transport companies, private rental and lease companies, and industries with their own railway rolling stock. The industry is less affected by general income developments than by transportation and infrastructure policies. Planning of new networks and increases in infrastructure tend to be long-term plans. Short-term variations arise, however, from budgetary bottle-necks. Railway rolling stock has a long economic life Product innovation does, however, involve the purchase or replacement of certain parts of rolling stock.

Product innovation has a significant effect on demand. Increased demand for fast transportation led to the development of high-speed rail technology and resulted in plans by many countries for new high-speed networks. France is increasing the network of its TGV, and it is expected that by the end of the century, all Western European countries will have high-speed rail connections. In addition to France, Germany, Italy, and Spain in particular are well started on their high-speed networks.

Supply and competition

In 1989, the EC (56% of total orders), Japan, South Korea, the USA and Canada (tied) were the world market leaders, in that order. Eastern European countries could become competitors for the EC eventually, due to lower labour costs. At the moment, however, the level of technology and industrial know-how, as well as the new political situation in Germany, makes them net importers. Japanese manufacturers are looking for new international markets to boost flagging exports, including Europe and the USA. Competition is mainly on the technological side, since high wages and the strong yen currently make Japanese firms less competitive on a price level. However, the Japanese might be concentrating mostly on the USA, which has a comparatively less competitive industry and a growing need for alternative forms of transportation due to overcrowded motor ways.

The Single European Market will have a significant effect on intra-EC trade, especially due to European standardisation efforts, and the enforced opening of public procurement competition to all qualified EC companies regardless of nationality.

Table 5: Railway rolling stock
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	788	905	1 187	965	856	840	723	410	445	1 341
Extra-EC imports	130	118	127	135	112	169	156	136	191	379
Trade balance	659	786	1 060	830	744	672	567	274	254	962
Ratio exports/imports	6.07	7.64	9.38	7.17	7.63	4.99	4.64	3.02	2.33	3.54
Terms of trade	102.7	111.7	97.3	100.0	95.5	88.3	94.2	84.2	83.5	78.0
Intra-EC trade	335	328	354	245	269	259	299	350	408	680
Share of total imports (%)	72.1	73.5	73.6	64.4	70.4	60.5	65.7	72.0	67.9	64.0

(1) Estimates
Source: Eurostat

Table 6: Railway rolling stock
EC trade by product at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports:										
Locomotives	118	130	232	153	94	212	266	32	50	54
Passenger coaches	272	275	281	309	254	189	83	41	26	608
Goods wagons	83	101	166	61	141	76	75	63	100	357
Parts	379	471	598	527	422	423	348	343	358	412
Extra-EC imports:										
Locomotives	10	7	8	4	13	11	14	19	25	36
Passenger coaches	17	23	23	24	18	38	2	0	10	30
Goods wagons	10	23	25	30	27	45	68	50	80	153
Parts	85	63	76	81	61	80	78	77	86	192
Intra-EC imports:										
Locomotives	60	40	12	21	16	12	21	49	54	68
Passenger coaches	83	129	180	80	73	68	60	67	122	230
Goods wagons	22	25	28	22	42	36	49	53	45	93
Parts	150	125	150	138	162	162	193	211	231	354

(1) 1982-1983 EC10; double counting may exist, hence explaining the differences in total figures compared to Table 4"
(2) Estimates
Source: Eurostat

Production process

Employment in the railway rolling stock industry has been falling since 1981, while total production has been increasing. The result is growing productivity which should help the EC to maintain its competitiveness compared to producers with lower labour costs, provided its technology remains at the highest level.

Since the industry has only a few clients, who for the most part have very specific needs, and as contracts are generally large, the industry works very closely with its customers. Producers can only develop new equipment in close collaboration with their clients. The Single European Market should make cooperation easier, as requirements will be harmonised.

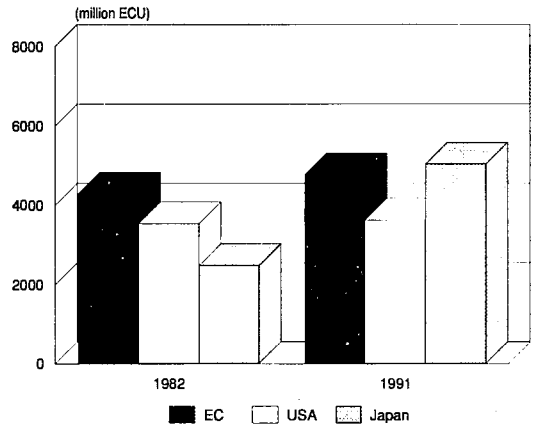
Innovations have been numerous in the industry. For example, in addition to the several different high-speed and tilting technologies available, multi-microprocessor control equipment and three phase drives have become standard in various countries. The use of aluminium has decreased vehicle weight significantly, increasing power efficiency. Also, on-board computerised networks on trains, and the use of telecommunications equipment and microprocessors in signalling equipment have increased the efficiency and safety of the rail transport sector. Extra-EC innovations include Japan's magnetic levitation system, and satellite-operated train operation control systems. These innovations show certain directions in which the railway rolling stock industry can advance, to ensure increased interest in rail transport.

INDUSTRY STRUCTURE

Companies

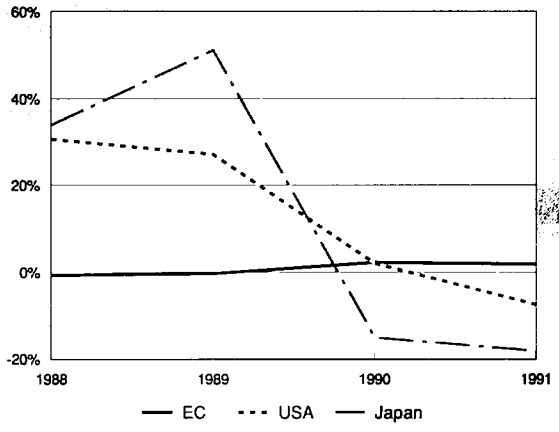
The industry contains about 100 locomotive, coach, and wagon builders, and about the same number of railway equipment manufacturers. Locomotives are mainly produced by divisions within large firms engaged above all in other industrial sectors, while passenger coaches and goods wagons are usually the primary product of the producing firm. The size of companies varies widely, from less than 100 employees to several thousand workers. The largest companies include GEC-Alsthom (UK-France), Asea Brown Boveri (Sweden-Switzerland), Siemens and AEG (Germany). All these companies produce in many fields other than transportation. Several of them are the results of mergers. There is a need for a concentrated

Figure 4: Railway rolling stock
International comparison of production at current prices



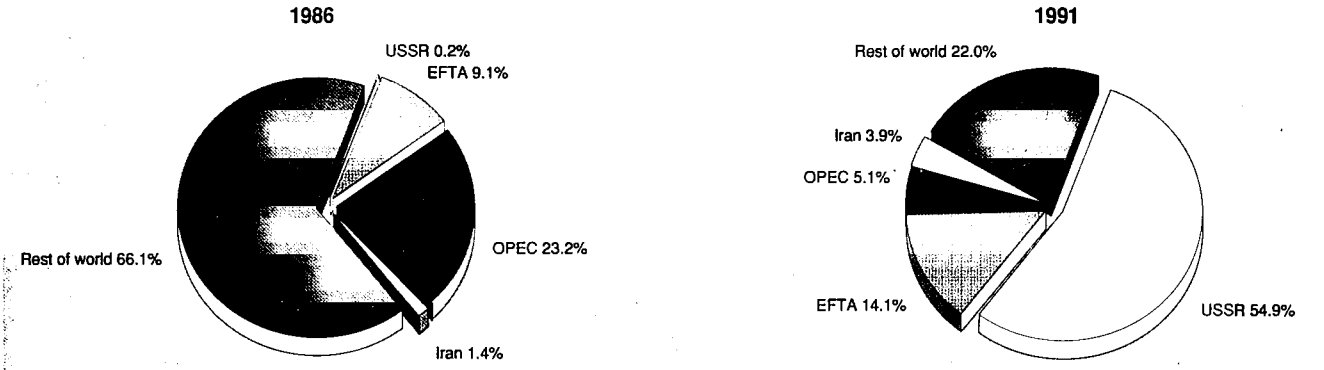
Source: Eurostat, Census of Manufacturers

Figure 5: Railway rolling stock
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Railway rolling stock
Destination of EC exports



Source: Eurostat

industry structure to deal with the continuous expense of R&D and innovation, and with foreign competition.

Strategies

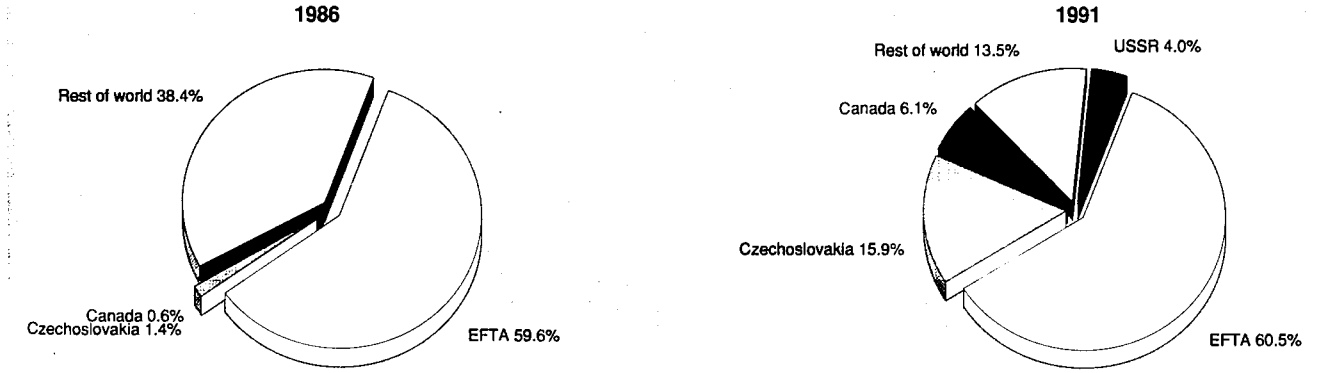
The primary strategies for the leading firms of the industry are increased innovation and technology and increased concentration. Some competitors and possible competitors have lower labour costs than prevailing in EC countries, such as South Korea and Eastern Europe. European firms must therefore stay competitive on the basis of quality and modernisation. Companies must also be large enough to withstand foreign firms. The specialised nature of products does not allow a large amount of economies of scale, but knowledge of different standards and requirements by different EC customers does give European firms an advantage over non-European firms on the world market. This advantage might well disappear after the introduction of European norms. Firms must therefore be prepared to face more direct foreign competition, as well as more intra-EC competition.

The railroad industry is looking in three primary directions. Much of current investment is going into the high-speed railways, which are seen as one of the most important of near-future developments. These high-speed systems will require some transformation of existing networks and infrastructure, as well as new infrastructure, and therefore provide the railway industry with new opportunities.

High-speed systems are limited in scope. However, another area which is receiving a lot of attention is the urban transit sector. Expanding cities and suburbs are making efforts for fast and easy public transportation, especially into the heart of cities. As urban transit systems cut down on both pollution and traffic, this is of primary importance to city planners. With the growth of cities, the transit systems will continue to grow to accommodate the increasing number of people and increased area. This sector is therefore considered by the industry to be of equal importance to the high-speed rail development, because of the almost unlimited room for expansion and demand.

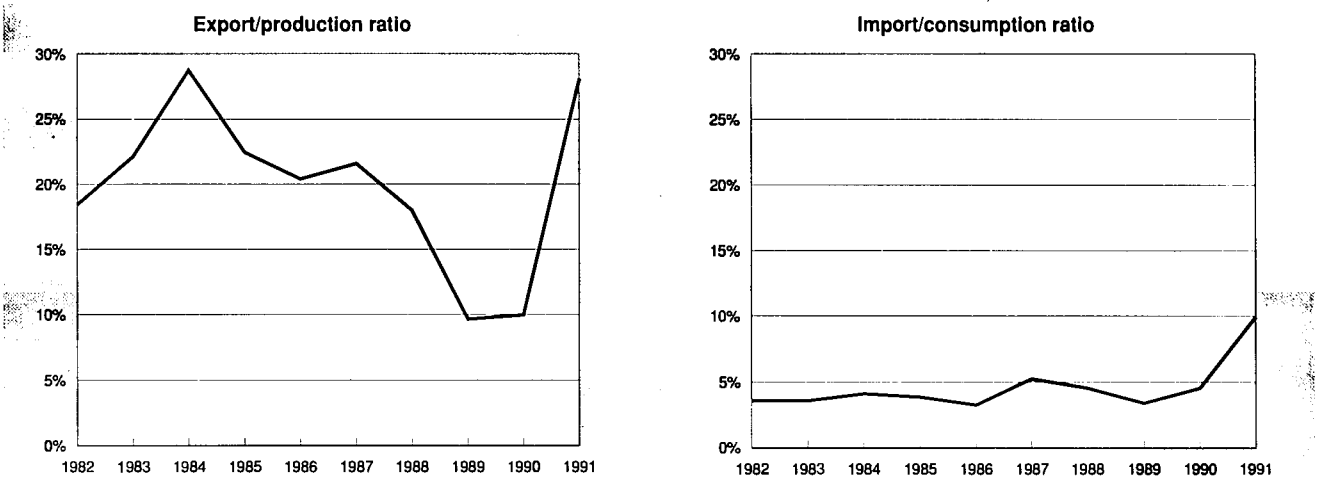
Combined transport is another important field for future activity of the industry. As it is not possible for railways to deliver goods to every location trucks can reach, the combined rail/road haulage offers a good solution, especially as it offers environmental, energy saving, security and anticongestion advantages. Goods can be transported by rail for long distances

Figure 7: Railway rolling stock
Origin of EC imports



Source: Eurostat

Figure 8: Railway rolling stock
Trade intensities



Source: Eurostat

and dispatched to their final destinations by trucks. Quick loading and unloading systems are essential for the success of combined rail/road traffic.

REGIONAL DISTRIBUTION

Production of different subsectors varies slightly from country to country. In 1989, Germany produced the most passenger coaches and goods wagons, while France produced the most locomotives (measured in value). Italy produced more passenger coaches and goods wagons, but fewer locomotives than France. These figures can change quickly, however, depending on incoming orders. In 1989, Spain was a much smaller producer than France. In 1991, Spain's value added was twice as high as that of France. The workforce is concentrated in France, Germany, Italy, the United Kingdom, and Spain.

ENVIRONMENT

Rail transport is a less polluting mode of transportation than air or road. This is one of the most important arguments in favour of railroads, and is becoming even more important as concerns regarding air quality grow. Much of the raw materials used in the industry, especially the large amount of iron, can be reused when the stock's economic life is over.

REGULATIONS

One of the most important regulations affecting the railway industry is the 1990 "excluded sectors" directive which addresses public procurement in the transport, water, energy, and telecommunications sectors. This directive will liberalise bidding for public contracts, which are extremely important contracts for the railway industry. This directive will significantly increase competition between firms, but price is not the only consideration for buyers, who are also very sensitive to quality, delivery time, payment factors, etc. Given that established relationships between clients and firms are also very important in this sector, the effects of the liberalisation will probably not be felt immediately.

OUTLOOK

It is not possible to forecast economic indicators for the railway industry, because the industry is extremely dependent on factors beyond its control, and which are not always foreseeable.

Table 7: Railway rolling stock
Largest companies by sales,1991 (1)

Company	Country	Sales (2)
(million ECU)		
ABB	Sweden-Switzerland	1 535
GEC-Alsthom	UK-France	1 344
Siemens	BR Deutschland	1 024
Ansaldo	Italia	540

(1) Transport activities only
(2) DRI estimates based on annual reports of companies
Source:Annual reports, DRI Europe

Changes in the political climate or budgetary situation of a country can lead it to cancel long-standing contracts, for instance. However, by examining medium and long-term trends, general forecasts can be made by the industry.

Despite negative growth trends for railroad rolling stock in the 1980's, the outlook for the early to mid 1990s looks promising if not stellar. Increased interest in high-speed lines as alternatives to air travel and road travel look good in the face of continuing worries about pollution from cars and overcrowded roadways, as well as the proximity of railroad stations to town centres, compared to airports. Large investments in suburban and urban mass transit rail stock can also be expected, for similar reasons. Positive effects of European integration include increased freight and passenger traffic among member states. The former USSR countries can also offer EC manufacturers large new markets, as the need for technology in those countries creates business opportunities for Western firms, provided that financing is available. The USA is another possible market; increased environmental awareness and very overcrowded motor ways have caused increased awareness of need for alternative transportation. However, certain requirements of US policy, such as final assembly work being done in the US, make it more difficult for foreign firms to compete, without involving long-term investments.

Although the Single European Market will offer the railroad industry some advantages, there are risks involved for firms as well. The primary risk is that deregulation of airlines and road haulage firms will make them even more competitive with rail. There is thus no guarantee that the Single Market will increase the demand for railway equipment.

While in the short term, Eastern Europe will increase demand for EC technology; in the medium term, Eastern Europe could become a competitor, especially on a price basis. The EC industry must continue to maintain its competitiveness mainly by staying ahead of the competition in technology.

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Aerospace
NACE 364

Following a period of sustained expansion, the aerospace industry is currently facing problems of structural adjustment. Despite considerable efforts at both national and European levels, the aerospace industry in Europe continues to suffer from the consequences of having maintained a fragmented industry structure. The industry now has to reorganise in view of the creation of the Single Market and the increasing globalisation of the economy.
Recent developments have brought to light the extremely weak financial situation of airline companies in the present state of the business cycle, and this weakness is having repercussions on the civil aircraft manufacturers. The drop in air traffic as a result of the Gulf war has led to a decrease in orders of two-thirds.
The end of the period of expansion was brought about by the dramatic reduction in military orders and the drop in civil airline orders. The opening of Central and Eastern Europe and the CIS will have a decisive influence on the future of the European aerospace industry.

INDUSTRY PROFILE

Description of the sector

The aerospace industry is engaged in research, development and the production of aerospace systems (aircraft, missiles, space launchers and satellites, their engines and equipment). These products have both civil and military applications. The industry includes manufacturers of fuselages and missiles, engines, space craft and their equipment.

Main indicators

In 1992 the European aerospace industry produced goods valued at over 40 billion ECU, directly employing more than 450 000 people and indirectly more than a million.

In 1991, the production of aircraft and missiles accounted for nearly half of European aerospace activity, the other half being divided between the production of engines (19%), equipment (27%) and the space sector (6%).

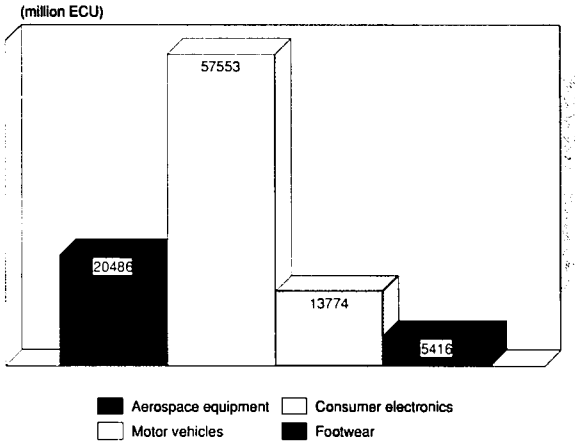
Aerospace production in Europe has always been mainly military: despite the growing share of the civil sector during the 1980s, even in 1990 the share of production for military purposes still amounted to 54% of total turnover.

Structurally, the aerospace industry has a high proportion of qualified engineers and managers on its payroll - nearly 20% in 1990. This proportion is even higher in the space manufacturing and equipment sector. This unusual percentage of highly skilled personnel reflects the crucial importance of R&D activity in production as a whole. In 1990, 24% of all employees were assigned to research and development activity.

Recent trends

Between 1982 and 1991 the value of production (in real terms) of the European aerospace industry increased by more than 5% per year. During this period there was lower than average growth of production of aircraft and missiles and of their engines, because of the cutback in the production of military aircraft. On the other hand, there was above average growth in the production of equipment, the second largest segment of the aerospace industry. Space craft, the smallest sector of the European aerospace industry, expanded considerably during the 1980s, owing to the growth in the European market (its main outlet) and the international market.

Figure 1: Aerospace
Value added in comparison with other Industries, 1991



Source: Eurostat

As a result of political détente, which led to a reduction in military sales, and of the explosion of orders for civil aircraft at the end of the 1980s, the relative share of production for military purposes declined from 70% in 1982 to 54% in 1990.

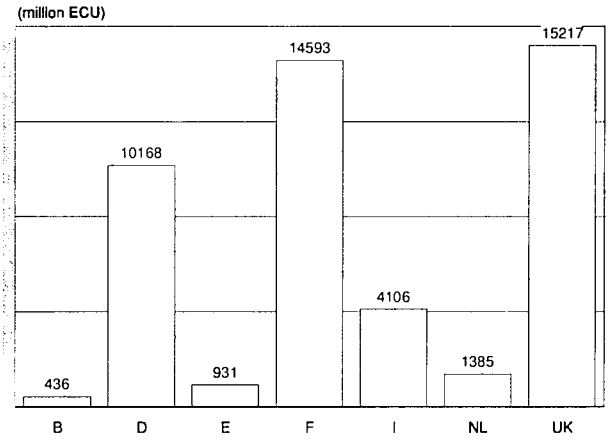
Generally this growth in turnover was the result of increased productivity, since the volume of employment remained unchanged at around 480 000 persons. However, there was an above average increase in employment in the space and equipment sectors. Employment in the production of aircraft and missiles remained unchanged, while fewer were employed in manufacturing engines. The skill level of employees also increased significantly: there was a 2% annual increase in the numbers of engineers and managers between 1982 and 1990.

International comparison

First it should be noted that the very large fluctuation in the value of the American dollar in relation to European currencies during the 1980s distorts comparisons between countries.

With a production of more than 40 billion ECU in 1992, the European aerospace industry is number two in the world, after the USA. Despite the success of the Airbus consortium, the USA is still the unchallenged leader in the world aerospace market: the whole of the European aerospace industry produces

Figure 2: Aerospace
Production (1) by Member State, 1990



(1) Consolidated turnover at national level
Source: Eurostat

Table 1: Aerospace
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (1)
Production	18 393	19 269	21 519	24 742	27 494	29 429	31 768	36 117	38 713	39 471	41 875
Extra-EC exports	9 036	9 304	10 128	11 596	12 978	13 235	14 558	17 282	17 380	18 084	19 367
Employment (thousands)	483.2	483.2	165.5	482.0	489.4	491.6	479.1	489.9	498.2	483.7	478.9

(1) DRI estimates
Source: Industry associations

Table 2: Aerospace
Breakdown by major product line, 1990

Extra-EC (million ECU)	Production (1)	exports	Employment
Aircraft and missiles	26 301	9 763	236 350
Engines	10 133	4 431	87 972
Equipment	14 701	2 923	155 469
Space	3 521	263	184 117
Civil	24 918	9 129	N/A
Military	29 737	8 252	N/A

(1) Production based on non-consolidated turnover thus numbers exceed those in Table
Source: Industry associations

Table 3: Aerospace
Average real annual growth rates

(%)	1982-85	1986-89	1982-90
Production	5.1	5.4	5.6
Extra-EC exports	3.6	11.3	5.3

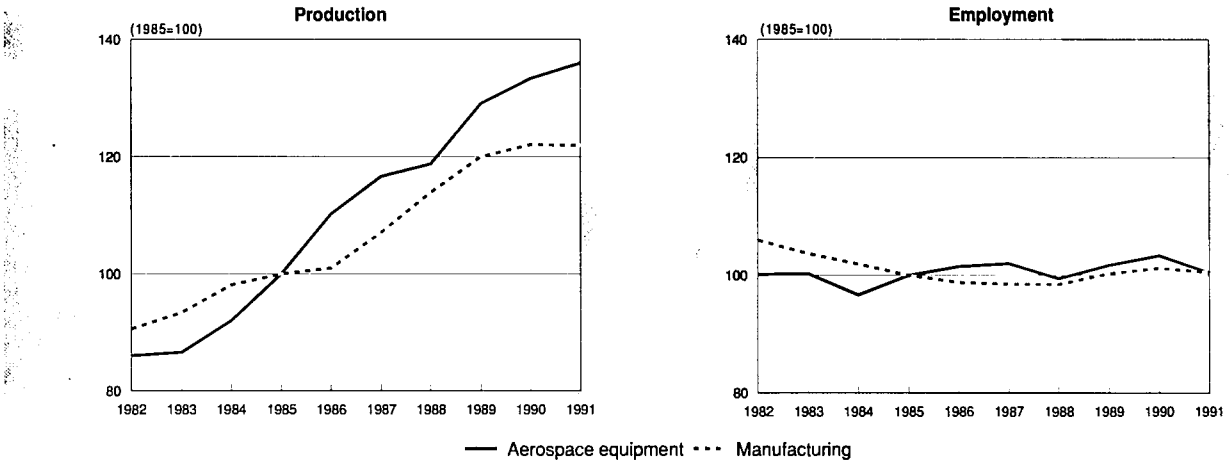
Source: Industry associations

Table 4: Civil aerospace equipment
External trade in current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	4 151	4 468	6 297	6 914	6 187	5 988	10 789	14 541	14 945	17 378
Extra-EC imports	3 575	4 022	4 974	6 111	6 176	6 035	10 246	14 196	15 863	18 839
Trade balance	576	446	1 323	803	11	-47	543	345	-918	-1 461
Ratio exports/imports	1.16	1.11	1.27	1.13	1.00	0.99	1.05	1.02	0.94	0.92
Terms of trade	95.9	130.6	114.2	100.0	87.7	79.6	81.2	82.4	90.3	113.4

Source: Eurostat

Figure 3: Aerospace
Production and employment indices compared to EC manufacturing



Source: Eurostat

less than the four leading American manufacturers. However, this domination became somewhat attenuated during the 1980s: the value of American production fell from 326% of European production in 1982 to 238% in 1991, owing to the slowdown in American sales of military equipment coupled with the growth in European civil production. At the present time Japan produces only about 20% as much as the European industry by value. Adequate statistical information about the aerospace industry in the former USSR and other countries of Central and Eastern Europe is not yet available, but they are thought to have a very high potential.

Aerospace production in the world is still dominated by military requirements, notwithstanding the growing importance of civil activities. In 1990, 61% of production in the USA was destined for military use, 54% in Europe and 55% in Japan (1989).

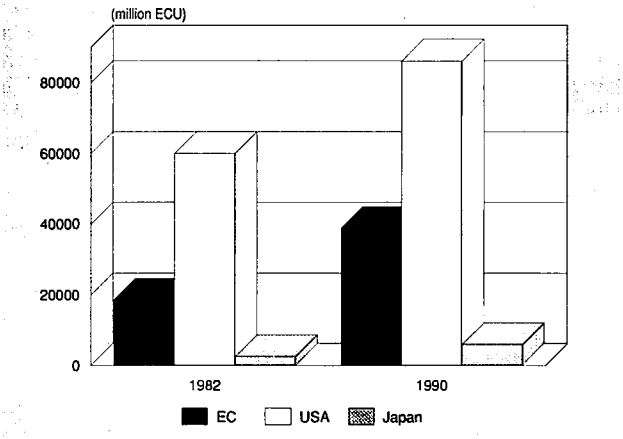
Foreign trade

Aerospace products are traded on an open world market. The importance of trade as a proportion of total turnover confirms this; more than half of production is exported.

For civil products, both exports from and imports into the EC increased considerably during the 1980s. Imported components (motors, equipment) correspond on average to 20/25% of the value of large European and American commercial aircraft. In terms of volume, imports and exports more or less balance. Indeed, in the middle of the 1980s the balance of trade was definitely in Europe's favour. Imports have been rising again since 1990, the result of orders for American civil aircraft by European airlines. Also, the chronic weakness of the American dollar since 1986 has proved a handicap for European exports.

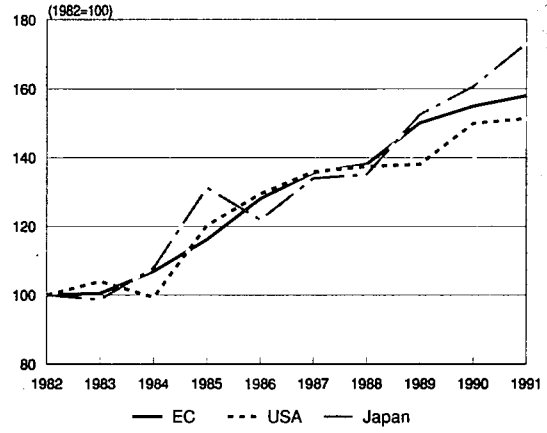
Trade between Europe and the USA dominates international trade in aerospace products, since each country is the other's largest trading partner for these products. The USA absorbs more than 40% of aerospace exports from Europe, whilst nearly 80% of imports of aerospace products into Europe come from the USA. Although the American aerospace industry holds first place in the Japanese market, Europe has a decidedly favourable balance of trade with Japan in the aerospace sector.

Figure 4: Aerospace
International comparison of production at current prices



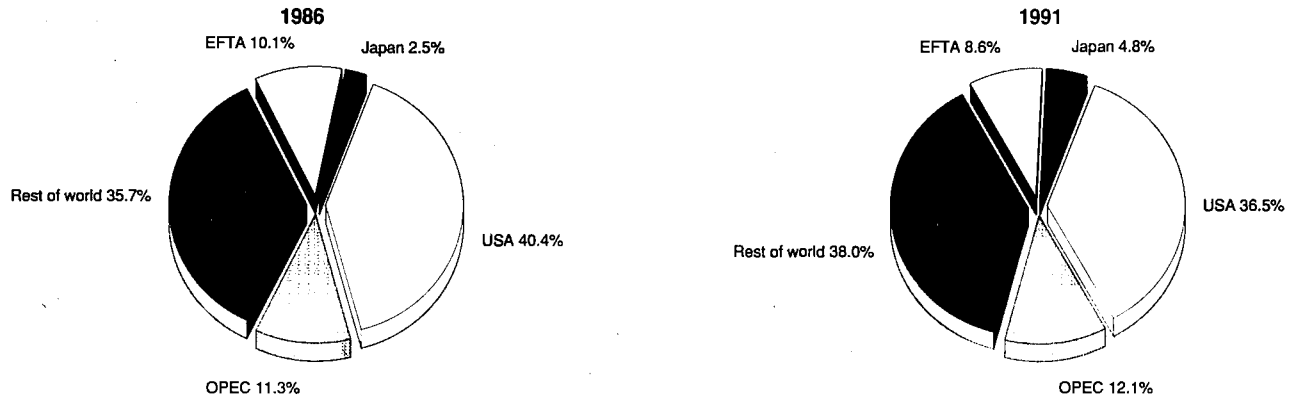
Source: Eurostat

Figure 5: Aerospace
International comparison of production growth at constant prices



Source: Eurostat

Figure 6: Aerospace
Destination of EC exports



Source: Eurostat

As a result of the development of programmes for European cooperation, intra-European trade in civil products is growing at a very rapid pace.

MARKET FORCES

Demand

Large commercial aircraft

There has been rapid growth in the large commercial transport aircraft sector during the last 25 years, as airlines have enlarged their fleets to cope with a regular yearly growth of 6% in world air traffic since the 1970s. Air traffic grew at the same pace as economic activity in general. Since 1985, the growth in orders for new aircraft has surpassed all expectations, and at the end of the 1980s the backlog of orders for large commercial aircraft was in excess of 3 000 units.

However, owing to the weak economic growth in Europe and the USA since 1989, coupled with the effects of the Gulf war and the high price of fuel, the air transport industry went into recession and sharply reduced its orders for new aircraft. In 1991 - for the first time since 1983 - the order books of the aircraft industry fell, i.e. deliveries of aircraft exceeded new orders. So the aerospace industry, still producing at a record rate, is out of step with the airline companies, who are facing the most serious financial crisis of their history. As a result, after reaching a figure of more than 600 aircraft a year between 1991 and 1993, deliveries are expected to fall to around 400 a year. Total deliveries during the period 1991-2010 are expected to amount to some 5 000 units.

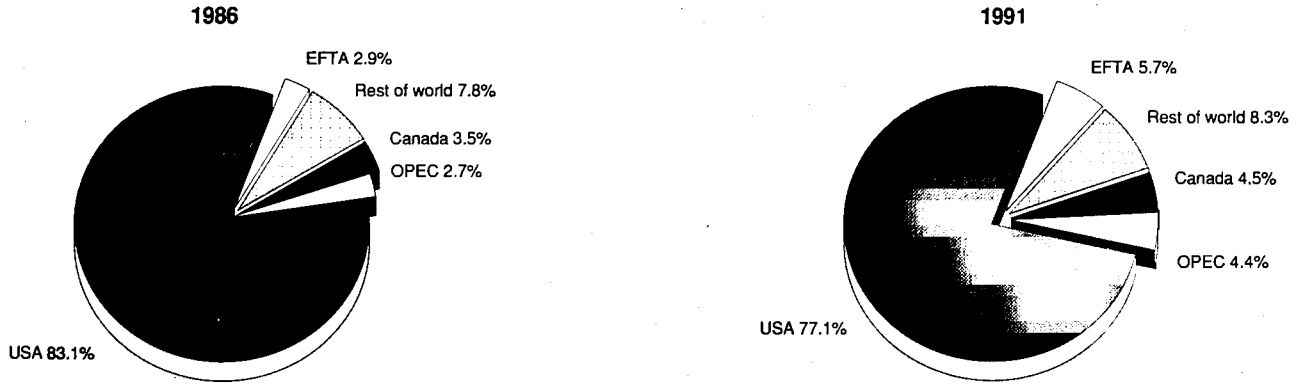
Regional transport aircraft

The growth in the numbers of large commercial aircraft is reflected in the regional transport aircraft sector, in which annual deliveries have increased from about 200 in 1984 to more than 400 in 1991. It is expected that growth at this rate will continue and that new sales will reach between 5 000 and 7 000 units during the period 1991-2010.

Helicopters

All helicopter manufacturers depend to a large extent upon military orders; nearly all the civil helicopters are derived from military ones or have a military equivalent which adds to the production volume. In value terms military sales represent 20 times as much as those to the civil sector. As the demand for military helicopters is shrinking, this has brought lean times to the whole of the helicopter industry. At present some 450 units a year are being delivered to the civil market, though this market is expected to pick up again, leading to a take-up of 5 000 units in the world for the period 1991-2000.

Figure 7: Aerospace
Origin of EC imports



Source: Eurostat

General aviation

The rise in the price of aircraft and the problem of civil liability has caused the market for civil aircraft, comprising business and light aircraft, to collapse. It is expected that during the period 1991-2010 the world market will absorb about 5 000 business aircraft and 60 000 light aircraft.

Military aircraft

The market for military aircraft comprises mainly combat aircraft and helicopters. Political détente has led to a fundamental reappraisal of defence policies, leading to a shrinkage of both domestic and export markets for military aircraft.

However, political détente has served only to catalyse a process that began in the early 1980s. The current crisis in the military aerospace industry is in fact largely due to the explosion of development costs in most recent military programmes, which have exceeded their initial budgetary estimates by large margins. These increases have led to a reduction in the number of aircraft ordered. The relative size of the military market is expected to continue to decrease over the next few years.

Space

The strong growth of space activity during the 1980s was principally linked to the military programmes of the USA and the former Soviet Union and, to a smaller extent, to the burgeoning of the civil and commercial markets. Space agencies play a decisive role in the development of space activities. Telecommunications satellites constitute the largest and most profitable market for space hardware.

In Europe, military space applications, which are concentrated in France and the United Kingdom, still take second place to civil projects. WEU has recently been giving thought to the development of disarmament control satellites.

Missiles

The market for missiles is one of the most volatile. Conventional force reductions consequent upon détente between East and West have caused the demand for missiles to contract, and there is also uncertainty as to the outlook for equipping the new combat aircraft (EFA, RAFALE and GRIPEN).

Supply and competition

Large commercial aircraft

Mergers among the European makers of large commercial aircraft have led to the emergence of a single European producer - Airbus - which is an association between four companies, Aérospatiale, British Aerospace, DASA and CASA. Each of these companies is itself the result of a series of mergers and acquisitions. Airbus has to meet the competition of the two largest American commercial transport manufacturers, Boeing and McDonnell Douglas.

In 1991 Airbus delivered 25 A-300, 19 A-310 and 119 A-320, thus securing about 1/5 of the world market for large commercial transport aircraft by numbers delivered. In terms of orders, Airbus had nearly 25% of the market (in numbers of aircraft). Sales of Fokker 100 and BAe 146 bring the European share to about one-third of the market (in numbers of aircraft). By mid-1992, the Airbus order book amounted to 873 aircraft, made up of 88 A300, 48 A310, 335 A320, 144 A321, 143 A330 and 115 A340.

Notwithstanding the success of Airbus, Boeing is clearly the market leader in terms of volume of production, the range of models and the rate of production. On average Boeing wins 2/3 of deliveries, partly because of the high value of its 747. Boeing is also the only manufacturer with a full range of 100- to 500-seat aircraft. Even though Airbus and McDonnell Douglas both have plans for very large aircraft, Boeing is likely to retain its monopoly in the class of aircraft with over 350 seats for some time-and that means its monopoly of more than 20% of the world market. Subcontracting in the industry for both Airbus projects and its main competitors' (Boeing and McDonnell Douglas) projects represent nearly 10% of Europe's civil aeronautic business.

This situation, combined with the threat of new entrants with new engines from Eastern Europe and the cost escalation of new aircraft, especially for the new 450+ seat aircraft, and potentially for the supersonic aircraft in the longer term, is placing increasing pressure on manufacturers to increase aircraft size and efficiency.

Regional transport aircraft

Several makers are competing in the market for regional transport aircraft. They include ATR, British Aerospace, CASA, DASA (Dornier) and Fokker in the EC, and de Havilland (Canada), Embraer (Brazil), Saab (Sweden) in the rest of the world. European industry accounts for two thirds of world deliveries (by value) in the regional transport aircraft market.

However, rough estimates of the market share needed to secure satisfactory profitability seem to indicate that there may be only half a dozen competitors who can succeed in this market. Consequently, there may be still more rationalisation to come.

Helicopters

There are seven main makers of turbine-driven helicopters, three in Europe (Agusta, Eurocopter and Westland) and four in the USA (Bell, McDonnell Douglas, Sikorsky and Boeing). European makers have a slightly larger share of deliveries than the American ones.

In terms of economies of scale deriving from close links between the design, development and manufacture of military and civil helicopters, the European helicopter industry suffers from an overall handicap compared with the USA, which produces twice as many military helicopters. Notwithstanding the recent concentration of Aérospatiale and MBB in Eurocopter, further rationalisation might be necessary to enable the European manufacturers to remain competitive against the strong competition from America.

General aviation

The market for general aviation, which is largely dominated by American manufacturers, underwent a radical restructuring during the 1980s. In the market for business aircraft, the main competitors of the two European makers (British Aerospace and Dassault) are Beech, Cessna and Gulfstream.

Military aviation

The world market for military aircraft is dominated by American industry, with a turnover twice as high as that of Europe. The main European producers (British Aerospace, DASA, Aérospatiale, Alenia and Dassault) each have a sales value of over 1 billion ECU in military aircraft. They account for two thirds of European military production. Hence military aircraft production exhibits a high degree of concentration, with some main contractors having a near-monopoly in their domestic markets. Nevertheless, the exponential cost of new programmes and the shrinking markets make cooperation the rule, and individual projects are becoming the exception.

The contraction of defence budgets will lead to a diversification by these firms from military production to civil production, in so far as the latter grows sufficiently to enable these new resources to be absorbed.

The outlook for the main European makers of military aircraft (DASA, Dassault, British Aerospace, Alenia, and also Fokker and CASA) is linked to the fate of the new combat aircraft EFA and RAFALE, and hence to the decisions that will be taken for the renewal of combat aircraft fleets. Cost overruns and the new political situation are leading to reductions in the numbers of aircraft required and even to the cancellation of some programmes.

Table 5: Aerospace
Destination of output, 1990

(%)

Exports	31.8
Public procurement	30.9
Civil final consumers	8.1
Intermediate sales	29.2

Source: Industry associations

Engines

The market for engines is dominated by four manufacturers: General Electric, Pratt and Whitney, Rolls-Royce and SNECMA. In order to share the very considerable costs of development, the aircraft engine manufacturers practise a policy of very far-reaching international cooperation. Transatlantic cooperation relates mainly to the civil market, military cooperation being confined to Europe. The consortia CFM International (General Electric and SNECMA) and IAE (Pratt and Whitney, Rolls-Royce, MTU, FIAT and JAE) are typical of cooperative civil engine programmes. Most of the engine makers are also associated in the new programmes for large civil aircraft engines: Trent (Rolls-Royce), GE 90 (General Electric + SNECMA + FIAT) and PW 4000 (Pratt and Whitney + MTU).

In Europe, the outlook for makers of military engines will be largely determined by the future of the proposed EFA and RAFALE combat aircraft. Rolls-Royce and MTU are cooperating on the EJ200 engine for the EFA, while SNECMA is developing the M88 engine for the RAFALE.

Space

The USA dominates the space sector in terms of production, followed by the former USSR. Europe's space effort, which comes third, is grouped around the European Space Agency. The space industry in Europe is considerably less integrated than that in the USA, but is now beginning to concentrate by forming groups, especially in the satellite sector.

Missiles

A lot of restructuring has been occurring with the object of consolidating an industry that is very fragmented, both geographically and in terms of products.

The main European manufacturers are British Aerospace, Thomson-CSF, Aérospatiale, Matra and MBB. Their competitors in America include Raytheon and Hughes.

Most recent missile programmes in Europe have been developed in multinational consortia, but the collapse of the market for missiles could put a stop to this process, or even lead to the dissolution of already existing cooperative arrangements.

Production process

Because an enormous initial investment is required for developing a new aerospace programme (up to 10 billion USD for a large commercial transport aircraft), economies of scale are critically important in the industry. Economies of scale can be achieved both on the supply side by enabling development and production costs to be reduced, and on the demand side in enabling the costs of maintenance, training and so forth to be held in check. Large production runs enable the fixed costs of start-up to be spread over many aircraft, as well as yielding the benefits of the learning curve. Then again, if families of products generating economies of scale are developed, this can engender customer loyalty.

INDUSTRY STRUCTURE

Companies

The aerospace industry is dominated by American firms, which enjoy the advantage of a large domestic market, mainly consisting of military procurement, though some companies have been affected by the reduction in American military expenditure.

In America the industry leaders in terms of turnover are Boeing, McDonnell Douglas, General Electric and United Technologies. The main European firms in the aerospace industry are smaller than their American competitors. Of the ten leading companies in the sector in 1990, four were European: British Aerospace, DASA, Rolls-Royce and Aérospatiale. Their production represents less than a third of that of the ten main producers in the world.

Strategies

Government-industry relationship

Whether for military reasons or considerations of technological independence, the aerospace industry has always been regarded as a strategic industry. Though the precise relationship between the state and the industry may vary from country to country, the state has a massive involvement everywhere. Control is not necessarily entirely direct; it can also be exercised via assistance to R&D and to exports, by regulations, and so on. The state exerts even greater influence in the space sector, where product development is still largely linked to government procurement.

An aerospace company has to make a huge initial investment to enter the market, and then bear several years of cash drain, after which it will take a decade or more to recover its costs. Furthermore, to remain in the market and still be financially solvent, a company has to develop a family of aircraft, the development costs of which are beyond the means of the manufacturer unless he is operating in a number of different market segments with several models that have complementary life cycles. Hence it is difficult for a firm to enter the aerospace market without government support during the interval be-

Table 6: Aerospace
Labour productivity and unit costs

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	35.8	37.7	38.5	38.5	41.6	41.2	43.4	46.3	47.3	48.1
Productivity index	93.0	98.0	99.9	100.0	108.1	106.9	112.7	120.1	122.8	124.8
Unit labour costs index (2)	82.5	86.0	91.7	100.0	102.1	106.8	113.9	120.6	123.6	N/A
Total unit costs index (3)	100.5	103.1	85.4	100.0	101.5	102.1	110.7	130.9	134.1	141.2

(1) Productivity determined by value added per person employed (1991 prices)
(2) Unit labour cost based on labour costs per person employed in current prices
(3) Total costs exclude costs of goods bought for resale
Source: Eurostat

tween the decision to launch the initial programme and the achievement of sufficient cash flow.

The systems of government funding of R&D in the USA and in Europe are not based on the same approach, but the aerospace industries in the two areas are at different stages of development.

The civil aerospace industry in the USA built up its power in the immediate post-war period and grew until the early 1980s in a situation of virtual monopoly. Because of its strategic importance, the American aerospace industry grew up in symbiosis with the state, which supported it (and still does) through three main finance streams: the DOD (Department of Defence), NASA (National Aeronautics and Space Administration) and the taxation system.

The European aerospace industry, on the other hand, and in particular that of the large civil transport aircraft, did not really emerge until the Airbus programme was started - in other words several decades later than the American aerospace industry. The initial investment, and especially the risk attaching to the start-up of new programmes, was covered by a grant of repayable advances.

Alliances

Firms are having increasing difficulty in assembling the industrial, technical and financial resources needed for launching new aerospace products; indeed, the costs are often far greater than the firm's own equity capital. Furthermore, the associated risks are increasingly heavy to bear - the more so as the economic cycle for aerospace programmes is often longer than 10 years. This has led to the forging of numerous inter-firm alliances in the aerospace sector.

Up to the present, European firms have usually solved the problem of critical size by cooperation within Europe. This was an alternative to industrial integration; and since Member States are mindful of their independence, it has occurred only within national frontiers. No multinational aerospace company exists.

Airbus Industrie, ATR, Tornado, EFA and Arianespace are examples of the strategy of cooperation, whereas Aérospatiale, British Acrospace and Deutsche Aerospace are examples of national integration.

Cooperative alliances imply technological specialisation by the participating companies not only in research and development but also in production. In Europe, this increased integration of production coexists with marked national specialisations, particularly in the maintenance of competing programmes. European cooperation programmes do not bring together a major partner and transatlantic cooperation structures that dominate the European programme, especially as regards power plants.

REGIONAL DISTRIBUTION

Most aerospace production in Europe is divided between four countries - the United Kingdom, France, Germany and Italy.

In 1991 these four countries together produced about 94% of the value added in aerospace in Europe. France with 31% and the United Kingdom with 32% are the two main producers, and have traditionally been the two countries in Europe most committed to this production. Nevertheless, the German and Italian aerospace industries have recently been expanding rapidly; they account for 22% and 9% of European production respectively. The remainder is provided by the Netherlands, Belgium and Spain.

ENVIRONMENT

The most significant impact of air transport on the environment has long been perceived as being the noise it creates. More recently attention has been directed to gaseous emissions in the high atmosphere. This is associated with the growing awareness of problems connected with the greenhouse effect and the wish to protect the ozone layer. These two themes will dominate the environmental aspects of air transport for the foreseeable future.

In this context, proposals for supersonic aircraft arouse concerns which aircraft manufacturers will certainly have to address before future supersonic transport becomes acceptable and economically viable.

The aircraft industry will have to meet the challenge to produce increasingly powerful civil engines to match the growing size of aircraft; these engines will also have to be increasingly efficient in view of the foreseeable rise in the price of fuel, while meeting environmental criteria.

The increase in air transport in the medium and long term will necessitate the extension of existing airports and the building of new ones. This will be environmentally acceptable only if tangible progress is made in terms of noise and gas emissions, which in turn will require more research.

The oldest aircraft have already been withdrawn pursuant to a number of international agreements, with considerable financial impact on the airline companies. Yet it is likely that current environmental standards will have to be made more stringent. For one thing, air transport within Europe will soon face competition from high-speed trains, and furthermore current standards are not adequate to meet the new environmental requirements:

- With respect to noise, the actual growth of air traffic, combined with the increased size of the aircraft, threatens substantially to reduce the benefit derived from the regulations that have come into force during the past decade. Unless aircraft noise is reduced still further, current standards are likely to be swamped by restrictions around airports during the next century.
- With respect to gaseous emissions, the current standards also appear inadequate in so far as they do not take into account the whole flight envelope: during a long haul flight more than 90% of the gaseous emissions are not covered by current standards.

REGULATIONS

Owing to the intensification of international competition, all firms are operating under the same competitive conditions. In the context of progressive globalisation of the aerospace market, this principle applies just as much to competition within the EC as with respect to external competitors. All the factors that could affect competition must be taken into account, and in particular both direct and indirect public subsidies.

Competition policy within the EC

When the rules on competition, particularly Articles 85 and 86, are applied to the aerospace industry, the specific conditions of its viability such as the high level of investment needed, the necessary degree of cooperation and the comparatively small number of producers, are taken into account. Some sectors of the industry are affected by:

- the worldwide dimension of the market, compared with which national markets are too restricted to nourish the development of enterprises strong enough to be internationally competitive;

- industrial operations of such a size that no existing European enterprise can master all the technologies and acquire the production equipment needed to manage a complex programme in industrial and economic terms;
- financial requirements that have reached a level beyond the ability of any individual operator to accumulate;
- the high degree of integration of the main competitors of the European aerospace industry.

Mergers are subject to Council Regulation (EEC) No. 4064/89 dated 21 December 1989. Their impact is generally evaluated on the world market. Consequently a merger bringing together most of the supply capacity of the EC in certain sectors of the aerospace industry does not necessarily amount to the creation of a dominant position incompatible with the common market.

Government subsidies for the aerospace industry are subject to articles 92-94 of the EEC Treaty. At the present time there is no sectoral aid framework laying down special directives for Member States in granting assistance to the aerospace industry. The distorting effects of subsidies on other competitors are also taken into account.

There are general regulations governing State assistance for R&D, but the special features of the sector are taken into account - the advanced technology content of the products, the fierce international competition and lastly the cooperative nature of research.

Commercial policy

The sectoral agreement of GATT [General Agreement on Tariffs and Trade] on international trade in civil aircraft, which came into effect on 1 January 1980, lifted most of the tariff and non-tariff barriers to trade in commercial aircraft. In particular, it regulates the various forms of government subsidy to the aerospace industry.

Because the situation of America is fundamentally different from that of Europe and governed by different considerations, the signatories to the agreement do not agree on how it should be interpreted.

On 1 April 1992 the negotiators of the EC and of the USA concluded an agreement resolving their dispute about large commercial transport aircraft. In July 1992, a multilateral negotiation was opened within the GATT framework in order to reach an agreement covering all types of aircraft and all aircraft producer countries so as to arrive at multilateral rulings for this sector.

THE POLITICAL DÉTENTE

Political détente, and in particular the far-reaching changes that have occurred in Europe since 1989, affect the aerospace industry in the world and in Europe from three points of view:

- it has resulted in a reduction of military aerospace activity and, given the considerable interaction between the civil and military spheres, these developments will have a significant effect on the civil aerospace industry;
- furthermore, competition is strengthening both in contracting military markets and in civil markets in which conversion from military industry is bringing about both contraction of some enterprises and the entry of new competitors;
- lastly, although tainted by great political and economic instability, the opening of the countries of Central and Eastern Europe and the independent republics of the ex-USSR will greatly change the outlook and the context of industrial cooperation.

Conversion of the military aerospace industry

The aerospace industry is facing the question of the effect that the considerable reduction in military expenditure will have. There is a reciprocal dependent relationship, even though an unequal one, between the civil and military aerospace sectors: until now their respective business cycles have been complementary, and this has enabled the potential for aerospace production to be maintained intact. Moreover, whereas the military side is helped by economies of scale made possible by a parallel civil activity, the civil side also benefits from the fallout of the technological advances made on the military side. Thus any reduction in R&D activities for military purposes will have long-term repercussions on technological capability and the competitiveness of the aerospace industry as a whole.

Aerospace industries of the former East bloc

The political and economic disintegration of the former USSR, combined with a considerable reduction in military sales and exports, has made a shambles of its aerospace industry. Yet this industry constitutes the high technology industrial sector which offers the West the best opportunities in terms of industrial and technological cooperation. Activity is expected to start up again in 1994, following the organisation of joint ventures, especially in the field of modernisation and re-fitting of Russian-designed aircraft with new Western engines. However, most sales will still be made on the domestic market.

The upsets that followed the fall of the Berlin Wall have had an enormous impact on the aerospace industry of Central and Eastern Europe. In 1991 the production rate, including that of spares and components, slowed down considerably. This industry is suffering from a serious handicap in terms of efficiency, organisation and over-manning. In the short term, despite its very low wage costs, the problems of organising and managing production, shortage of capital and the obsolescence of civil production tooling constitute formidable obstacles to investment by the aerospace industry of the West.

OUTLOOK

On the basis of information available in mid-1992, the following scenario appears likely for the aerospace industry during the period 1991-2000.

The improvement of air traffic in 1992 announces a recovery for airline companies, following the worst two years in their history, during which they lost more than 6 billion USD. The growth of world air traffic - about 5% per annum - will be reflected in the world commercial aviation industry, which will begin to grow at something like the same rate. The industry in Europe will continue to grow faster than its biggest competitor, the USA, and its market share will grow from 25% to 33% of the world market.

Economic recovery in the world and the need to replace aircraft in service will keep activity going in business aircraft and helicopters, while the market for light aircraft will grow more slowly.

The markets for engines and equipment will continue to grow at the same rate as for aircraft. The market for aviation control equipment might indeed grow more rapidly, because of the investment needed to overcome the problem of air traffic control.

Sales of military aircraft will continue to fall as programmes are cancelled and defence budgets slashed, though modernisation of existing aircraft might go some way to check this decline;

The space market will continue to grow. In Europe, growth in the commercial segment of the space market might make up for the probable falloff in government programmes, par-

Table 7: Aerospace
Expected real annual growth rates

(%)	1992-93	1992-96
Production	-2.0	0.0
Extra-EC exports	2.0	2.0

Source: DG III

ticularly the large ones of the European Space Agency, such as the Hermès space aircraft and the Columbus space module.

In general, consolidation of the European aerospace industry will intensify.

Openness towards the countries of Central and Eastern Europe and the Independent States of the former USSR will provide fresh opportunities for industrial cooperation. Because of the strategic nature of the aerospace industry, and above all the enormous potential of the Russian aerospace industry - probably the biggest in the world - there will be no avoiding the question of cooperation. Some cooperation initiatives are in the making, but in view of the complexity of the present situation and the differing interests, the process will be a long and delicate one.

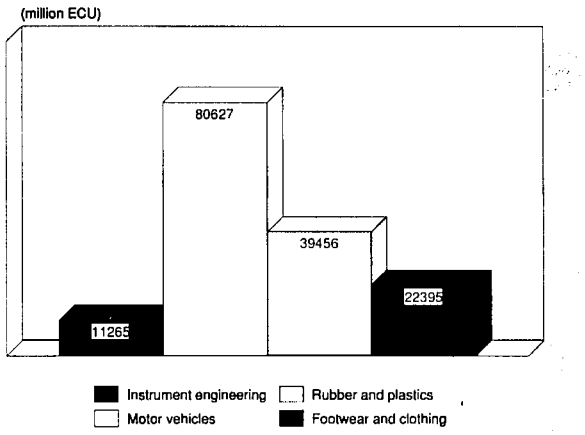
In the short term, the European aviation industry is continuing to expand in anticipation of long-term growth in the market. In addition to versions derived from existing programmes (Airbus A319, Fokker 130, BAe RJ, etc.) plans for an aircraft of very high capacity - 600-800 seats - due to be started in 1995 for entry into service after 2000 - are under study.

Written by: Commission of the European Communities, DGIII/E/5
The industry is represented at the EC level by: Association Européenne des Constructeurs de Matériel Aerospatial (AECMA). Address: c/o Technopolis, 175 Rue Jean-Jacques Rousseau, F-92138, Issy-les-Moulineaux Cedex; tel: (33 1) 47 36 98 76; fax: (33 1) 47 36 83 04.

Instrument engineering
NACE 37

The instrument engineering industry is an extremely diverse sector with a wide range of products. Demand for the products differs accordingly. Some products are used in private households while others by industry, particularly in the manufacturing sector. The common feature of nearly all subsectors is the use of microtechniques, increasingly associated with data processing.
Increasing competition coming from outside the EC has recently caused the balance of trade to decline, particularly for photographic equipment and clocks and watches.
The outlook is good for those sectors of the industry where EC producers have remained strong and have increased automation efforts in production processes. Environmental concerns and an ageing population will give fresh impetus to a number of sectors within the industry.

Figure 1: Instrument engineering
Value added in comparison with other Industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The industry of instrument engineering (NACE 37) includes the following activities:

- the production of measuring, checking and precision instruments and apparatus (NACE 371);
- the production of medical and surgical equipment and orthopaedic appliances (NACE 372);
- the production of optical instruments and photographic equipment (NACE 373);
- the production of clocks, watches and parts thereof (NACE 374);

Due to its diversity, the instrument engineering industry is an important supplier to the manufacturing sector. The industry's goods are used in nearly all production processes (metal working industries, electrical engineering, mechanical engineering and others) to monitor and regulate production processes.

The industry's most important sub-sector is NACE 371 (measuring, precision and control instruments) producing roughly 40% of total industry's output, followed by medical devices (30%), optical instruments and photographic equipment (23%) and clocks and watches (7%).

Main indicators

In 1991, the industry sold about 35% of production to non-EC countries. Imports however, were well above exports during the last decade, resulting in a negative trade balance of about 15% of production. About 48% of EC demand was from countries outside the EC. While production increased during the last decade, employment remained constant as productivity rose sharply. The largest producer within the EC is Germany (West), with about 49% of value added, followed by the United Kingdom (18%), France (15%), Italy (10%). The remaining EC producers accounted for 7% of total EC output.

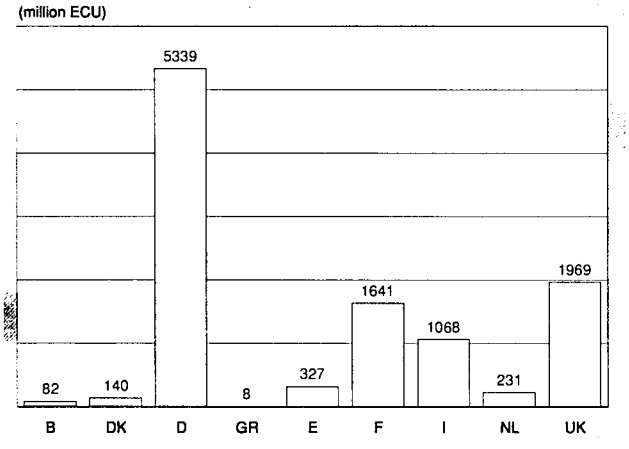
Recent trends

Demand increased during the former decade. The beginning of the eighties was characterised by a sharp rise in exports. A downturn occurred in the second half of the decade, however, as production growth slowed while rising demand caused a sharp increase in imports.

International comparison

The industry's most important producer is the United States. The performance of the main producing areas in the Triad (i.e. the EC, Japan, and the United States), however, varied considerably over the last decade. While production in the United States virtually stagnated during this period, production in the EC grew by 3.3% per year in volume and Japan experienced an average annual growth rate of 5.0%. Consequently, the share of US production in the Triad declined from roughly 60% in 1982 to 53% in 1989, and Japan increased its share in the Triads total from about 21% in 1982 to 30% in 1989. This performance was mainly the result of rapid growth in the measuring, precision and control instruments and the clocks and watches sub-sectors where Japanese firms nearly doubled their production during the period, while American production declined considerably. The EC's share declined slightly, from 20% to 18% for the same period.

Figure 2: Instrument engineering
Value added by Member State, 1991



Source: Eurostat

Table 1: Instrument engineering
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	13 547	13 953	14 835	16 835	18 149	19 214	21 719	23 425	24 519	26 744	**27 546**
Production	13 118	13 601	14 580	16 886	17 721	18 334	20 189	21 386	22 357	23 694	24 215
Extra-EC exports	4 356	5 070	5 998	6 942	6 616	6 355	6 961	7 818	7 909	8 224	8 372
Trade balance	-429	-352	-254	51	-428	-881	-1 531	-2 039	-2 162	-3 050	-3 330
Employment (thousands)	329.7	314.9	306.2	321.0	323.9	319.4	324.4	329.5	336.9	335.5	335.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Instrument engineering
Breakdown by major sector, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Measuring instruments	8 713	9 312	**2 039**
Medical instruments	7 024	6 811	**2 333**
Optical instruments and photographic equipment	7 254	5 445	**2 854**
Clocks and watches	3 062	1 379	**941**

(1) Excluding Ireland; estimates are used if country data is not available
Source: Eurostat

Table 3: Instrument engineering
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	**2.3**	5.7	**4.6**
Production	5.5	**2.7**	**3.6**
Extra-EC exports	12.8	**2.2**	**5.6**
Extra-EC imports	5.9	**9.0**	8.0

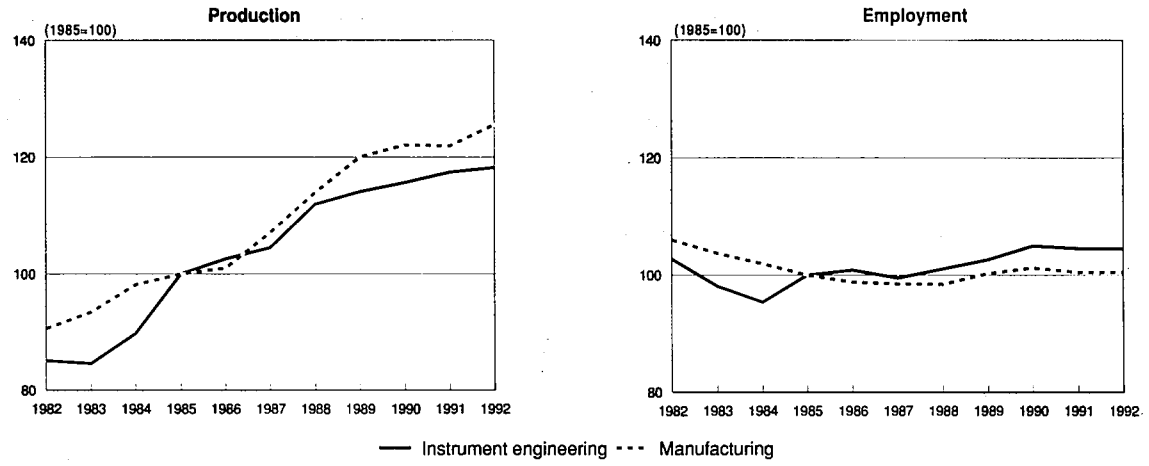
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Instrument engineering
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	4 356	5 070	5 998	6 942	6 616	6 355	6 961	7 818	7 909	8 224
Extra-EC imports	4 785	5 422	6 253	6 891	7 044	7 236	8 491	9 857	10 071	11 274
Trade balance	-429	-352	-254	51	-428	-881	-1 531	-2 039	-2 162	-3 050
Ratio exports/imports	0.91	0.94	0.96	1.01	0.94	0.88	0.82	0.79	0.79	0.73
Terms of trade index	109.2	105.8	100.2	100.0	102.3	109.4	108.5	101.2	106.3	106.5
Intra-EC trade	4 151	4 358	5 019	5 515	6 247	6 910	7 732	8 842	9 616	10 508
Share of total imports (%)	46.3	44.4	44.1	44.0	46.6	48.5	47.3	47.0	48.5	48.0

(1) Estimates
Source: Eurostat

Figure 3: Instrument engineering
Production and employment indices compared to EC manufacturing



1992 are BAK estimates
Source: Eurostat

Foreign trade

Products of the instrument engineering industry are subject to strong competition from extra-EC producers. While exports grew by 7.3% per year on average (in nominal terms from 1982 to 1991), imports increased by 10% per year for the same period. Consequently, the EC's trade deficit ballooned to a level more than seven times as large in 1991 as in 1982. Concerning imports, the most important competitors for EC firms were Japan, the United States and the EFTA countries, representing 80% of total EC imports. Despite the relatively low share of imports from developing countries (including the East Asian NIC's) at present, imports are likely to gain market shares in the EC. Increased NIC presence will be to the detriment of Japan, in particular, which has already lost about 8.5 percentage points of market share over the last five years. The most important recipients of products from the EC are the developing countries, with a total EC export share of nearly 30%. The EFTA countries and the United States each receive about 24% each of extra-EC exports.

MARKET FORCES

Demand

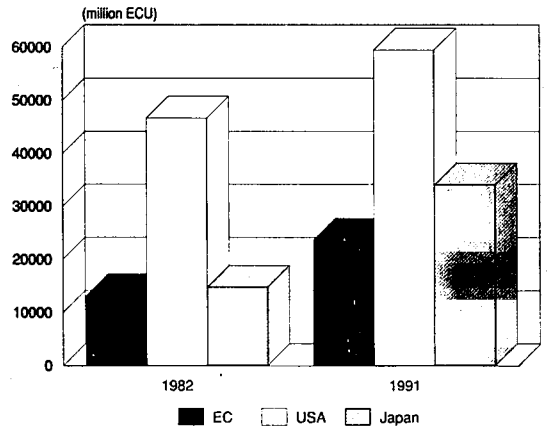
Demand rose 4.6% annually in volume terms from 1982 to 1991, with the latter half of the period growing at 5.6% annually. As the general field of instruments covers a wide field of diverse products, the demand pattern for its goods differs accordingly.

The growing use of electronic components (often in combination with data processing technology) is an important active force behind demand, a common feature for nearly all subsectors of the industry.

Other important factors which contributed to the favourable development of demand were: the upturn in industrial investment in the second half of the eighties, the necessity to become more competitive in preparation for the establishment of the common market in 1993, and the growing importance of environmental concerns which encouraged new applications for the field of instrument engineering.

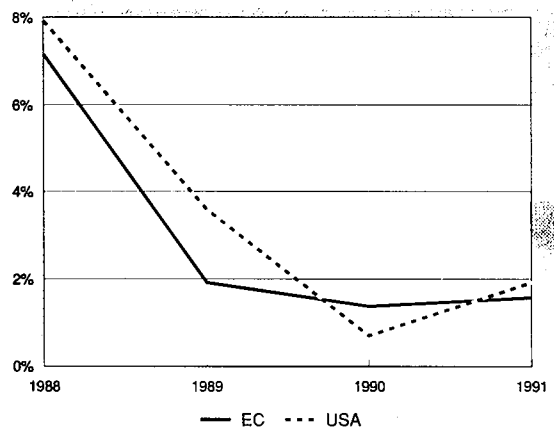
The subsector of measuring, precision and control instruments credits its recent success to the developments mentioned above.

Figure 4: Instrument engineering
International comparison of production at current prices



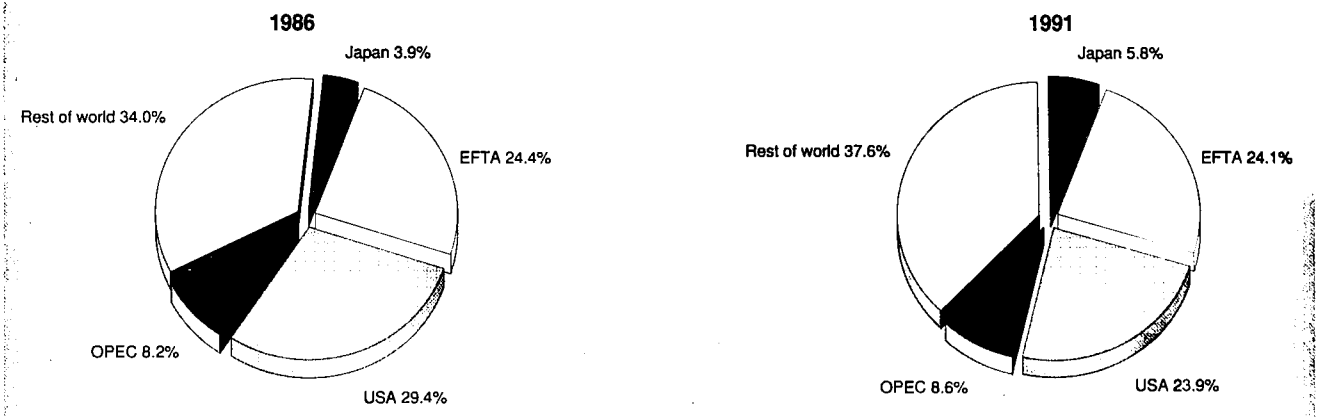
Source: Eurostat, Census of Manufacturers

Figure 5: Instrument engineering
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Instrument engineering
Destination of EC exports



Source: Eurostat

The wider use of precision instruments required for automation of production processes in the manufacturing sector also had a positive effect.

Optical precision instruments, a subgroup within optical instruments and photographic equipment was another beneficiary of increased automation in manufacturing processes. One of the best examples is the substitution of mechanical measuring methods with optical measuring methods, a trend which will give new impetus to this sector in the near future.

Demand in the field of spectacles, lenses, frames and mountings stems mainly from private households. Growth is supported by the increasing number of people wearing corrective glasses and by the latest trends in fashion. Demand for photographic and cinematographer equipment has been stimulated by new products development, the introduction of electronic processes, and the simplification of cameras. Such technological innovations are permitting firms to overcome market saturation. Demand for photographic and cinematographic equipment has also benefited from needs to monitor manufacturing processes.

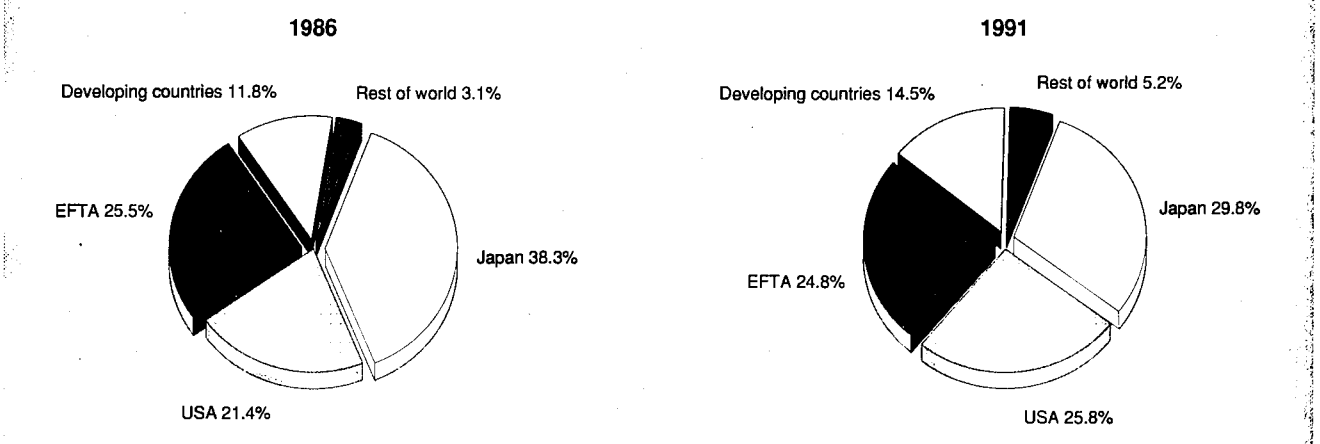
In the field of medical and surgical equipment, increased demand for disposable and sterilised instruments, and new, specially developed bio-compatible materials. In addition, demand is increasing due to an ageing population and a more health consciousness society.

In the sector of clocks and watches and components, demand is linked to consumer expenditure. Demand will benefit more from fashion trends than technological developments (most of which took place more than a decade ago). One characteristic in the evolution of demand during the latter half of the 1980's was the gradual shift from the lower-end of the price range to the higher-end range. This trend is expected to continue in the future.

Supply and competition

The instrument engineering industry is confronted with strong competition from producers outside the EC. While consumption increased by 4.6% in volume, production growth was only 3.6% between 1982 and 1991. In the first half of the eighties, extra-EC exports grew considerably. The second half of the decade, on the other hand, was characterised by a rapid increase of imports from outside the EC, causing the trade deficit to swell to about 3000 million ECU in 1991. Most of the deficit was in the optical instruments and photographic equipment subsector (-1800 million ECU) and clocks

Figure 7: Instrument engineering
Origin of EC imports



Source: Eurostat

Table 5: Instrument engineering
Breakdown by size of enterprise

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	28 355	89.3	24.3	18.7
20-99	2 763	8.7	20.7	18.6
More than 99	641	2.0	55.0	62.7

Source: Eurostat

and watches subsector (-1700 million ECU). The only subsector with a positive trade balance throughout the last decade was measuring, precision and control instruments (600 million ECU). In this section, however, the surplus in extra-EC trade has been declining from a peak of 740 million ECU in 1985 to some 600 million ECU in 1991.

Considering instrument engineering as a whole, the market shares of the United States and the developing countries (especially the East Asian NIC's) in the EC increased in recent years. Although Japan lost market shares in the EC, the EFTA countries share remained fairly stable. A contributing factor to these developments could be the decline of the US dollar against European currencies, causing increased competitiveness of US products. The success of the developing countries in the EC market is mainly the result of the latters strong position in the production of low technology instruments at highly competitive prices.

The situation in the various subsectors, however, varies considerably. In the field of measuring, precision and control instruments, EC companies have a relatively strong position in technologically advanced products. The most serious competitor is the US, with about 40% of total EC imports. The photographic equipment subsector is dominated by Japan and the United States; EC production in this field virtually disappeared during the last decade. The few surviving EC suppliers are at a disadvantage to their competitors, whose large scale production insures lower costs and allows greater expenditures for R&D and marketing. Regarding clocks and watches, the situation is characterised by the strong penetration of Japanese and the South East Asian NIC's products in the lower price range, and of Swiss products in the luxury watch market. Of the EFTA countries, Switzerland is the predominant exporter to the EC, with about 70% of exports from this region. In the field of medical and surgical equipment and orthopaedic appliances, the main source of imports is from the United States, the world's largest supplier for this industry. Medical science in the United States, the most sophisticated in the world, explains the technological lead of their firms. In contrast to other instrument engineering subsectors, Japan plays a minor role in this field. On the other hand, imports from developing countries, including the South East Asian NIC's, seem to be increasing, particularly in less technologically advanced products. Low production cost in these countries seems to be the basic factor in this development.

Production process

Despite the fact that production has increased markedly during the last decade, employment has remained relatively stable. From 1982 to 1984, employment levels actually fell from about 330 000 to about 306 000. Moderate production growth was accompanied by large restructuring efforts in instrument engineering. Since 1984, production increased by nearly 4% per year in volume, while employment increased by roughly 1.3% per year. Productivity increased therefore during the last decade, by some 2.3% per year on average, a consequence of the growing pressures of competition.

A major change within the production process occurred with the introduction of electronic components; as a result, some producers restricted themselves to the assembly and design of their products, as they were not able to produce all components themselves. Given the strength of competition from the South East Asian NIC's, Japan, and the United States, one may expect that the trend toward lower labour inputs will continue, while capital inputs are likely to increase at a fast pace in the next near future.

INDUSTRY STRUCTURE

Companies

The EC instrument engineering industry is generally organised into small to medium sized firms. The largest group of firms, those employing less than 10 workers, represents about 78% of the number of firms operating in the industry. Another 20% of the firms have between 10 and 100 workers. Most of the firms are highly specialised in a particular area of activity; in general, they have few competitors within the European Community. Competition stems mainly from firms outside the EC. Given the low demand for their products, most of the firms are operating at least on the national level, although some are actually operating in the global market.

Apart from the large number of small, narrowly specialised firms, there also exists a small number of larger firms, offering a broad range of products, usually within one single subsector. A few of the large firms are operating in several sectors of instrument manufacturing. The German firm Zeiss, for example, is active in measuring, checking and control machines, and in the field of optical instruments. Other large companies are operating mainly in other branches, such as Siemens, which deals in optics and medical and surgical equipment and even metrology. Only 2% of the 31 760 firms in instrument engineering employ 100 or more workers. Nearly one-third of the workforce is employed by firms of 500 or more workers. These firms, however, account for about 42% of total turnover for the industry.

Strategies

As mentioned above, the EC instrument engineering industry faces strong competition from outside the EC. On the whole, the competition from abroad can in be divided into two categories: competition on technologically advanced products, mainly from the EFTA countries, the United States and Japan; and competition in the field of less technologically advanced standard instruments, produced mainly in the East Asian NIC's, including South Korea, Taiwan and Singapore.

To compete in the field of standard instruments, the efforts of EC firms have to concentrate on cost reduction and increased production efficiency. This could mean a greater rationalisation effort for production processes. Another strategy is the increased use of sub-contracting in order to transfer parts of the production process to lower wage countries. This latter trend is already evident in the clocks and watches subsector.

The position of EC producers in the field of technologically advanced products is stronger, but they will have to increase R&D expenditure in order to remain competitive in the future. The problem is, however, that the present structure of the

industry does not work in favour of EC firms, as they are often too small to finance the necessary R&D efforts. A restructuring of the industry towards larger firms would be advantageous from the perspective of R&D. Cooperation in the field of research and development, as well as in production, could also help this industry meet the challenges of competition from abroad.

REGIONAL DISTRIBUTION

The dominant EC producer in the instrument engineering industry is Germany (West), with about 42% of total EC output. A majority of the large firms are located there. The United Kingdom accounts for about 21% of EC production, followed by France with about 16%, and Italy with about 9%. The share of production for the most important countries in the EC has remained relatively stable during the last decade. Some of the smaller producing countries did increase their share of production, but still contributed only a small part to total EC production. In Ireland, the industrys production nearly doubled from 1985 to 1991, to reach about 5.2% of total EC production.

ENVIRONMENT

The instrument engineering industry does not normally burden the environment to any large extent, as production involves infrequent use of polluting materials. In the field of medical and surgical instruments and orthopaedic appliances, the main burden for the environment stems from the extensive use of packaging materials, in of disposable and sterilised instruments. To restrict environmental damages, an EC Directive requires that all packaging materials are to be recyclable or recovered by the year 2000.

In the field of optical instruments and photographic equipment, the situation regarding production is similar. There is, however, one source of damage to the environment from chemicals used in the production of films and their development, which can possibly contaminate soil and water supplies. Environmental concern for the clocks and watches industry focuses on the use of small batteries containing nickel-cadmium. These substances can also pollute ground water.

More important in this context, however, are the opportunities from which the industry may benefit. The increased attention given to environmental concerns will generate additional demand for several subsectors in the next few years, particularly for the measuring, precision and control instruments industry. Increased requirements for measuring and analysing equipment to investigate harmful effects, and to regulate and reduce environmental damage will provide this industry increased demand for its products. Similar opportunities are offered to the subsector of optical precision instruments, for which the industry of measuring, precision and control instruments is an important client. The use of optical methods to measure and regulate production processes and the output of polluting materials will additionally increase demand for its products.

REGULATIONS

A more general regulation which will affect the instrument engineering industry as a whole is the introduction of technical standardisation of machinery within the EC. The removal of the non-tariff trade barriers within the EC is further supported by the standardisation of metrological regulations, a particularly important element for the measuring, precision and control instruments industry.

In the field of medical equipment, the most important non-tariff trade barrier for European producers is the lengthy and costly process of sanctioning products in the United States. Another important regulation is an EC Directive which requires all medical devices or products sold in the EC to feature an EC stamp of approval, attesting to conformity with EC law.

Regarding environmental legislation, the foremost regulation concerns an EC Directive which requires all packaging materials be recycled or recovered by the year 2000 (for further detail, see Environment section above).

OUTLOOK

The outlook for the instrument engineering industry as a whole appears better in the long-term than in the short-term. The current weakness in investment activities is likely to affect demand for measuring, precision and control instruments, as well as for optical precision instruments, another investment goods supplier. Demand for goods of the subsectors (heavily dependent upon consumer expenditure), is also expected to decline slightly in 1992, as consumers are expected to remain cautious. In the long-term, however, prospects for nearly all subsectors of instrument engineering are quite good. In the field of measuring, precision and control instruments, prospects are favourable, as the increasing automation of industrial processes will increase demand for testing and measuring instruments. Environmental concerns are also likely to boost demand for these products. In the field of optical instruments, the pattern of demand is similar to that described above. Regarding photographic equipment, the outlook is somewhat more pessimistic as competition from the United States and Japan is very strong. Demand for spectacles, lenses and frames is expected to remain high in the coming years; the problem, however, is that health expenditure cutbacks in the industrialised countries are likely to negatively affect demand. The medical equipment sector faces a similar problem. In the field of clocks and watches, the long-term outlook is more encouraging, thanks to the development of new products, and the emergence of new markets. Still, EC firms in this area are confronted with strong competition from abroad.

Table 6: Instrument engineering
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	3.6
Production	2.3	3.1
Extra-EC exports	4.4	4.6

Source: BAK

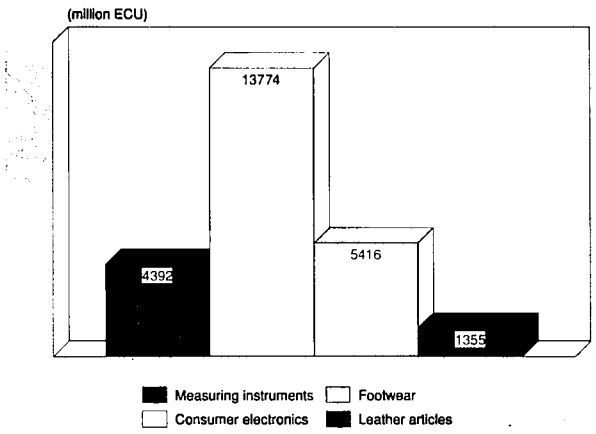
Written by: BAK

Measuring, precision and control instruments

NACE 371

The upturn in measuring, precision and control instruments during the last decade was mainly the result of increased investment activities within the EC. In addition, the growing use of electronic components has aided the development for new generations of instruments.
The common market has substantially increased the trade between EC member countries. Competition from outside the EC has also grown, resulting in a decline of the trade balance which remains positive. The medium term outlook is quite favourable due to the improved economic situation and to environmental concerns which will give the industry additional fresh impetus.

Figure 1: Measuring, precision and control instruments Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The manufacture of measuring, precision and control instruments includes the following products:

- gas meters, water meters and other liquid supply meters (including petrol pump meters);
- measuring, checking or automatically controlling instruments and apparatus;
- equipment for navigation, hydrology, geophysics and meteorology;
- drawing and mathematical calculating instruments;
- precision and measuring instruments;
- precision balances, laboratory equipment and teaching equipment;
- other precision equipment and apparatus.

In general, the activities of the industry are organised into small and medium-sized companies, concentrating their activities on one or two products. A few large companies, however, produce a broad range of products in different fields of instrument engineering, a number of them engaged primarily in other fields of manufacturing, such as consumer electronics, computers and motor vehicles.

Main indicators

The sector of measuring, precision and control instruments is the most important branch of instrument engineering, producing about 40% of the output for the entire industry and employing about 40% of its workforce. The largest producer among EC member countries is Germany (West), with more than 50% of value added. About 22% of EC production is exported to non-EC countries. The export orientation of the industry is illustrated by a positive trade balance, however, has been declining during the last decade.

Recent trends

Demand for the products of this industry (as measured by apparent consumption) more than doubled in value during the last decade. In the first half of the eighties, production growth was consistent with demand development. In the second half of the decade, however, production growth declined considerably, a consequence of slower export growth and a rise in imports.

International comparison

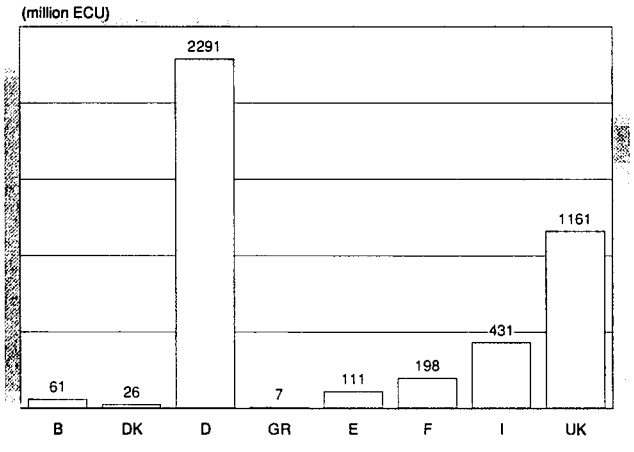
The comparison of the production figures between the United States, Japan and the EC, shows, that the United States remain the most important producer of measuring, precision and control instruments. The fastest growth, however, was experienced in Japan which overtook EC production in 1990. The Japanese share of triad production increased from 17% in 1982 to 30% in 1991, to the detriment of US production, which declined from 59% of triad total output in 1982 to 43% in 1991. The EC share of triad production increased from 24% to 27% for the same period.

Foreign trade

In parallel with fast increasing demand over the last decade, EC manufacturers have been confronted with ever stronger competition from abroad. As extra-EC imports increased faster than EC exports, the trade balance deteriorated somewhat, though still remaining positive. Declining import prices, responsible for an increase of the terms of trade in recent years could be one explanation.

The largest share of extra-EC exports is taken by developing countries, including the East Asian NIC's, a potentially dynamic market. The United States and the EFTA countries

Figure 2: Measuring, precision and control instruments Value added by Member State, 1991



Source: Eurostat

Table 1: Measuring, precision and control instruments
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	4 885	4 524	5 080	6 056	6 442	6 500	7 016	7 989	8 219	8 713	8 888
Production	4 885	5 142	5 709	6 794	7 158	7 205	7 610	8 477	8 812	9 312	9 474
Extra-EC exports	1 243	1 278	1 393	1 595	1 568	1 516	1 700	1 813	1 927	2 039	2 065
Trade balance	634	618	629	738	716	705	594	488	592	599	586
Employment (thousands)	123.8	120.6	116.7	126.1	128.0	126.2	126.4	129.2	135.5	134.2	133.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Measuring, precision and control instruments
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	6.4	1.1	3.9
Production	6.5	1.6	3.2
Extra-EC exports	5.4	4.1	4.5
Extra-EC imports	4.2	11.1	8.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Measuring, precision and control instruments
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 243	1 278	1 393	1 595	1 568	1 516	1 700	1 813	1 927	2 039
Extra-EC imports	610	659	763	857	852	811	1 106	1 325	1 335	1 440
Trade balance	634	618	629	738	716	705	594	488	592	599
Ratio exports/imports	2.04	1.94	1.82	1.86	1.84	1.87	1.54	1.37	1.44	1.42
Terms of trade index	113.4	109.5	104.0	100.0	107.7	113.9	108.8	112.7	116.7	112.4
Intra-EC trade	1 033	1 079	1 219	1 421	1 525	1 615	1 817	2 003	2 080	2 210
Share of total imports (%)	62.9	62.0	61.4	62.4	64.1	66.5	62.0	60.1	60.7	60.4

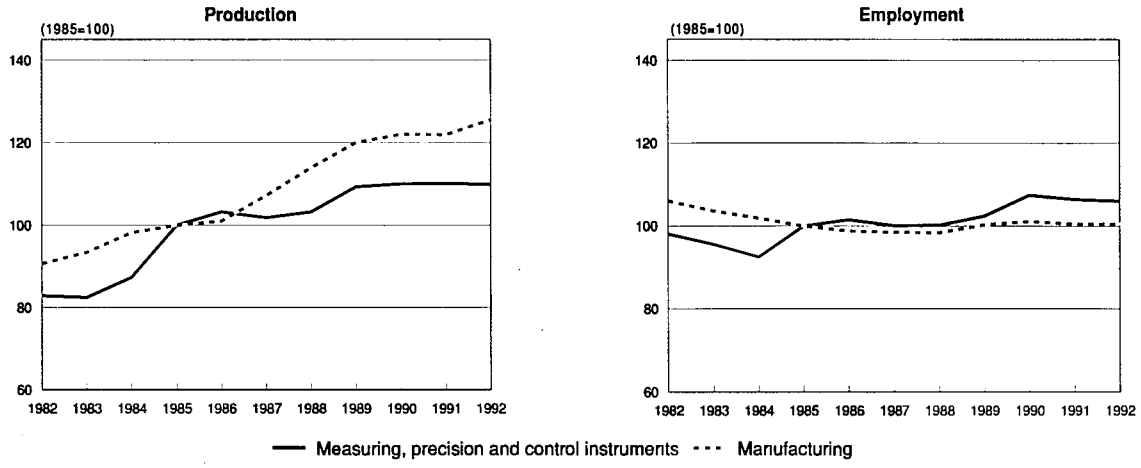
(1) Estimates
Source: Eurostat

Table 4: Measuring, precision and control instruments
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	31.4	31.3	32.8	33.8	34.9	35.6	36.0	37.4	36.3	37.4
Productivity index	92.7	92.5	96.9	100.0	103.2	105.1	106.3	110.6	107.1	110.4
Unit labour costs index (3)	84.1	88.1	94.4	100.0	106.2	110.4	115.5	122.9	129.6	N/A
Total unit costs index (4)	67.4	75.7	90.1	100.0	102.8	101.6	107.8	127.0	122.2	130.1

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Measuring, precision and control instruments
Production and employment indices compared to EC manufacturing



Source: Eurostat

are also important markets for EC manufacturers, while Japan remains of secondary importance.

Concerning imports, the largest supplier is the United States with about 40% of the total. Imports from Japan still present only about 12%.

Intra-EC trade more than doubled in value during the last decade. Consequently, intra-EC trade increased slightly compared to imports from abroad.

MARKET FORCES

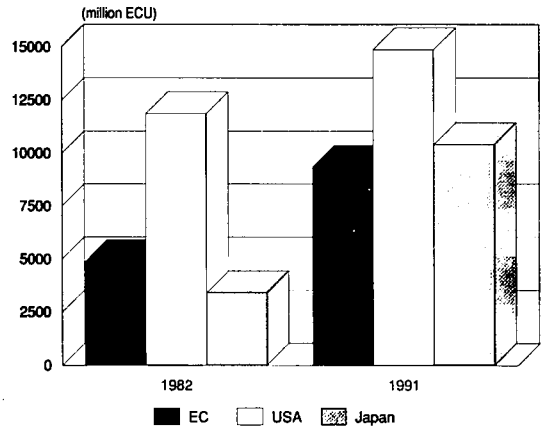
Demand

The industry covers a wide range of products, with demand across the entire range of the manufacturing and service sectors, not to mention private consumption. Measuring, checking and controlling instruments are used to automate, control and regulate production processes. The most important areas of application are not only in the areas of machine construction, vehicle production, and environmental protection, but also in the chemical, pharmaceutical and food industries. In the field of instruments for navigation, hydrology, geophysics and meteorology, the aircraft and shipbuilding industries are the main clients. The industry of weighing instruments (producing analytical, chemical and precision balances), is involved in industrial uses, as well as in wholesale and retail trade.

As a result of a fast changing environment, demand for measuring, precision and control instruments increased constantly in recent years. The growing use of sensors, the replacement of mechanical devices by electronic components and the requirements of system integration (including hook ups with data processing systems) have stimulated the production of new generations of instruments. In particular, the automation of industrial processes using data processing systems to allow the automatic readjustment of filling, dosing and conditioning processes has given fresh impetus to the industry.

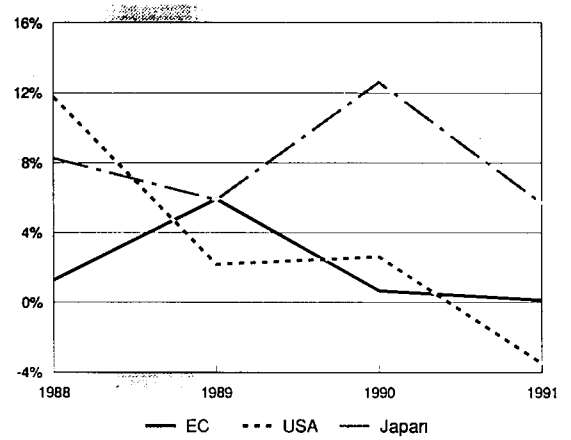
The introduction of new technologies has also led to a shift in demand. For example, the favouring of electronically regulated products to mechanically regulated instruments has caused a decline in the latter's production. For example, the share of electronically controlled products in the weighing industry is now above 90%.

Figure 4: Measuring, precision and control instruments
International comparison of production at current prices



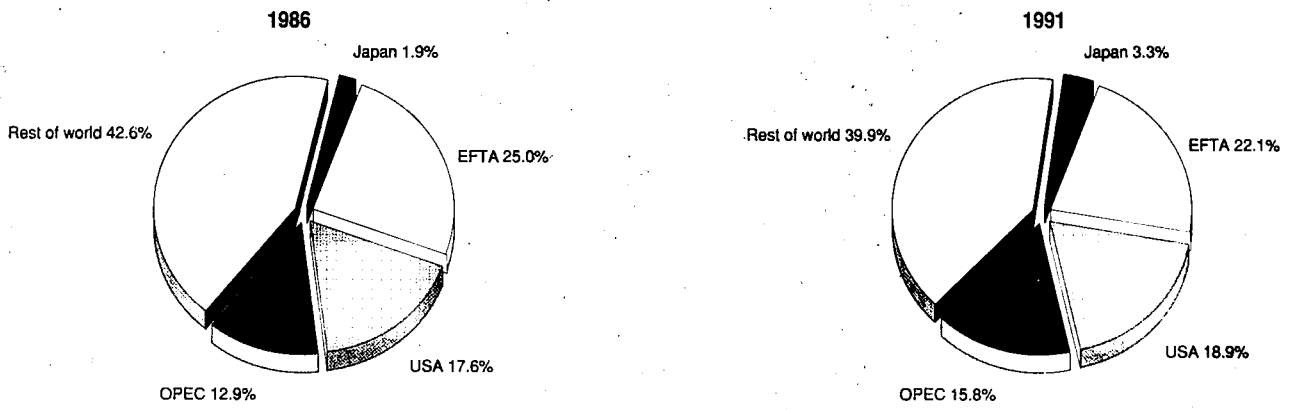
Source: Eurostat, Census of Manufacturers

Figure 5: Measuring, precision and control instruments
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Measuring, precision and control instruments
Destination of EC exports



Source: Eurostat

Apart from technological aspects, the recent upturn in demand for measuring, precision and control instruments was the consequence of a considerable increase in investment activities in the manufacturing sector. Reasons for the upturn in investment include the necessity to modernise in order to stay competitive, an increasingly open economy, high levels of capacity utilisation, a healthy economic climate, and positive expectations of the manufacturing sector in context with the EC market in 1993.

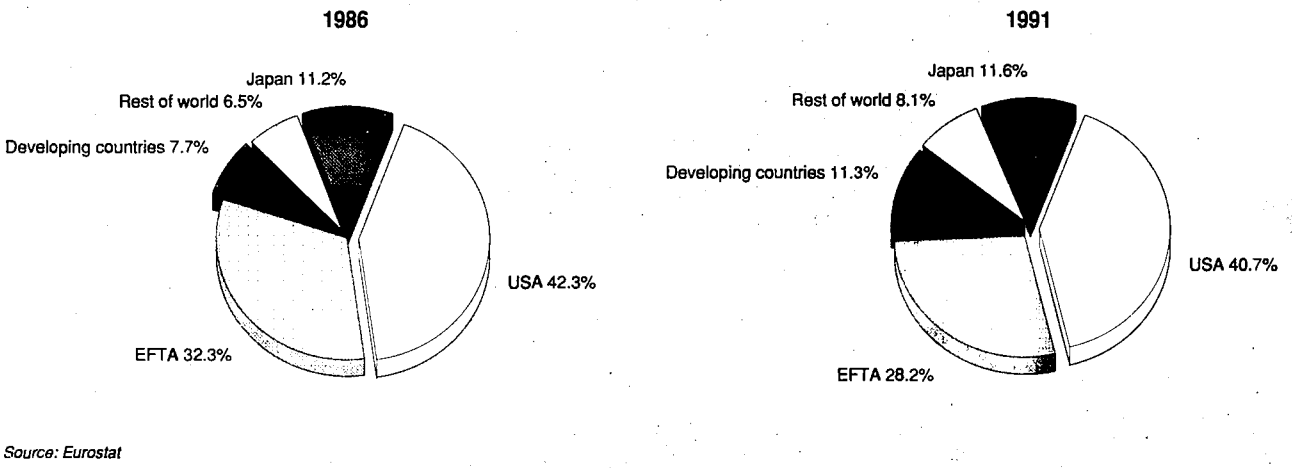
Supply and competition

Over the last decade, the production of measuring, precision and control instruments in the EC grew by an average annual rate of 7.6% in nominal terms. In the United States, in contrast, production recently declined, after a strong performance in the first half of the 1980's. Furthermore, EC manufacturers managed to increase their exports to the USA at a fast pace, thanks mainly to a faster pace of technological innovations compensating for the disadvantage of higher prices due to the decline of the US Dollar in recent years. On the import side, the United States remains the most important competitor to EC manufacturers, but the share of US imports has yielded to imports from Japan and the East Asian NIC's.

From 1982 to 1991, the most remarkable development was experienced by Japanese manufacturers of measuring, precision and control instruments with an average production growth of 13% per year in value. While the share of imports from Japan is still relatively low, it seems likely, that Japanese manufacturers will become more serious competitors in the future. In the weighing industry for example, competitors from Japan are making efforts to penetrate the retail trade market through a policy of price dumping. Such a development could be reinforced by the present decline of the Yen against EC currencies. Another element could be differences in the industrial structure between Japan and the EC. While EC enterprises in this sector are usually small to medium-sized, Japanese enterprises are often larger, which allows them to benefit from an abundance of capital for research and development and, possibly, from synergies and economies of scale. Also, the advent of the common market in 1993 has spurred efforts by the Japanese firms to get a foothold within the EC. In the weighing industry, for example, TEC and ISHIDA already have operations in EC countries, mostly in the United Kingdom. Additional competition for EC manufacturers can also be expected by countries of the East Asian NICs, which are highly competitive producers recognised for lower labour and lower capital costs.

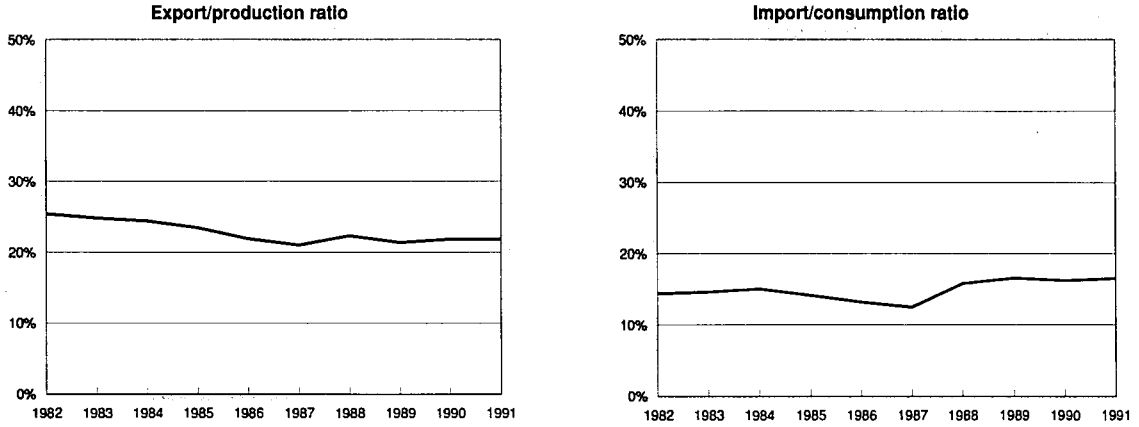
Trade between the EC countries from 1982 to 1991 grew faster than consumption, 8.8% per year on average against consumption growth of 8.3%. The most important exporter

Figure 7: Measuring, precision and control instruments
Origin of EC imports



Source: Eurostat

Figure 8: Measuring, precision and control instruments
Trade intensities



Source: Eurostat

within the EC is Germany (West) with about 32% of intra-EC exports, followed by the United Kingdom with 16%, and France with 15%. The main importer of products of the within the EC is France with about 21%, followed by Germany (West) with 20%, Italy with about 14% and the United Kingdom and the Netherlands with about 11% each. Important driving forces behind the increase of trade between EC members were the technical standardisation of machinery within the EC, and the growing number of cross-border corporate partnerships in expectation of the integrated EC market. This trend is expected to be reinforced during the next few years by an EC directive removing non-tariff trade barriers such as differing metrological regulations in each country.

Production process

The introduction of electronic components has also altered the relation with up-stream industries. Formerly the production of mechanically regulated measuring, precision and control instruments required the input of raw or partially processed materials which were then converted to high-value added products. With the introduction of electronic components, however, manufacturers could no longer produce most parts of their products themselves. The consequence was an increase in subcontracting, particularly with electronic companies. In some cases, producers of instruments have reduced their contribution to the tasks of assembly and design of their products. This development was responsible for a shift of know-how from the manufacturers to their subcontractors. The trend for increased integration with data processing systems is still ongoing. In the sector of precision mechanics, the integration of data processing achievements has opened up new possibilities in drawing and design technology. Similar developments are also taking place in the fields of analysis equipment, process control systems, transducers, measuring devices and other measurement systems and sensors.

Changes also occurred in the production process itself, where modernisation and automatisation were responsible for increased production efficiency. Labour productivity, measured by the value of output (value added) by unit of labour, grew by an average 2.0% per year over the last decade.

INDUSTRY STRUCTURE

Companies

As a result of a high level of specialisation in the industry and the relatively shortness of production runs, most of the industry is concentrated in small to medium-sized companies. Depending on the product line, the structure of the industry varies. In the weighing industry for example, there are about 350 firms, employing some 20 000 people; the size of the enterprises there ranges from firms employing only a few people to firms employing several thousand. Important companies in the weighing industry are Bizerba in Germany, and GEC Avery in the United Kingdom.

The enterprises in this industry are usually active only in the national market, at least as far as small and medium-sized companies are concerned. Other subsectors, such as the counting industry are concentrated mainly in medium to large manufacturing firms. A similar picture is found in a branch of the measuring, checking and controlling machines sector, which is fairly concentrated with about 80 suppliers worldwide. The main EC producers are Zeiss of Germany, Renault Automation and Tri Mesures of France, and Italy's Dea. In measurement and automation technology, about 85% of the firms are small to medium-sized, with up to 200 employees and a few larger firms with more than 1000 employees. Important firms in this sector are Hartmann & Braun and Endress & Hauser in Germany, and Foxborro (taken over by Siebe), in the United Kingdom.

In the last few years a shift in marketing strategy for the industry has evolved. Most companies are now forced to operate at least on a pan-European level, while larger firms will operate on a global level. The tendency to globalise is likely to increase in the near future, as the EC wide market becomes fully operative and overseas markets open up.

Strategies

As already mentioned, international competition will continue to increase in the foreseeable future. In the fields of highly sophisticated products, EC producers will face a fast pace of technological innovation, imposed mainly by Japan, but also by the United States and the EFTA countries. In the field of less technologically advanced products (i.e. the more standard instruments), increased competition can be expected from the East Asian NIC's, who are very competitive in terms of prices. Finally, cross-border competition within the EC is

expected to increase as already mentioned. In the fields of standard instruments, EC firms will need to invest in modernisation and automatisation of the production process, to improve production efficiency and to reduce costs to counteract the effect of higher labour costs (as compared to labour costs in the East Asian NIC's).

In order to remain competitive in the field of highly sophisticated products, EC firms have to increase their R&D expenditures considerably; the problem is, however, that a very high cost strategy cannot be financed by small or medium sized companies. A higher degree of concentration is thus becoming imperative if the industry is to survive and to prosper. Changes in that direction have already been happening. In the weighing industry for example, Toledo has been taken over by Mettler, GEC Avery took over Berkel and Testut has bought Trayvou and Lutrana. In industrial process control, changes have occurred with the takeover of Foxboro by the British firm Siebe, which has thus become the world's second largest producer of these types of instruments, behind Honeywell. At the beginning of 1990, the Italian company Elsag, after selling Bailey Controls to the American Babcock Wilcox Group, bought the Sereg division of Schlumberger. In 1989, CGE-Alsthom took over the industrial control operations of the British GEC.

Another possible strategy, (particularly for specialised niche products) is for the smaller firms to increasingly limit their activities to design and assembly, while upstream activities (i.e. components production) and even marketing and service are subcontracted to other firms.

REGIONAL DISTRIBUTION

The leading producers of the measuring, precision and control instruments are the United States, with about 45% of world production, followed by Japan with about 28% and the EC with about 26%. Within the EC, Germany is the most important producer (about 40% of the EC total), followed by the United Kingdom (34%), Italy (12%) and France (5%).

ENVIRONMENT

The production process for the manufacture of measuring, precision and control instruments has very little impact on the environment. More important in this context are the opportunities that will benefit the industry emanating from the growth of environmental concerns for manufacturing processes and utilities. Developing needs for measuring and analytical equipment for gas, vapour, dust and noxious substances in water and for apparatuses to investigate harmful effects on man, animals, plants, soil and food will provide the industry with growing demand for its products. Beyond this initial source of demand for an identifying and monitoring apparatus, the demand for instruments to regulate and reduce environmental damage (for instance, the provision of gas desulphurisation systems) will also develop. The competitiveness of EC industry in the field of environmental protection systems should be rather good, given that environmental concerns have traditionally been particularly important in most EC countries.

REGULATIONS

As mentioned above, the technical standardisation of machinery within the EC should ease trade between EC member firms. Another EC directive should remove non-tariff trade barriers still caused by different metrological regulations in each country.

In the field of electronic weighing machines, the Commission has issued anti-dumping duties on imports from a number of Japanese firms. Similar measures are being considered regarding electronic weighing machines produced in South Korea and Singapore.

OUTLOOK

Prospects for products of the measuring, precision and control instruments industry are quite good in the medium to long-term. In the short term, however, the outlook is rather pessimistic. Investment activities in the short-term are expected to remain moderate as many firms are still not operating at full capacity following rapid expansion during the 1980's. Given the economic recovery expected in the near future, demand and production will return to a stable growth path. Rapid technological change, the onset of the common market, the development of new markets in South East Asia and the growing weight of environmental requirements in manufacturing and service industries will all invite increased production of the industry's products. EC firms, however, will have to brace themselves for increased competition from abroad. The advent of an era of free movements of goods in the EC market opens a huge market to fierce competition from manufacturers. A major consideration is whether or not extra-EC countries vying for a larger share of the EC market will be compelled to open their own markets to competition. If not, the industry in the EC is likely to lose market share within its own market, without strengthening its presence abroad.

Table 5: Measuring, precision and control instruments
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.2	3.2
Production	2.0	3.0
Extra-EC exports	3.0	3.2

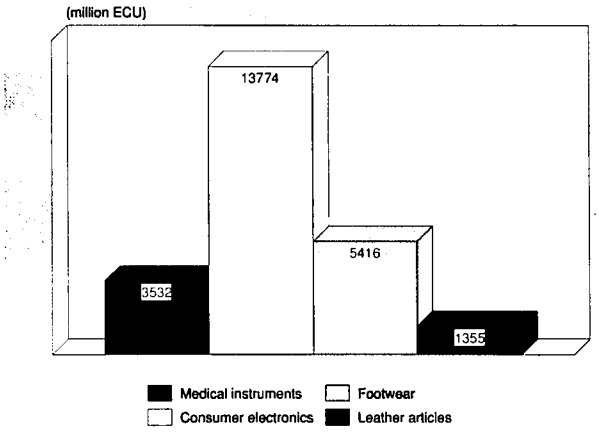
Source: BAK

Written by: BAK
The industry is represented at the EC level by: European Committee of Weighing Instrument Manufacturers (CECIP). Address: CEDEX 72, F-92038, Paris la Défense; tel: (331) 47176376; fax: (331) 47176377; and, EUROM V, Measurement and Automation Technology. Address: Pipinstrasse 16, D-5000 Cologne 1; tel: (49) 221 92 12 12-0; fax: (49) 221 24 50 13.

Medical and surgical equipment and orthopaedic appliances
NACE 372

An ageing population and increasing health consciousness of the population in general are the most important driving forces of a strong expansion in health spending. Consequently, the industry of medical and surgical equipment and orthopaedic appliances in the EC experienced a strong period of growth in recent years. The main competitor of EC firms is the United States, which dominates the world market with technologically advanced products. Lately, EC manufacturers have seen their share of world production fall. In order to stay competitive, EC producers will have to increase their R&D efforts.

Figure 1: Medical and surgical equipment and orthopaedic appliances
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The sector of medical and surgical equipment and orthopaedic appliances includes the following activities:

- manufacture of medical apparatus for diagnostic work;
- manufacture of medical, surgical and veterinary equipment and instruments;
- manufacture of dental instruments and apparatus;
- manufacture of orthopaedic appliances, artificial limbs, eyes, teeth, etc.

The sector does not include orthopaedic footwear (refer to NACE 452). X-ray apparatus and electro-medical instruments, including electro-medical diagnostic equipment, electro-medical treatment, electro-dental instruments, electrical hearing aids and pacemakers are also excluded (refer to NACE 344).

The industry in the EC is characterised by a large number of small enterprises, usually specialised in narrowly defined niche markets, often producing a small number of closely related products. The few medium-sized and large firms in the industry produce a broad range of devices, exclusively in the field of medical equipment.

Main indicators

The medical and surgical equipment and orthopaedic appliances industry represents about 30% of total production for the entire sector of instrument engineering. The most important producer in the EC is Germany (West), with more than 50% of the total value added, followed by France (18%), the United Kingdom (15%) and Italy (10%). About 34% of EC production is exported to countries outside the EC. Meanwhile, the industry in the EC faces increasing competition from abroad. After posting surpluses in the mid-eighties (a positive trade balance of about 10% of production), the trade balance turned negative in 1991. Employment in this industry increased between 1982 and 1991 at an average annual rate of 1.8%.

Recent trends

In the development of the industry during the last decade, one may distinguish between two different phases. The first half of the eighties was characterised by the fast growth of extra-EC exports, which also permitted rapid production growth. In the second half of the eighties, the situation changed: while extra-EC exports grew slowly in volume, imports kept growing, capturing an ever increasing share of the EC market.

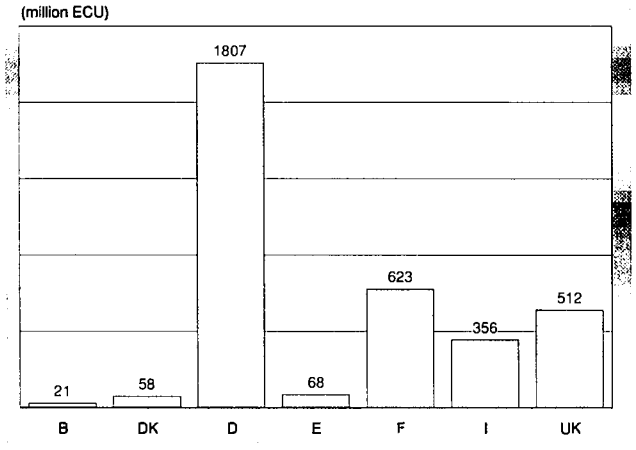
International comparison

The United States were and have remained the world's largest producer of medical and surgical equipment and orthopaedic appliances. The EC is far behind with a volume of about 30% only of the US production. Japan is a distant third with production about one-third lower than the EC's. Potentially, therefore, US firms are the most serious competitors of EC companies in the industry. But the United States also comprises the largest potential market for EC exports, as consumption is about three and a half times that of the EC. At present, EC imports from the USA are more than twice as large as EC exports to the USA.

Foreign trade

During the last decade, extra-EC trade outgrew production. While exports grew by approximately 11% per year in nominal terms, imports increased by nearly 15% per year for the same period. Consequently, the EC trade balance since 1985 has deteriorated. In 1991, it was negative for the first time during the period considered. Important trade partners for EC companies are the United States, the EFTA countries and, to a

Figure 2: Medical and surgical equipment and orthopaedic appliances
Value added by Member State, 1991



Source: Eurostat

Table 1: Medical and surgical equipment and orthopaedic appliances
Main indicators at current prices (1)

(million ECU)	1 982	1 983	1 984	1 985	1 986	1 987	1 988	1 989	1 990	1 991	1992 (2)
Apparent consumption	2 855	3 205	3 495	3 806	3 956	4 331	5 292	5 644	6 113	7 024	7 329
Production	3 005	3 391	3 695	4 265	4 501	4 685	5 467	5 655	6 198	6 811	7 096
Extra-EC exports	904	1 059	1 236	1 657	1 775	1 686	1 781	1 954	2 151	2 333	2 422
Trade balance	150	186	200	458	545	353	175	10	85	-213	-232
Employment (thousands)	82.2	83.4	84.9	89.4	90.2	89.8	92.6	94.3	95.3	96.2	97.2

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Medical and surgical equipment and orthopaedic appliances
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.7	8.0	6.5
Production	7.1	4.9	5.7
Extra-EC exports	15.3	2.6	6.6
Extra-EC imports	5.5	11.2	9.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Medical and surgical equipment and orthopaedic appliances
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	904	1 059	1 236	1 657	1 775	1 686	1 781	1 954	2 151	2 333
Extra-EC imports	754	873	1 036	1 199	1 230	1 332	1 606	1 943	2 065	2 546
Trade balance	150	186	200	458	545	353	175	10	85	-213
Ratio exports/imports	1.20	1.21	1.19	1.38	1.44	1.27	1.11	1.01	1.04	0.92
Terms of trade index	113.3	109.2	102.8	100.0	103.0	108.5	115.9	105.4	105.9	107.7
Intra-EC trade	702	777	936	1 137	1 289	1 429	1 616	1 835	2 132	2 514
Share of total imports (%)	48.1	47.0	47.4	48.6	51.1	51.7	50.1	48.5	50.7	49.6

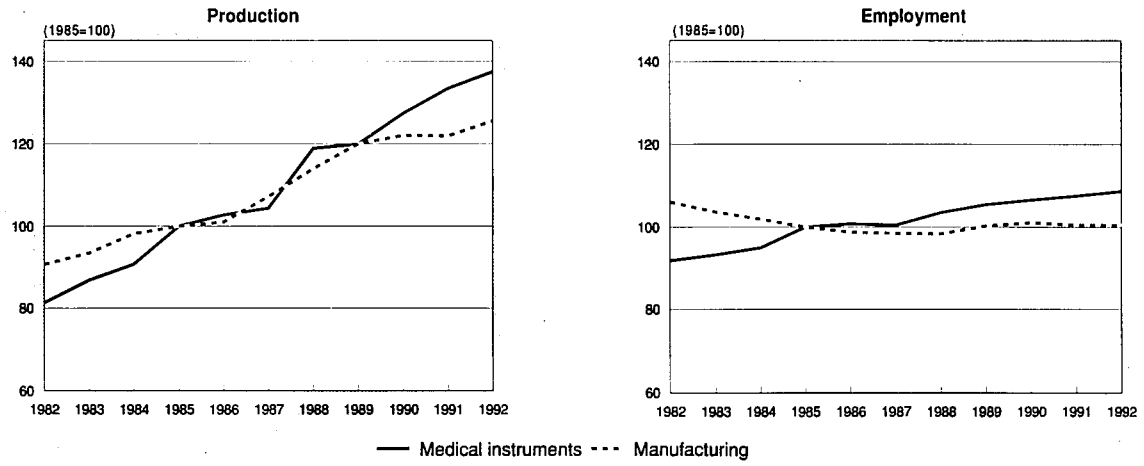
(1) Estimates
Source: Eurostat

Table 5: Medical and surgical equipment and orthopaedic appliances
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	28.2	30.0	29.8	31.1	31.3	31.2	35.1	32.8	35.4	36.7
Productivity index	90.7	96.7	95.9	100.0	100.7	100.5	113.0	105.5	114.0	118.1
Unit labour costs index (3)	81.4	87.6	92.7	100.0	106.2	111.9	118.0	120.0	124.9	N/A
Total unit costs index (4)	73.7	81.5	91.9	100.0	106.2	114.2	126.0	134.2	142.4	155.3

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Medical and surgical equipment and orthopaedic appliances
Production and employment indices compared to EC manufacturing



Source: Eurostat

smaller extent, Japan. EC exports to the United States actually stagnated between 1985 to 1990, but exports to Japan more than doubled over the same period; exports to the EFTA countries increased considerably as well. Considering imports, the most important source is the United States, with about 50% of the total. Over the last few years, intra-EC-trade enjoyed growth of about 15% per year in nominal terms.

MARKET FORCES

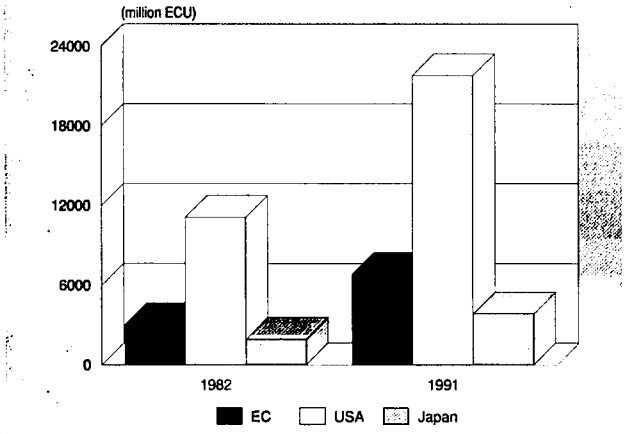
Demand

During the last decade, the industry enjoyed a rapid growth in demand of around 7% per year in real terms. One reason for this development is the increase in demand facing the health industry due to the ageing of the population as well as to increased health consciousness by the population in general.

Product innovation represents another important factor in the increase of demand over the years. As new findings in medical science and technology find their way more and more rapidly into practical applications, the role of product innovation for developing demand becomes increasingly crucial. In the field of diagnostic apparatus, the implementation of data processing systems for analysing results has widely expanded the product range. In this era, a new method of endoscopic treatment has been developed, minimal invasive surgery. Under endoscopic view, treatments are conducted by high frequencies or lasers, with minimal damage. Further developments are occurring in the field of anaesthetic devices, where the identifying, measuring and monitoring of anaesthetic gas is now supported by data processing systems. Quantitative demand of medical devices for operative and postoperative treatment has greatly increased with the growing tendency to use disposable and pre-sterilised instruments. In the field of prosthetic and orthopaedic devices, bio-compatibility has become a major priority, leading to the development and utilisation of new materials and production processes.

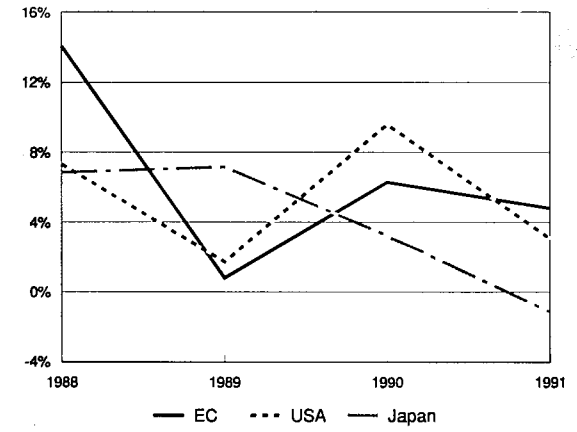
Due to the increasing use of disposable instruments and to the smaller volume and easier use of modern medical equipment, many treatments can now be given in units or at home. This enables substantial savings as hospitalisation can be shortened or avoided all together, reducing staff requirements. The spiralling growth of health costs in all developed countries,

Figure 4: Medical and surgical equipment and orthopaedic appliances
International comparison of production at current prices



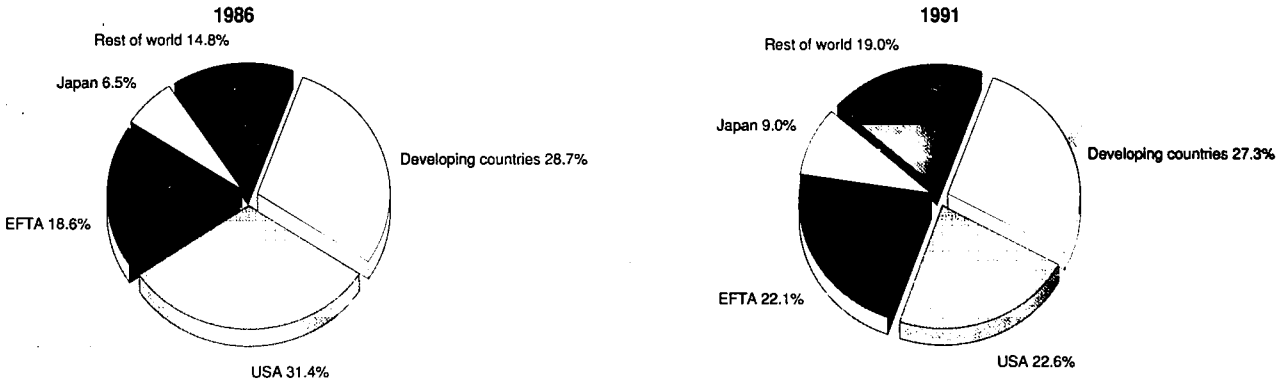
Source: Eurostat, Census of Manufacturers

Figure 5: Medical and surgical equipment and orthopaedic appliances
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Medical and surgical equipment and orthopaedic appliances
Destination of EC exports



Source: Eurostat

however, is triggering revisions in national health policies. Such measures include putting caps on public costs by transferring an increasing share of costs to the patients, and by encouraging competitive bidding to push down prices. The developments will inevitably have a negative effect on demand for the industry's products.

Supply and competition

As the world's largest producer of medical and surgical equipment and orthopaedic appliances, the United States is also the most important competitor for EC producers. Imports from the United States represent over 50% of total EC imports. This is to be expected if one considers the size of the US domestic market, which consumes 55% to 60% of total world demand. One explanation for the United States' leading position its substantial commitment to medical research and development. The decline in exports of EC countries to the United States in recent years may have been caused by lags in the pace of innovation. An additional hampering factor resides in the lengthy and costly process of sanctioning a product in the USA, often an insurmountable obstacle for small or even medium-sized firms with little financial muscle.

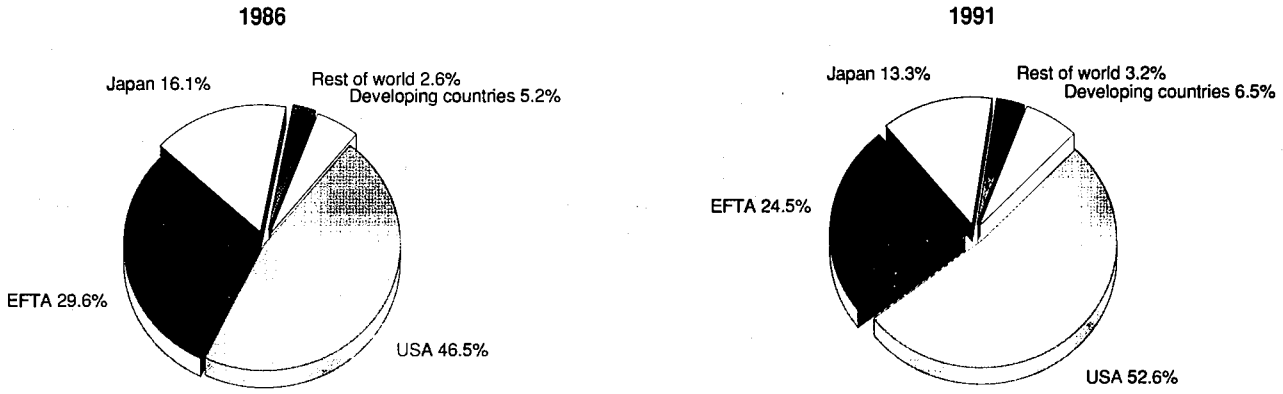
Until now, Japan plays a relatively minor role in the EC trade of the industry's products. EC exports to Japan are about 9% of total EC exports; but about 13% of EC imports come from Japan. This share has declined during the last five years. Imports from the East Asian NIC's are likely to increase (particularly in the field of relatively lower value-added instruments), where these countries have production cost advantages. Examples are standard instruments from East Asian NIC's and Pakistan, as well as blood pressure measuring instruments from Japan.

Intra-EC trade grew from 702 million ECU in 1982 to 2514 million ECU in 1991. This corresponds to an annual average growth rate of 15% in value, well above production growth (10%). One reason for such rapid growth is the technical standardisation within the Community and the more rapid approval of products. This trend can be expected to continue in the future with the adoption of an EC Directive establishing the characteristics required for various products which will enable their free movement in the EC.

Production process

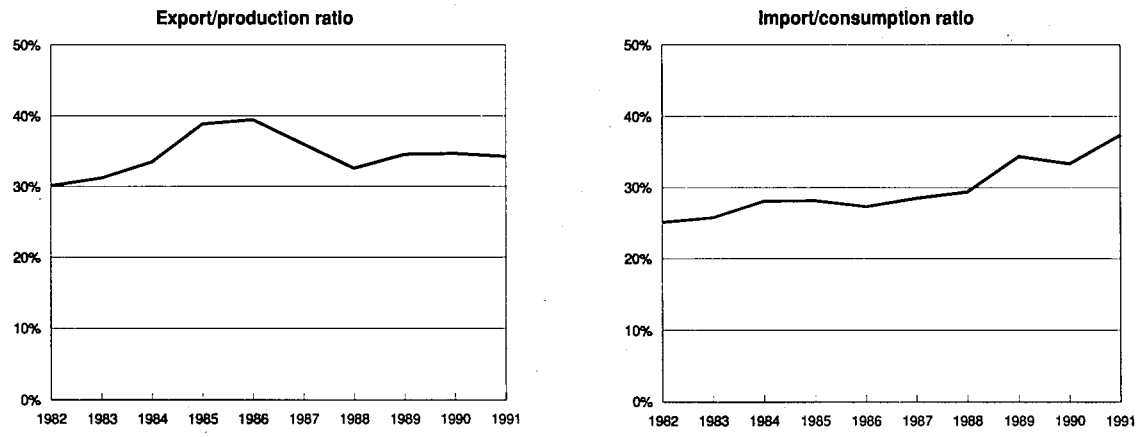
In 1991, about 96 000 employees in the EC were involved in the production of the industry in the EC. Employment has averaged an annual growth rate of 1.8% for the last decade. As value added during the same period increased at an average rate of 4.8% per year, this represents a relatively fast rate of productivity growth of 3% per year, mainly the result of increased efforts by firms to modernise their equipment and

Figure 7: Medical and surgical equipment and orthopaedic appliances
Origin of EC imports



Source: Eurostat

Figure 8: Medical and surgical equipment and orthopaedic appliances
Trade intensities



Source: Eurostat

automate their production process to reduce workforce requirements, a must in the face of rapid increases in unit labour costs.

INDUSTRY STRUCTURE

Companies

The enterprises of the industry in the EC are mostly small to medium sized. There is a large group of small firms, each with less than 250 employees which produce very specialised products to satisfy the heterogeneous demand characteristics of the sector. As a consequence of their narrow specialisation, exports are very important for these firms, as their national market is often too small to ensure survival. The share of exports on total EC production is about two-thirds, one-half of which is intra-EC exports, the other half is extra-EC exports.

In the field of anaesthetic apparatus and equipment, the most important firms are the Draeger Werke in Germany, Air Liquide in France and Ohmeda and British Oxygen in the United Kingdom, all which are not only present in a number of countries in the EC, but also in the United States. In the field of small instrumentation, Germany has a large number of small firms each with about 100 employees, producing approximately 50% of the total world production. Germany's Aesculab is one of the few large companies in this area. Among the other EC producers, the structure of the small instrumentation industry is similar. In the field of operative and postoperative treatment, important firms are Germany's Beiersdorf and Braun. In orthopaedic appliances, there are about 70 firms in the EC employing a combined total of nearly 2500 employees. The most important are Smith & Nephew in the United Kingdom, Dow Corning in France, Otto Bock, Aesculap, Waldemar Link and the Gebr. Martin in Germany. Another important firm is Italy's Sorin, which belongs to Fiat and is specialised in dialysis machines and cardiographs.

The world's largest supplier of health care products, however, is the US firm Baxter, producing in nearly all sectors of medical equipment, (e.g. blood bags, apparatus for diagnostic work, medical dressings, infusion sets, surgical gloves and more). Other important US firms are 3M, Johnson & Johnson and Abbott Laboratories, mainly producing infusion sets and catheters, medical dressings, implants, dental materials and diagnostic devices.

Strategies

EC producers face strong competition from outside the EC, mostly from the United States, as a consequence of technological advantages. The EFTA countries also pose a competitive threat. In the field of standard instrumentation, competition stems mainly from Japan and the East Asian NIC's.

Technical standardisation within the EC is expected to strengthen competition from abroad, since US and Japanese competitors will no longer be forced to adapt their products to the differing requirements of various EC countries. This standardisation, however, will also enhance the capability of EC producers to increase their share of intra-EC trade.

The strategies of EC firms producing standard instruments will continue to be oriented towards cost reduction through the modernisation and automation of production processes. Even so, EC producers may still not be able to lower production costs to the level of their competitors from the East Asian NICs. The result may lead to a loss of market shares not only in the EC, but in other export markets such as Eastern Europe.

In the field of highly sophisticated products, however, the position of EC producers is better, as they have better access to technological innovations. Such innovations however, require increased investments in research and development. For example, R&D investments for most German firms presently represent about 6% to 12% of turnover.

Another problem concerns the weak link between scientific research and industry in the EC. At present, time lags between scientific discoveries and their application to industrial production of a new product may be very long, particularly when compared to the USA.

High levels of R&D expenditure, however, can hardly be expected from small or medium sized firms. The strategy for these firms will have to be the production of very client-specific products designed for small niche markets. Another possibility is a consolidation into larger firms, or at least cooperation in research and development.

REGIONAL DISTRIBUTION

The main producer of medical and orthopaedic equipment in the EC is Germany with about 51% of production. France and the United Kingdom each produce about 16%, followed

by Italy with 11%. The German domestic market offers many opportunities for the industry, as Germany maintains an active policy of promoting modernisation of medical equipment. It is estimated for example, that equipment for dental practises is renewed in Germany twice as often as in France.

ENVIRONMENT

The problems of the industry regarding environmental issues are not usually found on the production side. An important issue is the disposal of waste in the form of packaging materials used in ever increasing quantities for sterilising instruments as well as for single-use disposable devices. An EC directive requires all packaging materials be recycled or recovered by the year 2000.

REGULATIONS

As is the case for all health products, the process for product approval in the United States represents a non-tariff trade barrier. Besides the above mentioned EC directive, another directive planned for July, 1994 will require medical devices and products distributed in the EC to feature an EC stamp of approval attesting to its conformity with EC law. Free movement within the EC is allowed once the product has been shown to be in compliance with the provisions of this Directive. Another EC directive which is coming into force in January, 1993 is related to active implantable devices which will require the EC stamp for free distribution within the EC.

OUTLOOK

The outlook for the industry is quite good, as continuous ageing of the population will sustain demand for all health related instruments. East European countries also offer a huge potential for demand growth as their economies develop. Conversely, EC producers face a number of risks, such as increasing competition from US producers due to their huge domestic market and traditional R&D advantage. The second risk is the EC market in 1993 and the risks emerging from product standardisation. The opening of borders between EC member countries, however, also presents an opportunity for EC producers as the size of their domestic markets increases.

Table 6: Medical and surgical equipment and orthopaedic appliances
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.8	3.8
Production	2.5	3.6
Extra-EC exports	3.0	3.0

Source: BAK

Written by: BAK

Optical instruments and photographic equipment
NACE 373

World production in the industry of photographic equipment is dominated by the United States and Japan. EC firms are the leaders in optical precision instruments and sight correction products, thanks to their high technological standards.

INDUSTRY PROFILE

Description of the sector

The industry of optical and photographic equipment covers the following sectors:

- spectacles, lenses, frames and mountings, also including equipment for use by opticians;
- optical precision instruments (other than opticians items);
- photographic and cinematographic equipment.

Optical precision instruments in the EC are frequently produced in firms active in the whole sector of instrument engineering, mainly in the field of measurement technology, since the latter plays an increasingly important role in the application of optical technology.

Main indicators

The EC industry of optical instruments and photographic equipment represents about 23% of the larger sector of instrument engineering, with Germany as the most important manufacturer (44% of EC output in terms of value added). About 52% of production is exported to countries outside the EC. The main feature of the industry, however, is the strong market penetration of non-EC producers which is reflected in the large trade deficit of the industry (equivalent to about 33% percent of production in 1991).

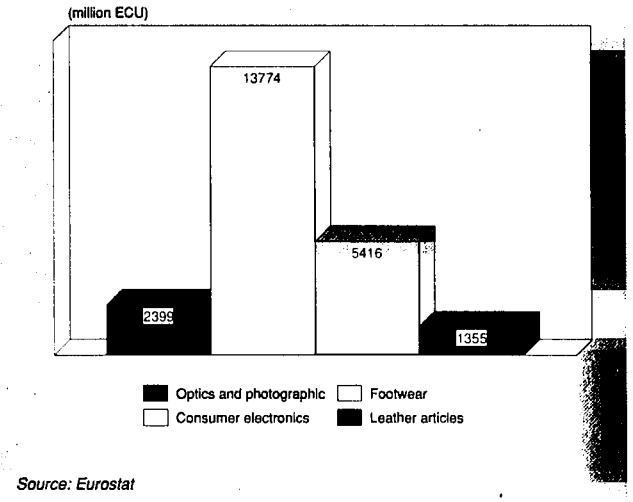
Recent trends

Demand for products of the industry increased considerably from 1982 to 1991, with EC production lagging somewhat behind. But the pattern of development did vary somewhat over time. At the beginning of the eighties, demand in the EC evolved at a relatively moderate pace, and production growth was stimulated by strong demand from outside the EC. During the second half of the eighties, on the other hand, EC consumption increased at a fast pace, while production lagged behind, resulting in increased imports from outside the EC.

International comparison

The United States are the most important manufacturer of optical instruments and photographic equipment; Japan's production represents about 40% of US production, while EC production stands at 25% (in 1991 figures). The development of production over the last decade varied considerably between these three regions. While the United States experienced a production decline of 5.5% per year from 1982 to 1991, in real terms, with a particularly sharp decline after 1985, Japan and the EC managed to increase their production over the same period at an annual rate of 1.7% and 3.1% respectively. Therefore, the share of US production from the total declined from 68% in 1982 to 60% in 1991, to the benefit of Japan (with an increase from 21% to 24%) and the EC (with an increase from 11% to 15%).

Figure 1: Optical instruments and photographic equipment Value added in comparison with other industries, 1991



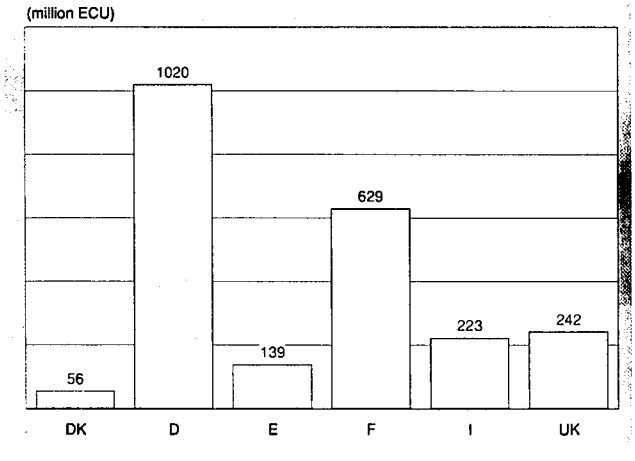
Source: Eurostat

Foreign trade

Extra-EC exports of EC producers increased by an annual average growth rate of over 6% per year in the last few years. The most important recipients of EC products are the United States and the EFTA countries. Imports from outside the EC, on the other hand, increased by 8.7% per year for the same period, with the consequence that 64% of demand was satisfied by imports in 1991. The consequence was a sharp deterioration in the balance of payment, with the deficit growing 14% per year in nominal terms from 1982 to 1991. The lion's share of imports into the EC was taken by Japan, with more than half of total extra-EC imports. During recent years, however, Japan has lost market share in the EC in favour of the East Asian NICs and the United States (about 20% of EC imports in 1991).

The most dynamic development took place at the level of intra-EC trade, with an average annual growth rate of 11% in the period considered here. As a result, intra-EC imports as a proportion of total imports increased from 47.5% in 1982 to 52% in 1991.

Figure 2: Optical instruments and photographic equipment Value added by Member State, 1991



Source: Eurostat

Table 1: Optical instruments and photographic equipment
Main indicators at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
Apparent consumption	3 594	3 705	3 992	4 641	4 960	5 539	6 301	6 435	6 677	7 254	7 558
Production	3 051	3 072	3 456	4 023	4 219	4 572	5 133	5 125	5 237	5 445	5 536
Extra-EC exports	1 660	1 894	2 399	2 610	2 509	2 406	2 548	2 989	2 801	2 854	5 895
Trade balance	-543	-633	-537	-618	-741	-967	-1 168	-1 310	-1 440	-1 809	-2 121
Employment (thousands)	72.8	71.0	73.0	75.6	76.1	75.4	77.8	78.4	77.2	75.8	75.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Optical instruments and photographic equipment
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.3	4.7	3.6
Production	6.0	1.6	3.1
Extra-EC exports	13.5	2.5	6.0
Extra-EC imports	3.9	6.5	5.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Optical instruments and photographic equipment
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	1 660	1 894	2 399	2 610	2 509	2 406	2 548	2 989	2 801	2 854
Extra-EC imports	2 203	2 527	2 935	3 229	3 249	3 374	3 716	4 300	4 241	4 663
Trade balance	-543	-633	-537	-618	-741	-967	-1 168	-1 310	-1 440	-1 809
Ratio exports/imports	0.75	0.75	0.82	0.81	0.77	0.71	0.69	0.70	0.66	0.61
Terms of trade index	121.4	111.0	101.4	100.0	100.1	100.7	96.0	90.5	98.8	95.5
Intra-EC trade	2 015	2 147	2 506	2 596	2 919	3 340	3 715	4 376	4 769	5 168
Share of total imports (%)	47.5	45.7	45.3	43.7	46.6	49.1	49.4	49.9	52.3	52.0

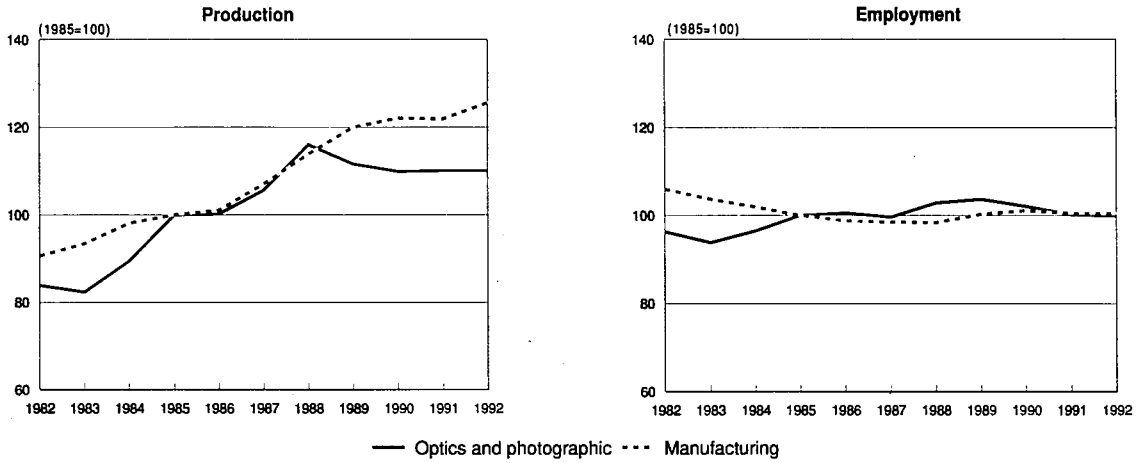
(1) Estimates
Source: Eurostat

Table 4: Optical instruments and photographic equipment
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	27.5	28.1	29.7	31.5	30.4	32.8	34.2	30.7	31.4	31.7
Productivity index	87.2	89.0	94.2	100.0	96.3	104.2	108.4	97.4	99.4	100.4
Unit labour costs index (3)	82.9	88.9	93.6	100.0	105.7	112.7	117.3	122.4	129.5	N/A
Total unit costs index (4)	78.9	81.1	85.9	100.0	104.4	111.8	124.0	130.5	133.5	143.4

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Optical instruments and photographic equipment
Production and employment Indices compared to EC manufacturing



1992 are BAK estimates
Source: Eurostat

MARKET FORCES

Demand

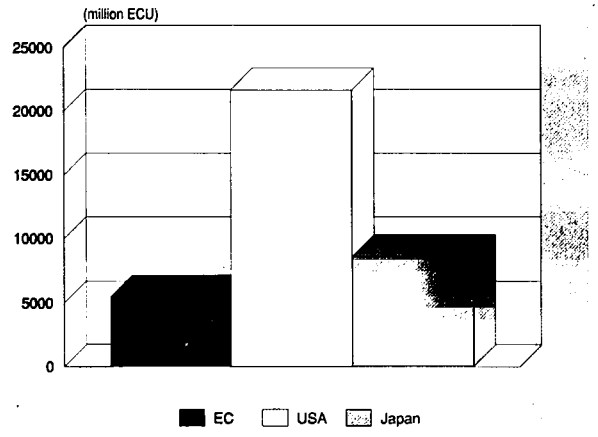
Demand for products of the optical instruments and photographic equipment industry increased considerably during the last decade. In real terms, EC consumption grew by an average rate of 3.6% per year from 1982 to 1991. As the industry as a whole covers a number of subsectors responding to different demand patterns, the analysis needs to be broken down by product types.

In the field of spectacles, lenses, frames and mountings, increasing demand stems both from the increasing number of people wearing corrective glasses, and from fashion considerations. In line with the ageing of the population, the number of spectacle wearers has been increasing steadily during the last years. In Germany for example, about 50% of the population are now wearing spectacles and lenses.

Furthermore, since the wearing of spectacles has become subject to fashion trends, customers are more and more switching to high quality products, as well as to more than one pair of spectacles (or lenses) for different personal uses. Technological developments of the quality of the glasses, that lead to a rise in prices, also contributed to the positive trend in demand for goods of the ophthalmic industry. Another development over the last years was the substitution of plastic materials for glasses in the production of lenses. From 1989 on, demand for products of the ophthalmic industry in the EC declined, due to changes in refund policies of social security systems.

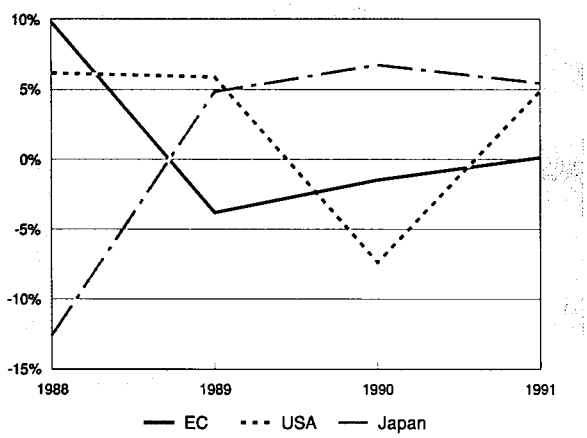
In the field of optical precision instruments, the main outlet is in industrial processes, to improve testing and measuring methods. Particularly important is the sector of measuring, precision and control instruments, where often optical methods have replaced the mechanical process of measuring. In some cases, advanced optical technology in industrial processes may allow to take precise measurements, without having to make contact with the object. It includes opto-electronic process control and sensor technology, microanalytic equipment, multiple co-ordinate measuring machines and high power telescopes. Laser technology is used for soldering and automatic sheet cutting in the car industry and in the aerospace sector, but also in medical technology to treat materials, as well as to perform endoscopic surgery. Technological innovations and

Figure 4: Optical instruments and photographic equipment
International comparison of production at current prices



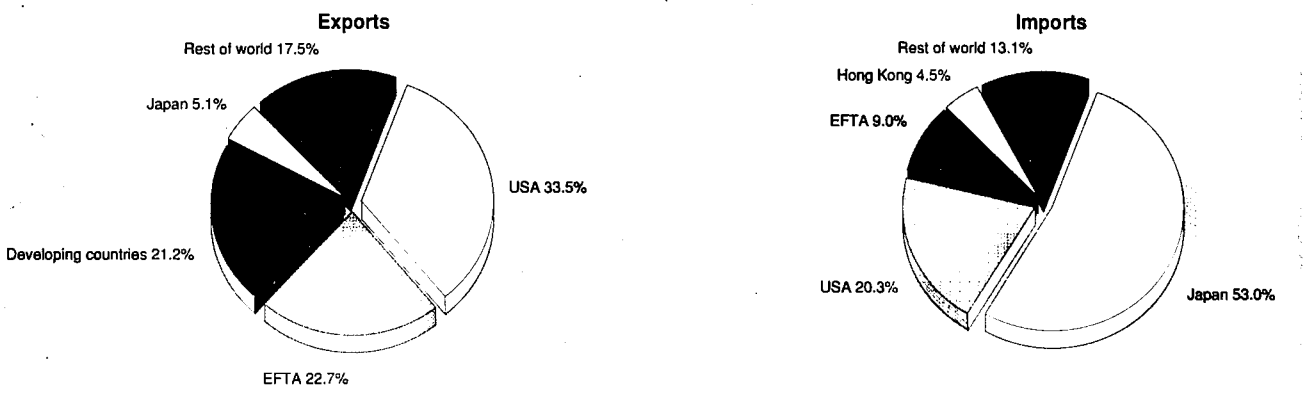
Source: Eurostat, Census of Maunfacturers

Figure 5: Optical instruments and photographic equipment
International comparison of production growth at constant prices



Source: Eurostat, Census of Maunfacturers

Figure 6: Optical instruments and photographic equipment
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

increased investment activities in manufacturing have been the driving force behind the favourable development of demand in that area of the industry.

In the field of photographic and cinematographic equipment, demand stems mainly from private households, but also from specific industrial branches. In the sector of photographic apparatus, product innovation was the driving force behind the continuously thriving demand of the last years. The introduction of electronics was responsible for a move to electronically regulated cameras, with a decreasing share of mechanical parts. Technological improvements, intended to make sophisticated cameras more user friendly as well as to improve the quality of the pictures, has permitted to offer cameras with features such as autofocus, autorewind and autoflash. These last years however, there appears to be a trend among customers to shy away from highly sophisticated cameras, towards simpler, handier or even throw-away models. At present, demand exhibits a downward trend, as a result of high equipment rates and "innovation fatigue" among customers. The loss of markets in Eastern Europe has also reduced world demand. Another field of demand is the use of state-of-the-art special cameras and lenses in aerial and space photography, traffic and bank hall monitoring, medicine and science, as well as in studio and press photography. Demand for photographic and cinematographic equipment is also supported by the growth in importance of communication systems: transmitted images, videos and communications all require photographic or related equipment.

Supply and competition

Despite the fact that production both in Japan and the United States fell after 1985, due to the gradual maturation of their markets, both producers are trying to supply the still increasing demand for optical instruments and photographic equipment in the EC, inadequately supplied by EC producers. Imports from these two countries and increasingly also from the East Asian NICs more than doubled from 2 203 million ECU in 1982 to 4 663 million ECU in 1991 in current prices.

The few EC survivors in the field of photographic equipment can hardly hope to compete with Japanese and the USA producers, which are highly competitive in prices, as a consequence of their large scale production. In particular, Japanese producers such as Canon, Olympus or Nikon are extremely efficient in both production and marketing and their size allows them to invest heavily in research and development.

In the field of optical precision instruments, the situation is characterised by the strong position in export markets of EC firms producing state-of-the-art technology. The most important export market for these products are the United States, where competition is mainly between EC producers.

In the field of spectacles, EC firms are in a leading position worldwide. In the production of fashion frames, in particular, France and Italy are strong exporters thanks to their excellent image abroad. In the production of spectacles, Germany is very successful on foreign markets. However, competition from Japan and East Asian NICs is on the rise; imports of frames from the East Asian NICs have increased, as a result of their price competitiveness, following the lower production costs. Japan is lately becoming a more serious competitor in the field of spectacles, since the MITI in Japan is encouraging research and development activity in this subsector, to supply rapidly increasing demand from the ageing population.

As a result of enhanced intra-EC trade, competition between EC Member Countries is on the rise. In the field of optical precision instruments, the high degree of specialisation of each firm forces producers to search for additional markets abroad, as national markets for their products are too small to permit them to reach the critical size necessary to render production profitable. France and Italy have become specialists mainly in the field of spectacles, and Germany and the United Kingdom in the field of precision optics. Intra-EC competition is likely to increase even more in the next few years, once impediments to trade, that still exist, are fully eliminated on the internal market.

Production process

Employment in the industry has only changed to a small extent during the period 1982 to 1991; on average, it increased by about 0.5% per year. As production during the same period rose by about 31% during the same period, it follows that productivity increased some 1.6% per year.

The growing use of electronics to enhance the capabilities of optical instruments has given rise to the development of high performance systems. These include opto-electronic process control and sensor technology, microanalytic equipment, multiple co-ordinate measuring machines, high power telescopes and developments in quantitative microscopy. In the sector of photographic equipment, similar developments took place at the photographic laboratory level. The same applies in the field of microfilm technology, which now occupies a strong position in serving high performance systems such as microfiches and EDP retrieval. In ophthalmic optics, innovation occurs mainly through the use of new materials for glasses (plastics) and for frames (carbon fibre).

INDUSTRY STRUCTURE

Companies

In the subsector of spectacles, lenses, frames and mountings, the industry comprises mainly small and medium-sized firms with a maximum of 500 employees. Production of frames is mainly done by even smaller firms, usually employing less than 100 employees. Despite their small size, however, the firms usually operate at the international level, with EFTA countries and the United States as their most important extra-EC outlets. The few large companies in the subsector are Rodenstock in Germany, Essilor in France, Luxottica in Italy, Indo in Spain and Pilkington in the United Kingdom.

In the subsector of optical precision instruments, the German Zeiss, and Philips from the Netherlands, are the most important suppliers of electronically regulated microscopes. Worldwide there are about 12 producers in this area. Leica, the Swiss/United Kingdom company specialised in optical instruments, has become a world leader in the sector, behind the Japanese company Nikon.

In the field of photographic equipment, there are a few large manufacturers in the EC that often are highly specialised, such as Augenieux, a French manufacturer of camera lenses.

Strategies

EC enterprises in the field of photographic equipment face strong competition from outside the EC, especially from the United States and Japan. Intra-EC competition is particularly strong in the field of optical precision instruments, and this type of competition is bound to increase with the onset of the internal market in 1993. Important regrouping has already taken place: the British firm Cambridge instruments, and the Swiss firm Wild Leitz, merged to form the new group, Leica, specialised in optical instruments; in 1988, Wild Leitz had already taken over one of its main competitors, Kern.

The creation of subsidiaries in low wage countries could be another solution for EC firms, to improve price-competitiveness by shifting parts of production to these countries, while restricting themselves mainly to development, design and the assembly of the products.

REGIONAL DISTRIBUTION

The main producers are Germany with a share of production of 37%, followed by France with 25%, Italy with 16% and the United Kingdom with 14%. The largest intra-EC exporter is Germany, with about 37% of the total, followed by France (14%), Italy (13%) and the United Kingdom (12%). The main importer from countries outside the EC is once again Germany with about 34% of the total.

Among EC producers, there is a large degree of specialisation. As already mentioned, Germany produces mainly optical and photographic instruments, while France and Italy are major producers in ocular optics, mainly spectacles frames.

ENVIRONMENT

The production process of optical instruments and photographic equipment has little effect on the environment. On the contrary, the solution to ecological problems may actually offer new opportunities to the industry.

The optical and precision instruments subsector, for example, depends to a considerable extent on demand for measuring and control instruments, as already mentioned. Thus, enhanced monitoring and measuring needs in the context of environmental concerns, will probably boost demand for optical and precision instruments. Similarly, there will be an increase in demand for analysing instruments, such as microscopes, optical instruments for physical and chemical analysis, spectrographs, colorimeters and photometers. Demand for photographic equipment may benefit also from ecological concerns, as highly sophisticated cameras are increasingly used in the field of aerial and space photography to monitor environmental damage.

One area, however, of environmental damage related to photographic equipment concerns the run-off of chemicals used in the production of photographic films and in their development, into the soil and possibly into water supplies.

OUTLOOK

The outlook for the industry of optical instruments and photographic equipment remains somewhat depressed in the short term, but will improve in the medium term. Lower demand for products of optical precision instruments is expected for 1992, as a result of low investment in the manufacturing sector. In the field of the ophthalmic industry, the loss of markets in Eastern Europe will continue to weigh down demand; the German industry of ophthalmic products, however, may still profit from increased demand in former Eastern Germany, though at a lower pace than before. In the medium term, the more optimistic outlook is based on the expected upswing in the West European economy, which will increase demand for optical precision instruments in line with the recovery of investment activities. The ophthalmic industry will continue to benefit from the ageing process of the population and may also find, on a later stage, new markets in Eastern Europe. But producers will need to counter Japanese efforts to gain a foothold in these markets; first steps in this direction have already been taken by German companies looking for business contacts in Hungary. Last but not least, the above mentioned opportunities offered by increased environmental concerns reinforce the prospects for a favourable development of demand in the next few years.

Table 5: Optical instruments and photographic equipment Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.8	3.8
Production	3.0	3.3
Extra-EC exports	5.5	5.8

Source: BAK

Written by: BAK
The sector is represented at the EC level by: European Federation of Precision Mechanical and Optical Industries; Ophthalmic Optics (EUROM I); Optical Instruments (EUROM II); and Photographic and Video Technology (EUROM III). Address: Pipinstrasse 16, D-5000 Köln 1; tel: (49 221) 921212-0; fax: (49 221) 245013.

Clocks and watches
NACE 374

Demand in the EC for clocks and watches increased constantly during the last decade, driven essentially by fashion trends rather than by technological developments, which had already taken place in the early sixties. Production, however, declined by 3.2% per year from 1982 to 1991 in value. This development illustrates the strong competition from Japan, the East Asian NICs and Switzerland. This is not expected to change in the next few years. In the medium term, the outlook is somewhat more optimistic thanks to the economic recovery in Western countries and potentially increased demand from China and India.

INDUSTRY PROFILE

Description of the sector

The industry defined as clocks, watches and parts thereof includes watches, instrument panel clocks, clocks, control apparatus and timing devices using clock-work or synchronous motors and time switches, as well as clock and watch movements. The sector encompasses mechanical, electrical and electronic watches.

As a general rule, enterprises in the industry are highly specialised, exclusively producing in their narrowly defined area.

Main indicators

The subsector of clocks and watches is the smallest one among the larger sector of instrument engineering in the EC. In 1991, its output accounted for roughly 6% of total instrument engineering production, and its share of employees was 6.3% of total employment. Germany (former West Germany) and France are the most important manufacturers of clocks and watches in the EC. These two countries' output accounts for nearly 80% of total EC output, measured in terms of value added.

The sector is characterised by increasing competition from outside the EC, giving rise to a fast deterioration of its trade balance during the last decade.

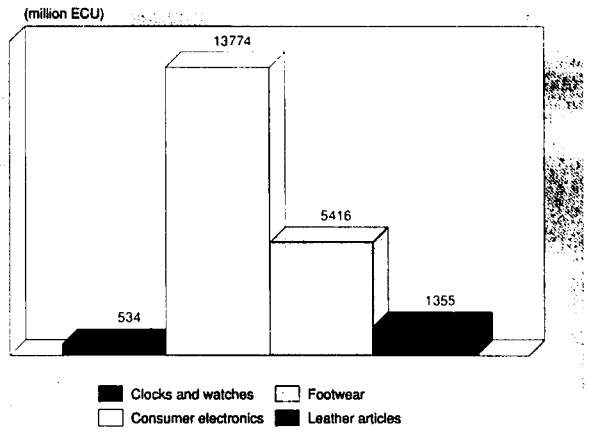
The development of EC production in constant prices underwent different phases during the eighties. In the two years from 1982 to 1984 production decreased by some 39%, following the precipitous fall in prices triggered as a result of the development of electronic watches. From 1984 to 1989, production started increasing again at a rate of 1.9% per year in volume, thanks to a favourable performance of the industry in France (3.1% per year) and in the United Kingdom (3.6% per year). Since 1989, however, EC production has been declining again, to 1 215 million ECU in 1991 in real terms (1985 prices), the lowest production level during the period considered here. EC consumption moved more or less in line with production up to 1989. In 1990 and 1991, however, demand kept increasing, while production decreased resulting in a strong increase of imports.

Extra-EC trade developed rapidly during the eighties. Imports and exports increased at similar rates during that period. But given the fact that imports are more than twice as high as exports, the trade balance further worsened.

International comparison

The largest producer of clocks and watches in the world is Japan, that had a 1991 production value equal to more than eight times that of the EC. Production in the United States is about 81% of that in the EC, with about 1 117 million ECU in 1991. The development of production in the United States during the eighties was similar to that of the EC: production in the United States declined by 3.0% per year in real terms from 1982 to 1991, as compared to 5.8% per year in the EC for the same period. Japanese enterprises in contrast increased their production by 12% per year to reach 11 869 million ECU in 1991. Consequently, EC and US producers saw their shares of world production drop drastically. In 1982, Japan produced about 54% of the output of the Triad, the EC roughly 28% and the United States about 18%. In 1991, the share of EC production dropped to some 9% and that of the USA to 8%, in favour of Japan, now producing 83% of the Triad's output.

Figure 1: Clocks and watches
Value added in comparison with other industries, 1991

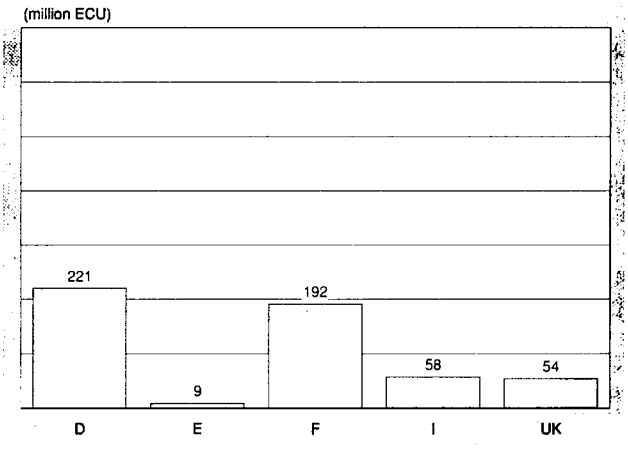


Source: Eurostat

Foreign trade

Exports of the EC companies to extra-EC markets increased by 6.4% per year from 1982 to 1991, in nominal terms. The most important markets for the EC are Switzerland, with roughly 31% of total exports, and the developing countries, with a share of 37%. The strong competition faced by EC producers from non-EC producers is underpinned by the fact, that EC imports increased by 8.9% per year during the same period (1982-91). Imports were almost three times as large as exports in 1991, with the result that the deficit of the trade balance as a percentage of consumption more than doubled

Figure 2: Clocks and watches
Value added by Member State, 1991



Source: Eurostat

Table 1: Clocks and watches
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)
Apparent consumption	2 533	2 349	1 985	2 030	2 345	2 359	2 598	2 855	2 922	3 062	3 071
Production	1 854	1 577	1 221	1 281	1 387	1 374	1 411	1 524	1 465	1 379	1 348
Extra-EC exports	539	528	670	754	754	733	876	958	972	941	934
Trade balance	-679	-771	-764	-749	-958	-986	-1187	-1331	-1457	-1683	-1723
Employment (thousands)	45.3	33.5	25.2	24.3	24.2	22.6	21.9	22.2	21.3	21.2	21.2

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) BAK estimates
Source: Eurostat

Table 2: Clocks and watches
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-8.6	5.9	0.8
Production	-14.8	-0.9	-5.8
Extra-EC exports	13.8	10.4	11.5
Extra-EC imports	11.0	12.3	11.9

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Clocks and watches
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	539	528	670	754	754	733	876	958	972	941
Extra-EC imports	1 218	1 299	1 433	1 502	1 712	1 719	2 062	2 289	2 429	2 624
Trade balance	-680	-771	-764	-749	-958	-986	-1 187	-1 331	-1 457	-1 683
Ratio exports/imports	0.44	0.41	0.47	0.50	0.44	0.43	0.42	0.42	0.40	0.36
Terms of trade index	95.0	97.2	95.5	100.0	98.5	110.0	99.6	78.7	75.7	79.0
Intra-EC trade	401	419	443	465	513	526	583	629	634	616
Share of total imports (%)	24.7	24.4	23.6	23.6	23.0	23.4	22.0	21.5	20.7	19.0

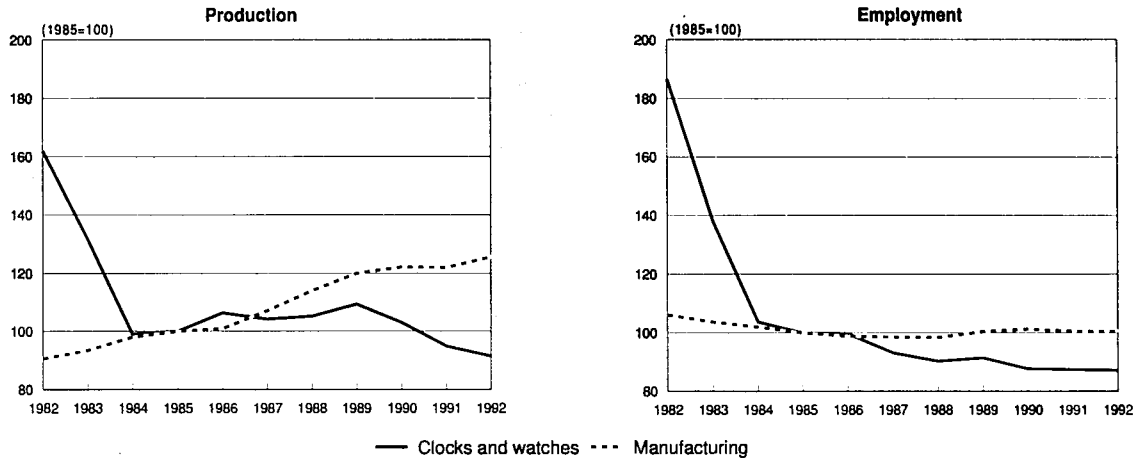
(1) Estimates
Source: Eurostat

Table 4: Clocks and watches
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	21.5	23.6	23.8	23.9	24.9	26.4	28.2	28.4	27.7	25.1
Productivity index	90.0	98.6	99.5	100.0	104.2	110.4	117.8	118.8	115.5	104.8
Unit labour costs index (3)	84.7	95.5	94.6	100.0	108.2	121.6	119.1	125.3	134.4	N/A
Total unit costs index (4)	77.1	88.8	89.3	100.0	109.8	113.1	121.4	128.8	130.7	125.5

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Clocks and watches
Production and employment indices compared to EC manufacturing



1992 are BAK estimates
Source: Eurostat

over the last decade. Being world leaders in high quality mechanical watches, Swiss producers are the most important extra-EC competitors, with more than 50% of total imports into the EC. Imports from developing countries are the result of strong competition from Hong Kong (about 17% of total imports), an important producer of electronic watches in the low price segment. About 14% of imports are from Japan. All in all, 86% of EC demand is satisfied by products from outside the EC.

MARKET FORCES

Demand

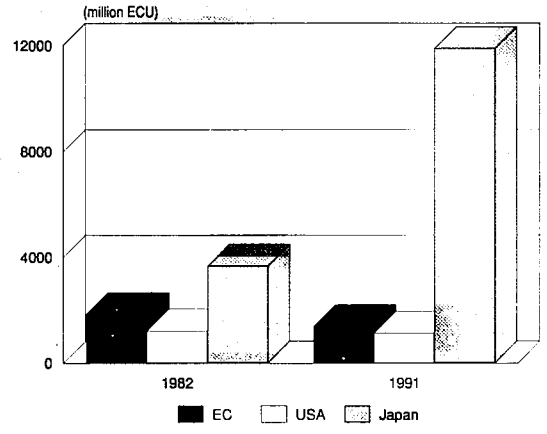
Apparent consumption of clocks, watches and components increased steadily after 1984. Demand, a function mainly of consumer expenditures, was stimulated to a greater extent by fashion trends than by technological developments, given that intensive use of electronic components in this sector's products dates from the early sixties. Innovations, therefore, took place mainly in the form of design changes. Another important feature of demand in the second half of the eighties, was a gradual shift away from the cheap electronic watches produced in Japan and Hong Kong, to top-of-the-range watches. This resulted in increased imports from Switzerland, the main producer of high quality watches.

Supply and competition

The clocks and watches industry in the EC is faced with strong competition from abroad. As mentioned already, about 86% of EC consumption is imported from outside. While consumption in EC countries grew by 1.0% per year in average from 1982 to 1991, production during the same period declined by 5.8% per year (all in real terms). As a result, the EC trade deficit tripled in the same period, to reach 1 683 million ECU in value in 1991.

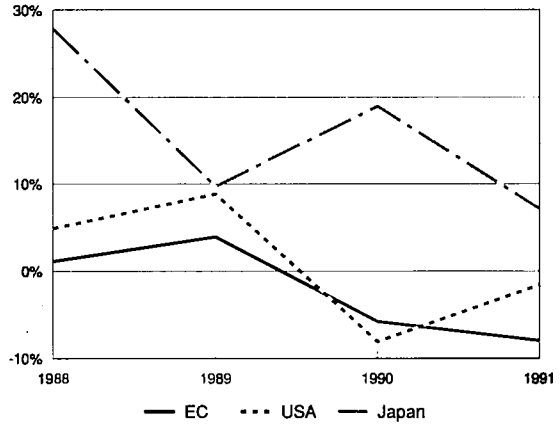
Extra-EC imports stem mainly from Switzerland, Japan and Hong Kong. The largest exporter towards the EC is Switzerland where clocks and watches manufacturers specialise in top-of-the-range mechanical watches. Competition from Swiss manufacturers is expected to increase further, as Swiss producers try to increase market penetration by supplying their products at very competitive prices. This is made possible mainly by the different industrial structure of the Swiss watch

Figure 4: Clocks and watches
International comparison of production at current prices



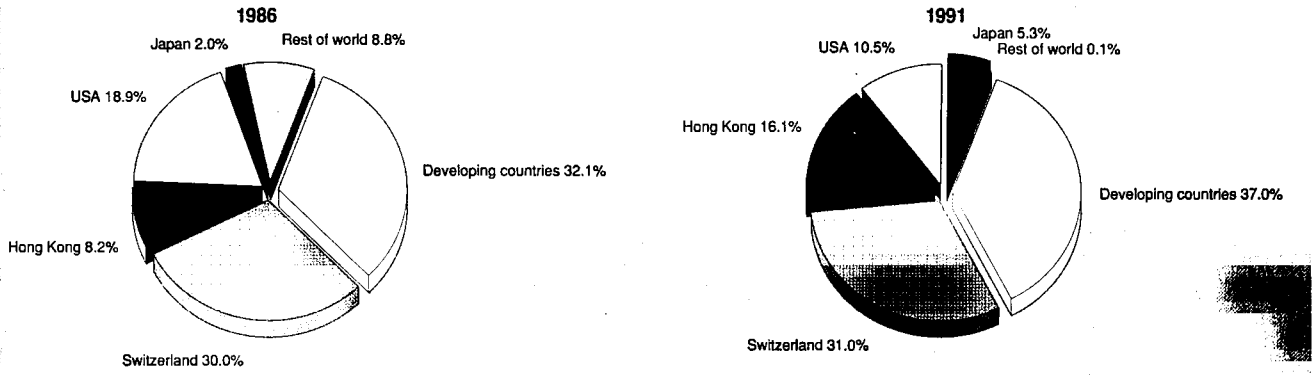
Source: Eurostat, Census of Manufacturers

Figure 5: Clocks and watches
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Clocks and watches
Destination of EC exports



Source: Eurostat

industry. While EC manufacturers are often small and medium sized, Swiss producers are of international size, which enables them to benefit from economies of scale. The result is that SMH, the Société de Microtechnique et d'Horlogerie (the manufacturers chiefly of Rado, Omega, Longines, Tissot and Swatch) have been meeting with mounting success in the EC. Swatch for example sold one million watches alone in France in 1991.

In the field of low-cost electronic watches, Hong Kong and Japan are dominating the world market, with 65% of world production (in volume) in the sector. The share of imports to the EC from these countries, however, declined from 43% of total EC imports in 1986 to 31% in 1991. This result underlines the recent trend for customers to upgrade demand towards high-price watches, as already mentioned.

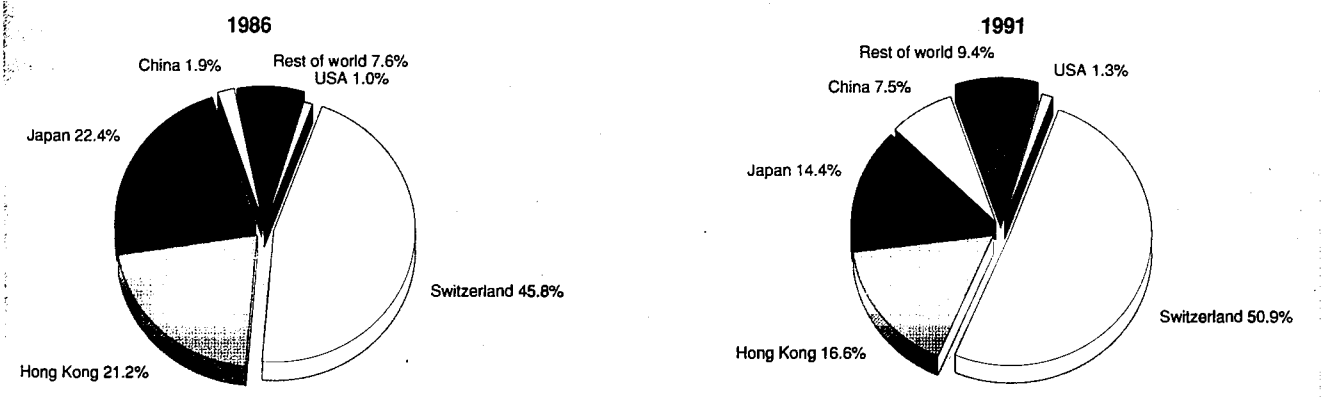
EC manufacturers are operating mainly in the field of mid-range watches. They are not able to compete in prices with electronic watches from the East Asian NICs, as a consequence of lower labour costs in these countries, or of the better availability of components, mainly for the production of electronic movements. Another factor that worked to the detriment of EC producers was a fast fall in prices of electronic watches following the devaluation of the Yen, compounded in 1989 by the efforts of some manufacturers in Japan to clear surplus inventories.

Taking into account that overall demand for watches is likely to decrease in line with the economic slowdown in Europe and the United States, and the loss of markets in Eastern Europe, competition on EC markets can be expected to become even harsher. Prices will drop, the profit situation of EC firms will worsen. Efforts of EC producers to move up to the top-of-the-range segment can also lead to price decreases, as market saturation in that segment is reached also. This has been happening already for French and German watch producers.

Production process

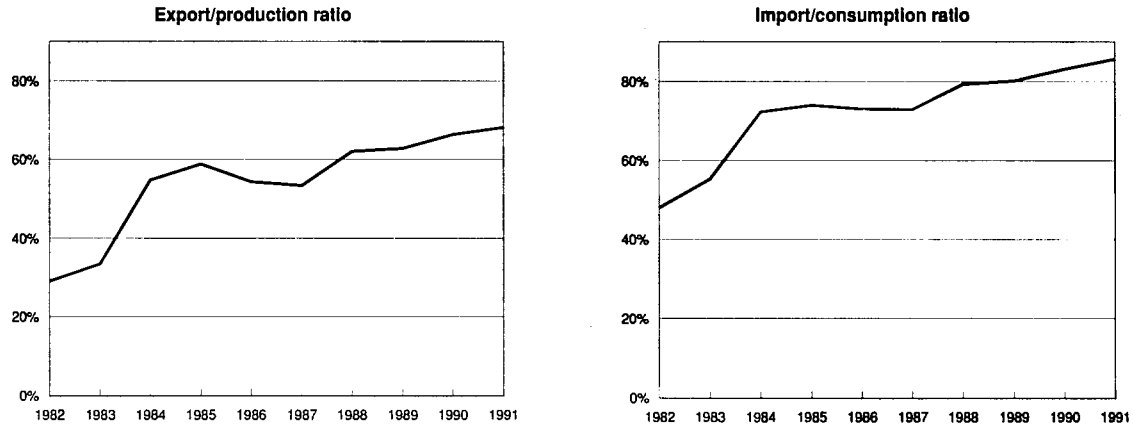
The strong price competition from Japan and Hong Kong caused a difficult profit situation for some of the European manufacturers. Lower labour costs and more efficient production processes in these countries allowed the supply of watches and clocks at very low prices. Watch producers in the EC were compelled to modernise their equipment to reduce costs. Given higher labour costs, a substitution process of capital equipment for labour took place. While EC producers had been employing about 45 000 people at the beginning of the eighties, employment declined during the eighties at an average rate of 8% to reach only 21 000 people only in 1991. The strongest falls in employment could be observed in Germany (-10% per year from 1982 to 1991), Italy (-12%), and the United Kingdom (-13%). Consequently, a restructuring of the production process took place in these producing coun-

Figure 7: Clocks and watches
Origin of EC imports



Source: Eurostat

Figure 8: Clocks and watches
Trade intensities



1992 are Cei-Bois estimates
Source: Eurostat

tries, resulting in increased productivity. In contrast, France's workforce fell first at a much slower rate, but major producers in France were forced to reduce their workforce by 7% in 1991 as the industry there was faced with increasing difficulties. As a whole, productivity of the industry in the EC, as measured by the ratio of value added to employment, rose at an average rate of 2.5% per year from 1982 to 1991.

Another feature of the last years was the tendency of manufacturers to move out of the production of parts, in order to concentrate on the tasks of design, assembly and distribution to jewellers.

INDUSTRY STRUCTURE

Companies

The clocks and watches industry is generally structured into large numbers of small firms, with a few larger companies, seldom employing more than 700 people. The larger companies are mainly in the field of cases and movements production. The most important producers in the European Community are the German firms Junghans (1400 employees), Dufa-Kienzle (800 employees) and Kundo and Staiger. France's Ebauches is one of the most important producers of movements in the world, while Vedette is operating in the field of clocks. Other companies in France are Herbelim and Pequignet, producing in the high price segment,

Most EC companies are active on extra-EC markets, with the United States, the EFTA countries and the East Asian NICs as their main export markets.

Strategies

The clocks and watches industry in the EC faces strong competition from Switzerland in the high-price segment, and from Japan and Hong Kong in electronic low-cost watches. The smaller firms producing in the low-price range were particularly hit by the competition from Japan, since they could not produce on a scale sufficient to permit low-cost production. The mid-range sector, however, is presently dominated by EC manufacturers, but even these are now confronted with increasing efforts on the part of Swiss manufacturers to strengthen their presence in EC markets by supplying some of their products at very competitive prices. In anticipation of the onset of the internal market in 1993, companies from outside the EC, mainly the Swiss and the Japanese, have been increasing their investment activities in the EC. Thus, the Compagnie Générale Horlogère, a subsidiary of the Hattori-Seiko group, has expanded its presence in France by making large investments there, while the Swiss SMH has taken over the rough-hewing manufacturing part of the German Porta.

In order to face up to these challenges on their domestic market, EC companies have intensified their investment activities during the last few years. This has permitted firms in the mid-range sector to retain their place on the market, by frequently renewing their product lines and by improving the quality of their watches.

To better meet the intensification of competition, firms in the mid-range segment are being forced to regroup. In Germany for example, important regrouping took place: the clock producing Dufa-Kienzle, for example, took over the watch firms Haller and Buerk and the clock firms Peter-Uhren, Schmid-Schlenker and Patz. Kundo and Staiger are working together in both research and development and the production of watches. Increased efforts in research and development are very important, as the success of the German Junghans illustrates; the company managed to increase its turnover by 23% in 1991, by introducing first the solar watch and then the radio set watch.

To streamline production costs, some EC firms increasingly subcontract the production of parts to other countries' producers, mainly in South-East Asia; others established subsidiaries there. Thus, the France Ebauches has already subsidiaries in Mauritius, Tunisia, and Hong Kong; even SMH has now subsidiaries in Thailand, Hong Kong and China.

REGIONAL DISTRIBUTION

The production structure in the EC has undergone considerable changes during the eighties. While Germany (former West Germany) was the dominating producer at the beginning of the eighties, with nearly 50% of the EC total, its relative position weakened in the following years in favour of France, whose share of EC production surpassed that of Germany by 1987. In 1989, however, stimulated by the German reunification, Germany (former West Germany) managed to remarkably increase its production. In 1991, the share of Germany in total EC production was 42%, followed by France (37%), the United Kingdom (12%) and Italy (7%).

Intra-EC exports are similarly dominated by these countries, which make up about 80% of the total. The most important intra-EC exporter is Germany (former West Germany) with 45% of the total, followed by France with 20%.

ENVIRONMENT

The only ecological issue related to this industry is the problem of disposal of the small nickel-cadmium batteries used to power electrical and electronic time pieces. As known, the cadmium contained in these batteries may progressively seep into ground water and endanger public health.

REGULATIONS

In the area of trade restrictions, which are in generally almost absent in this sector, the forthcoming directive on gold watches should, nevertheless, facilitate trade in these products, since major restrictions still exist in France, the United Kingdom, the Netherlands, Ireland, and Spain.

OUTLOOK

Prospects for the industry in the EC are not very encouraging, at least in the short term. World demand for watches has decreased lately, due to the recession in Europe and the United States and the loss of markets in Eastern Europe, caused by the dissolution of the communist block and the former Soviet Union.

In the medium term, the general outlook for the industry is somewhat more optimistic, thanks to the expected economic recovery in the United States and in West Europe and to the huge potential for increased demand from China and India. The markets in East Europe are not expected to recover in the next few years. To be able to profit from the global upturn in demand, however, EC producers will have to increase their efforts in product innovation, as well as in the realm of cost reduction, to increase their competitiveness against extra-EC competitors.

Table 5: Clocks and watches
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	4.3	4.2
Production	0.5	0.7
Extra-EC exports	6.0	5.7

Source: BAK

The enacting of the internal market in 1993 will not change drastically the landscape for the industry in the EC, as most of the firms are already operating internationally.

Written by: BAK
The industry is represented at the EC level by: Permanent Committee of European Watch and Clock Makers Secretariat/French Chamber of Watch and Clock Makers and Micro-technology (CPHE).
Address: Avenue de Messine 34, F-75008 Paris; tel: (33 1) 45 61 95 22; fax: (33 1) 43 59 03 86;
and,
The International Confederation of Jewellery, Diamonds, Pearls and Stones/Confédération Internationale de la Bijouterie, Joaillerie, Orfèvrerie, des Diamants, Perles et Pierres (CIBJO). Address: Address: 78A Luke Street, London EC2A 4PY, United Kingdom; tel: (44 71) 613 44 45; fax: (44 71) 613 44 50.

Food, drink and tobacco

NACE 41,42

Demand for processed food products rose significantly between 1982 and 1991. Growth of average income positively influenced consumers' preferences toward high-service content, rather than fresh, products.
The food industry is not very concentrated: there are many small companies, but the number of large firms has been steadily growing. In the 1980s, M&A activities increased the level of concentration in all of the main EC markets for this sector.
Changes which recently took place in Eastern Europe offer the food industry further possibilities for expansion.

INDUSTRY PROFILE

Description of the sector

This industry includes all the activities of processing agricultural products, fish, meat, and tobacco, and is coded in the group NACE 411 to 429.

Main indicators

Apparent consumption increased between 1982 and 1991. Production followed the same trend of consumption, at a slightly higher rate. The trade balance was positive, and increased overall during the period, although it was affected by variable export growth after 1985. Employment decreased until 1986, then began a slow recovery; however, employment figures in 1991 were lower than in 1982.

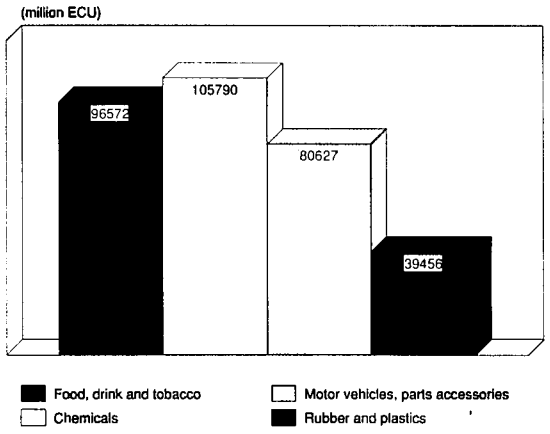
The meat sector has the highest value of production of the various sectors, and is the only sector to experience higher employment in 1991 than in 1982. Employment in the grain milling, dairy and tobacco sectors, on the other hand, decreased overall during that period as a result of the substitution of capital-intensive for labour-intensive production techniques. In the other food sectors, employment decreased through the mid-1980s, then began a slow period recovery. This recovery can be ascribed both to the slowing down of the process of substitution of labour with capital, and to a new expansion phase of activity which increased labour input needs.

Extra-EC exports in value grew substantially more than extra-EC imports, resulting in an 84% increase in the trade balance over the ten year period. Meat processing and processed vegetable and fruit products show the only negative values in the trade balance.

In most sectors, production in current terms increased. The exceptions included oils and fats, sugar, and confectionery which had variable growth, and the alcohol and spirits industry which had an overall decline. In each sector, consumption followed the trend of production for the most part.

Value added for 1991 correlated with the concentration of the food industry in each country. The German industry had the highest value added, followed by the UK and France. In these countries, the food industry has reached a high level of concentration by pursuing conglomerate strategies. American and European multinationals operate in various markets and different sectors in these three Member States. The Spanish and the Italian industry are characterised by the presence of a significant number of small companies, but these markets have been the object of intense M&A activity on the part of both national and foreign companies, which has contributed to an increase in the concentration level in these markets and to a general restructuring of the industrial system. Benelux countries have rather low value added because their national markets have proven insufficient for the establishment of a significant industry. Greece is characterised by a significantly low value added as well, due to an immature and slowly developing industrial system.

Figure 1: Food, drink and tobacco
Value added in comparison to other industrial sectors, 1991



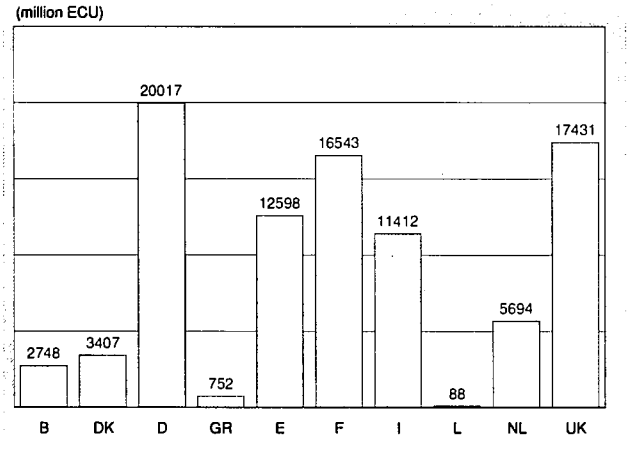
Source: Eurostat

Recent trends

After 1986, there was a slight acceleration in consumption compared to production, and a corresponding decline in exports. In the second half of the decade, imports also slowed down.

Production grew slowly compared to manufacturing. Employment also grew more slowly than in manufacturing until 1991, when employment in manufacturing dropped, while employment in the food drink and tobacco industry continued its slow but steady growth.

Figure 2: Food, drink and tobacco
Value added by Member State, 1991



Source: Eurostat

Table 1: Food, drink and tobacco
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	276 720	298 981	324 781	334 091	333 069	338 643	359 117	387 651	406 573	428 952	445351
Production	279 688	300 535	327 105	337 583	335 890	341 682	361 540	392 613	411 516	434 389	450800
Extra-EC exports	19 694	20 283	23 745	24 672	20 701	20 305	21 477	25 068	24 860	26 115	27229
Trade balance	2 968	1 554	2 324	3 492	2 821	3 039	2 423	4 962	4 943	5 437	5449
Employment(thousands)	2 532.3	2 502.9	2 471.9	2 418.6	2 367.4	2 385.7	2 351.2	2 402.7	2 432.8	2 455.9	2 463.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Food, drink and tobacco
Breakdown by major product line, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Meat	75 015	75 043	3 797
Dairy products	61 050	64 017	3 729
Compound feed	29 400	29 629	864
Brewing and malting	24 537	25 531	1 108
Tobacco	37 052	37 794	1 211

(1) Estimates
Source: Eurostat

Table 3: Food, drink and tobacco
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.5	3.1	2.9
Production	2.6	2.9	2.8
Extra-EC exports	3.7	0.4	1.5
Extra-EC imports	3.6	2.7	3.0

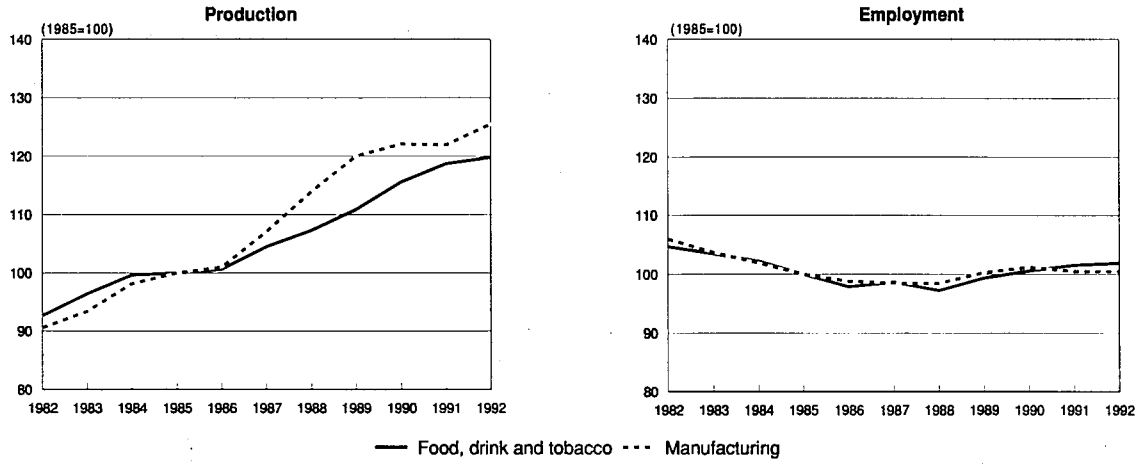
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Food, drink and tobacco
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	19 694	20 283	23 745	24 672	20 701	20 305	21 477	25 068	24 860	26 115
Extra-EC imports	16 726	18 729	21 421	21 180	17 880	17 266	19 054	20 106	19 917	20 679
Trade balance	2 968	1 554	2 324	3 492	2 821	3 039	2 423	4 962	4 943	5 437
Ratio exports/imports	1.18	1.08	1.11	1.16	1.16	1.18	1.13	1.25	1.25	1.26
Terms of trade index	101.6	99.1	92.5	100.0	108.2	107.9	106.0	116.1	126.5	124.2
Intra-EC trade	31 731	33 072	36 765	40 872	42 150	43 256	47 878	52 347	53 949	59 261
Share of total imports (%)	65.2	63.5	62.9	65.6	69.9	71.1	71.2	72.0	72.8	73.9

(1) Estimates
Source: Eurostat

Figure 3: Food, drink and tobacco
Production and employment indices compared to EC manufacturing



Source: Eurostat

Foreign trade

In the second half of the 1980s, growth of both extra-EC imports and exports in volume declined substantially. The export to import ratio increased slightly, due to a slower increase in imports than exports.

The volume of intra-EC trade increased steadily throughout the 1980s, and in 1991 was twice as high as extra-EC exports. During the period from 1986 to 1991, the proportion of exports in value destined for the USA, EFTA and OPEC countries decreased. In the case of the OPEC countries the fall occurred in 1991, and was caused by the Gulf war. The decrease in the importance of the USA as a destination for exports can be linked to protectionist measures taken by the USA and EC countries. Imports from Brazil have also diminished, while those from the rest of the world are increasing.

Extra-EC exports are not significant compared to production, and decreased as a percentage of production from approximately 7% in 1982 to around 6% in 1991. Intra-EC exports are more significant and are an increasing proportion of production (13.6% in 1991), due to the implementation of the Single Market. The ratio of extra-EC imports to apparent consumption has decreased more than exports to production.

MARKET FORCES

Demand

Demand for both fresh and processed food products in Europe grew at a rather modest rate despite nearly 0% growth in population and a decrease in the share of total expenditure for food consumption in most countries. Demand for industrially-made food products is much more dynamic than demand for fresh and artisanal products because of a substitution movement favouring high-service content, easy-to-prepare products which will keep longer than fresh ones.

In addition, the rise of retail chains favours the consumption of industrial products compared to fresh ones due to a number of factors:

- the general decrease in the number of shopping trips the consumer makes per week;
- the logistic optimisation of supplies on the part of the retailers chains with respect to the industry;
- the greater control exerted on the prices of industrial products compared to fresh products, which are periodically subject to over- or underproduction crises which obstruct price controls.

The aggregates are heavily weighted by the high value of fresh and preserved meat, which tends to bias data towards trends in the meat industry.

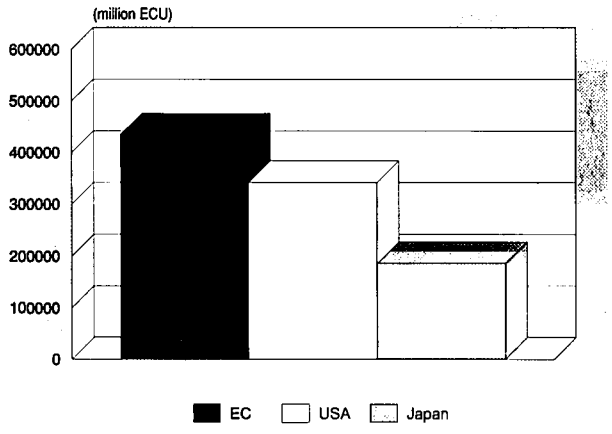
Supply and competition

Extra-EC trade of processed food products is low since large-size companies find it convenient and cheap to establish and buy production capacity in the main markets. Internationalisation strategies by means of foreign investments toward the main markets have been preferred to exporting because of transport costs and the ability to exercise direct control upon the principal final markets.

Legal obstacles concerning labelling, food content and, with regard to meat, the restraints on breeding techniques also hinder exports in the food sector.

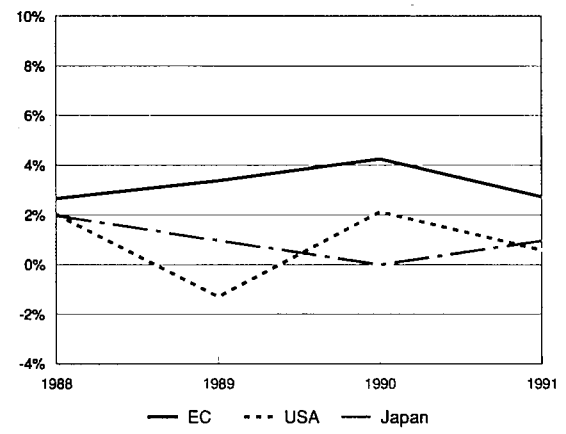
The abolition of some of the factors which limit trade has contributed to the growth of foreign trade in the EC market.

Figure 4: Food, drink and tobacco
International comparison of production at current prices, 1991



Source: Eurostat, Census of Manufacturers

Figure 5: Food, drink and tobacco
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Table 5: Food, drink and tobacco
Production and employment by country, 1991

	Production (million ECU)	Employment (thousands)
EC	434 389	2 455.9
Belgique/België	13 745	70.3
Danmark	14 107	66.3
BR Deutschland	97 216	518.7
Hellas	5 397	61.3
España	46 489	364.6
France	78 916	352.5
Ireland	11 019	47.3
Italia	53 962	218.8
Luxembourg	372	2.6
Nederland	29 960	127.1
Portugal	6 830	73.5
United Kingdom	76 375	553.1

Source: Eurostat

Food companies have shown steady profitability indicators, despite the problems. Such stable profitability, particularly in the early 1990s, was unusual compared to the difficulties experienced by the manufacturing industry.

Production process

Since 1982, the food industry has been characterised by a technological substitution process in favour of increased capital intensity. The decrease in employment which lasted until 1986 can be ascribed to this factor.

Product innovations have also been numerous; while some were designed specifically to fulfil consumers' individual preferences, others had the objective of increasing the quality to price ratio of offered products.

INDUSTRY STRUCTURE

Companies

The number of companies operating in the European food sector is rather large. However, the percentage of turnover in value of the first ten companies (with holding company in the EC) accounted for around 18% of the total market in 1989.

All of the larger-size companies are multinationals, mostly American or from other non-EC countries, which operate as conglomerates, thus favouring business areas such as the food, pharmaceuticals and chemicals sectors.

The largest European food company by sectorial turnover is Nestlé (CH), followed by Unilever (Anglo-Dutch) Unilever is the largest company in the sector in the EC, and turnover in 1989 was only 58% of Nestlé's turnover. Among the first ten companies in the EC there are seven UK companies (including Unilever), two French and one Italian. UK companies account for more than 70% of the turnover of the first ten EC companies.

Only three European companies are positioned among the top ten food, drink and tobacco companies in the world: Nestlé, Unilever and Grand Metropolitan; the others are all American. US companies had the advantage of having first operated inside the large US market: the size and the political structure of the country favoured the first multi-plant strategies by US companies and, therefore, the first multi-market and multi-product strategies.

By contrast, the internationalisation and competitive positioning of European competitors are more recent. For this reason, American companies have a strong position in Europe, while the same cannot be said for European companies in the large American market.

Strategies

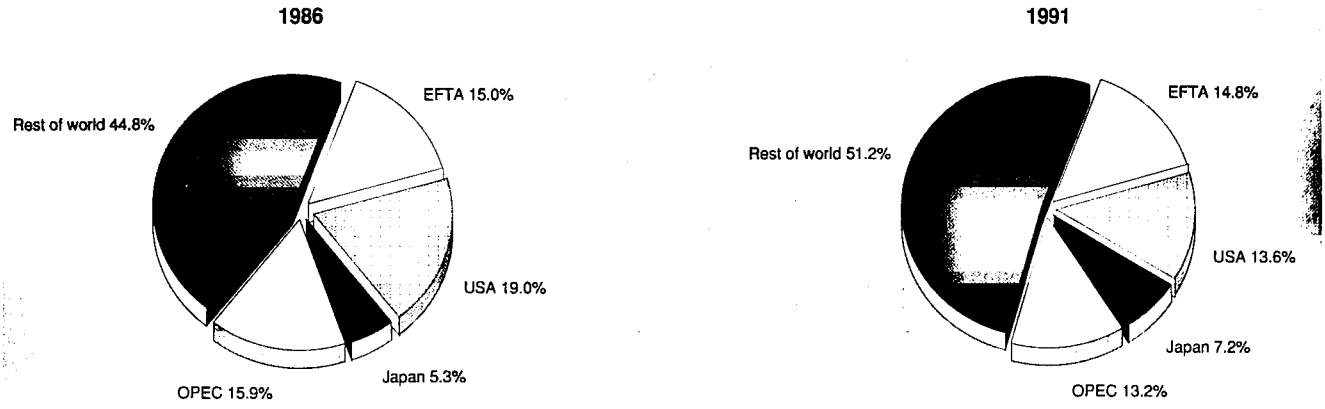
M&A activities in the EC food and drink market have been more important than in many other sectors. The largest com-

Table 6: Food, drink and tobacco
Top 10 food firms in Europe, 1991

	Country	Turnover (million ECU)	Employees (thousand)	Net profit (million ECU)
Unilever	UK/NL	33 059	298.0	1 645
Nestlé	CH	28 453	201.1	1 392
B.A.T. Industries	UK	15 903	212.3	587
Grand Metropolitan	UK	12 477	122.2	940
Ferruzzi Finanziaria	I	11 581	44.9	75
BSN	F	9 469	59.2	560
Sucres et Denrées (1)	F	6 762	5.6	-67
Willisdown Holdings	UK	6 636	48.7	178
Allied-Lyons	UK	6 529	78.7	539
Eridania Zuccherifici	I	6 049	15.8	88

(1) 1990
Source: DABLE

Figure 6: Food, drink and tobacco
Destination of EC exports



Source: Eurostat

panies reinforced their positions with respect to medium-size firms by acquiring these firms, and by some important mergers among the major companies.

Northern European markets are more concentrated than those in the southern European countries. The acquisition process has strongly affected markets in the south because of the high growth expectations of brand-name products. The 1980s saw a recomposition in the relative size of competitors due to the acquisition process. This strategy has been pursued by almost all the major companies in the world, and has three objectives.

- to implement a market-product diversification in order to exploit economies of scope;
- to improve or to maintain a relative market position compared to those of the main competitors;
- to inhibit increases in production capacity so as not to induce overproduction crises.

Since 1989, the level and intensity have of M&A activity have tapered off somewhat.

One of the main strategies pursued by the largest companies is rationalising promotional investments for brand strategies.

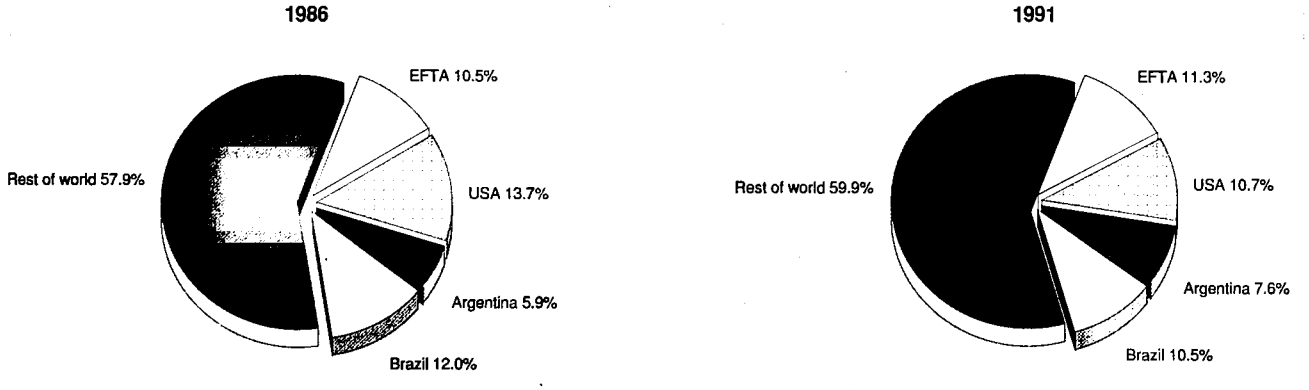
The acquisition process has been preferred as a strategy of market penetration because the low import-export activity, as well as the different regional preferences and the need for promotional investment for new brands, make introduction of a new product difficult and costly. In addition, the expectation of stability of demand makes investment in industrial capacity unsuitable.

Another aspect which influences the strategies of the food industry is the increasing bargaining power of commercial outlets and the competitive pressures of the large companies. Small and medium-size firms have the most competitive disadvantages because they find themselves squeezed between the two, with a few options including:

- positioning themselves in a high quality segment or niche position;
- becoming the unbranded suppliers of the distribution chains.

A different model of expansion through M&A refers to corporations which are involved in food processing of non-differentiated products such as sugar, starch, Soya, maize, etc.

Figure 7: Food, drink and tobacco
Origin of EC imports



Source: Eurostat

Table 7: Food, drink and tobacco
Breakdown by size of enterprise, 1988

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	243 352	92.1	29.1	14.9
20-99	16 410	6.2	20.0	16.9
More than 99	4 339	1.6	50.8	68.2

Source: Eurostat

Firms are expanding vertically, both upstream to production of the raw materials, and downstream to the production of brandable products from these raw materials.

ENVIRONMENT

Cultivation of crops as well as breeding, slaughtering, and dairy production have a negative impact on the environment, especially water, by discharging organic pollutants. The further processing of food, as distinguished from agricultural activities, is not a major environmental hazard. Pollution from processing is directly linked to the degree of energy involved for the necessary heat in the single production processes, which, however, cannot be considered among the pollutant technologies.

The impact on environmental issues is particularly evident with regard to the product itself.

The developments in distribution (selfservice) and demography (small and single households) have had a significant impact on packaging. Packaging plays an important role in the protection, safety, information, shelflife etc. of food and drink products.

Moreover, standardisation in the European legislation also includes common packaging standards, particularly for fresh fruit and vegetables. Packaging materials for all products, food and non food, represent 25% of household waste.

Some countries have introduced special taxes, such as that on plastic bags in Italy or on PVC plastic bottles in Germany. Such measures, however, reintroduce the distortions in competition which the EC is working to harmonise. In some cases, there is a trade off between environmental needs and harmonisation in food legislation, product and packaging standards.

Table 8: Food, drink and tobacco
Major mergers and acquisitions in the European food industry

Purchaser	Country	Purchase	Country	Year	Price (in million ECU equivalent)
Cadbury-Schweppes	UK	Poulain	France	1987	137
Nestlé	Switzerland	Rowntree	UK	1988	3 983
Nestlé	Switzerland	Buitoni	Italy	1988	1 000
Ferruzzi	Italy	Lesieur	France	1988	722
United Biscuits	UK	Ross Youngs	UK	1988	501
RHM	UK	Avana	UK	1988	417
BSN	France	HP Foods	UK	1988	298
KIO	Kuweit	Ebro	Spain	1988	244
Campbell	USA	Freshbake	UK	1988	163
GrandMet	UK	Pillsbury	USA	1989	5 263
BSN	France	RJR Nabisco (Europe)	USA	1989	2 417
BSN/IFIL	France/Italy	Galbani	Italy	1989	1 484
Pepsico	USA	Smiths/Walker	UK	1989	1 225
Südzücker	Germany	Raffinerie Tirlemontoise	Belgium	1989	435
Cadbury-Schweppes	UK	Trebor	UK	1989	163
Bouyges	France	Grand Moulins	France	1989	142
Unilever	UK/Netherlands	Boursln	France	1989	128
Philip Morris	USA	Jacobs-Suchard	Switzerland	1990	3 728
Assoc.British Foods	UK	British sugar	UK	1990	1 232
Paribas	France	Guyomarch	France	1990	398
CPC	USA	Ambrosia/Marmite/ Bovril(Beecham)	UK	1990	233
United Biscuits	UK	Verkade	Netherlands	1990	112
Booker	UK	FITCH Lovell	UK	1991	408
Ferruzzi	Italy	Béghin Say (add. 10%)	France	1991	334
Banco Central	Spain	Azucarera española (75%)	France	1991	311
Besnier	France	Brindel	France	1991	215
MBO	UK	Devro	UK	1991	154

Source: Corporate Intelligence Group Research, Outram Culliman & Company

On the other hand, the biodegradability of materials used in packaging processed food might bring a new opportunity, but the higher costs of these materials could damage the competitive position of the companies adopting them. For these reasons, the problem of environmental impact must be considered in the more general context of the harmonisation of laws.

REGULATIONS

EC legislation has certain goals, including:

- the abolition of technical and fiscal obstacles to the free movement of goods;
- the protection of public health and of the final consumer;
- the homogeneity of information;
- economic and technological objectives.

There is legislation concerning general aspects such as labelling, the use of additives, the characteristics of the production process, etc., as well as legislation referring to specific sectors, as in the case of legislation on beer, pasta, etc.

The recent change in policy on the part of CAP must be taken into consideration, since it will influence the supply strategies of the processing industry through changes in availability, quality and prices of the agricultural materials used.

OUTLOOK

EC growth is expected to be higher in the mid-1990s than the late 1980s and early 1990s, both for production and for domestic market, due to increases in income and in consumption propensity for industrial products, especially high-service content products. This kind of propensity is higher in Northern European countries, with more established industrial traditions. However, it is also growing in rapidly developing countries, such as Spain and Greece.

Table 9: Food, drink and tobacco
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	0.9	0.9
Production	0.9	0.9
Extra-EC exports	2.8	2.8

Source: Prometeia

The UK is the exception. Recession has significantly conditioned the sectorial demand expectations and, consequently, production planning. In this case, beverages is the only segment which faces a positive growth expectation.

Population growth will also affect demand, mainly due to immigration rather than increased birth rates. In addition to the immigration flow from Africa, the influx of immigrants from Eastern Europe is expected to reach significant proportions.

Producers face the risk of excessive pressure on prices from the big distribution chains, as well as from possible surpluses.

However, the steady increase in demand for processed products, combined with the possibility of expansion in Eastern European markets provide continuing opportunities for companies. In addition, the industry is not as affected by cyclic economic swings as the manufacturing industry offering a measure of protection to producers.

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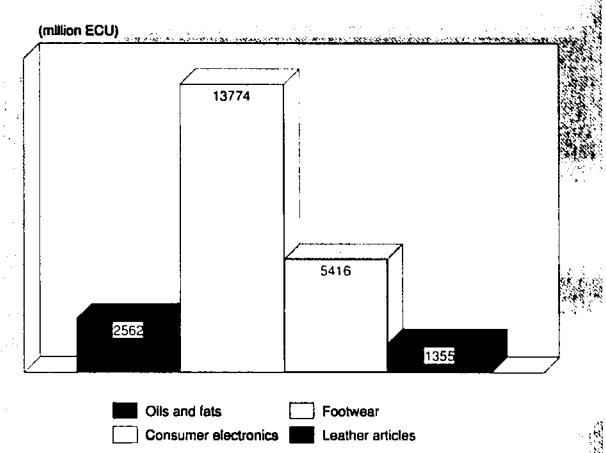
The industry is represented at the EC level by: Confédération des Industries Agro-Alimentaires de la CE (CIAA). Address: Rue de la Loi 74, Bte 9, B-1040 Brussels; tel: (32 2) 230 81 45; fax: (32 2) 230 85 69.

Oils and fats
NACE 411

Consumption of vegetable and animal oils and fats was stable over the 1980s and early 1990s. With respect to products for human consumption, there has been a progressive substitution of animal fats with vegetable fats, and the substitution of traditional products with innovative low-fat content products. The new emphasis on nutrition may encourage a more geographically widespread consumption of olive oil.
Concentration process in the oils and fat industry, which is likely to intensify with the creation of the Single Market, has meant a growing rationalisation of the production process with a consequent improvement in productivity.
From the strategic point of view, advertising outlays and the product range policies are becoming increasingly important.

Figure 1: Oils and fats
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The main products of the oil and fat-producing industry are:

- products of oilseed processing destined for final consumption, which include both seed-oil prepared for human consumption and oil cake and protein meals for animal feed;
- products of oilseed processing which are used as raw materials for the food preservation industry, for cake and biscuit making, confectionery, etc., and for the manufacturing of celluloid, electronic insulation, candles, enamel paints, fuels, glycerine, linoleum, lubricants, paints, soaps, etc.
- products of olive-processing; olive oil, which has different brand names depending on the production technique utilised and the qualitative level of the product;
- margarine, minarine and dairy spreads (a mixture of butter-fat and vegetable fat in varying percentages), which represent the next step in the processing of vegetable and dairy fats.
- fats and oils from land and marine animals.

The increased number of products on the market for human consumption has led to the EC adopting a classification based on the definition of three broad groupings: butter (milk-derived fats only); margarine (vegetable or animal fats not dairy fats); and products with both of these fats, called mixed fats. For each group there are six further categories, based on variations in fat content between 20% and 95%.

Main indicators

The developments in the main indicators in nominal terms have been variable. The result of the harvests , and thus climatic factors, in the major producing areas, can quickly affect trade flows and market prices. Changing relative prices encourage substitution with products endowed with similar functions and uses.

Compared to 1990, 1991 was characterised by a weakness in both consumption and production. The trade balance also worsened slightly. Employment fell by 12 000 between 1982 and 1991. The trends in consumption and production furthermore differed from country to country. In 1991, a drop in output was recorded in Italy, France, Ireland and Belgium, while an increase in production was observed particularly in Portugal, but also in Denmark, Greece and Spain. Consumption rose in Greece, Spain, Holland, Portugal and the United Kingdom, while there was a stationary or downward trend in the other countries.

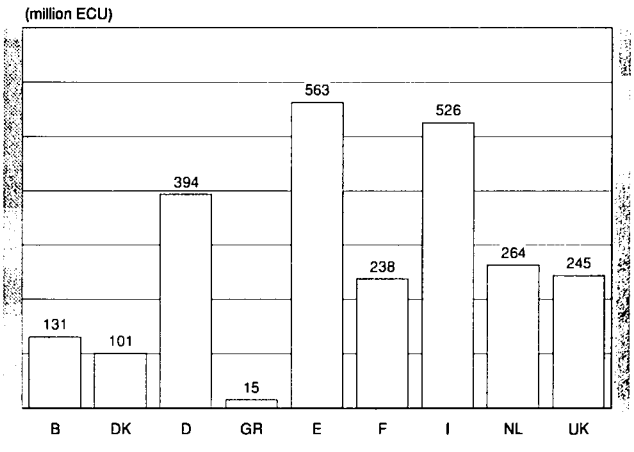
The dynamics of the aggregate data are, moreover, the outcome of differing trends in the various subsectors, as the end-markets are very heterogeneous. For example, the performance of the oil-seed sector for animal consumption is conditioned by the flexibility of breeders and the compound feed industry in their choice of livestock feed in response to changing prices. With respect to oilseeds destined for human consumption, the effects of the substitution between olive oil and seed oil is an important force affecting demand.

In the olive oil sector, the prices and the quantities consumed are greatly influenced by both the quantity and quality of the harvests in the main producing countries. Furthermore, there is a trend towards an increase in olive oil consumption in countries that are not traditional consumers.

The consumption and production of margarine is conditioned by the degree of success, depending on the country, achieved by the substitute products put onto the market and by the legislative discrimination applied by some countries.

The highest levels of added value are found in Spain, Italy and Germany. German output is mainly oriented towards the

Figure 2: Oils and fats
Value added by Member State, 1991



Source: Eurostat

Table 1: Oils and fats
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	16 536	18 840	22 013	21 526	16 886	15 981	19 015	19 894	19 709	19 724	20 220
Production	13 342	15 216	18 287	18 146	13 860	13 543	15 925	16 879	17 327	17 301	17 726
Extra-EC exports	1 348	1 719	2 264	2 157	1 319	1 289	1 297	1 535	1 479	1 394	1 363
Trade balance	-3 194	-3 625	-3 725	-3 379	-3 025	-2 438	-3 090	-3 015	-2 382	-2 424	-2 494
Employment (thousands)	63.7	62.1	55.5	56.4	49.7	51.6	54.3	50.1	51.7	51.6	51.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Oils and fats
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.2	3.1	2.8
Production	2.3	3.3	2.9
Extra-EC exports	10.3	-2.9	1.3
Extra-EC imports	4.9	0.5	2.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Oils and fats
Breakdown by major product line, 1989

(%)	Domestic use	Net production	Extra-EC exports
Vegetable fats and oils	66.6	71.4	95.8
Fats and oils of land animals	28.8	27.5	0.0
Fats and oils of marine animals	4.6	1.1	4.2
Total fats and oils	100.0	100.0	100.0

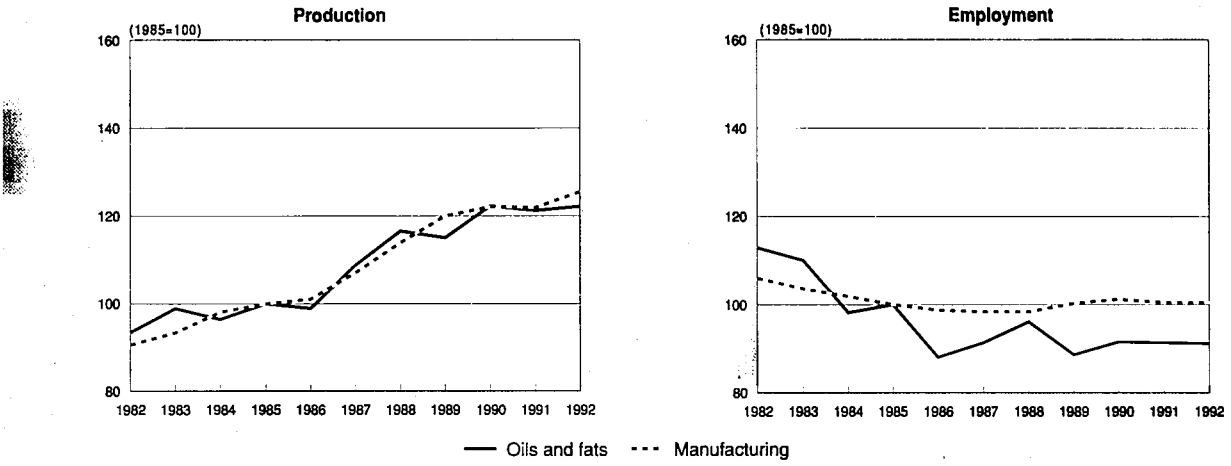
Source: Eurostat

Table 4: Oils and fats
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 348	1 719	2 264	2 157	1 319	1 289	1 297	1 535	1 479	1 394
Extra-EC imports	4 542	5 343	5 989	5 537	4 344	3 727	4 387	4 550	3 861	3 818
Trade balance	-3 194	-3 625	-3 725	-3 379	-3 025	-2 438	-3 090	-3 015	-2 382	-2 424
Ratio exports/imports	0.30	0.32	0.38	0.39	0.30	0.35	0.30	0.34	0.38	0.37
Terms of trade	88.5	89.0	88.8	100.0	100.5	95.4	86.4	93.1	113.6	115.5
Intra-EC trade	2 078	2 367	3 466	3 334	2 294	1 983	2 246	2 527	2 319	2 410
Share of total imports (%)	31.4	30.7	36.7	37.6	34.6	34.7	33.8	35.7	37.5	38.7

(1) Estimates
Source: Eurostat

Figure 3: Oils and fats
Production and employment indices compared to EC manufacturing



Source: Eurostat

processing of oil-seeds, while in Spain and Italy the production of olive oil plays a significant role.

Recent trends

From 1984 to 1990, production and apparent consumption in real terms grew variably. In 1991, both production and consumption decreased, due to consumption saturation and a significant drop in extra-EC trade. The difficulties encountered on international markets are expected to continue for a considerable time owing to the fact that traditional importing countries are developing their own production and exporting capacity.

Foreign trade

The overall trade balance of the industry is negative: although the EC is a net exporter of olive oil and margarine, it is largely reliant upon imports for its stock-piles of oilseeds, other vegetable oils, cake and meals. In 1990 and 1991, extra-EC imports accounted for approximately 62% of total trade in oils and fats. Two of the main suppliers, Brazil and Argentina, significantly increased their share of total imports between 1986 and 1991, to the detriment of the other largest supplier, the USA. Extra-EC exports make up 8% of the output and are directed mainly towards the EFTA countries and the United States. The terms of trade have undergone a clear-cut deterioration over the last two years.

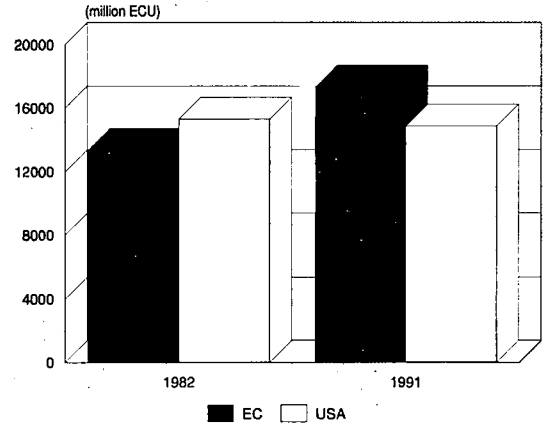
MARKET FORCES

Demand

Animal feed

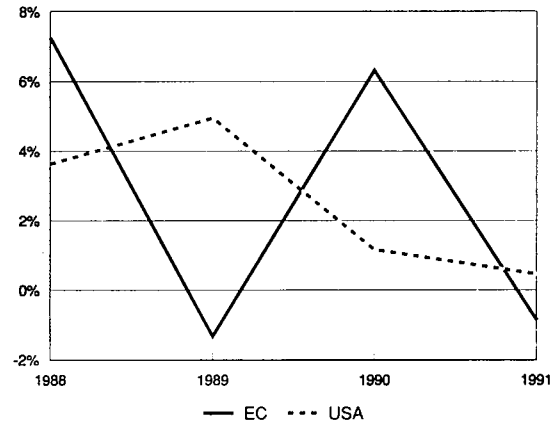
The demand for cake and protein meals fluctuates from year to year due to the possibility of varying the composition of the compound with different raw materials according to changes in their relative prices. To a limited extent, cereals, corn gluten feed and green fodder can be used as substitutes for low protein meals produced from softseeds. The basic factor that influences the demand for compound feeds and their composition is represented by the production orientation of EC and world animal breeding, and, ultimately, by the demand for different kinds of meat.

Figure 4: Oils and fats
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Oils and fats
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Table 5: Oils and fats
Breakdown by major product line, 1991

(thousand tonnes)	Industrial products	Extra-EC imports	Extra-EC exports	Apparent consumption
Vegetable products : Oils and fats(1)				
Liquid	6 615	450	1 640	5 425
Coconut/palm kernel	44	927	10	961
Linseed	101	19	21	99
Castor	17	78	1	94
Palm	0	1 527	23	1 504
Total	6 777	3 001	1 695	8 083
Protein meal :				
Soya	9 668	10 423	793	19 298
Colza/Rape	3 593	682	22	4 253
Sunflower	2 359	1 538	13	3 884
Cotton	315	586	6	895
Copra	22	1 095	4	1 113
Palmkernel	4	1 455	0	1 459
Lin	190	395	11	574
Maize	184	1 057	0	1 241
Others	67	790	9	849
Total	16 402	18 021	858	33 566
Marine products:				
Fish oil	139(2)	373	33	479
Fish meal	495	741	284	953
Total	634	1 114	317	1 432

(1) Excluding olives
(2) Crude oils and fats
Source. FEDIOL

Human consumption

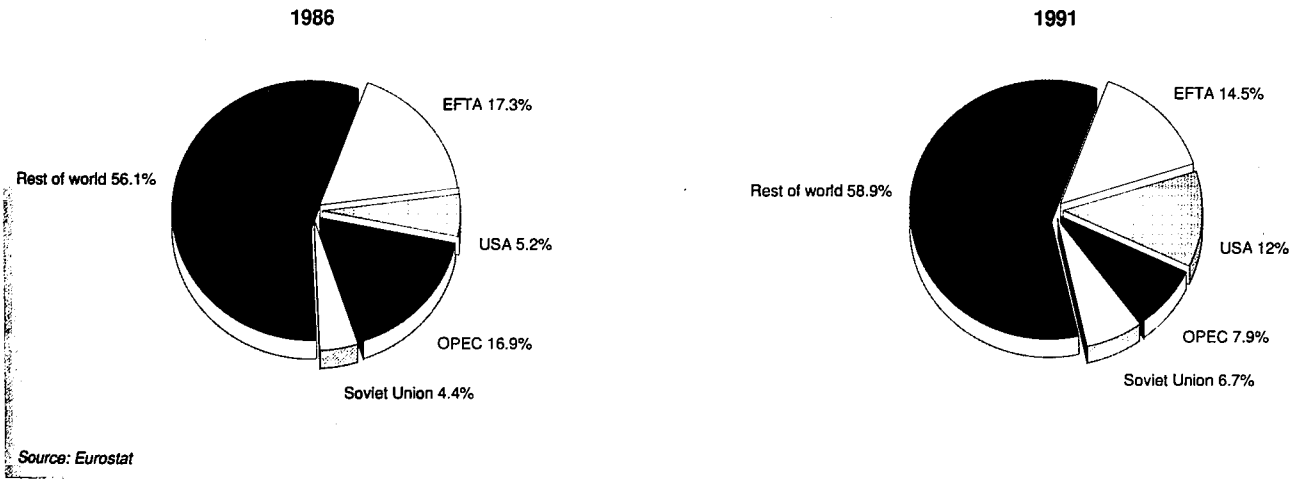
The share of the various kinds of oils and fats within the human diet varies significantly from country to country owing to the diversity of eating habits. For instance, the use of olive oil is found mainly in the major producing countries (Spain, Greece and Italy), while per capita margarine consumption is very high in Holland, Belgium and Denmark. Margarine consumption is negligible in the Mediterranean countries. Per capita consumption of margarine in Denmark, for instance, is 13 times higher than per capita consumption in Italy.

To summarise, the main variables influencing human consumption are:

- price;
- consumer health concerns;
- the entry on the market of innovative products, in particular those with low fat content (i.e. dairy spreads);
- legislative factors, such as the limits imposed by some Member States on the marketing of margarine, minarine and spreads.

Price differentials between olive oil and seed oil and between butter and margarine also bring about significant changes in demand for these products, but health concerns are at the root of the substitution between saturated and polyunsaturated

Figure 6: Oils and fats
Destination of EC exports



Source: Eurostat

Table 6: Olive oil
Main indicators, 1990/91

(thousand tonnes)	EC	Extra-EC	World
Production			
Olive oil	1 008	461	1 469
Edible olive marc oil	85	6	91
Total	1 093	467	1 560
Consumption			
Olive oil	1 239	473	1712
Edible olive marc oil	100	17	117
Total	1 339	490	1 829

Source: FEDOLIVE

fats and between animal and vegetable fats. These concerns have had an important effect on the growing popularity of vegetable oil consumption at the expense of both butter and margarine, which has implications for the future growth in sales of dairy spreads throughout Europe. Innovative products such as low-calorie, fat-free oil and fat substitutes also have excellent chances of market success. An important contributing factor to such developments will be the removal of the remaining legislative norms preventing the entry of those products on some national markets.

Supply and competition

The supply capacity of the industry tends to remain above the average annual demand in order to cope with wide fluctuations in consumption. The processing of oilseeds comprises two different production phases that are not always integrated in the same company:

- the processing of oilseeds into crude oil and protein meal;
- the refining, hydrogenation and fractionation of crude oils and fats.

The production capacity of the companies that operate in the first phase is generally greater than that of the companies working in the refining stage. The chance to exploit high technical economies of scale tends to favour a process of concentration of production activities.

The industry structure of olive oil production in Italy and Greece is characterised by the presence of small companies (and a few large ones) working at the local level, whereas in Spain production is carried out in large-capacity plants. This gives Spanish industry a competitive advantage.

The companies of the EC have to face competition from countries such as Argentina, Brazil and Malaysia that are developing and enhancing their production capacities.

Production process

The processing of the oilseeds, largely automated, is capital-intensive. Technological innovations have paved the way for increasing automation of the various phases of the production process. This is reflected (in the data on the industry as a whole) in the higher increase in productivity than in unit labour costs and in total unit costs.

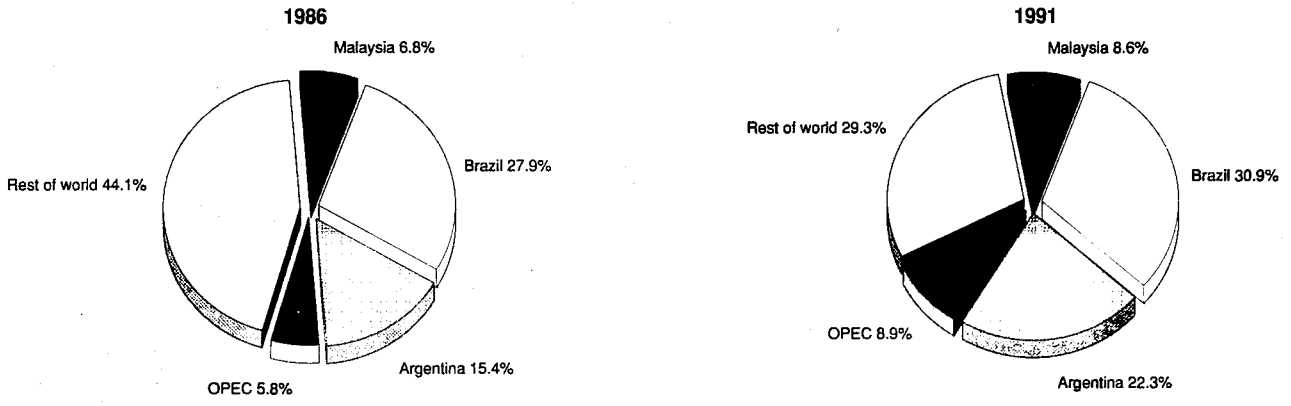
The production of margarine takes place in highly industrialised plants as well, while for the production of olive oil, as has already been stated, there is variability in the market structures across the EC.

INDUSTRY STRUCTURE

Companies

In 1991, following several acquisitions and mergers, the leading European firm in the crushing of oilseeds was the Ferruzzi group, through its subsidiary Cereol, which has a share equal to 18-20%. ADM (US) is also a major crusher in Europe. Unilever is the leader in refining, with Ferruzzi in second place.

Figure 7: Oils and fats
Origin of EC imports



Source: Eurostat

Table 7: Oils and fats
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	28.7	31.3	28.0	29.1	38.1	46.9	44.9	44.6	49.5	49.7
Productivity index	98.6	107.5	96.1	100.0	130.9	161.1	154.0	153.0	169.9	170.4
Unit labour costs index (3)	86.5	89.4	100.7	100.0	109.0	109.8	109.7	117.7	124.3	N/A
Total unit costs index (4)	59.8	71.2	97.2	100.0	80.9	75.7	91.9	101.8	102.7	101.2

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Table 8: Oils and fats
Oilseed crushing, crude oil, cakes and meals production, 1991

(thousand tonnes)	Crushed oilseeds (1)	(%)	Crude oils&fats (1)	(%)	Meals & cakes (2)	(%)
Belgique/België, Luxembourg	1 801	7.7	540	8.1	1 237	7.5
Danmark	317	1.3	112	1.7	199	1.2
BR Deutschland	5 957	25.4	1 787	27.0	4 114	25.1
Hellas	779	3.3	135	2.0	602	3.7
España	3 241	13.8	870	13.1	2 288	13.9
France	2 396	10.2	942	14.2	1 434	8.7
Italia	2 521	10.7	573	8.6	1 924	11.7
Nederland	3 996	17.0	896	13.5	2 997	18.3
Portugal	812	3.5	193	2.9	542	3.3
United Kingdom	1 674	7.1	579	8.7	1 065	6.5
EC	23 484	100.0	6 627	100.0	16 402	100.0

(1) Excluding olives, maize germs, grape and tomato pips
(2) Excluding olives
Source: FEDIOL

Table 9: Oils and fats
Production of olive oil by country, 1990/91

(thousand tonnes)	Olive oil	Edible olive marc oil	Total
EC	1 008	85	1 093
Hellas	170	17	187
España	639	51	690
France	1	0	1
Italia	163	13	176
Portugal	35	4	39

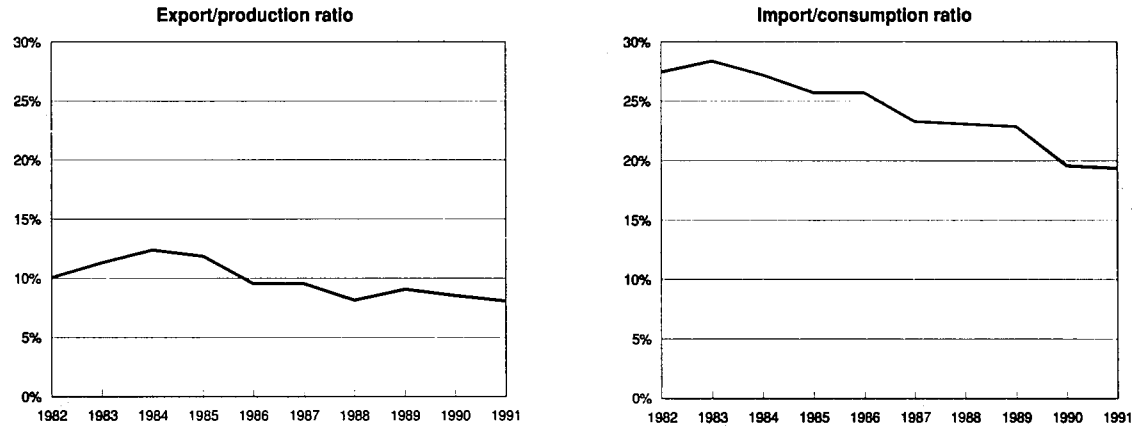
Source: FEDOLIVE

Table 10: Oils and fats
Production of margarine by country

(thousand tonnes)	1988	1989	1990
EC	1 764	1 807	1 828
Belgique/België, Luxembourg	183	186	189
Danmark	103	105	N/A
BR Deutschland	472	479	602
Hellas	27	27	31
España	68	69	82
France	160	162	158
Ireland	19	23	N/A
Italia	72	73	79
Nederland	226	255	256
Portugal	59	60	60
United Kingdom	375	368	371

Source: IMACE

Figure 8: Oils and fats
Trade intensities



Source: Eurostat

In the edible oils sector, the first three groups, Ferruzzi (Italy), Unilever (Anglo-Dutch) and Elosua (Spain), together hold a 45% to 50% share of the market.

In the margarine sector the leading three companies are Unilever, Vandemoortele (Belgium) and Rau (Germany). They account for 60% to 65% of total margarine sales in Europe. In general, the presence of cooperative companies is strong in this sector.

Strategies

The fundamental strategic response to the transformation of the European market consists of the concentration and rationalisation of the production structure, which allows for greater competitiveness based on lower costs.

In oil and fats for human consumption, with the entry of numerous new products onto the market, it is fundamental from the strategic point of view to invest heavily in advertising. The entry and expansion of the multinationals in the sector, which have been very active in the acquisitions of important national companies, is relegating the small- to medium-size companies to geographical niches or to markets for very high quality products.

The competitive strength of the large companies lies in diversification of products. In a market where the product typology grows constantly, a firm which "makes the first move" into new innovative sectors has excellent prospects for growth.

REGIONAL DISTRIBUTION

The European oilseed processing industry is located mainly in Germany, Holland, Spain, Italy, Belgium and France. The production of olive oil is concentrated in Spain, Italy, Greece and Portugal. The production of margarine is located primarily in Germany, the United Kingdom, Holland, Belgium, France and Denmark.

Table 11: Oils and fats
Expected real annual growth rates

(%)	1992-96	1992-96
Apparent consumption	2.0	2.0
Production	2.0	2.0
Extra-EC exports	-2.2	-2.2

Source: Prometeia

ENVIRONMENT

The main ecological problem affecting the industry regards the disposal and processing of solid urban waste. The volume and the chemical composition of the packaging are subject to regulations. In addition, consumers are becoming increasingly aware of environmental problems and might show a preference for products packaged in the most environmentally friendly way.

REGULATIONS

EC regulations are designed to:

- give producers a guaranteed income (production subsidies);
- support the EC market (intervention price);
- facilitate the marketing of the product within the EC (consumption aid);
- assist exports (export compensation).

Some of the regulations have limited importance or use. Intervention prices have been used to a limited extent. The consumption aid only applies to olive oil. Export compensation is not used for vegetable oilseeds.

OUTLOOK

The process of substitution between animal fats and vegetable fats will continue over the next few years. The innovative products will have an excellent chance of growth at the expense of traditional products.

The creation of the Single Market will mean, firstly, an increase in international competition. As a consequence, the concentration process that is ongoing will probably speed up. The removal of legislative barriers will increase slow the penetration of certain products in several national markets.

On the international markets, the problems already mentioned caused by the competition of some strong raw and semifinished materials producers should be offset by the opportunities that

arise from greater openings in trade with the former USSR and the countries of Eastern Europe.

Future risks to the outlook will come from the development of new substitute products in response to changes in consumption patterns in the EC, the general maturity of the market for human nutrition and animal feed, and greater competition in traditional markets.

Companies, in particular large diversified enterprises at the international level, will be able to take advantage of the trend towards market segmentation, and the prospects of greater trade with the countries of Eastern Europe and the ex-USSR.

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The industry is represented at EC level by: Fédération de L'Industrie de l'Huilerie de la CE (FEDIOL). Address: Rue de la Loi 74, Bte.4, B-1040 Brussels; tel: (32 2) 230 3125; fax: (32 2) 230 0946; and,
Fédération de l'Industrie de l'Huile d'Olive de la CE (FEDOLIVE). Address: (provisional) Via del Governo Vecchio 3, I-00186 Roma; tel: (39 6) 654 3251; fax: (39 6) 689 6176; and,
Association des Industries Margarinières des Pays de la CEE (IMACE). Rue de la Loi 74, Bte. 3, B-1040 Bruxelles; tel: (32 2) 230 4810; fax: (32 2) 230 2274.

Meat
NACE 412

The unification of Germany led to a sudden rise in the production of meat in the EC in the first few years of the 1990s due to a large scale slaughtering program.
As a result of the application of milk quotas, there has been an increase in the slaughtering of milk cows in addition to the shift in cattle breeding from milk to meat cows. Both of these events have contributed to the significant rise in the production of meat and veal.

INDUSTRY PROFILE

Description of the sector

The slaughter and meat processing industry includes five subsectors:

- slaughter-houses (NACE 412.1);
- processing and preserving of meat (NACE 412.2);
- killing, preparing and preserving on poultry (NACE 412.3);
- processing of slaughter by-products (NACE 412.4);
- production of animal guts and meat offal (NACE 412.5).

The degree of diversification of the companies operating in this industry is generally rather low, especially for the numerous medium to small businesses, which tend to specialise. A few large meat processing groups have diversified into other food sectors, such as dairy, to take advantage of economies of scope in marketing and distribution. The leading companies in the poultry sector have diversified into the animal feed sector.

Main indicators

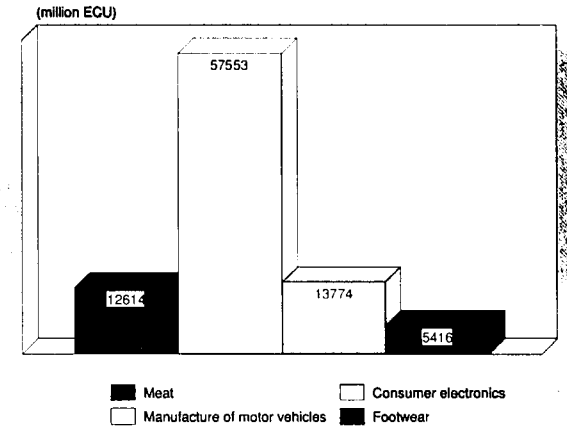
Total production of meat at current prices in 1991 increased by 5.1% compared to 1990, while the rate of apparent consumption growth was slightly lower, at 4.1%. The trade balance was positive for the first time is more than ten years. The increase in production was particularly significant in Ireland and Germany. The unification of Germany has had the most significant contribution to the increase in the production of beef, veal and pork meat, compared to poultry, lamb, mutton and goat meat. East German producers were not competitive compared to EC producers, and chose to slaughter their livestock rather than continue to invest in upkeep. The sizeable increase in meat production attributable to this slaughter activity was therefore a temporary increase

From 1989 to 1991 employment in the EC industry as a whole rose by an average of 2.1% per year. Significant increases were recorded in Germany, France, the UK, Portugal and Ireland. Employment dropped in Italy and Denmark (-2.1% average per year in each country).

The consumption of beef and veal has not been affected very much by the drop in prices, which was not completely passed on to consumers by retail prices. The growth in overall quantitative consumption (7%) was not matched by a parallel increase in per capita consumption, suggesting that increased consumption was caused only by increased population rather than increases in individual consumption.

France has the greatest share of value added in current prices (28.3%), followed by the UK with 16.1%, Germany with 15.1%, Spain with 12.9% and Italy with 11.6%. The top five countries account for 84% of total added value.

Figure 1: Meat
Value added in comparison with other industries, 1991



Source: Eurostat

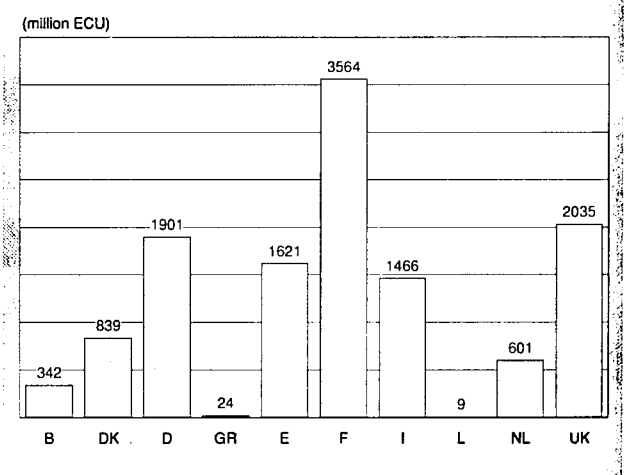
Recent trends

In the second half of the decade, average yearly growth rates for all the key indicators were lower than over the period 1982 to 1985. Increases in production of meat are expected through to 1994, with less than proportionate increases in consumption, and an increase in exports is also expected due to the opening of trade links with the former USSR and the countries of Eastern Europe.

Foreign trade

The improvement in the trade balance recorded in 1991 is result of the recovery in exports (which increased by 12.6% in nominal terms and 22.4% in real terms), and the reduction in imports (which decreased -7.1% in nominal terms and -2.1% in real terms). Since 1986 there has been a continuing improvement in the terms of trade. Intra-EC trade accounts for approximately 20% of production. The trade flows in beef, veal and pork meat, especially following the entry of Greece, Spain and Portugal in the EC, are mainly from the strong producing countries of northern Europe towards the southern areas. Extra-EC exports comprise 5% of production and are directed primarily towards Japan, the former Soviet Union, EFTA countries and OPEC countries. The significant increase

Figure 2: Meat
Value added by Member State, 1991



Source: Eurostat

Table 1: Meat
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	41 938	45 644	53 276	55 922	56 461	56 981	61 592	68 467	72 087	75 015	76 859
Production	40 297	44 528	52 297	54 619	55 838	56 293	60 761	67 759	71 401	75 043	77 076
Extra-EC exports	2 177	2 505	3 134	3 200	3 125	3 077	3 173	3 648	3 373	3 797	4 024
Trade balance	-1 641	-1 116	-979	-1 304	-623	-688	-831	-708	-685	28	217
Employment (thousand)	362.5	375.2	394.7	391.6	400.3	410.5	426.4	430.4	438.1	447.8	450.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Meat
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	7.7	4.1	5.3
Production	8.4	4.5	5.8
Extra-EC exports	10.7	5.8	7.4
Extra-EC imports	1.9	-0.7	0.1

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Meat
Breakdown by major product line, 1990

(thousand tonnes carcass weight)	Total domestic use	Net production	Extra-EC exports
Beef and veal	7 159	7 982	880
Pork	12 883	13 534	679
Lamb, mutton and goat meat	1 415	1 183	8
Horse meat	199	87	7
Poultry	6 056	6 354	428
Other meat	760	702	6
Offal	1 964	1 912	63
Total meat	30 436	31 754	2 071

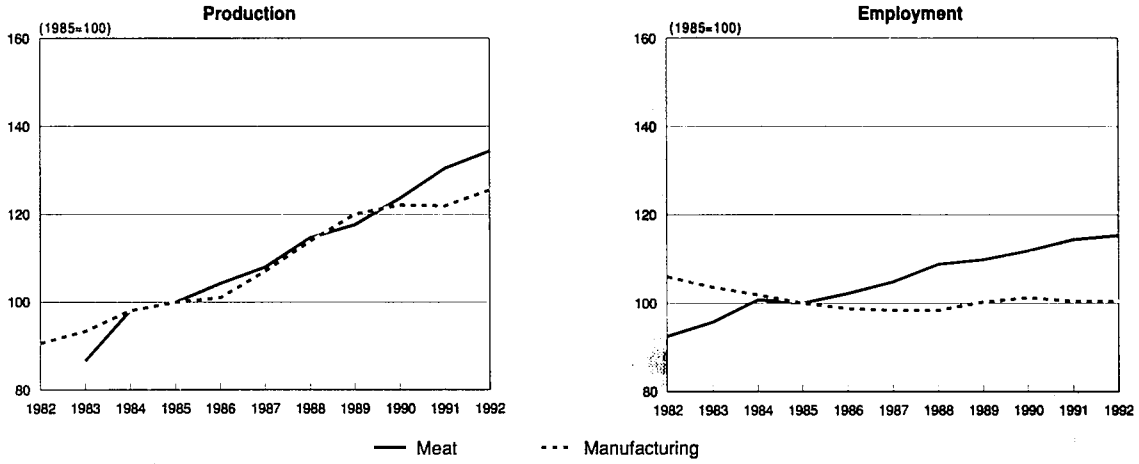
Source: Eurostat

Table 4: Meat
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 177	2 505	3 134	3 200	3 125	3 077	3 173	3 648	3 373	3 797
Extra-EC imports	3 818	3 621	4 112	4 503	3 748	3 765	4 004	4 356	4 059	3 769
Trade balance	-1 641	-1 116	-979	-1 304	-623	-688	-831	-708	-685	28
Ratio exports/imports	0.57	0.69	0.76	0.71	0.83	0.82	0.79	0.84	0.83	1.01
Terms of trade index	102.8	102.6	100.2	100.0	106.8	101.9	98.4	96.8	99.8	96.7
Intra-EC trade	9 398	9 772	10 280	11 319	11 393	11 445	11 958	13 549	13 616	14 460
Share of total imports (%)	71.1	72.9	71.4	71.5	75.2	75.2	74.8	75.6	77.0	79.3

(1) Estimates
Source: Eurostat

Figure 3: Meat
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

in the share of meats exported to the former Soviet Union, compared to 1986, is particularly worth noting.

About 80% of EC imports are of EC origin; the main non-EC suppliers are Argentina, New Zealand, Brazil and some Eastern European countries.

MARKET FORCES

Demand

The proportion of fresh meat and meat products in total consumption is around 73% to 75% in quantity and 65% to 70% in value. The main suppliers and consumers of processed meat products are Germany, France and Italy.

In the shopping basket there has been a shift from beef and veal meat to so-called "white", lean meat. This shift, which has been triggered in part by price considerations, is also a response to a new orientation in consumption recorded in the industrialised countries. Consumers are paying a greater attention to dietary factors and, especially in the countries of northern Europe. In addition, there is an increasing preference for specially packaged products, such as individually portioned meats. The convenience of these packaged meats and meat products is resulting in a shift of consumer demand away from frozen meat and meat products, which were previously seen as the most convenient preparations.

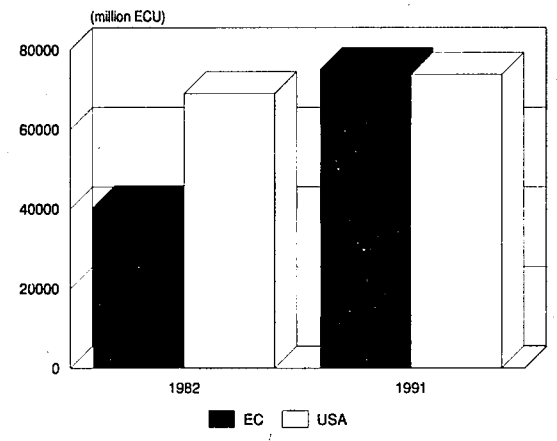
Supply and competition

The degree of concentration in the industry varies from country to country. Production of fresh meat is highly fragmented in Italy, Greece, and Portugal, while there is a fair degree of concentration in Germany, the Netherlands. Denmark and France.

The processed meat sector market concentrations tend to mirror those of fresh meat, with the notable exception of Spain, which has a concentrated fresh meat market, but a fragmented processed meat market.

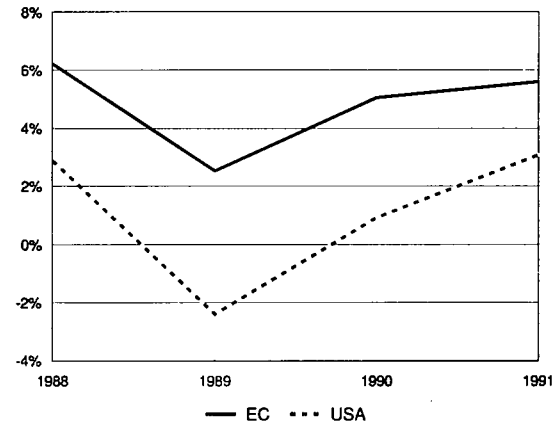
A drastic change in the competitive scenario, from the concentration standpoint, should come about with the enforcement of EC directives regarding quality and hygiene standards. The high financial costs necessary for the modernisation of plant and equipment will lead to the closure of many small-sized

Figure 4: Meat
International comparison of production at current prices



Source: Eurostat, Census of Manufactirers

Figure 5: Meat
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufactirers

Table 5: Meat
Per capita meat consumption

(kg)	Beef & veal			Mutton & lamb			Pigmeat			Poultry			Total
	1988	1989	1990	1988	1989	1990	1988	1989	1990	1988	1989	1990	1990
EC	22.6	22.2	N/A	3.8	4.1	N/A	39.7	39.3	N/A	17.6	18.0	N/A	83.6(1)
Belgique/België/ Luxembourg	21.9	20.8	19.8	1.8	1.8	1.9	47.0	46.7	44.9	16.5	15.8	16.5	83.1
Danmark	17.0	19.1	18.9	0.8	0.8	1.0	65.9	64.7	64.2	11.2	11.4	12.4	96.5
BR Deutschland	23.5	22.8	22.2	0.9	1.0	1.1	62.1	58.7	57.8	11.2	11.4	12.4	93.5
Hellas	19.0	23.7	22.7	14.1	14.6	14.2	21.6	23.3	21.0	15.5	16.0	16.5	74.4
España	11.5	11.7	12.5	5.8	5.9	6.4	44.8	45.1	47.1	22.0	22.5	22.6	88.6
France	30.3	30.4	29.7	4.7	4.9	5.5	37.7	37.4	37.2	19.4	21.1	21.6	94.0
Ireland	18.9	19.1	17.1	6.5	7.1	7.7	35.3	35.6	35.4	20.9	19.9	21.7	81.9
Italia	26.6	26.6	25.5	1.6	1.8	1.8	29.8	30.9	31.5	19.1	19.6	19.4	78.2
Nederland	19.3	19.7	N/A	0.7	0.7	N/A	46.5	46.7	N/A	16.7	17.2	N/A	84.3(1)
Portugal	13.3	14.1	15.2	3.1	3.2	3.4	24.3	27.6	28.6	17.0	17.7	18.1	65.3
United Kingdom	21.5	19.2	18.9	6.7	7.2	7.6	24.9	24.2	24.2	19.4	18.9	19.5	70.2

(1)Totals for 1989
Source: MLC

abattoirs. The impact of the enforcement of this measure will differ from country to country; in Denmark, Germany, Holland, France and Belgium more than half of the plants and equipment already comply with EC standards, while in the remaining countries only 10% are up to standard.

The European producers will also have to face an increase in the market power of wide-scale distributors, which is expressed by the progressive reinforcement of distributors' brands. The relative power of the customers is greater in the countries where the supply is not concentrated.

Production process

Productivity in the meat industry in general has increased continuously. Although the nature of the product does not allow for the introduction of technological innovations on such a level as to generate significant economies of scale, the last few years have witnessed an increase in investments aimed at increased efficiency in the production process, with the introduction of automation in those phases requiring less manual skill.

INDUSTRY STRUCTURE

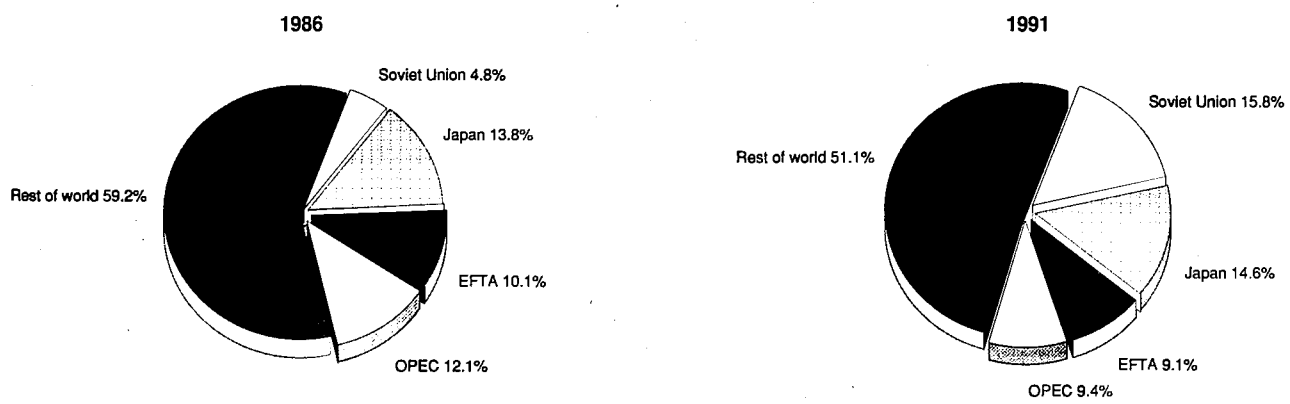
Companies

In 1990 the number of abattoirs was estimated at 6,631. About 40% of these were located in Italy, although they accounted for only 10% of all carcasses. The highest concentration can be found in Germany where 5% of the EC abattoirs account for 22% of all carcasses.

In the fresh beef and veal meat sector, the top three firms, Socopa (France), Inalca-Gruppo Cremonini (Italy) and Sucden (France), together have a 4-6% share of the EC market. In the sector of fresh pork meats, Annuss Fleisch (Germany), West Fleisch (Germany) and Sued-Fleisch (Germany) have a 4-4.5% share of the market. In the lamb and mutton sector, NZ MPB HL Foods (UK) and Socopa (France) account for 15-16% of the market. For the poultry sector, Paribas (France), Sipa (Italy), and AIA-Gruppo Veronesi (Italy) have 15-18% of the total market. In processed meats, Nestlè (Switzerland), Unilever (Anglo-Dutch) and BP Nutrition (UK) cover 9-11% of the market.

Cooperatives hold significant shares of the supply in the main producing countries. In order to cope with the challenges

Figure 6: Meat
Destination of EC exports



Source: Eurostat

Table 6: Meat
Number of abattoirs, 1990

	Abattoirs			EC approved abattoirs	
	Number	Total throughput(3)	Average throughput(4)	Number	% of total
EC	6 631	115 013	17 345	1 184	17.9
Belgique/België	160	5 352	33 450	93	58.1
Danmark	48	8 976	32 879	48	100.0
BR Deutschland	350	25 455	72 729	299	85.4
Hellas (1)	430	3 912	9 098	7	1.6
España (1)	476	14 337	30 120	46	9.7
France	530	17 962	32 190	311	58.7
Ireland	742	3 136	3 672	42	5.7
Italia (2)	2 640	11 243	4 250	153	5.8
Luxembourg	6	92	15 333	6	100.0
Nederland	176	7 438	42 261	105	59.7
Portugal (1)	221	1 994	9 023	1	0.5
United Kingdom	852	15 116	17 742	73	8.6

(1) Based on estimate for number of abattoirs
(2) 1989
(3) Thousand cattle units
(4) Cattle units
Source: UEEA, MLC, OFIVAL, ISTAT

posed by market globalization, these companies have increasingly taken on an entrepreneurial structure, in some cases setting up joint ventures with private companies.

Public slaughter-houses are also widespread, especially in Italy, Germany and France. However, the share of meat slaughtered in private plants is on the rise throughout Europe.

Strategies

The smaller companies in the industry use a product-oriented approach to strategy, by acting on the price as a competitive variable, or by concentrating on niche policies.

Among the strategies of the large companies in the industry there is a widespread tendency to adopt market-oriented policies, by allocating resources to product innovation and advertising expenditure whose purpose is to establish industrial labels. For the pork and poultry meats, there are attempts at branding and introducing quality trade marks. Although there are a few producer labels on the market for beef and veal, the advertising campaigns are first and foremost aimed at regaining consumer trust and fidelity;

For all the kinds of meat, the strategies of the large companies are also focused on the qualitative improvement of the product; vertical integration upwards fits in with this approach. Integration policies are also adopted downstream in the scope of catering and fast food restaurants. Large companies also engage in mergers and acquisitions to expand company growth in the country of origin, and to facilitate entry into foreign markets where the acquisition of a local company is the most efficient way to overcome the obstacles arising from the diverse consumer traditions and from differing distribution systems. External growth policies are thus relatively frequent. The most significant transactions have taken place in the meat processing sector, in which some large multinationals have entered by way of take-overs. For example, in Italy Kraft-General Foods has taken over Fini, Invernizzi and Negroni; Nestlè (Switzerland) has taken over Vismara, Locatelli and Kings, BSN (France) has taken over Galbani. In addition, Nestlè has taken over Herta, a leading German company in the sector.

Recent acquisitions among slaughterhouses include Guyomarch (France) by Paribas (France); Meadow Irish Meats (Ireland) by Kerry Group (Ireland); Taher Meats (Ireland) by Kepak (Ireland); Studleigh-Royd (UK) by Perkins Food PLC (UK); NVC (Netherlands) by Coveco BV (Netherlands); OMSA (Spain) by Inversiones Ibersuizas SA (Switzerland).

Through consortiums and various state bodies, each Member State is committed to obtaining EC recognition for the protection of its own typical produce.

Table 7: Meat
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU)(2)	20.6	22.6	23.0	23.5	25.8	27.8	26.9	26.5	27.3	28.2
Productivity index	87.6	96.0	97.7	100.0	109.6	118.0	114.5	112.4	116.1	119.7
Unit labour costs index (3)	84.5	88.5	94.0	100.0	103.1	105.9	111.8	116.4	121.6	N/A
Total unit costs index (4)	78.9	85.0	95.1	100.0	98.8	95.3	99.2	109.4	113.6	117.2

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Table 8: Meat
Net production in volume by country, 1990

(thousand tonnes carcass weight)	Beef and veal	Pork	Lamb and mutton	Horse meat	Poultry
EC	7 982	13 534	1 183	87	6 354
Belgique/België, Luxembourg	322	787	7	3	191
Danmark	202	1207	1	1	132
BR Deutschland	1 793	3 357	37	4	456
Hellas	82	147	129	0	160
España	514	1 789	234	7	837
France	1 753	1 871	194	13	1 657
Ireland	514	159	82	0	84
Italia	1 164	1 332	85	57	1 102
Nederland	520	1 660	16	1	512
Portugal	117	279	28	1	184
United Kingdom	1 001	946	370	0	1 039

Source: Eurostat

REGIONAL DISTRIBUTION

The geographical location of slaughtering activity is dependent on the location of breeding activity. About 85% of beef and veal meat is produced in Germany, France, Italy, the UK, the Netherlands and Spain. 83% of the pork meat comes from Germany, France, Spain, Holland, Italy and Denmark. For poultry, France, Italy, the UK, Spain, the Netherlands and Germany together add up to 88% of production. The UK, Spain, France, Greece and Italy produce 86% of the total amount of sheep and goat meat.

ENVIRONMENT

The ecological problems related to the slaughter and meat processing industries can be traced back to the production of the primary material, i.e. livestock rearing. Excessively high territorial concentrations, especially for pig-breeding, create conditions for ground pollution, especially of the underground water-bearing stratum.

There are also difficulties in the disposal of the liquids and the discards of the slaughtering. This fact has stimulated the development of systems for the utilisation of such leftovers in the production of, for example, fertilisers or animal feeds.

Table 9: Meat
Production in current value by country, 1991

(million ECU)	
EC	75 043
Belgique/België	1 671
Danmark	4 572
BR Deutschland	11 062
Hellas	253
España	7 950
France	21 484
Ireland	2 861
Italia	8 809
Luxembourg	49
Nederland	5 414
Portugal	525
United Kingdom	10 394

Source: Eurostat

REGULATIONS

Beef and veal

The basic regulations for the beef and veal sector go back to Regulation 805/68 EEC, subsequently amended several times.

Regulations 2822/72, 1302/73, 2226/78 and 859/89 are measures intended to sustain the market, including permanent intervention, while Regulation 425/77 acts on import norms. Lastly, Regulation 1208/81 defines a common European classification scale for the carcasses of adult cattle.

The norms for intervention give the producers of each Member State the possibility of selling their product to EC intervention agencies, to reduce the supply on the market when the average EC price falls below 84% of the intervention price (set at the start of the marketing year) and when, at the same time, the average market price within the Member State falls to below 80% of the intervention price. In 1991, after a rapid fall in prices and a corresponding increase in the EC stocks, the latter threshold was lowered to 72%. Subsidies can also be provided for private storage (Regulation 989/68 and 3445/90).

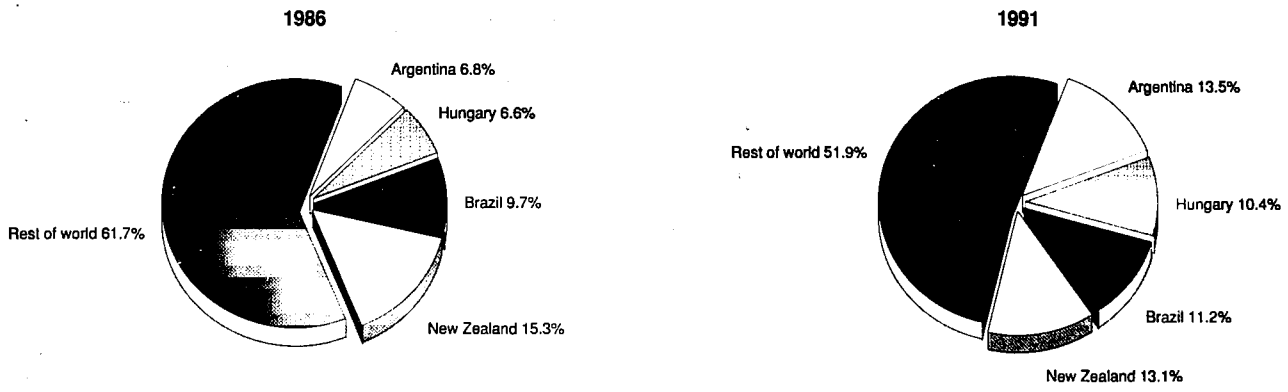
The GATT agreement provides for the partial modification of import levies and export refunds, with six schemes for the importation of meat from non-EC countries, embodied by regulations 3888/89, 3891/89, 2207/90, 2208/90.

There is also a system of premiums made to breeders, aimed at directing production in a particular field (Regulations 1357/80, 468/87, 859/87, 714/89, etc.).

At the end of 1991, under pressure from the high production increases and from the growing resort to intervention, a reform of EC policy in the beef and veal sector was introduced. That reform comprised the following main points:

- beginning from 1/7/93, the intervention price is lowered by 15%;
- premiums to breeders of male bovines and suckler cows will be increased;
- in order to encourage the breeding of higher quality stock, a coefficient of animal-density per farm will be introduced;
- a 100 ECU premium will be introduced for each calf disposed of within ten days of birth;
- the possibility exists of obtaining financing for promotional campaigns for beef and veal meats, from the Feoga-Garanzia.

Figure 7: Meat
Origin of EC imports



Source: Eurostat

Pork meat

The fundamental regulation for pork meat is number 2759/75, which replaces the previous Regulation 121/67. Market support measures are available in this sector as well, similar to those implemented for the beef and veal sector, i.e. import levies and export refunds (Regulation 3602/82). There is a common classification for pig carcasses as well (2967/85).

Poultry

The basic norms that regulate the EC market for poultry are addressed in Regulations 2771/75 and 2777/75, and include amendments of the previous laws. There are no measures of intervention or market support for the poultry sector; market prices within the EC directly reflect the trends in demand and supply. Import levies and sluice gate prices are provided for to prevent the entry of foreign products into the market at prices that are lower than EC production costs.

OUTLOOK

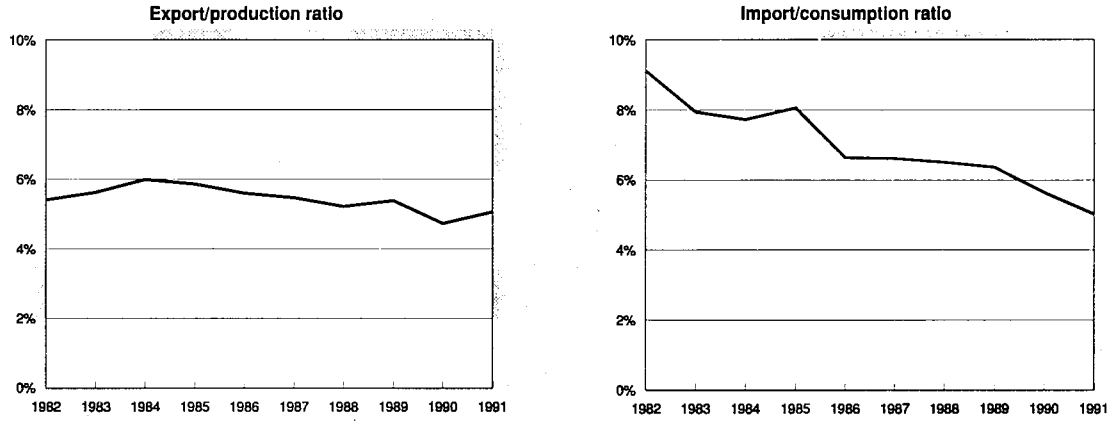
Over the next three years a strong increase in industrial concentration is expected, due to both the enforcement of Directive 497/91, and the intensification of international competition within the EC itself. Both of these factors will lead to many minor companies leaving the market.

It is difficult to evaluate medium-term developments of the main indicators because this is a regulated market, subject to many changeable international agreements; much depends on the evolution of such accords and on EC legislation. Overall internal consumption will continue to increase rather slowly. The European consumer will tend to turn increasingly towards products with high-quality and high added value.

The limits imposed by the EC budget and by outside pressures for a reduction in support to producers might lead to legislative developments whose effect could be the stabilisation of the production of beef and veal and pork meats, and the increase of exports to third-party countries in order to reduce the stockpiles. Exports would benefit from the opportunities offered by the opening of the markets in the former USSR and Eastern Europe.

The latter amount to a source of opportunities as well as risks. The obsolete and inefficient production structure of these countries turns them into potential markets for processed products. Furthermore, there is a chance to reach agreements and joint ventures with local businesses to finance the moderni-

Figure 8: Meat
Trade intensities



Source: Eurostat

Table 10: Meat
Breakdown of meat processing by Member State, 1991

(tonnes)	Production (ECU million)	Production Meat (1)	Sausage(2)	Other (3)	Total
Belgique/ België	306	23 000	35 000	180 000	238 000
BR Deutschland (4)	6 822	N/A	876 057	N/A	1 856 226
Danmark	5 363	165 084	101 285	178 563	444 932
France	4 180	107 829	301 569	503 735	913 133
Italia	5 609	200 000	350 000	400 000	950 000
Nederland	2 310(5)	152 365	89 624	129 360	371 349
Portugal	207	8 403	20 531	32 341	61 275
España	4 999	176 000	169 000	485 000	830 000
United Kingdom (5)	5 043	N/A	N/A	N/A	590 000

(1) Includes meat and edible meat offal, salted, in brine, dried or smoked (not cooked)
(2) Includes sausage and similar products, of meat , meat offal, or blood; food preparations based on these products"
(3) Includes other prepared or preserved meat, meat offal, or blood
(4) 1990
(5) 1989
Source: CLITRAVI

Table 11: Meat
Expected real annual growth rates

(%)	1992-93	1992-96
Consumption	2.6	2.6
Production	3.0	3.0
Extra-EC exports	6.0	6.0

Source: Prometeia

sation of the local productive set-up. Nevertheless, there is a risk linked to the increase in cattle imports coming from these countries with which the EC has already had to deal.

Other sector risks include the difficulty for the beef and veal industry in reversing the new consumer demand for "white" meats, although this is an opportunity for the producers of these products. Consumers will also become more powerful in the market as distribution improves; producers will need to watch consumer demand shifts more closely. Also, many small firms are expected to go out of business as competition increases.

On the other hand, there is a large market now opening in Eastern Europe, and much potential for innovative products exists in the Western European market, as well. There has been little movement in this direction, and untapped consumer demand exists. Quality brands are beginning to appear as well, which will give producers the chance to achieve qualitative differentiation of products.

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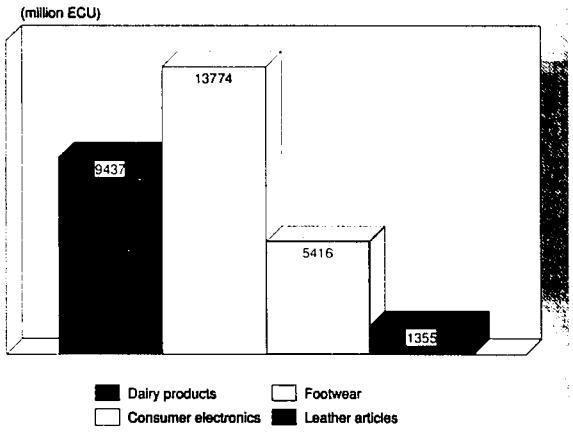
Liaison Centre of the Meat Processing Industry in the EC / Centre de Liaison des Industries Transformatrices de Viandes de la CE (CLITRAVI), (NACE 412.2). Address: Bld. Baudouin 21, 7th floor, B-1210, Brussels; tel: (32 2) 223 0141; fax: (32 2) 223 1244.

Dairy products
NACE 413

The period of 1983 to 1989 was characterised by a drop in milk deliveries, a reduction in butter and skimmed milk powder stocks, and rising prices. From the end of 1989 and through to 1991, a recovery in production took place. At the same time, extra-EC exports decreased due to such factors as the Gulf War and the diversification of supply sources away from the traditional countries. As a consequence, prices decreased not only in the EC market but also in the world market. Moreover, the problem of production surpluses once more became acute, with rising stocks of skimmed milk powder and of butter.
The consumption of yoghurt and desserts, fresh cheeses and semi-skimmed milk has increased whereas the consumption of butter has continuously decreased. Technological innovations and an increasing market segmentation on the part of firms favour the spread of higher value added products. M&A activity over the last five years has radically changed the competitive scenario.

Figure 1: Dairy products
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The main products of the dairy industry are:

- products destined for final consumption: fresh and U.H.T milk, butter, cheese, fresh products (cream, fermented milk, desserts, fresh cheese), powdered milk;
- products which serve as raw materials for further processing and can be regarded as commodities: powdered milk, butter, butteroil, casein, whey powder. These products provide proteins and fats both for human and animal nutrition. Whey protein concentrates have proved to be very good substitutes for egg white in the pastry industry.

Dairy firms are very rarely diversified into non-food sectors. Often dairy fims diversify into related products which provide scope economies. This might include other fresh products areas such as "charcuterie" (marketing economies), and preserved vegetables (production and packaging economies).

Main indicators

In 1991 production and apparent consumption at current prices were stable, while the trade balance improved after a significant drop in 1990. Employment decreased 8.5% from 1987 to 1991.

Particularly worth noting is the increase in Portuguese production, which grew by more than 20% per year on average in 1989 and 1991. Portugal has been subject to production quotas only since 1991.

France has the highest value added share at 24.6%, followed by Germany with 15.9%, Italy with 15.7%, the UK with 15.1% and Spain with 10.4%. The first five countries account for 82% of EC value added.

Recent trends

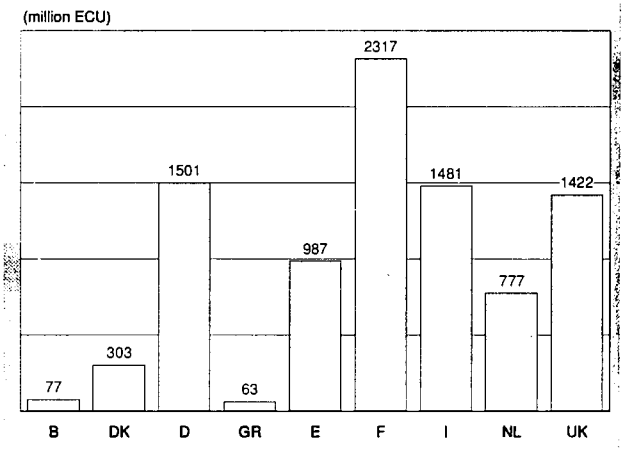
EC production and apparent consumption in the industry grew approximately 9% between 1985 and 1990, but growth rates are expected to decrease. Growth is varied among different single product lines. Innovative products and fresh cheese show the highest growth rates. Fresh milk products and cheese production and consumption are also growing, while the overall production of milk as an end-product is decreasing. Within this sector, the production of whole milk is decreasing, while semi-skimmed milk production is increasing. In 1989 butter production began to recover from a fall which lasted from 1986 to 1988. The decrease in EC consumption and extra-EC sales caused EC butter stocks to rise from 5,000 to 260,000 tonnes in 1989 and 1990.

Foreign trade

The trade balance, which had improved steadily from 1986 to 1989, worsened in 1990 due to a sudden decrease in exports. In 1991, however, both the trade balance and the terms of trade improved. Extra-EC and intra-EC exports each account for a fairly small share of total production (6% and 15% respectively). High transport costs and the local nature of firms (as opposed to operating on a national or international scale), result in a market better suited for domestic consumption. Those products which are exported from the EC are directed primarily towards OPEC countries and, to a lesser extent, towards the US.

The share of extra-EC imports in total consumption is negligible, at slightly over 1% of consumption in 1990.

Figure 2: Dairy products
Value added by Member State, 1991



Source: Eurostat

Table 1: Dairy products
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	43 282	47 626	49 615	50 997	53 535	53 368	55 487	59 978	60 991	61 050	61 300
Production	46 430	50 344	52 783	54 059	55 813	55 739	58 324	63 393	63 767	64 017	64 237
Extra-EC exports	3 849	3 426	3 846	3 765	3 013	3 081	3 598	4 295	3 595	3 729	3 680
Trade balance	3 147	2 718	3 168	3 062	2 278	2 372	2 836	3 415	2 777	2 967	2 937
Employment (thousands)	281.7	284.9	281.2	272.0	264.6	270.9	254.3	251.1	250.2	247.7	246.3

(1) Estimates are used if country data is not available, in particular from 1989 onwards.
For trade figures, only 1991 is estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Dairy products
Average real annual growth rates(1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.3	1.7	1.9
Production	2.0	1.5	1.7
Extra-EC exports (2)	-1.6	-1.8	-1.7
Extra-EC imports (2)	-0.5	-0.7	-0.6

(1) Estimates are used if country data is not available, in particular from 1989 onwards.
(2) 1991 are Prometeia estimates
Source: Eurostat

Table 3: Dairy products
Breakdown by major product line, 1989

(thousand tonnes)	Total domestic consumption	Net production	Net exports
Fresh milk products except cream	33 051	33 294	N/A
Drinking milk	28 781	28 996	276
Cream	981	1 002	30
Concentrated milk	N/A	1 235	N/A
Whole milk powder	334	903	589
Skimmed milk powder	999	1 450	N/A
Butter	1 504	1 729	400
Cheese	4 509	4 814	N/A

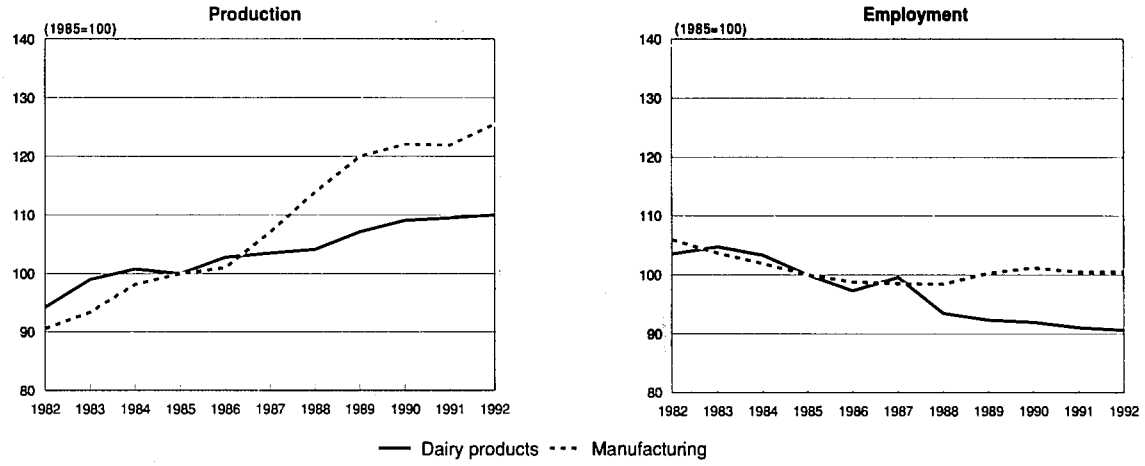
Source: Eurostat

Table 4: Dairy products
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	3 849	3 426	3 846	3 765	3 013	3 081	3 598	4 295	3 595	3 729
Extra-EC imports	702	708	677	703	736	710	762	879	818	761
Trade balance	3 147	2 718	3 168	3 062	2 278	2 372	2 836	3 415	2 777	2 967
Ratio exports/imports	5.49	4.84	5.68	5.36	4.10	4.34	4.72	4.88	4.39	4.90
Terms of trade index	99.0	96.7	98.3	100.0	87.4	76.5	81.7	102.4	103.3	97.8
Intra-EC trade	6 290	6 496	6 570	7 406	7 875	8 168	9 718	9 900	9 137	9 919
Share of total imports (%)	90.0	90.2	90.7	91.3	91.5	92.0	92.7	91.8	91.8	92.9

(1) Prometeia estimates
Source: Eurostat

Figure 3: Dairy products
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

MARKET FORCES

Demand

Less than 20% of milk produced in the EC is consumed as an end-product. The remaining milk is used to produce cream and fresh products (8-9%), butter and cheese (50-60%), powders (15-16%), animal feed (4-5%) and other products.

The consumption patterns of dairy products are regional although many consumers throughout the EC are showing a new preference for "healthy" fresh and low fat products. As a consequence, consumption of many kinds of yoghurt, semi-skimmed milk, flavoured milk and fresh cheeses is increasing, whereas that of whole milk is decreasing. Mixed-fat products, such as dairy spreads, are being used increasingly as butter substitutes. Not all countries allow the trade of mixed-fat products in their national market, but liberalisation is expected with the implementation of the Single European Market.

EC butter, powdered milk and cheese surpluses are often exported to international markets but world demand is decreasing due to the consumption saturation of developed countries and an increase in production in some importing countries. Moreover, some of the countries which traditionally imported EC dairy products are diversifying their supply sources. East European countries have higher milk production than the EC, and expanded trade with these countries will alter the world market situation.

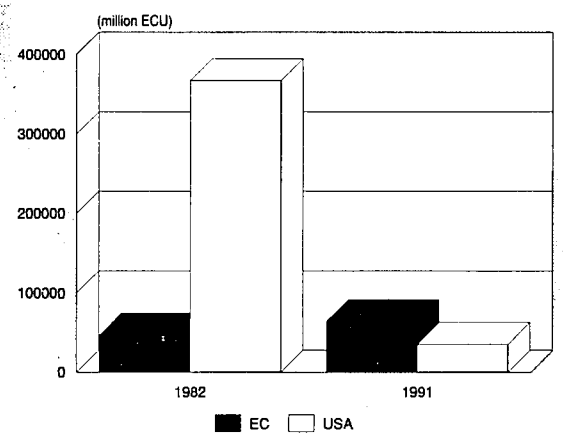
Supply and competition

As a consequence of the restrictions represented by the milk "quota system", the dairy industry structure has radically changed, especially in some Northern European countries where mergers among cooperatives have led to significantly increased concentration. The implementation of the Single European Market will increase international competition within the EC, and countries with a more concentrated market will have a competitive advantage.

Production process

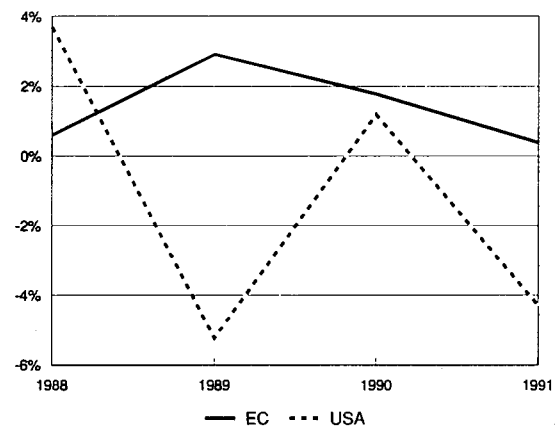
In recent years the production process has significantly improved due to technological innovation. The automation of some production steps led to scale economies, especially in the production of powders and of some kinds of cheeses the

Figure 4: Dairy products
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Dairy products
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Table 5: Dairy products
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	30.5	31.1	32.4	34.1	35.8	36.3	37.4	36.5	37.6	38.1
Productivity index	89.4	91.2	95.1	100.0	104.8	106.5	109.5	107.1	110.4	111.7
Unit labour costs index (3)	83.5	88.7	94.0	100.0	103.9	106.9	112.3	118.4	127.8	N/A
Total unit costs index (3)	83.3	90.1	94.7	100.0	107.6	104.6	117.5	129.1	130.1	130.9

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed at 1991 prices
(3) Based on costs per person employed at current prices
Source: Eurostat

Table 6: Dairy products
Employment by country, 1991 (1)

EC	247 733
Belgique/ België	8 071
Danmark	7 872
BR Deutschland	40 726
France	57 366
Ireland	10 855
Italia	30 045
Nederland	19 148
Portugal	11 078
United Kingdom	38 275

(1)Estimates
Source: Eurostat

development of an ultra-filtration process allows not only more efficient use of raw material components, but also the development of new milk by-products. The production of many regional specialities is still, however, artisanal.

INDUSTRY STRUCTURE

Companies

The total number of EC dairies is estimated at 6,500. Although all EC countries have become significantly more concentrated, there are still remarkable differences in the levels of concentration across countries. Italy shows the lowest ratio (3,200 tonnes of average intake per dairy) and the Netherlands show the highest (334,000 tonnes par dairy).

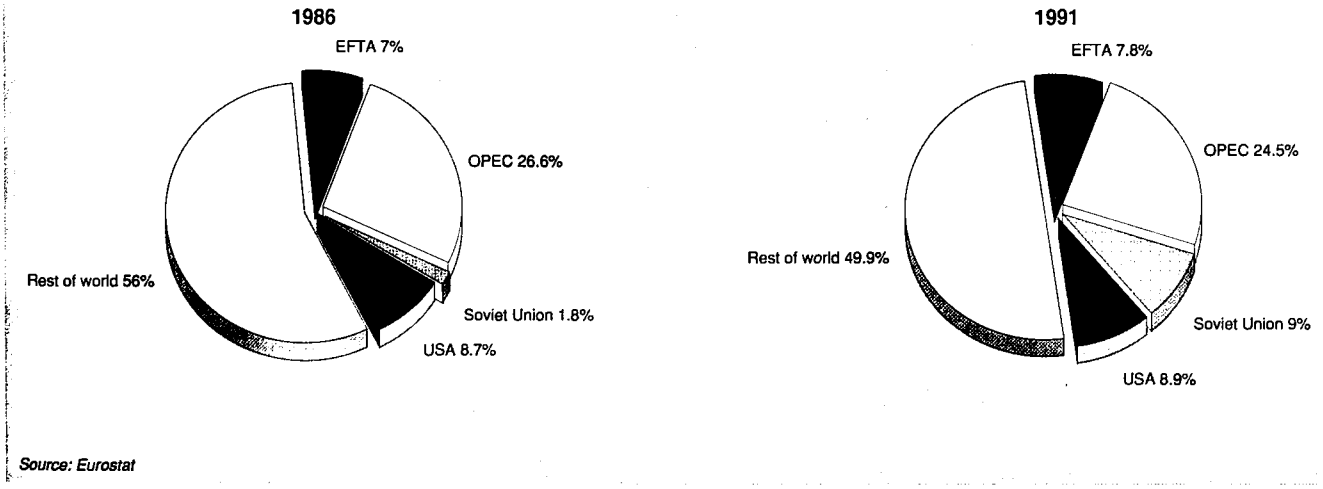
In the countries where geographical features contribute to a fragmented distribution system, large firms coexist with smaller, more specialised firms which often concentrate on the production of regional specialities. In the liquid milk sector, Parmalat (Italy), Sodiaal (France) and MMB (UK) altogether account for 15% to 20% of the market. In the yoghurt sector, BSN (France), Nestlè (Switzerland) and Sodiaal (France) account for 35% to 40% of the market. In the fresh cheese sector BSN (France), Unilever (Anglo-Dutch) and Philip Morris (Kraft) account for 25% to 30% of the market. In the powdered milk sector Nestlè (Switzerland), France Lait (France) and HL Foods (UK) account for 60% to 65% of the market.

A great number of cooperatives operate in the dairy industry, especially in Ireland, Denmark, Belgium, the Netherlands and Germany. In Italy and Spain there is significant municipal and state involvement in the industry.

Strategies

The restrictions imposed by EC agricultural policies and the saturation of the traditional product markets have forced firms to produce higher value added products. Technological innovations both in the production process and in packaging have favoured product differentiation and market segmentation, primarily by the leading firms. These large firms are also diversifying their product lines to increase their market share in the area of low fat and mixed fat products (like "spreads"). Although cooperative firms are adopting industrial management decision-making processes, they face difficulties in

Figure 6:Dairy products
Destination of EC exports



Source: Eurostat

Table 7: Dairy products
Size structure of dairies by annual milk intake , 1988 (1)

	Total number of dairies	Average intake (1000 tonnes)	Less than 20 000 tonnes: number of dairies	Less than 20 000 tonnes: % of total intake	20 000-100 000 tonnes: number of dairies	20 000-100 000 tonnes: % of total intake	Over 100 000 tonnes (2): number of units	Over 100 000 tonnes (2): % of total intake
Belgique/ België	41	4.2	27	49.8	9	46.0	77	40
Danmark	43	7.7	16	7.6	6	84.7	65	70
BR Deutschland	156	6.8	196	42.2	56	51.0	408	53
España	375	21.2	82	61.7	5	17.1	462	9
France	934	12.1	142	27.1	67	60.8	1143	21
Ireland	49	7.3	23	25.0	12	67.7	84	62
Italia	2 557	58.4	58	25.7	11	15.9	2 625	3
Nederland	7	0.7	13	6.7	13	92.6	33	334
Portugal	85	19.9	7	21.1	5	59.0	97	12
United Kingdom	580	8.6	54	15.8	19	75.6	653	23

(1) Figures are for cow's milk, including cream in milk equivalent
(2) Portugal over 50 000 tonnes intake
Source: MMB, ""EC Dairy Facts and Figures

adopting a market-oriented diversification policy due to their strong relationship with associated farmers.

Remarkable investments both in promotion and in advertisement have allowed the success of producer brands, although in some countries distributor's labels are also present.

Recent structural changes in the industry are due to M&A activity involving both private firms and cooperatives. Companies are acquiring local firms to facilitate the penetration of foreign markets and to strengthen their position in their own countries. Over the last few years, the most important mergers and acquisitions have been the following: the acquisition of Interlait (France) by ULN (France); the acquisition of 51% of Lacteria Espaniola (Spain) by UNL (France); the acquisition of Bridel (France), Jean Jacques (France) and Valmont (France) by Besnier (France); the acquisition of Laiterie D'Auzances (France) by Unilever (Anglo-Dutch); the merger of the Dutch co-ops CC Friesland, Domo Beiland and Noord Nederland in Friesland Frico Domo; the merger of the Dutch co-ops DMV Campina and Melkunie in Campina Melkunie BV; the acquisition of Cloche D'Or (France), La Fromagerie du Velay (France), Fauquet (France), Ludovico (Italy) and Millway Foods (UK) by Bongrain (France); the acquisition of Galbani (I) by BSN (France); the acquisition of Invernizzi (Italy) and Fattorie Osella (Italy) by Kraft; the acquisition of Locatelli (Italy) by Nestlè (Switzerland); the acquisition of many other Italian firms and municipal dairies by Parmalat (Italy) and SME (Italy).

REGIONAL DISTRIBUTION

The milk delivered to French, German, British, Dutch and Italian dairies accounts for 80% of total milk intake. The production of fresh milk products is mainly due to Germany, Spain, United Kingdom, France and the Netherlands, although cheese production is significant also in Italy, the UK and in Denmark.. The largest industrial plants for the production of powdered milk are located in Northern Europe.

ENVIRONMENT

The most important environmental issues related to the dairy industry are soil and water pollution caused by stock-farming. The industry, however, also has to deal with the management of household waste disposal and therefore with packaging regulations.

REGULATIONS

The primary regulations for the dairy industry concern the following:

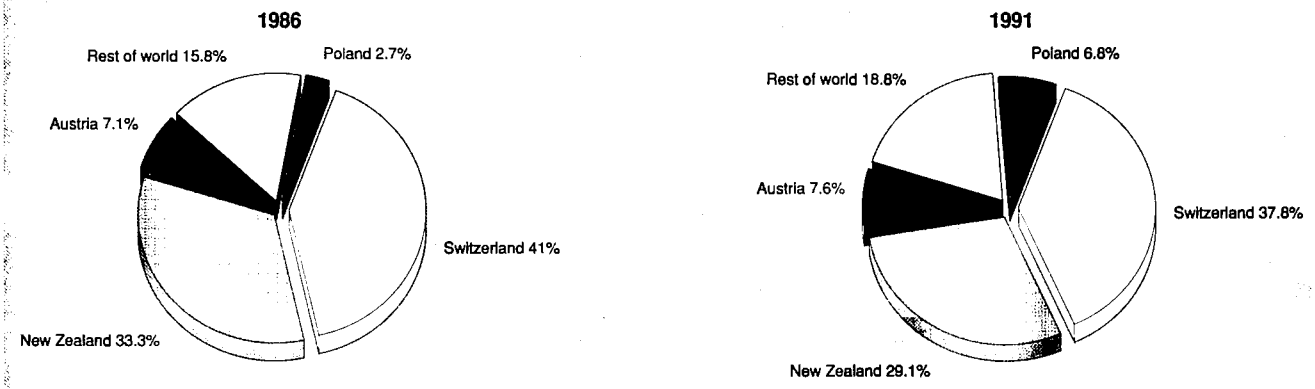
- market support involving the purchase of butter, of some kinds of cheese and of skimmed milk powder and the adoption of the "Community Preference" principle through import levies and export refunds;

Table 8: Dairy products
Net production by country, 1990

(thousand tonnes)	Fresh milk products except cream	Drinking milk	Cream powder	Concentrated milk powder	Whole milk	Skimmed milk	Butter	Cheese
Belgique/ België, Luxembourg	1 124	917	49	28	35	86	89	63
Danmark	769	645	48	0	84	41	93	295
BR Deutschland	6 587	4 907	514	440	145	453	396	1 115
España	3 858	3 510	38	37	12	45	46	181
France	5 779	4 401	162	70	247	580	538	1 471
Ireland	660	643	21	0	15	195	155	70
Nederland	1 821	1 391	57	404	204	80	215	581
Portugal	943	833	5	N/A	6	15	15	54
United Kingdom	7 306	7 076	64	204	70	166	138	312

Source: Eurostat

Figure 7: Dairy products
Origin of EC imports



Source: Eurostat

- the disposal of product stocks through special sales on domestic and foreign markets (especially on the USSR market);
- measures for the harmonisation of hygiene and quality standards of milk and milk by-products meant for intra-EC trade;
- the establishment of milk quotas (Regulations 856/84, 857/84, 1447/84, 1527/88) and co-responsibility levies.

OUTLOOK

The development of the dairy industry is strictly related to the future EC agricultural policies and to the many agreements which influence extra-EC trade.

The most important consequences of the establishment of the Single European Market will be the following:

- legislative problems related to the protection of Designation of Controlled Origin products;
- problems related to hygienic and qualitative standardisation of products;
- a further increase in concentration and internationalisation of the industry.

Among the risks the dairy industry faces is a change in consumer demand towards lower-fat products. These include mixed-fat products, which contain both vegetable or grain oils and dairy products and which will be affected by Regulations which will reduce bans on mixed-fat products in certain countries. World demand for certain dairy products is also decreasing as more countries move to produce these products domestically. EC countries which tend towards smaller, more specialised firms will be at particular risk from increased competition at the establishment of the Single European Market.

The current leading firms, however, will be able to advantage of opportunities associated with the implementation of the Single Market, especially in the international sector. Increased concentration will bring gains from the ability to invest in new technological processes and product innovation. Also, although some foreign markets are saturated, there are other niche markets which can be developed.

Table 9: Dairy products
Expected real annual growth rates

(%)	1993 -93	1993-96
Apparent consumption	0.6	0.6
Production	0.5	0.5
Extra-EC exports	-1.7	-1.7

Source: Prometeia

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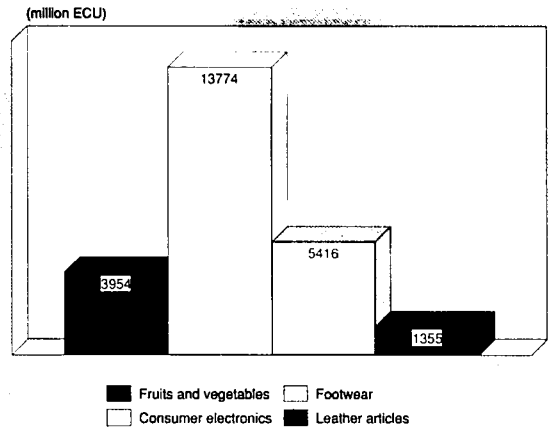
Fruit and vegetable processing and preserving
NACE 414

While the vegetable preserves market in general is going through a phase of slow growth, some sectors (such as fruit juices) are growing more rapidly. Industry is concentrated in the hands of a few multinational enterprises, but a strata of small businesses also exists. These producers are preparing themselves against strong price competition coming from Asian and East European rivals. The promotion and advertising strategies of the companies will take on growing importance in the future, as will the role of large-scale distribution.

Figure 1: Fruit and vegetable processing and preserving Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

This sector includes fruit and vegetable processing activities designed to prolong preservation. The main product categories are tomato preserves, preserves of other vegetables, oil or vinegar preserves, fruit juices, jams, and jellies.

Main indicators

Exports remain small relative to actual production, just under 10% in 1991. Although the real production growth, which was averaging upwards of 4% per year between 1987 and 1990, slowed to gains of closer to 3% in the beginning of the nineties.

The number of people employed in the early 1980's had decreased in parallel with the introduction of more capital intensive technologies. As of 1989, however, this process of labour substitution for capital came to an end, producing renewed growth in the number of employees.

Recent trends

The trend of consumption and production in real terms shows generally steady growth throughout the eighties, apart from a slowdown in 1985. The trend in consumption has been faster than the trend in production, reflecting an increase in import penetration. Exports have remained stable, if not declining.

Although the US market is about the same size as the EC's, growth in the EC has been slightly higher over the last several years.

Foreign trade

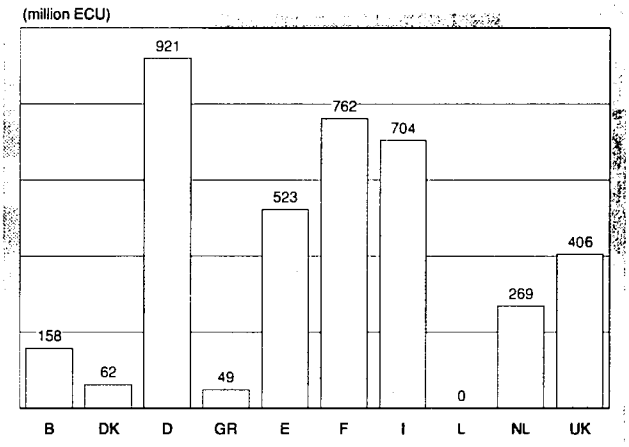
While exports were characterised by large fluctuations throughout the 1980's, imports from non-EC countries grew steadily resulting in a worsening of the trade deficit. By 1991, the ratio of exports to imports was close to 40%.

From 1986 to 1991, the make-up of the countries exporting to the EC shifted in favour of the East European countries which export large quantities of semi-finished fruit-based produce and, depending on the area, several kinds of vegetables. Over 50% of imports come from East European and developing countries. In 1991, Turkey alone supplied almost 20% of imported goods, most notably tomato-based semi-finished produce. The trade flow coming from Brazil is also important, consisting largely of concentrated juices of tropical and citrus fruits. Imports from the EFTA countries and the United States account for a small share of total imports, which consist mainly of speciality products.

Regarding exports, the greatest share is destined to the most developed EC and non-EC countries. The share destined to the United States, however, has progressively declined since 1986 because of the proliferation of typical Mediterranean products in the US domestic market. In addition, protectionist measures on fruit and vegetable imports have been introduced in the United States following the implementation of similar European measures on American meat imports. Exports to the Middle East are quite sizeable too, even though EC goods are losing market share as a result of price competition from non-EC competitors. Overall, exports as a share of production increased from 36.3% in 1982 to 41.3% in 1991.

The volume of intra-EC trade is understandably much higher than the value of goods coming from non-EC countries. During the 1980's, intra-EC trade grew at an average rate that was well above overall import growth, increasing its importance in overall EC trade. The slowdown in intra-EC trade in 1986 was most likely affected by the introduction of production quotas for the principal forms of fruit and vegetable processing (tomatoes, peaches, pears etc.), enforced by the EC for the first time in 1985.

Figure 2: Fruit and vegetable processing and preserving Value added by Member State, 1991



Source: Eurostat

Table 1: Fruit and vegetable processing and preserving
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	11 040	11 212	13 067	13 345	13 275	14 388	15 405	16 297	17 651	19 251	20 800
Production	10 058	10 242	11 987	12 204	12 223	13 212	13 931	14 904	15 885	17 103	18 330
Extra-EC exports	1 005	1 126	1 383	1 535	1 304	1 294	1 368	1 634	1 456	1 512	1 513
Trade balance	-982	-970	-1 080	-1 140	-1 052	-1 176	-1 473	-1 393	-1 765	-2 148	-2 470
Employment (thousand)	147.2	138.6	138.7	135.0	131.6	132.8	129.3	131.9	133.3	134.8	136.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. For trade, however, only 1991 has been estimated.
(2) Prometeia estimates
Source: Eurostat

Table 2: Fruit and vegetable processing and preserving
Breakdown of production by country and by major product line, 1990

	Jam, marmalade, jelly and chestnut paste (thousand tonnes)	Canned vegetables excluding baked beans (million 850 ml tins)	Canned fruit (million 850 ml tins)
Belgique/België	27.0	119.0(1)	44.5
Danmark	36.4	N/A	N/A
BR Deutschland	229.3	151.9	94.4
España	45.0	289.2	326.3
France	151.2	1 229.8	286.4
Hellas	N/A	N/A	224.2
Italia	48.0	223.4	215.0
Nederland	25.2	428.9	92.8
United Kingdom	156.4(2)	221.5(2)	36.7(2)

(1) Estimated
(2) 1989 figures
Source: OEITFL

Table 3: Fruit and vegetable processing and preserving
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.3	5.9	4.3
Production	2.5	4.2	3.6
Extra-EC exports	9.8	-1.4	2.2
Extra-EC imports	0.3	9.5	6.3

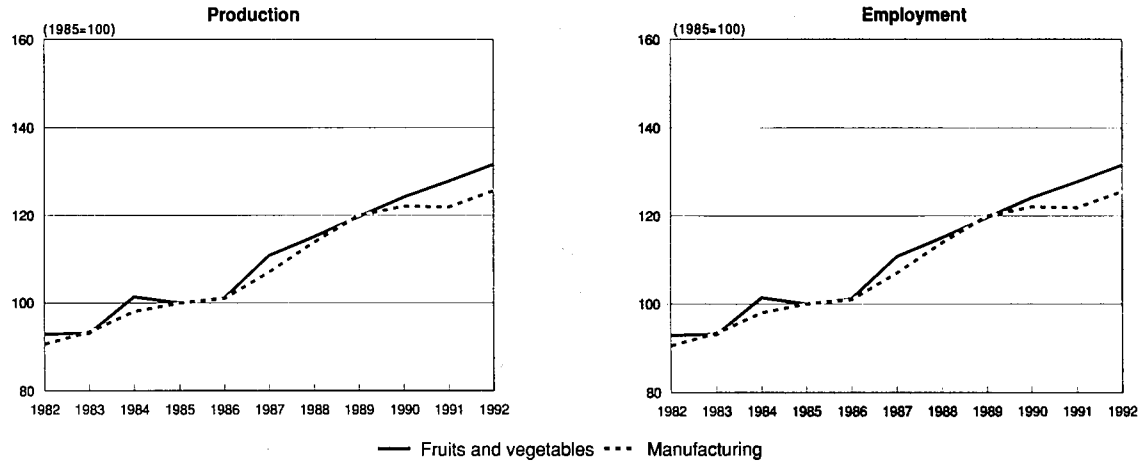
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Fruit and vegetable processing and preserving
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 005	1 126	1 383	1 535	1 304	1 294	1 368	1 634	1 456	1 512
Extra-EC imports	1 987	2 096	2 463	2 676	2 356	2 470	2 842	3 028	3 221	3 659
Trade balance	-982	-970	-1 080	-1 140	-1 052	-1 176	-1 473	-1 393	-1 765	-2 148
Ratio exports/imports	0.51	0.54	0.56	0.57	0.55	0.52	0.48	0.54	0.45	0.41
Terms of trade index	115.6	115.1	109.3	100.0	120.9	119.3	115.6	127.3	128.9	134.8
Intra-EC trade	2 656	2 968	3 512	3 790	3 818	4 179	4 514	4 947	5 532	6 186
Share of total imports (%)	57.0	58.4	58.7	58.5	61.7	62.7	61.2	62.0	63.1	62.8

(1) Estimates
Source: Eurostat

Figure 3: Fruit and vegetable processing and preserving
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

MARKET FORCES

Demand

In spite of the well-established product characterisation of vegetable preserves, opportunities still exist for further growth in the market. This is due to the homogenisation of food consumption trends within the EC and to the renewal of products by way of differentiation strategies enacted upon by the companies. Product innovation and advertising made by industry are also giving an impetus to demand. For now, however, product innovation has taken on a supporting role to demand, as large volumes of consumption are still directed towards traditional products.

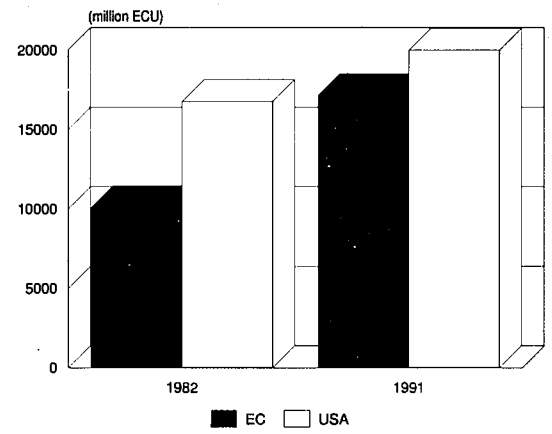
The products that make up the aggregate reveal different demand dynamics. Fruit juice consumption is experiencing a growth phase throughout Europe both in terms of the overall market and in per capita terms. On the other hand, fruit preserves are going through a slack phase, with consumption declining in some countries. Germany is affected by the greater availability of fresh fruit. Spanish output is turning increasingly to the export market, while domestically there is an increasing substitution away from canned or processed goods to fresh fruit. Growth in the EC market can be credited to higher quality products and product innovation.

The consumption of tomato preserves is increasingly strong in the Anglo-Saxon countries, thanks to the popularity of the Mediterranean diet (particularly pasta). Tomato preserves are fundamental for such dishes.

The market for vegetable preserves is quite stable, although it is affected by competition from frozen and fresh produce. Consumption is still growing strongly in the German and French markets. France is often used by producing companies as a base from which to export produce to other EC countries.

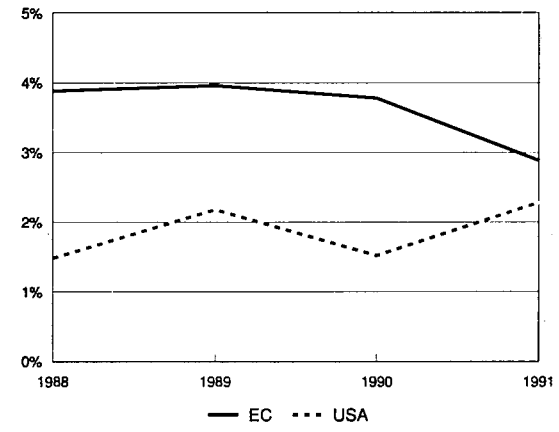
Another factor which influences demand is the expansion of modern and/or large-scale distribution. On the one hand, the distribution network improves communication between industry and consumers. On the other hand, it allows consumers to shop less frequently which tends to encourage the sale of packaged products rather than fresh goods.

Figure 4: Fruit and vegetable processing and preserving
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Fruit and vegetable processing and preserving
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Table 5: Fruit and vegetable processing and preserving
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	22.1	24.8	23.3	23.1	24.4	26.8	28.0	28.0	28.8	29.3
Productivity index	95.6	107.2	100.9	100.0	105.8	115.9	121.1	121.3	124.7	126.9
Unit labour costs index (3)	85.5	86.7	96.6	100.0	105.2	111.1	119.8	129.2	136.4	N/A
Total unit costs index (4)	73.1	78.8	95.8	100.0	101.9	108.8	118.1	122.4	130.2	139.1

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Supply and competition

The countries that produce vegetable preserves are located mainly in the Mediterranean basin, i.e. Italy, Spain, Portugal and Greece. Competition between them is complicated by a mechanism of quotas which was introduced in 1985. This institutional factor has indeed limited the redistribution of production among countries on the basis of changes in relative competitiveness. Subsidised domestic production has also contributed to a reduction in import flows.

Exports too have undergone a slowdown owing to the preference of EC industry towards serving customers within the internal market first and foremost. One of the effects of the introduction of production quotas has been a lessening in the degree of external dependency.

Despite the importance of production quotas, other factors do influence relative competition within the EC. Italy, for example, the main producer and exporter within the EC, is characterised by much higher labour costs compared to other Mediterranean countries. This factor works against the Italian producers by limiting their price competitiveness.

Within each country two kinds of industrial organisations can be distinguished. The first group is the principal food multinationals that operate in many sectors; they follow defined advertising and distribution strategies, perform R&D and occupy the upper band of the market. These companies benefit from productive capacity organised in large-sized plants. The second group is a system of small companies that operate in marginal and local markets, organised into territorial systems or zones where there is a large availability of usable primary goods. Some companies occupy niches in the market, while others are destined to become marginal.

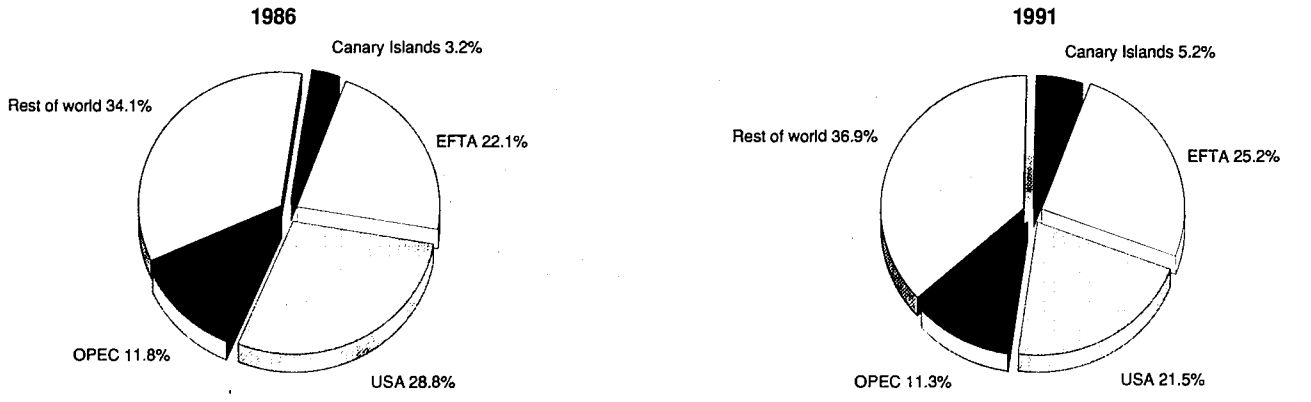
Traditionally, the EC has been affected only marginally by competitive pressure from outside its borders. This development is attributed mainly to the Community's subsidies for agricultural production and quality requirements for vegetable preserves. Trade figures, however, indicate that imports are growing rapidly. Import increases are largely due to low-cost semi-finished produce coming from other Mediterranean countries. One example is Turkey, which provides tomato concentrate and partially processed exotic fruits and vegetables which are unavailable inside the EC. Other imported goods include concentrated and frozen fruit juices, frozen fruit and seedless fruits (for jam-making), raisins, pickled olives and capers etc. Apart from the availability of certain kinds of produce, the competition from non-EC imports is reinforced by lower labour costs in both East European and developing countries.

The recent liberalisation of the East European economies has already made its effects felt with the sudden increase in the availability of partially processed primary agricultural goods. This abundant supply will in future fuel imports into Europe at very advantageous prices.

Production process

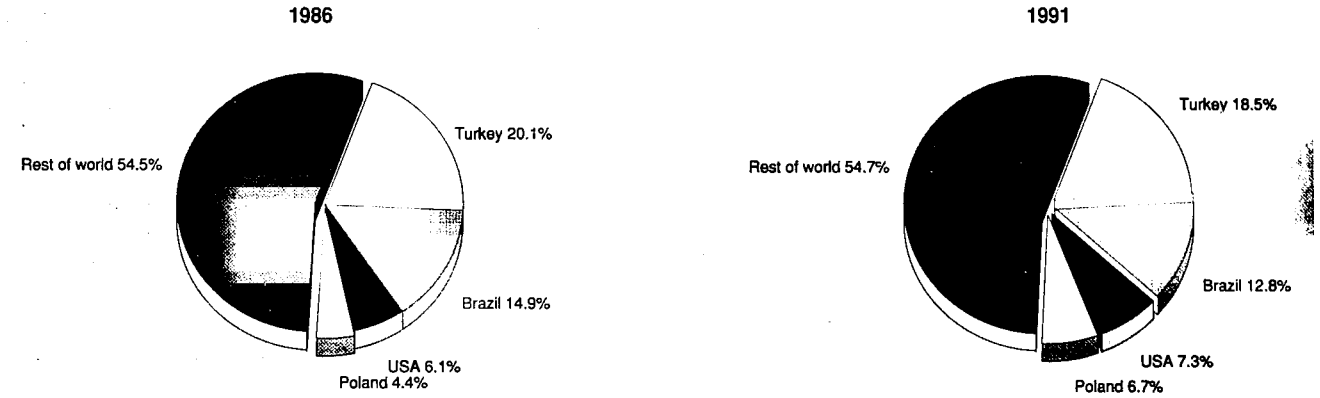
Vegetable and fruit preserves (tomatoes, peas, peaches, pears, etc.) are produced, in most cases, in plants that are located no more than a few hundred kilometres away from the area in which the fresh produce is cultivated. Given this situation, agricultural zones with vegetable and fruit cultures also have

Figure 6: Fruit and vegetable processing and preserving
Destination of EC exports



Source: Eurostat

Figure 7: Fruit and vegetable processing and preserving
Origin of EC imports



Source: Eurostat

a high concentration of processing plants. The technologies for automatic harvesting and processing have indeed helped the creation of hybrids that induce a simultaneous maturation of the produce, which then has to be harvested, transported and processed in a very short period of time. During the 1980's, value added rose consistently as a result of the overall growth in capital intensity. Unit labour costs, however, have risen at a faster rate than labour productivity.

INDUSTRY STRUCTURE

Companies

The number of large companies operating in this sector is small as many producers operate in niche markets. Furthermore, there are very few large companies having multinational features that are present in all major European markets.

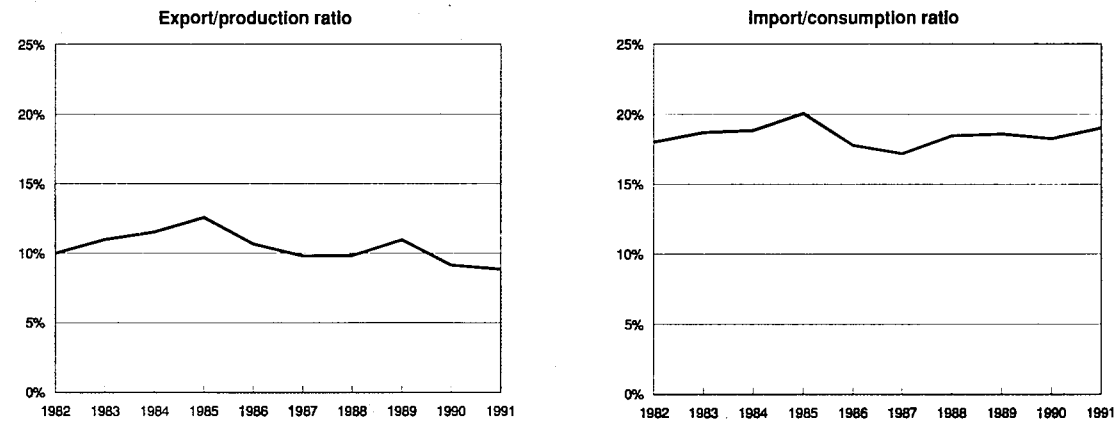
In 1989, the foremost enterprises operating in the European market included, for canned vegetables (non-tomato), Bonduelle, CGC, Grand Metropolitan, HL Foods, Suiker Unie, and Heinz, which together had an EC market share of 40% to 50%. For processed tomatoes, SME, Nestlé, BSN, Heinz, Mars and CPC were the dominant producers with a combined EC market share of 50% to 60%. For canned fruit, BSN, Del Monte, Conserves Gard, Odenwald, and Nestlè were the leading EC companies with a combined market share of 50% to 60%. Finally for fruit juices, Eckes, Melitta, Cadbury Schweppes, Hero, Pernod Ricard, and Procter & Gamble were the EC market leaders with a combined share of 30% to 40%.

Strategies

Company response to the demand conditions described above has been varied. Leading or large companies operating in various markets and offering a diversified range of products can increase their own market shares by promoting their own brands with large advertising campaigns. Packaging offers a further element of innovation. These strategies are supported by horizontal product differentiation, where innovations tend to value intrinsic oganoleptic qualities.

Furthermore, important process innovations have been introduced with a view to improving the preserved product from a nutritional standpoint. Such innovations include techniques of irradiation, extrusion and filtration. The preservation industry does not dedicate many resources to research and development but tends to adapt technologies used in other industries, such as the chemical, energy and plastics industries

Figure 8: Fruit and vegetable processing and preserving
Trade intensities



Source: Eurostat

Table 6: Fruit and vegetable processing and preserving Employment and production by country, 1991 (1)

	Employment	Production (million ECU)
Belgique/België	6 197	745.4
Danmark	1 301	256.7
BR Deutschland	22 870	4126.8
Hellas	N/A	903.0
España	N/A	2 044.2
France	17 985	3 062.6
Ireland	1 239	149.6
Italia	19 408	2 952.0
Luxembourg	0	0.0
Nederland	6 333	1 097.7
Portugal	3 561	187.1
United Kingdom	16 201	1 578.3

(1) Estimates
Source: Eurostat

(where R&D has a basic strategic importance) to their own needs. In a secondary group of companies we find the huge cooperative groups that are strongly integrated with the upstream agricultural sector. These firms tend to efficiently exploit the productive capacity of their huge-sized plants. Compared to the first group of large multinationals, they allocate fewer resources to commercial promotions. Such companies are privileged suppliers of brand-name products to large chain distributors.

Small-sized companies tend to develop niche markets by supplying speciality products endowed with a high qualitative content. The distribution sector is concentrated in most of the EC markets. This sector exerts pressure on the design of the commercial strategies of the major companies by means of the promotion of own-brands and compressing the industry's margins by demanding low prices.

The investments made in the 1980's were directed toward the modernisation of production capacity by adopting more capital-intensive technologies associated with higher productivity and investments in advertising campaigns. Acquisitions, mergers and stake-holdings (particularly on the part of large-scale industry) also gained increasing importance in the eighties. The trend towards the acquisition of national brands by big businesses was especially lively in those markets where concentration was rather low, such as in Italy and Spain.

REGIONAL DISTRIBUTION

The distribution of production in the various countries (in addition to reflecting the size of the market) is also marked by sharp differences in the fruit and vegetable processing industry itself. Germany is concentrated in the most significant market segments, fruit juices and preserved vegetables. In France the industry is characterised by the presence of large diversified enterprises in various food segments, with high product differentiation and an emphasis on quality.

In the 1980's, Italy witnessed a process of concentration in its industry which took its level of added value close to that of Germany and France. Spain is proceeding along these lines although it is a couple of years behind. The sector in Greece has numerous small-sized productive units. Furthermore, the level of prices is rather low despite significant production volume. The United Kingdom maintains a well-established and highly concentrated industry. The UK's market is more mature than that of France or Germany and, as a result, prices and margins tend to be narrower.

ENVIRONMENT

The production process, the by-products, and the industry's discharges, do not have a significant environmental impact. The importance of marketing in this mature industry combined with modern self-service distribution needs, however, pave the way for increasingly cumbersome packaging. This means more waste disposal problems in processing the refuse.

OUTLOOK

In the near future, current consumption trends are expected to remain steady. This will take place across Europe as a result of the diffusion of several products that have already

Table 7: Fruit and vegetable processing and preserving Consumption of the main categories of processed and conserved fruits and vegetables 1989 and average yearly growth rate 1985/89

	Processed tomatoes (thousand tonnes)		Canned vegetables (thousand tonnes)		Fruit juices (million litres)	
	1989	1985/89	1989	1985/89	1989	1985/89
EC	959.7	6.6	3 258.6	1.0	6 012.8	8.9
Belgique/België						
Luxembourg	34.3	5.4	112.0	-3.0	174.1	5.4
Danmark	13.4	38.4	22.7	0.8	132.8	4.7
BR Deutschland	60.0	3.3	818.7	3.0	2 244.0	9.9
Hellas	30.1	1.5	63.0	1.5	116.0	12.0
España	83.7	7.8	295.0	0.0	361.4	17.4
France	187.8	-1.1	1 102.3	3.1	918.0	5.1
Ireland	2.1	18.5	58.2	-1.1	28.0	11.7
Italia	440.0	7.3	140.7	-0.7	460.2	21.0
Nederland	3.5	0.8	192.0	-1.3	550.0	6.3
Portugal	19.0	5.2	28.4	0.0	158.2	8.7
United Kingdom	85.8	42.1	425.6	-3.3	870.0	5.6

Source: Food for thought

Table 8: Fruit and vegetable processing and preserving
Expected real annual growth rates

(%)	1992-93	1993-96
Apparent consumption	4.5	4.5
Production	3.0	3.0
Extra-EC exports	1.0	1.0

Source: Prometeia

achieved maturity in their markets of origin, such as tomato preserves and fruit juices.

Production will be affected primarily by changes in the CAP (Common Agricultural Policy). Since 1991 a formula to aid agricultural production has been introduced which excludes industry from being subsidised.

Furthermore, the shift from the quotas policy to that of guaranteed minimum thresholds will dissuade unscheduled increases in EC output. This mechanism might affect the containment of the interdependency with the extra-European areas, by having a positive effect on the intra-EC trade flows and by making extra-EC exports merely residual.

A new backdrop is provided by the opening of the East European economies, some of which are especially rich in agricultural produce and which make up one of the few goods they have to trade for technology. Clearly the acquisition of new preservation technologies and the marked price competitiveness of these countries is going to have a significant influence on the competitive scenario of Eastern Europe.

In summary, the risks that the fruit, vegetable, processing and preserving industry faces in the future are:

- high prices and thus the non-competitiveness of European industry;
- the replacement of fresh produce with freezing and chilling;
- the replacement of fresh produce with value-added produce (irradiated or ready-washed vegetables).

Companies which adopt a strategy of product innovation and establish niches based on high quality produce will be the best positioned for growth in the future.

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Fish
NACE 415

The strong increase in demand for processed fish over the eighties was not matched by an equal increase in EC production, thus the trade balance decreased sharply.
The markets which show the fastest growth are those of canned and frozen fish. The popularity of these products is due mainly to the product differentiation policies adopted by leading firms through the introduction of "convenience" and high value added products. Fresh fish, however, still constitutes a highly competitive substitute product.

INDUSTRY PROFILE

Description of the sector

The fish and seafood processing industry covers two main subsectors:

- Quick freezing of edible fish and other seafoods (NACE 415.1).
- Processing of fish and other seafoods (not including quick freezing); the subsector includes dried, salted, smoked and canned fish (NACE 415.2).

Main indicators

From 1986 to 1990, production at current prices increased, on average, by 8.5% per year, meanwhile, apparent consumption experienced even stronger growth (10% per year on average). The trade balance deteriorated sharply (the trade deficit has almost doubled in five years) due to a number of factors, most notably a decline in exports. Although in 1991 consumption and production increased by 7% and 8%, respectively, the trade balance continued to worsen despite a 9.8% increase in exports. The fishing sector is witnessing an unsteady trend in employment. In terms of distribution across the EC, Germany's fish industry shows the highest value added, followed by the UK, Spain, France and Italy. These five countries account for 75% of total value added.

Recent trends

The main indicators at constant prices show similar trends to those at current prices. In the second half of the 1980's, a rapid increase in consumption was not matched by a similar development in production. Consequently, extra-EC imports show a significant increase. If we divide the 1985-1991 period into two sub-periods, we can observe a strong slowing down in the growth of production and consumption between 1989 and 1991, which is should improve during the early 1990's.

Foreign trade

The EC is a net importer of processed fish. Between 1982 and 1991 extra-EC imports increased their share of apparent consumption (from 21% in 1982 to 27% in 1991). Among the main suppliers are the EFTA countries (whose share has decreased since 1982) Thailand, the US and Argentina.

By comparison, the share of extra-EC exports on EC production is relatively small, 10% throughout the eighties and slipping to 8% in 1991. Extra-EC exports are directed mainly towards the EFTA countries, the USA, Japan, and the OPEC countries.

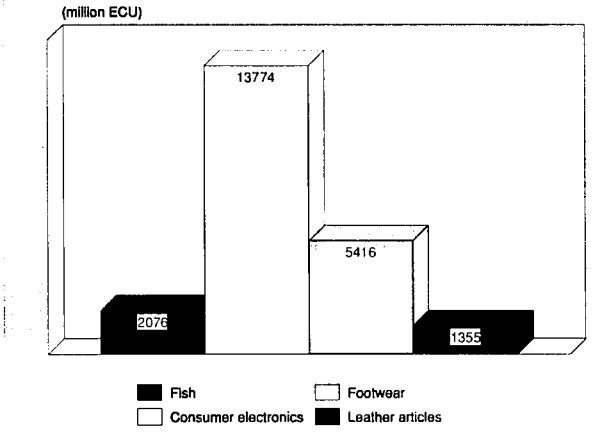
MARKET FORCES

Demand

Increased recognition of fish as a healthier alternative to meat has recently attracted more consumers. Due to the improvement of distribution systems and packaging techniques, processed fish still faces strong competition from fresh fish, especially in Greece, Ireland and Portugal. The demand for frozen fish, however, is increasing in almost every country thanks to the development of "convenience" preparations and packaging which increase a product's storage period. The evolution of production technologies and a less than proportional increase in fresh fish services (in certain countries) also has a significant effect on demand. Spain, Belgium and France show the highest per capita consumption of frozen fish. The Italian, Danish and German markets also demonstrate positive demand. Increased dependence on catering will also encourage strong growth in the consumption of frozen fish.

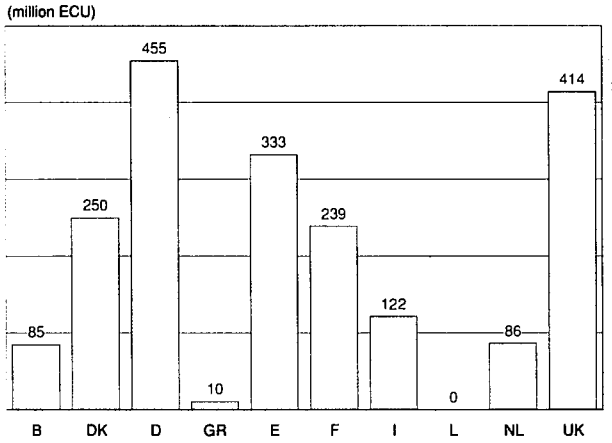
The consumption of canned fish is increasing in Belgium, France, Italy, Spain and in the UK. Tuna is very popular in almost every country. The increase in sales is due mainly to marketing efforts by the leading firms, which adopted product differentiation policies through the introduction of both high quality products and new products such as mixed tuna salads. In Denmark and Holland the market has almost reached saturation, while in Greece canned fish cannot achieve a good market position due to the strong competition of fresh fish.

Figure 1: Fish
Value added in comparison with other industries, 1991



Source: Eurostat

Figure 2: Fish
Value added by Member State, 1991



Source: Eurostat

Table 1: Fish
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (2)
Apparent consumption	5 555	6 056	6 550	6 850	7 267	7 711	8 682	9 784	10 650	11 513	11 826
Production	4 909	5 328	5 776	6 005	6 221	6 538	7 265	8 243	8 636	9 229	9 367
Extra-EC exports	520	547	579	678	688	727	654	664	702	771	786
Trade balance	-645	-728	-774	-845	-1 045	-1 173	-1 417	-1 541	-2 014	-2 284	-2 459
Employment (thousands)	94.9	95.8	93.0	89.7	84.4	82.3	83.6	92.2	89.0	89.1	89.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) 1992 are Prometeia estimates
Source: Eurostat

Table 2: Fish
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.9	7.1	6.0
Production	3.7	5.3	4.8
Extra-EC exports	2.5	0.7	1.3
Extra-EC imports	4.0	11.1	8.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Fish
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	520	547	579	678	688	727	654	664	702	771
Extra-EC imports	1 166	1 275	1 353	1 523	1 734	1 900	2 071	2 204	2 716	3 055
Trade balance	-645	-728	-774	-845	-1 045	-1 173	-1 417	-1 541	-2 014	-2 284
Ratio exports/imports										
Terms of trade index	96	97	98	100	100	103	102	101	105	102
Intra-EC trade	788	850	915	1 103	1 291	1 447	1 523	1 710	2 006	2 215
Share of total imports (%)	40.1	39.9	40.3	42.0	42.7	43.2	42.3	43.6	42.4	42.0

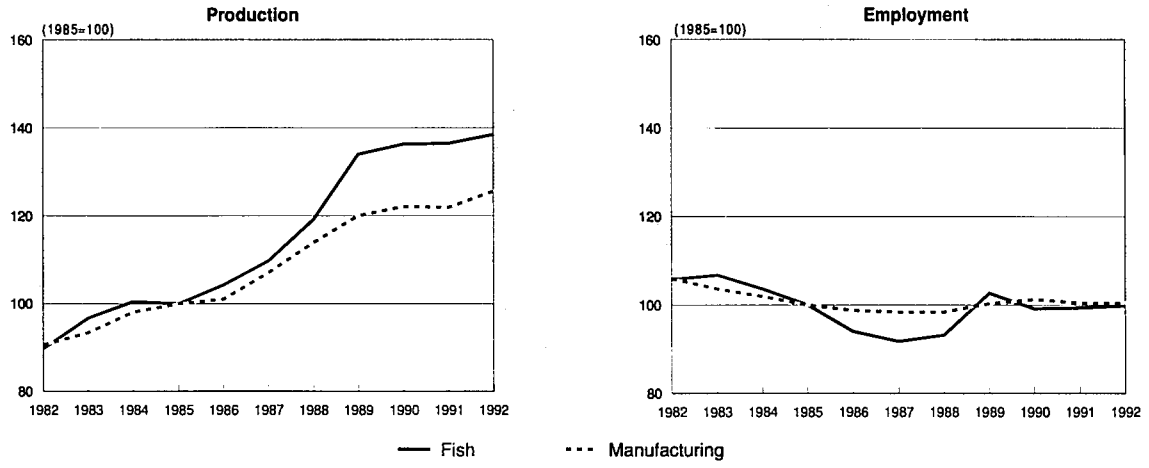
(1) 1991 are estimates
Source: Eurostat

Table 4: Fish
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	17.2	18.5	19.7	20.0	21.2	22.4	23.7	21.9	23.6	23.3
Productivity index	86.0	92.3	98.5	100.0	106.1	112.2	118.7	109.4	118.0	116.4
Unit labour costs index (3)	79.2	86.4	93.2	100.0	103.4	107.6	116.3	119.4	127.3	N/A
Total unit costs index (4)	76.0	83.5	91.0	100.0	113.1	123.1	130.4	135.2	144.7	153.5

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Fish
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

The increased consumption of smoked salmon in several countries is partially credited to the expansion of salmon farming.

Supply and competition

One of the most important competitive variables for the industry, both within the EC and between the EC and third countries, is raw material availability and price. Regulations aimed at preserving EC fish stocks, together with a growing tendency by coastal nations to defend exclusive fishing zones, may limit the productive capacity of EC fish-processing firms. The expansion of waterculture may be a partial answer to this problem, especially if it creates integrated market-oriented structures involving production, processing, scientific research, and market information.

Production process

The production process of canned fish is characterised by a certain degree of automation and scale economies. Firms operating in the high quality range produce fish in tins and glass containers. The introduction of easy-open aluminium tins is a recent innovation.

The deep-freezing process has been transformed by the innovation of cooling techniques. As shown in Table 4, productivity has increased more slowly than total unit costs throughout the eighties.

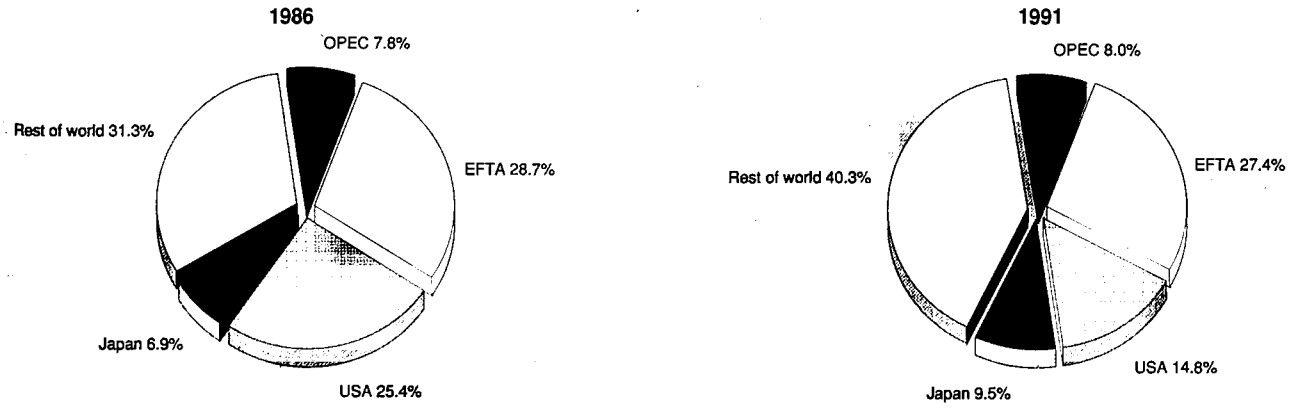
INDUSTRY STRUCTURE

Companies

The fish processing industry is characterised by a medium to high degree of supply concentration in single domestic markets.

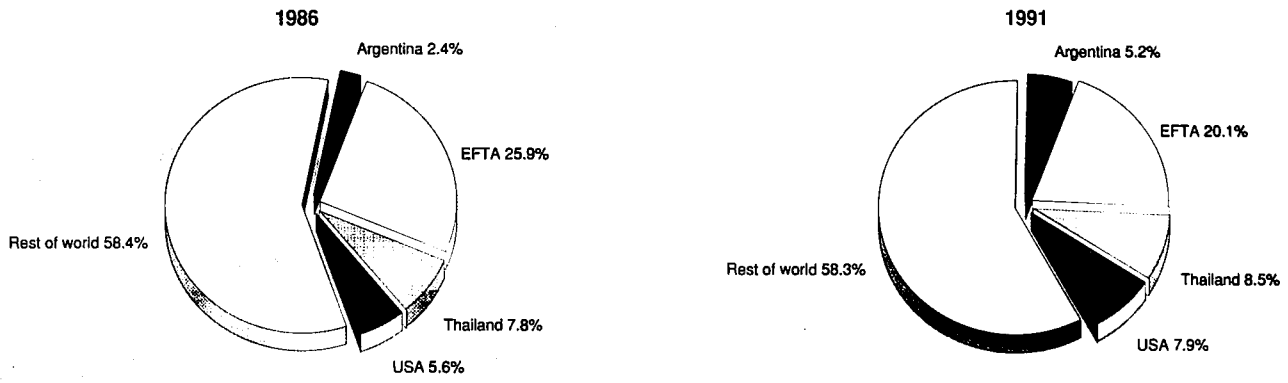
- With respect to canned fish, the three main firms in this sector (Saupiquet, Heinz and Unilever) together comprise 20% to 25% of the total EC market. In the frozen fish market, Unilever is leader, followed by Nestlé and Pescanova. These firms account for 45% to 50% of total EC sales. In the dried, salted and smoked fish sectors, the three main firms (Friedrichs, Unilever and HL Foods) hold 15% to 20% of the total EC market. Unilever and HL Foods also account for a negligible share in the fresh fish sector.

Figure 4: Fish
Destination of EC exports



Source: Eurostat

Figure 5: Fish
Origin of EC imports



Source: Eurostat

Strategies

The most significant competition leading firms in the industry confront comes from fresh fish. Thus the main strategic actions consist of differentiation policies, involving preparation and packaging, which accentuate the "convenience" aspects of the product.

Competition is strong and encourages industrial concentration. Mergers and acquisitions activity performed by multinationals like Unilever and Nestlé, has increased the internationalisation of the industry.

ENVIRONMENT

The environmental issues related to fish processing are mainly connected to raw material supplies. The excessive exploitation of fish stocks caused by global fish consumption is an important ecological issue. This problem can be solved by the proliferation of waterculture. The EC has financed numerous projects in this area. A secondary problem involves the death of thousands of dolphins which are caught in tuna fishing nets. The EC has taken measures to rectify this problem, most notably through the ratification of a Protection of Wildlife Agreement on December 31, 1991, which classifies dolphins as a highly protected species.

REGULATIONS

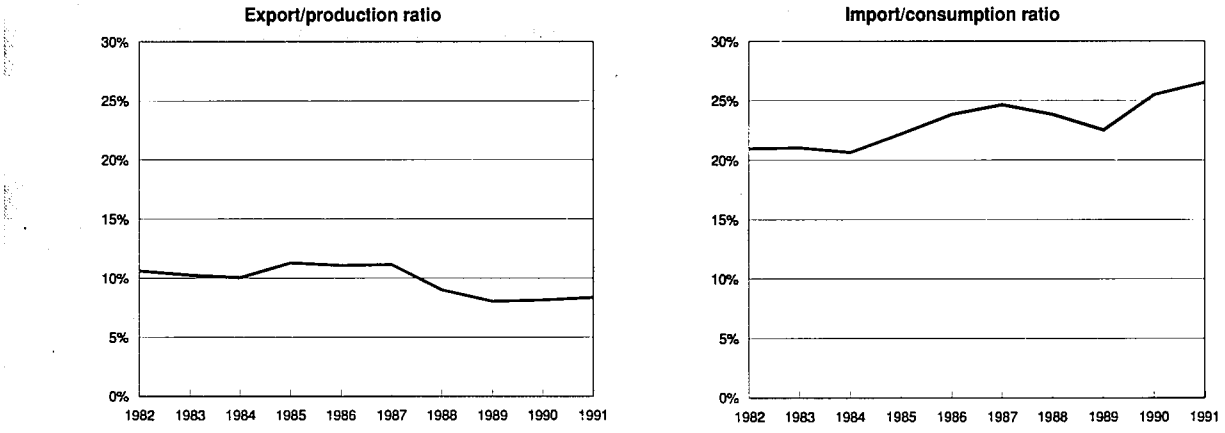
The EC passed new regulations concerning the preservation of fishing stocks (tenth, eleventh and twelfth modification of Regulation 3094/86/EEC).

Other regulations set the bacteriological standards for shellfish to be marketed in the EC. Moreover, very rigid hygienic measures have been applied to fish processing, unloading operations, freezing plants and regulations for boats equipped for immediate fish processing. Other regulations concern processes for smoking and salting fish.

OUTLOOK

Over the next few years, fish consumption is expected to increase, especially frozen and canned fish. Future market segmentation with the introduction of higher value added products and the expansion of processed fish to markets where fresh fish presently dominates will be the driving forces for this growth. Imports will continue to take an increasing share

Figure 6: Fish
Trade intensities



Source: Eurostat

Table 5: Fish
Consumption of fish in the EC, 1989

	Fresh fish total market (thousand tonnes)	per capita consumption (kg)	Frozen fish total market (thousand tonnes)	per capita consumption (kg)	Canned fish total market (thousand tonnes)	per capita consumption (kg)	Other processed fish (1) total market (thousand tonnes)	per capita consumption (kg)
EC	3 570.1	11.0	1 094.8	3.4	807.7	2.5	509.5	1.6
Belgique/België, Luxembourg	144.2	14.0	48.3	4.7	22.1	2.1	3.8	0.4
Danmark	11.1	2.2	14.2	2.8	10.3	2.0	13.3	2.6
BR Deutschland	226.0	3.6	120.5	1.9	167.1	2.7	90.4	1.5
Hellas	145.0	14.5	17.0	1.7	5.0	0.5	13.0	1.3
España	689.9	17.8	362.3	9.3	99.5	2.6	35.7	0.9
France	901.4	16.1	254.0	4.5	246.5	4.4	35.0	0.6
Ireland	12.5	3.6	7.4	2.1	3.9	1.1	2.4	0.7
Italia	766.5	13.3	48.9	0.9	103.3	1.8	35.3	0.6
Nederland	140.5	9.5	11.9	0.8	25.5	1.7	36.3	2.5
Portugal	266.9	25.5	10.3	1.0	17.7	1.7	100.3	9.6
United Kingdom	266.1	4.7	200.0	3.5	106.8	1.9	144.0	2.5

(1) Dried, salted and smoked fish
Source: Food for Thought

Table 6: Fish
Expected real annual growth rates

(%)	1992-93	1993-96
Apparent consumption	3.3	3.3
Production	1.5	1.5
Extra-EC exports	2.3	2.3

Source: Prometeia

of the EC market, however, and the trade deficit will widen. The implementation of the Single Market will favour industrial concentration.

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Deep-frozen products
NACE 412.21, 414.1, 415.1

The recent demand for deep-frozen products has outpaced that of other food sectors. In countries where per capita consumption is low (Italy and Spain, for example), demand is directed towards other kinds of products, such as pre-cooked foods. Production of deep-frozen products is dominated by two firms but several local producers exist which operate in niche markets. As some markets approach saturation, mergers and acquisitions are concentrating the industry even more.

INDUSTRY PROFILE

Description of the sector

This sector includes a variety of products processed by means of preservation at low temperature. In order for frozen products to be safely preserved, they must be subjected to frigid conditions very rapidly. Goods in this category include: vegetables, potatoes, fish, meat, poultry, fruit, oven products and prepared foods. Deep-frozen products are classified according to different NACE codes. The main NACE groups are: frozen meat (NACE 412.21); frozen vegetables (NACE 414.1); frozen of fish and other sea products (NACE 415.1).

Recent trends

Over the last ten years, the European deep-frozen products industry has consistently grown at a faster rate than other food sectors. Between 1983 and 1989, the increase in consumption was 7.2% per year (the data for 1990 cannot be compared to the previous time-series), even though this increase was different for various countries and product categories.

Meat experienced the swiftest consumption growth (14.8%), followed by potato by-products (9.4%). Consumption forecasts for pre-cooked and oven products are expected to record the highest growth rate. Regarding per capita consumption, the EC can be divided into two groups. The first includes Germany, the UK, Ireland, France and Benelux where per capita consumption is about 20 Kg. The second includes the Mediterranean countries, where frozen-food consumption is very low. Only Spain shows a notable upward consumer trend. Denmark, with a per capita consumption of 36kg, does not fit into either of these two groups. By comparing the EC per capita consumption data (approximately 17 Kg per capita consumption in 1989) with those for the US (about 51 Kg.), we find a strong potential for future growth. It is difficult to predict whether the EC countries will follow US consumption patterns. In countries like the UK and the Netherlands, for example, the consumption growth rate is decreasing. Precise data on foreign trade of deep-frozen products are not available. Significant import flows come from the Scandinavian countries (fish), Eastern Europe, South America (meat) and the US (fruit juices).

MARKET FORCES

Demand

In 1990, about 6 million tonnes of frozen products were consumed in the EC. The products consumed vary from country to country because of different nutritional habits. The most widely consumed deep-frozen products by country were: poultry in Denmark and Germany, potatoes in France, fish in Portugal and Spain, fruit and vegetables in Italy and the UK. Deep-frozen products are found to be more popular in higher-income countries. Apart from different nutritional habits, the demand for frozen products depends on other factors, including: the use of home freezers, dining-out habits (fast food restaurants) and improvements in product distribution. The percentage of European families owning home freezers and microwave ovens varies greatly from country to country. In 1990, home freezers were owned by 94% of families in Denmark, 84% in the UK, 70% in Germany and the Netherlands, 42% in France and even lower percentages in the Mediterranean countries. Microwave-ovens were owned by 84% of families in the US, compared to 51% of UK families, 34% of German families, 20% for other central European countries (data for Mediterranean countries are not available.)

Catering in the US has had a positive impact on the demand for frozen foods. The percentage of sales attributable to catering has been higher than that for retail sales (55.5% versus 44.4%). By contrast, European deep-frozen products are sold mainly through retailing. Catering sales are expected to increase significantly.

The spread of efficient modern distribution systems for deep-frozen products will have a positive impact on demand. In Italy, a majority of deep-frozen products are sold in traditional stores whereas in other countries specific distribution systems are being developed. In France and in the UK, most deep-frozen product distribution takes place via freezer centres; in Germany distribution takes place through discount channels. France and Germany, in particular, are expanding domestic distribution systems for frozen products.

Supply and competition

The deep-frozen products sector is consists of a large number of producers. French production is highly fragmented with more than 400 producers. Germany and Spain each have about 100 producers. Denmark and Italy have about 75 and 60 producers, respectively.

The high fragmentation of the market is due to low entry barriers for deep-frozen product production. Distribution and advertising, on the other hand, are characterised by higher entry barriers, with a small number of multinational firms selling various products while specific products and local markets are often covered by minor producers.

INDUSTRY STRUCTURE

Companies

Using the criteria of market distribution share for both countries and products, only Unilever and Nestlé cover the entire spectrum of products in almost every country (Unilever has a stronger market penetration than Nestlé). The entire market is controlled by these two firms: Unilever has a leading role in the UK, Italy, Germany, Belgium and the Netherlands, while Nestlé dominates in France, Denmark and Portugal. Out of the other firms, only a few are diversified in terms of products or geography (an example is Campbell whose market share is about 1.4%). The others are focused mainly on specific products in particular geographical areas. The foremost product specialised companies are: McCain (accounting for 38% of potato by-products sales in Europe), Grand Metropolitan (oven products), Bonduelle (vegetables) and Coppen&Wise (oven products).

Of the regionally specialised companies, Pescanova has the highest market share in Spain and Portugal. In Italy, SME accounts for 18% of the market; United Biscuits holds 12% of the UK market; Ortiz-Miko in France accounts for 10.8%; and Danish Danisco maintains 11.4% of the domestic market.

Niche oriented firms also exist. An interesting example is provided by Bo*Frost and Eismann, each specialising in channel distribution. Through home-sales they gained a 4.9% and a 3.7% share, respectively, of the German market.

Table 1: Deep-frozen products
Volume of consumption

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1990(1)	Per capita consumption (kg), 1989
EC	3 596	3 827	4 181	4 455	4 949	5 097	5 485	6 045	17.11
Belgique/België, Luxembourg	75	82	90	104	128	149	159	170	16.02
Danmark	127	135	147	161	166	177	186	213	36.17
BR Deutschland	994	1 059	1 124	1 202	1 256	1 279	1 404	1 616	27.79
France	630	688	824	883	1 002	1 064	1 187	1 342	21.15
Hellas	39	43	46	53	54	57	59	62	5.86
España	152	166	180	207	431	447	472	541	12.05
Ireland	65	69	74	75	77	80	82	84	22.13
Italia	220	241	260	300	320	339	350	396	6.06
Nederland	211	206	212	213	225	231	242	276	16.35
Portugal	40	44	47	55	56	59	61	64	5.91
United Kingdom	1 043	1 094	1 177	1 202	1 234	1 215	1 283	1 281	22.41

(1) Estimated
Source: 1983-89 Consumer Europe - 1990 estimated on the basis of Swiss Frozen Food Industry and Consumer Europe Data

Table 2: Deep-frozen products
Consumption by main products

(thousand tonnes)	1983	1984	1985	1986	1987	1988	1989	1983/89 yearly growth
Vegetables	921	976	1 120	1 193	1 340	1 356	1 447	7.8
Potato products	655	672	754	846	898	1 003	1 126	9.4
Fish	547	569	618	670	728	746	794	6.4
Meat	299	360	374	393	525	544	592	14.8
Bakery products	348	414	453	440	446	461	495	6.0
Ready meals	199	287	329	378	209	246	262	4.7
Poultry	683	669	668	693	714	707	757	1.7
Fruit & fruit juices	N/A	26	27	28	30	34	37	7.3(1)

(1) 1984/89 yearly growth rate
Source: Consumer Europe

Table 3: Deep-frozen products
Market values (meat & poultry excluded), 1989

(million ECU)	Fish	Potato	Vegetables	Fruit	Pastry	Soup	Ready meals	Total
EC	48 081.0	1 601.8	3 234.5	165.6	1 633.9	58.2	3 727.5	15 229.7
Belgique/België, Luxembourg	212.4	81.8	80.1	0.6	64.5	13.0	151.6	604.0
Danmark	74.7	27.6	72.5	6.2	96.9	10.7	139.7	428.3
BR Deutschland	555.4	267.2	550.1	108.3	296.7	17.3	818.5	2 613.5
France	1 409.8	468.1	512.5	26.2	436.5	7.3	869.5	3 729.9
Hellas	54.8	20.7	47.5	0.0	7.8	0.0	13.4	144.2
España	1 096.6	42.1	460.5	0.0	26.9	0.3	337.7	1 964.1
Ireland	23.3	25.7	11.6	0.4	3.8	0.0	38.6	103.4
Italia	302.5	82.6	635.7	1.2	142.3	0.3	241.9	1 406.5
Nederland	48.3	91.0	99.5	2.4	37.7	9.3	487.1	775.3
Portugal	85.1	4.7	8.7	0.0	0.0	0.0	6.7	105.2
United Kingdom	945.2	490.4	755.9	20.3	520.7	0.0	622.8	3 355.3

Source: Food for Thought

Table 4: Deep-frozen products
Consumption of frozen food products for selected EC countries and the USA, 1990

Total consumption (thousand tonnes)	DK	F	D	I	NL	E	UK	USA(2)
Vegetables	43.4	303.6	281.2	193.8	44.9	156.5	331.8	1 037.0(3)
Potatoes	13.7	335.9	332.4	57.4	79.8	38.7	199.4	
Fish	13.1	269.5	127.3	54.2	13.0	256.7	136.4	1 104.0
Poultry	51.2	36.9	434.0	11.7	16(1)	7(1)	229(1)	1 799.0
Meat	35.7	167.9	84.6	11.4	79.8	45.7	78.9	635.0
Ready meals	24.3	4.9	145.5	16(1)	15(1)	5.5	152.8	3 006.0
Others	36.2	223.8	211.0	51.8	29.0	30.9	153.2	1 858.0
Total	217.6	1 342.5	1 616.0	396.3	277.5	541.0	1 281.5	12 439.0

Per capita consumption (kg)	DK	F	D	I	NL	E	UK	USA(2)
Vegetables	8.4	5.4	3.6	3.4	3.0	4.0	6.0	16.5(3)
Potatoes	2.7	5.9	4.2	1.0	5.3	1.0	3.6	
Fish	2.5	4.8	1.6	0.9	0.9	6.5	2.4	4.5
Poultry	9.9	0.7	5.5	0.2	1.1	0.2	4.1	7.3
Meat	6.9	3.0	1.1	0.2	5.3	1.2	1.4	2.6
Ready meals	4.7	0.1	1.8	0.3	1.0	0.1	2.8	12.3
Others	7.0	4.0	2.7	0.9	1.9	0.8	2.8	7.6
Total	42.3	23.7	20.4	6.9	18.6	13.7	23.0	50.8

(1) Estimated
(2) 1989
(3) Vegetables and potatoes
Source: Swiss Frozen Food Institute

Strategies

Companies which are not focused either on particular areas or products and do not account for a high market share are in a difficult situation. For example, Campbell was forced to sell some of its partner firms operating in the frozen-food sector. Concentration as a result of mergers and acquisitions are particularly frequent between small and medium companies. The limited number of brands a company slates for commercial distribution, is encouraging the acquisition of brands and established distribution networks, even at the local level. Concentration is most prevalent in the UK (Booker, A. Fisher, Perkins), where growth rates are declining. Another important aspect is the marketing of distributors' own labels while utilising the productive capacity of minor companies.

OUTLOOK

The deep-frozen products sector is expected to grow at higher than average rates than the food industry in general. The highest growth rate is expected in pre-cooked products (mirroring a US trend). The proliferation of home microwave ovens and the growing need catering will also have positive effects on this sector. The sector is also expected to grow in those countries where per capita consumption continues to be much lower than average.

In reference to companies operating in this sector, the market remains fragmented and characterised by either large firms with a complete spectrum of products or geographically-isolated small firms focused on specific products. Sector concentration through mergers and acquisitions are increasing, especially for less specialised producers.

Table 5: Deep-frozen products
Retail distribution of frozen food, 1989/90

(% volume)	France	Italia	UK	BR Deutschland
Supermarket	30	60(1)	68(1)	20(1)
Hypermarket	28			
Home service	19	0	0	37
Freezer centre	17	0	23	0
Other	6	40(2)	9	43(3)
Total	100	100	100	100

(1) Supermarket and hypermarket
(2) includes traditional mixed grocers
(3) includes discounters (15%)
Source: Euromonitor

Table 6: Deep-frozen products
Number of producers by country, 1990

Danmark	75
BR Deutschland	100
France	412
España	122
Italia	60
Nederland	30
United Kingdom	42

Source: Swiss Frozen Food Institute

Table 7: Deep-frozen products
Expected annual growth rates

(%)	1989/95
Frozen pastry	7.0
Frozen fruit	3.0
Frozen vegetables	4.5
Frozen potato	7.0
Frozen soup	2.5
Frozen fish	6.0
Frozen ready meals	14.0

Source: Food for Thought

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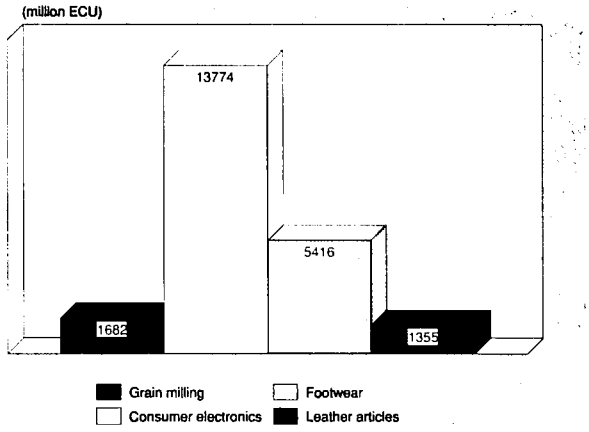
Grain milling
NACE 416

The European grain milling industry comprises more than 3 000 mills and produces almost 25 million tonnes of wheat and rye flour. At present, the sector needs first-grade raw material. Although European grain production seems to favour a quantity-oriented over a quality-oriented policy, quality standards for flour in particular have been rising substantially.

Technological progress in the sector has had two major effects: it has improved the quality of the products and has made production process more efficient. However, the industry is still characterised by a low level of plant utilisation, especially in the southern European countries. Further progress is expected in the sector, including the closing down of marginal and technologically outdated plants and their replacement by new updated plants, to meet the quality-oriented demands of the sector.

Figure 1: Grain milling
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The grain milling industry includes the milling of grain into flour, bran making, seeds and grain milling husking. Produced flour is mainly intended for the baking industry although use varies significantly across the EC Member States.

Main indicators

In 1991, production exceeded ECU 11 billion, a 6% increase (in current prices) compared to the previous year. This represents significant growth when compared to the sometimes negative rates of change in production that prevailed throughout the latter half of the 1980s. Apparent consumption increased in 1991 as well, by 6.4% in current prices compared to the previous year, reaching ECU 10.5 billion.

Extra-EC exports was steady at 7% of total production. The trade balance has also been relatively stable since 1989, with small variations caused by slight movements in exports and a small but steady decrease in imports.

At present, there are more than 35 000 people working in the European grain milling industry, but innovations in processes have significantly affected employment, which has decreased by a total of 16 000 workers since 1982.

In 1991, value added of the industry reached ECU 1.7 billion. France and the UK account for 17.5% of total value added each, while Italy and Spain account for 15% each and Germany for 12%.

Recent trends

Production and consumption growth increased at rates of 1% per year on average in real terms between 1982 and 1991. Growth between 1982 and 1985 was more than double that between 1985 and 1991. The 4% growth in production at constant prices in 1991, however, was the highest growth rate in ten years. Apparent consumption grew 2.7% in real terms in 1991.

Extra-EC exports declined on average in real terms for the period 1982 to 1991, although it was only after 1985 that negative growth rates appeared. The year 1989 marked the beginning of a slight recovery and in 1991 extra-EC exports increased, in real terms, by 17% compared to the previous year.

A one-time significant reduction in extra-EC imports occurred in 1989, when imports decreased from ECU 225 million to ECU 62 million. The decrease has continued since 1989, albeit at a much lower rate.

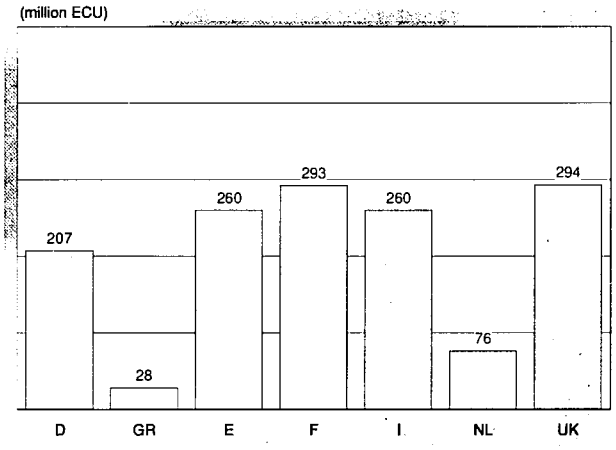
Foreign trade

The export/import ratio increased dramatically after 1989, from 2 to 1 in 1988 to 15 to 1 in 1991. The trade balance has also improved due to an increase in export value combined with a constant import value.

Intra-EC trade has been variable. The increases which were the first result of increasing integration, have given way to significant decreases. In the latter part of the 1980s, high taxes significantly affected transport costs for the sector, hindering intra-EC trade. Tax reductions forecast for 1993 should result in a recovery of trade. Even with the decreases, intra-EC trade has risen to more than 90% of total imports.

Mediterranean countries represent the primary market for EC exports, particularly Algeria (20% of the total), Libya (8.5%) and Syria (5.2%). Because of the severe food crisis, East European countries are becoming increasingly important markets as well. In the mid-1980's, trade with these countries was practically non-existent; today countries of the former USSR account for 11% of EC exports.

Figure 2: Grain milling
Value added by Member State, 1991



Source: Eurostat

Table 1: Grain milling
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	8861	9396	9845	9749	9680	9765	9828	9757	9817	10444	10925
Production	9503	9629	10434	10527	10158	10181	10203	10493	10529	11183	11700
Extra-EC exports	1206	824	1164	1325	814	641	661	798	764	790	820
Trade balance	642	233	589	779	477	415	375	736	712	739	775
Employment (thousands)	51.2	48.1	47.4	44.7	43.3	42.2	39.6	38.9	37.3	35.2	33.1

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Grain milling
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.5	0.5	0.8
Production	1.6	0.9	1.1
Extra-EC exports	0.4	-2.4	-1.5
Extra-EC imports	-2.1	-31.0	-22.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Grain milling
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1206	824	1164	1325	814	641	661	798	764	790
Extra-EC imports	563	591	575	546	336	225	286	62	52	50
Trade balance	642	233	589	779	477	415	375	736	712	739
Ratio exports/imports	2.14	1.39	2.03	2.43	2.42	2.84	2.31	12.80	14.63	15.74
Terms of trade index	95.2	84.9	86.7	100.0	95.3	88.2	72.9	88.9	95.4	81.3
Intra-EC trade	586	681	799	889	835	847	878	450	469	511
Share of total imports (%)	51.0	53.5	58.2	61.9	71.3	79.0	75.4	87.8	89.9	91.0

(1) Estimates
Source: Eurostat

Table 4: Grain milling
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	25.8	28.1	28.5	32.4	33.2	35.9	38.3	40.0	42.8	47.8
Productivity index	79.4	86.8	87.9	100.0	102.2	110.7	118.0	123.4	131.8	147.3
Unit labour costs index (3)	83.1	87.4	94.0	100.0	106.3	109.2	118.5	126.7	136.2	N/A
Total unit costs index (4)	83.3	88.0	96.7	100.0	97.6	103.7	108.6	112.5	117.5	129.2

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

The USA is no longer the most important importer to the EC. Thailand now accounts for almost 30% of EC imports. EFTA countries have significantly increased exports to the European Communities, while OPEC countries have also improved their position. Each group accounts for 8% of total EC imports. As mentioned previously, however, imports are no longer a significant portion of EC consumption.

MARKET FORCES

Demand

Bread making accounts for at least three quarters of the flour produced in the EC. Use varies considerably from country to country, however. In Italy, half of the flour is used for the production of pasta, while 15% is used in the production of pizza dough.

The grain milling industry is particularly influenced by movements of the EC grain market, especially in wheat. The increase in grain production in 1990 (170 million tonnes) was above the guaranteed maximum quantity by 10 million tonnes, and led to a fall in world prices. At the same time, grain consumption is diminishing due to decreasing use of cereal in compound feed.

The amount of land used for grain crops is decreasing in the EC, because of restrictive policies. As a result, there has been a substitution from cultivation of cereals to oilseeds, as well as substitutions between different kinds of grains produced. France and Denmark have expanded their areas cultivated with common wheat. Durum wheat is grown in Italy, France and Spain.

Supply and competition

Competition from foreign firms is not strong; the EC provides 60% of the world trade in flour, followed distantly by the USA, which provides 21% of the flour traded worldwide. High transportation costs are partially responsible for this, as proximity to markets is very important.

The industry's competitiveness, however, is dependant upon the availability of supply of quality raw materials at prices competitive with those of their competitors; this is a perennial concern of producers. The industry is also concerned with discrimination in EC export policies between raw and processed materials.

Technological innovations have helped the EC to maintain its competitive advantage, as well as increase productivity, by increasing the quality control available at the mills themselves.

Production process

Productivity is continuously increasing, and almost doubled at the beginning of the 1980s. Labour productivity reached ECU 48 000 of value added per working unit in 1991 and has remained above the trend of the unit labour costs.

Technological innovation processes, which have greatly increased production capacity, also mean that many plants are now underused, particularly those in France, Italy and Spain, where capacity utilisation is about 50-60%. The increase in final production has therefore not contributed to a change in the utilisation level of the plants.

INDUSTRY STRUCTURE

Companies

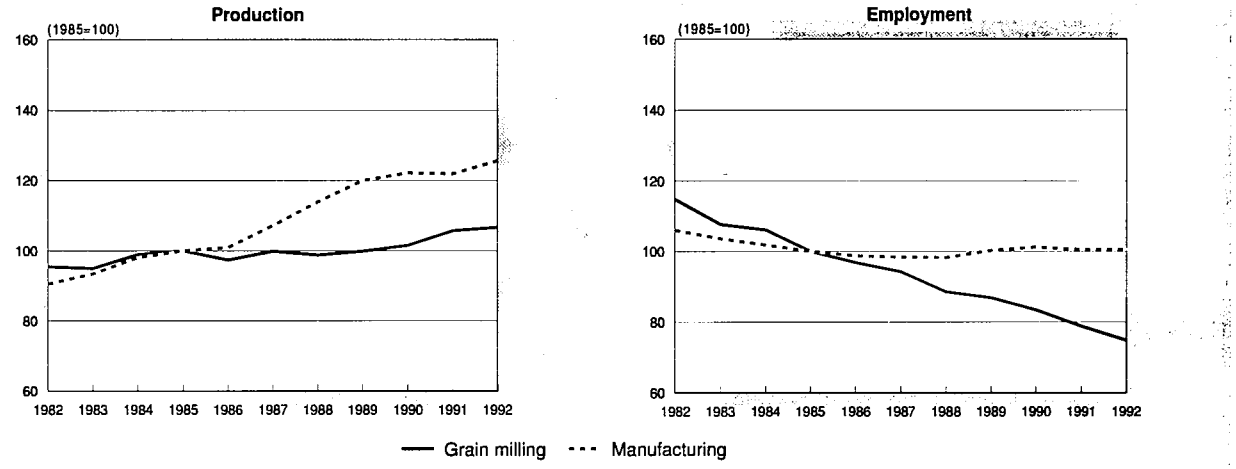
Due to inability to compete with the newer mills, many old mills have been shut down in the last twenty years. In 1970, 11 000 mills were operating in the EC countries, in 1991 that number was around 3 000, a decrease of two thirds.

Productivity differs greatly from country to country: France, Italy, Germany and Spain average around 6 000 tonnes of flour per mill per year, while the United Kingdom averages 45 000 tonnes per year per mill, and Denmark and Benelux average around 17 000 tonnes per year per mill. These extraordinary differences can be attributed primarily to the importance in certain countries of small and artisanal mills. France, for example, had 958 operating mills in 1990, while the United Kingdom had 84. France actually produced over a million tonnes more than the United Kingdom in 1990.

Despite its low average production per mill, France has the most concentrated industry in the EC. The two largest companies account for 80% of the national market, which is 12% of the European market share. France Farine, the leading French company, accounts for 60% of the national market. In both Germany and in the UK, the two largest companies account for less than half of the national markets.

No one company in the EC controls more than 10% of the European market share and only six companies account for more than 2% each.

Figure 3: Grain milling
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

Table 5: Grain milling
Consumption of flour by Member State, 1990

(%)	Biscuit and rusk bakeries	Household manufacturers confectioners	Flour	Other uses
Belgique/België	90.5	7.8	1.6	0.2
Danmark (1)	83.0	-	17.0	0.0
BR Deutschland	73.0	14.0	8.0	5.0
España	79.3	16.2	1.6	2.9
France	68.9	15.0	5.3	10.4
Ireland (2)	72.0	13.0	15.0	0.0
Italia (3)	81.0	19.0	-	-
Luxembourg	92.0	0.0	8.0	0.0
Nederland	67.2	13.4	0.4	19.0
Portugal (4)	89.0	10.0	1.0	0.0
United Kingdom	63.8	17.1	5.7	13.4

(1) Biscuit and rusk bakeries include manufacturers and confectioneries
(2) 1988 figures
(3) Household manufacturers and confectioners include flour and other uses
(4) 1989 figures
Source: National Milling Associations

Strategies

Faced with an increasingly demanding market, producers are finding quality control to be one of the most important aspects of production. It involves all aspects of the system, from raw material to preserving, manufacturing and marketing. High quality inputs in particular are becoming necessary. However, by favouring production of high-yield but low-quality wheat, the EC incentive system has resulted in reduced cultivation of high-quality wheat.

Industry has responded with technological innovations designed to increase quality control on-site, to test humidity and protein content for example. Client industries, such as industrial bread making, require high quality inputs, and firms are increasingly concentrating on quality objectives to meet the needs of this, and other, growing client industries.

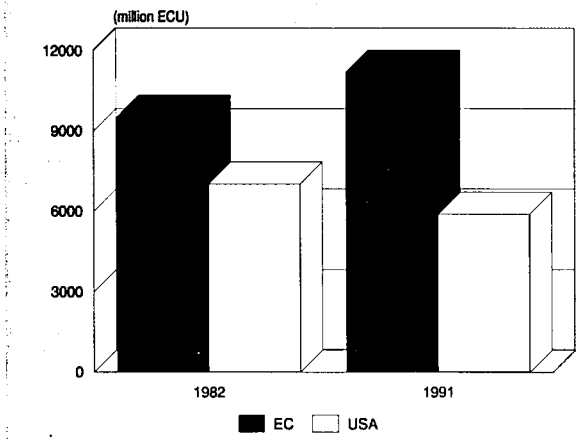
REGULATIONS

Of particular importance to the grain milling industry are regulations on product labelling and on the amount of residual pesticides which can be used on grain, and which could affect the supply of grain, either by encouraging the cultivation of grains which are less susceptible to pests, or by encouraging the growth of higher value cereals to offset the loss of grain harvested.

Harmonisation of national legislation will also have an effect on the industry. Italian law, for instance, forbids the marketing of frozen bread. If this type of law is repealed by EC legislation, the importance of the industrial baking industry could become more pronounced, and its input requirements could become more significant to the grain milling industry.

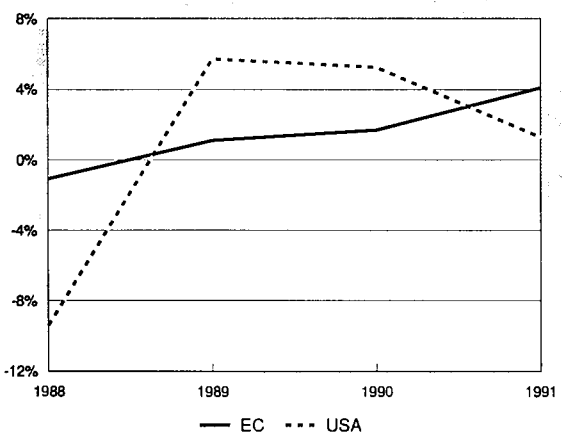
Other regulations include Regulation 2176/90, which allows Member States to grant subsidies for non-food employment of grain; such aid aims to avoid the increase in grain production.

Figure 4: Grain milling
International comparison of production at current prices



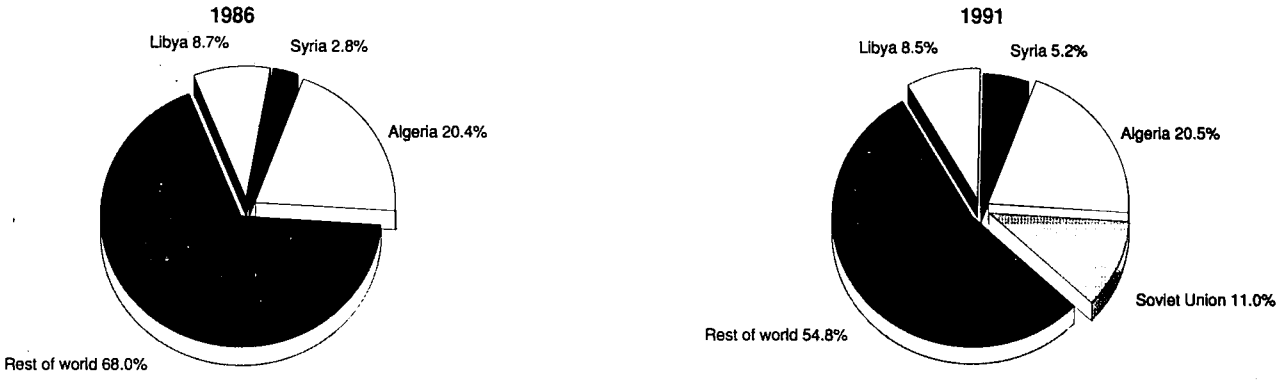
Source: Eurostat, Census of Manufacturers

Figure 5: Grain milling
International comparison of production growth at constant prices



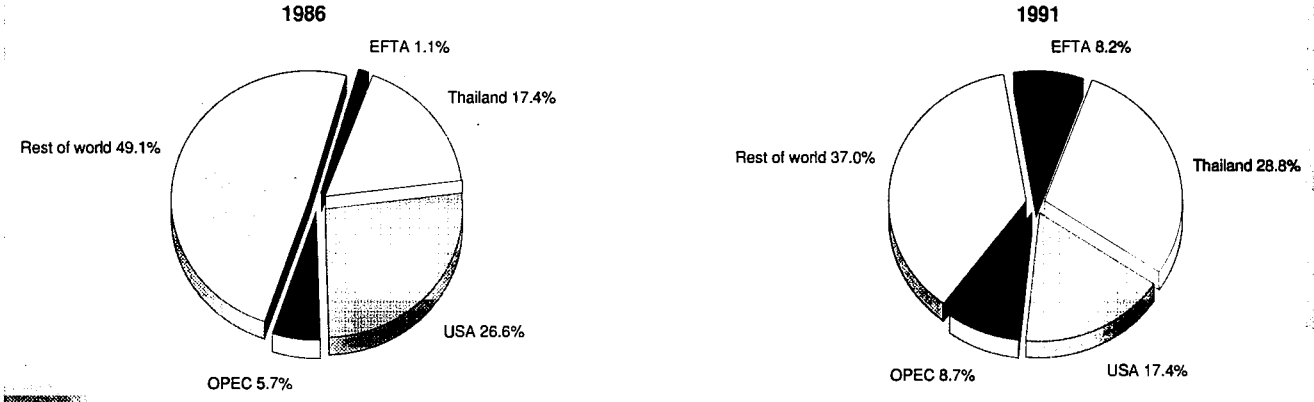
Source: Eurostat, Census of Manufacturers

Figure 6: Grain milling
Destination of EC exports



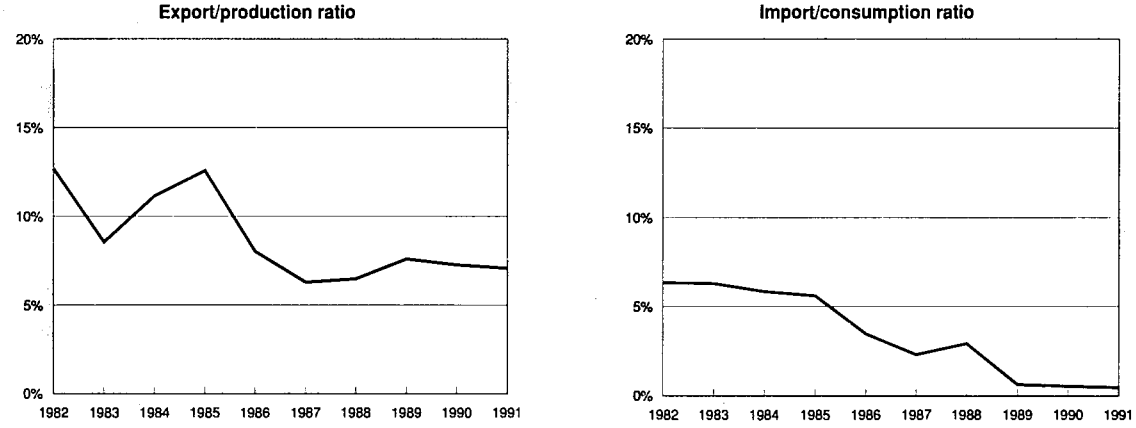
Source: Eurostat

Figure 7: Grain milling
Origin of EC imports



Source: Eurostat

Figure 8: Grain milling
Trade intensities



Source: Eurostat

Table 6: Flour
Number of mills and total production, 1990

	Number of mills	Total flour production (1000 tonnes)	Average production per mill (1000 tonnes)
EC (1)	3 142	24 638	7.8
Belgique/België	64	990	15.5
Danmark	16	312	19.5
BR Deutschland	596	4 190	7.0
Hellas (2)	180	1 400	7.8
España	499	2 186	4.4
France	958	5 021	5.2
Ireland (3)	8	179	22.4
Italia	821	4 640	5.6
Luxembourg	4	116	29.0
Nederland	55	1 166	21.2
Portugal (4)	37	550	14.8
United Kingdom	84	3 886	46.3

(1) Approximate figures because of absence of 1990 data for Greece and Ireland
(2) 1986 figures
(3) 1988 figures
(4) Estimated by the association
Source: National Milling Associations

Table 7: Grain milling
Expected real annual growth rates

(%)	1992-93	1993-96
Apparent consumption	0.9	0.9
Production	0.9	0.9
Extra-EC exports	0.7	0.7

Source: Prometeia

OUTLOOK

Change in consumption patterns, and particularly decreased bread consumption in EC countries, is a serious challenge for the grain milling industry, although increased consumption of other products, such as biscuits and rusks could offset some of the decrease in demand. Although bread consumption as a whole is down, demand for industrially produced bread has increased. This could affect the grain milling industry both by altering demand patterns, and by changing distribution systems. Harmonisation of legislation (such as that regarding frozen bread, mentioned above) will offer new challenges for firms in countries where legislation is eased, as competition by substitute products increases.

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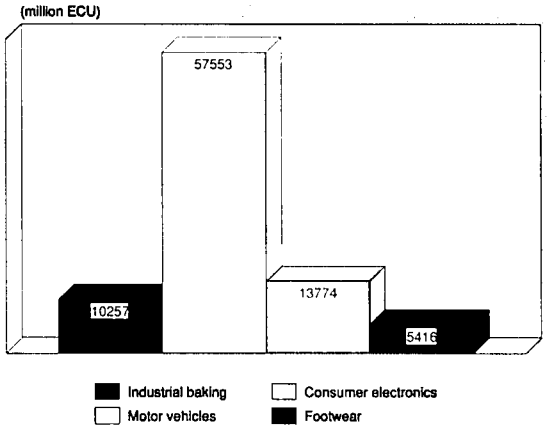
Industrial baking
NACE 419

Consumption of biscuits, rusks and flour-based snacks is expanding. The large number of products available on the market is credited to strong market segmentation policies carried out by leading companies. Supply is subject to a process of rapid concentration and internationalisation. The presence of distributors' own labels is prevalent in many countries.
Mass-produced bread is replacing localised bakery output. In particular, the demand for industrially made bread is increasing with improved distribution and changes in individual dining habits (i.e. fewer meals inside the home). Technological innovations also favour supply concentration in this subsector.

Figure 1: Industrial baking
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

NACE 419 includes the following subsectors:

- 419.1: large scale breadmaking
- 419.2: breadmaking at establishments other than bread factories
- 419.3: cakes and flour confectionery production
- 419.4: rusk making
- 419.5: biscuit production.

Both large companies (which cover the entire production range) and specialised bakeries operate in the industry.

Main indicators

Production and consumption figures are nearly identical while extra-EC trade is minimal. Figures for 1988 to 1991 show an average increase of 7% to 8% per year in production. Between 1990 and 1991, the highest increases were recorded in Germany, Denmark and the United Kingdom. For the period 1986 to 1991, employment rose an average rate of 3.5% per year. The trade balance remains positive and is expected to increase.

Germany and the United Kingdom are the largest markets, followed by Spain, France and Italy. These five countries accounted for more than 87% of total value added in 1991 (Figure 2).

Recent trends

Production and apparent consumption data (at constant prices) exhibited a positive trend throughout the second half of the 1980's. Although decreasing until 1988, figures for extra-EC exports are presently increasing both in terms of volume and value.

Biscuits, rusks, cakes, pastry, flour-based snacks, and frozen products have all recorded increased production and consumption. In many countries, chocolate, whole-wheat, low sugar and fat biscuits have recorded significant gains. Total bread consumption, on the other hand, decreased slightly, especially in the southern European countries. Industrially made bread is particularly popular in areas where retailing patterns have shifted from traditional independent grocery stores (and bakeries) to food discounters and hypermarkets.

Foreign trade

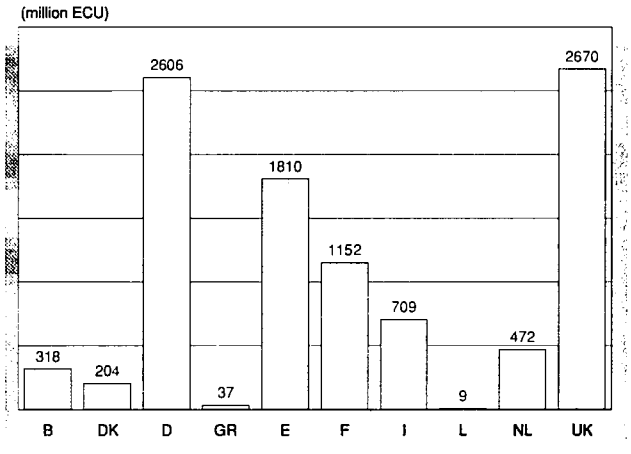
Intra-EC trade accounts for 7% to 8% of apparent consumption and 90% of total imports (intra- and extra-EC). Extra-EC imports account for a small share of consumption. The EC's foremost trading partners in this sector are EFTA countries. Only 3% of production is exported outside the EC. EFTA countries, the US, OPEC and certain East European countries represent the main trading partners. The terms of trade decreased between 1985 and 1990, rebounding in 1991.

MARKET FORCES

Demand

Bread and bakery product consumption is characterised by strong regional preferences. The European market is a huge array of products and items where new products are frequently introduced. Concerning bread consumption, Greece recorded a very small volumes of per capita (30kg). By contrast, Italy (85 kg) and a number of northern European countries (60 to 80 kg) lead the consumption figures. Northern European countries show the highest consumption levels of biscuits and rusks compared to southern European countries. Italy is an exception with a per capita volume consumption similar to that of France and higher than that of Denmark. Changes in dietary habits and distribution channels have a strong influence on present changes in bakery products consumption.

Figure 2: Industrial baking
Value added by Member State, 1991



Source: Eurostat

Table 1: Industrial baking
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	14 116	14 328	15 809	16 581	16 929	17 811	19 692	21 511	22 613	24 289	25 129
Production	14 410	14 672	16 209	17 043	17 343	18 174	20 038	21 939	23 076	24 842	25 706
Extra-EC exports	365	415	482	564	543	511	506	612	652	752	792
Trade balance	294	344	400	463	413	363	346	428	464	553	577
Employment (thousands)	417.5	410.3	411.3	402.6	405.0	417.2	429.6	454.7	467.8	480.5	487.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Industrial baking
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	0.4	3.4	2.4
Production	0.7	3.3	2.4
Extra-EC exports	12.5	3.6	6.5
Extra-EC imports	6.1	9.9	8.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Industrial baking
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	365.2	415.4	482.3	564.3	542.9	510.7	506.1	611.8	651.7	752.3
Extra-EC imports	70.8	71.2	82.8	101.5	129.4	147.8	160.2	184.1	188.0	198.9
Trade balance	294.4	344.2	399.6	462.7	413.4	362.9	345.9	427.7	463.6	553.4
Ratio exports/imports	5.16	5.84	5.83	5.56	4.19	3.45	3.16	3.32	3.47	3.78
Terms of trade index	110.7	110.6	104.5	100.0	93.6	94.6	94.0	95.1	98.2	96.9
Intra-EC trade	687	739	880	1 002	1 128	1 223	1 361	1 491	1 681	1 976
Share of total imports (%)	90.7	91.2	91.4	90.8	89.7	89.2	89.4	89.0	89.9	90.9

(1) Estimates
Source: Eurostat

Table 4: Industrial baking
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	19.4	19.7	19.6	19.9	20.6	21.2	21.7	21.4	21.5	21.3
Productivity index	97.9	99.3	98.5	100.0	103.6	106.6	109.3	107.6	108.2	107.5
Unit labour costs index (3)	86.1	88.5	94.3	100.0	101.3	103.7	110.1	116.3	120.6	N/A
Total unit costs index (4)	78.7	83.3	93.4	100.0	100.1	100.6	106.1	108.7	108.2	113.8

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Consumption of industrially made bread in lieu of bread from local bakeries is being aided by the tendency to eat more often in fast-food restaurants and bars. This trend is also responsible for the spread of frozen products (bread, "croissanteries" and cakes). The tendency to substitute meals with snacks also favours growth of flour-based snacks, crispbread, rusks and biscuits. Paradoxically, consumers are seen to prefer healthy eating (i.e. fresh food, whole-wheat, low-fat and low-sugar products) though a rise in indulgence eating (i.e. rich, chocolate-filled biscuits and industrially made cakes) is also prevalent.

Product innovation is rather high and concerns different aspects: recipes, packaging and sizes. Some leading companies have introduced whole wheat product lines for several types of products.

Supply and competition

Bakery products suppliers are mostly fragmented, due to the regional structure of consumption patterns, the high costs of transport and product fragility. Local bakery production is still made up of small artisanal firms which continue to survive in local markets.

Regarding industrially made bread, preservation problems limit both the operating areas and supply capacities of bread factories, forcing them to adopt a multiplant structure for geographical expansion. Companies producing frozen bread can develop higher supply capacity.

Scale economies are not very relevant for biscuits, snacks and crispbread; moreover, economies of scope are limited to raw material supplying and marketing (i.e. using the same labels for different products).

Mergers and acquisitions are still taking place in this sector, redefining the industrial structure. This will lead to a change in competition and in relations between industrial producers and modern distribution operators. Modern distribution, in fact, plays a significant role in the marketing of bakery products. Distributors' market power is evidenced in the success of distributors' own labels. US companies are interested in this industry and, consequently, have entered the European market; a source of concern for European market leaders.

Production process

The production process is subject to continuous technological innovation. Leavening, extrusion, freezing, packaging and transport are all undergoing modernisation. Unfortunately, automation and rationalisation of the production process are not improving productivity significantly.

Table 5: Biscuits / rusks
Production and per capita consumption trends, 1989

	Production (thousand tonnes)	Per capita consumption (kg)
EC	3 515	10.2
Belgique/België, Luxembourg	205	14.8
Danmark	100	9.0
BR Deutschland	445	6.1
Hellas (1)	41	4.0
España	161	4.3
France	593	12.5
Ireland	22	12.4
Italia	648	11.1
Nederland	357	20.2
Portugal	34	3.2
United Kingdom	909	15.0

(1) Estimated
Source: CAOBISCO

INDUSTRY STRUCTURE

Companies

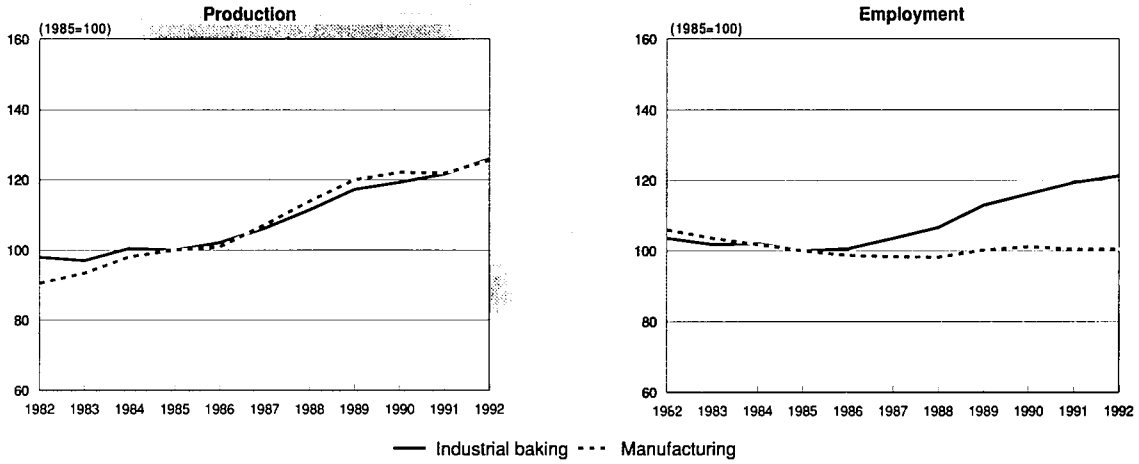
The UK shows the highest concentration level for industrially-made bread; here the two largest companies account for 50% to 55% of the national market. In France, the top three companies account for 55% to 60% of the market, while distributors' own labels account for another 25% to 30%.

Crispbread is the most concentrated sector. The share of distributors' own labels in this sector is remarkable in the United Kingdom and Germany.

Strategies

Acquisition of local companies is the best strategic device to enter foreign markets and/or strengthen one's position in domestic markets.

Figure 3: Industrial baking
Production and employment indices compared to EC manufacturing



Source: Eurostat

Table 6: Industrial baking
Turnover and employment , 1991

	Turnover (1) (million ECU)	Employment (2)
Belgique/België	187	5 247
Danmark (3)	90	1 280
BR Deutschland (4)	4 851	90 182
France	1 367	17 300
Ireland	N/A	9 300
Nederland	1 615	40 000
United Kingdom	3 214	42 000

(1) Baking industry
(2) Employment in bread factories
(3) Only ryebread
(4) Entreprises with 20 or more employees
Source: AIBI

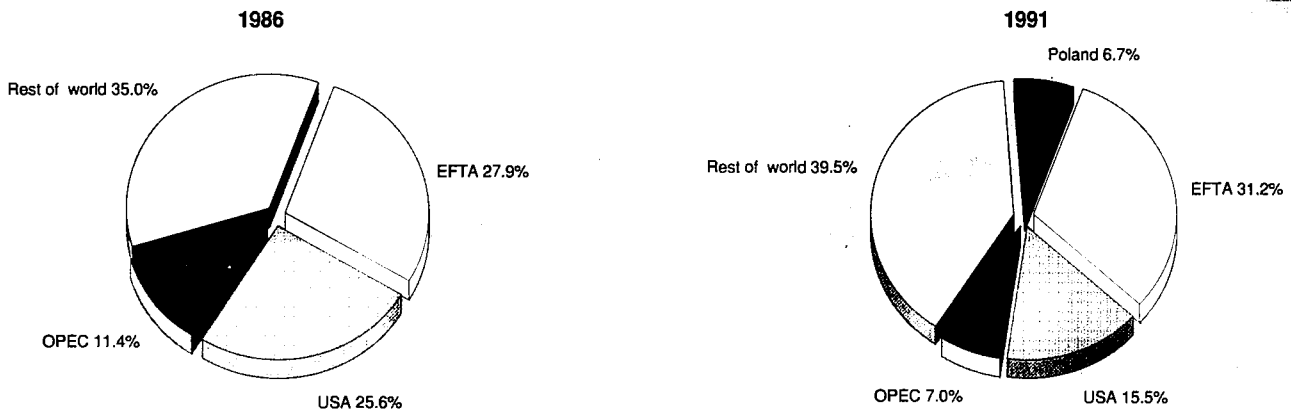
Of the US companies operating in this sector, Borden acquired a number of regional companies, particularly in Germany. Campbell and General Mills are also interested in consolidating their presence in this sector.

Leading companies consider product innovation, market segmentation and an optimal range of products as key strategic factors. Smaller companies (usually less diversified) aim to maintaining leadership (or significant market shares) at regional level.

REGIONAL DISTRIBUTION

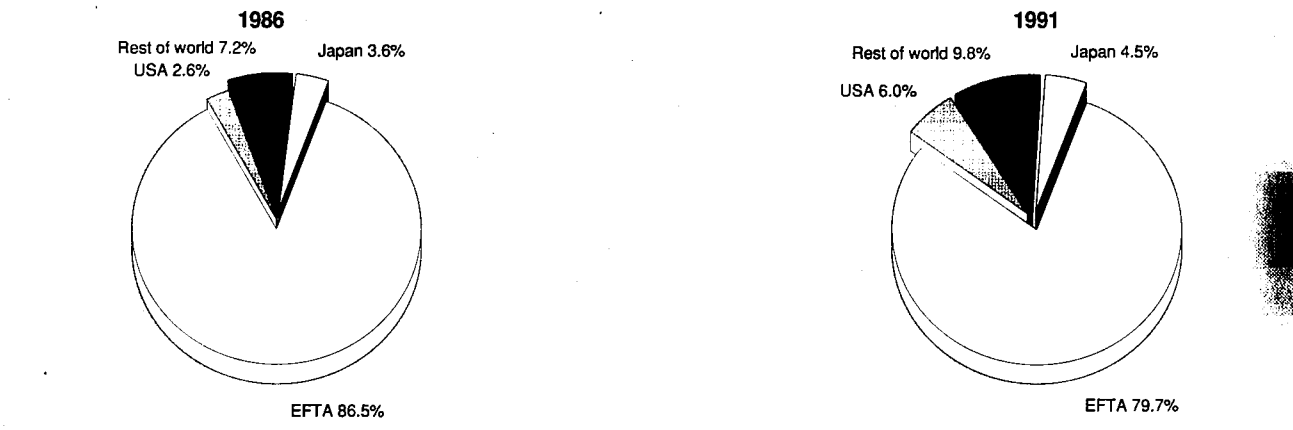
The characteristics of this industry's products favour multi-plant production structures dispersed throughout consumption areas rather than concentration in specific areas. The geographical distribution of companies, therefore, matches consumption patterns.

Figure 4: Industrial baking
Destination of EC exports



Source: Eurostat

Figure 5: Industrial baking
Origin of EC imports



Source: Eurostat

ENVIRONMENT

The environmental issues are limited to the disposal of urban solid waste. In future, companies will encounter increasingly strict regulations regarding volume and chemical composition of packaging material. Given the importance of packaging for preserving such fragile products, it will challenging to create innovative packaging which will meet both environmental, production and marketing requirements.

OUTLOOK

The tendency to substitute locally-produced bread with industrially-made bread is predicted to continue. This trend, however, will be limited by consumer preferences for "natural" and fresh products, which differ between Member States. Such preference will allow a number of artisanal bakeries to survive, especially in countries where modern distribution methods are emerging. The subsectors of snacks and richly filled chocolate biscuits ("indulgence products"). and healthier whole-wheat and dietary products will expand.

Technological innovations, the need to face the growing market power of customers, and the implementation of the Single Market will stimulate the concentration of the industry. A major opportunity for this sector is the emerging internationalisation of consumer patterns.

Table 7: Industrial baking
Expected real annual growth rates

(%)	1992-93	1993-96
Apparent consumption	3.5	3.5
Production	3.5	3.5
Extra-EC exports	5.0	5.0

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Association Internationale de la Boulangerie Industrielle (AIBI). Address: In der Dikken 33, D-4000 Duesseldorf; tel: (49 211) 653086/88; fax: (49 211) 653088; and, Association des Industries de la Chocolaterie, Biscuiterie, Biscotterie et Confiserie de la CEE (Caobisco); Address: Rue Defacqz 1, B.7, B-1050 Bruxelles; tel: (32 2) 539 1800; fax: (32 2) 539 1575.

Sugar
NACE 420

The EC is the world's largest producer of sugar. Production and trade of sugar in the EC are promoted by a system of production quotas, import taxes and export subsidies that are due to be reviewed in 1993. Although this system was originally aimed at achieving self-sufficiency without accumulating surpluses, in recent years EC production has consistently exceeded consumption.
The EC sugar industry is becoming more concentrated as a result of national and cross-borders mergers between sugar companies. Moreover, the industry has recently undergone a process of production rationalisation; the total number of factories involved in beet processing in the EC (excluding former East Germany) has fallen steadily while average plant size has increased.

INDUSTRY PROFILE

Description of the sector

The EC sugar industry is specialised in beet sugar rather than in cane sugar production. Beet is planted during the spring and harvested from September to November. Beets produced in the EC (approximately 102 million tonnes in 1991) are processed by a small number of high capacity factories. The product cycle of beet sugar includes the following phases:

- extraction of the beet plant's sucrose content by treating beet slices with steam and immersing them into tanks of hot water to produce a raw juice;
- purification, evaporation and crystallisation of the juice;
- processing of crystals to obtain sugar in its marketable form.

Molasses is a by-product of sugar production that is used directly as either cattle feed, fertiliser or by the fermentation industry.

Main indicators

All EC countries produce sugar beet. Due to German reunification, the EC area under cultivation increased by 12.7% in 1990/91. This expansion was accompanied by an 11.3% increase in EC production and for the first time in six years EC production exceeded 15 million tonnes.

In 1990/91 more than half of EC production was accounted for by France (27.5%) and Germany (27.1%). Yields (in tonnes of sugar per hectare) vary greatly across countries. In 1990/91, France, Germany, and Italy respectively produced 9.2, 6.9 and 5.5 tonnes of sugar per hectare.

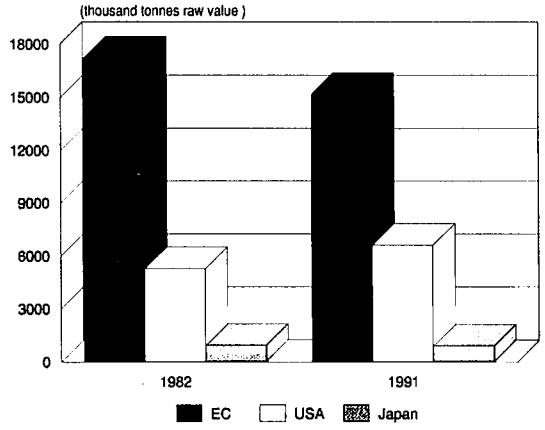
Recent trends

EC sugar consumption has shown only marginal changes during the last ten years (the 90/91 figures are influenced by the inclusion of the former East Germany) while production has been more erratic. Production fell between 1982 and 1984, recovering slightly between 1988 and 1991.

International comparison

The EC remains the major producer of sugar although its output of sugar has decreased since 1982 while the other major producing countries have increased supply. The EC is both the second largest exporter of sugar (after Cuba) and the second largest consumer (after the former Soviet Union).

Figure 1: Sugar
International comparison of production at current prices



EC. including East Germany;
1991 does not include Spain, Portugal, Ireland
Source: FAO, Production Yearbook

Foreign trade

EC exports of refined sugar are mainly to OPEC countries. In the last five years, however, an increasing share of exports has been to the former Soviet Union.

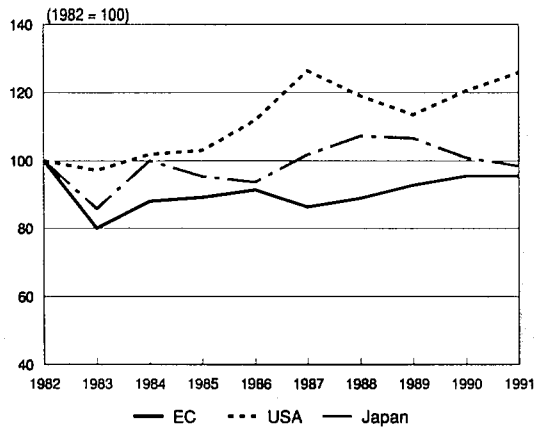
According to the terms of the Lome Convention, the EC is committed to import 1.3 million tonnes of sugar annually from African, Caribbean and Pacific (ACP) countries for an indefinite period (the price paid to producers is based on EC current minimum prices). Since the EC is more than self-sufficient in sugar, these tonnages increase the quantities available for export.

MARKET FORCES

Demand

In 1990/91, sugar for industrial uses accounted for about 67% of total EC demand for sugar. The overall level of consumption in the EC remained roughly constant (at around 11 million tonnes) during the last decade. Consumption is dependent upon various factors including demand saturation and competition from new sweeteners (i.e. isoglucose and synthetic products). Stable levels of overall and per capita consumption are also explained by low values of income elasticity of demand

Figure 2: Sugar
International comparison of production in volume



Source: FAO, Production Yearbook

Table 1: Sugar
Main indicators (1)

(thousand tonnes white sugar)	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
Apparent consumption	10 995	10 855	10 686	10 890	10 790	11 068	10 869	10 902	11 112	11 639	11 662
Production	16 060	15 085	12 245	13 587	13 630	14 108	13 195	13 941	14 275	15 876	14 786
Exports	2 653	2 782	3 112	3 052	2 982	3 194	3 462	3 158	2 565	2 742	2 752

(1) Fiscal years ending 30 September; 1981/82 to 1985/86 EC 10
1991/92 apparent consumption and exports are Prometeia estimates
Source: CEFS, EC Commission DG VI

Table 2: Sugar
Areas under beet cultivation

(thousand hectares)	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC (1)	2 242	2 098	1 905	1 936	1 886	1 899	1 840	1 835	1 866	2 102	2 000
Belgique/België	135	130	120	123	125	118	111	114	111	113	106
Danmark	76	76	72	74	73	69	67	69	67	66	65
BR Deutschland (2)	464	429	403	423	415	399	384	386	392	620	574
Hellas	42	41	38	28	43	44	28	34	49	44	39
España	220	260	249	209	178	195	182	190	172	170	157
France	610	533	462	501	464	421	420	417	427	474	435
Ireland	35	34	36	36	35	38	37	33	32	33	33
Italia	320	257	222	217	225	277	283	272	298	265	278
Nederland	133	137	117	129	131	137	128	123	124	125	123
United Kingdom	207	201	186	196	197	201	200	197	194	192	190

(1) excluding Luxembourg and Portugal
(2) including former East Germany in 1990/91
Source: CEFS

Table 3: Sugar
White sugar production

(thousand tonnes)	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC	16 061	15 085	12 245	13 587	13 630	14 108	13 195	13 941	14 275	15 876	14 786
Belgique/België	1 030	1 105	782	839	943	938	804	925	956	1 030	890
Danmark	480	537	346	547	530	499	388	506	487	544	468
BR Deutschland (1)	3 392	3 303	2 507	2 894	3 155	3 192	2 731	2 760	3 071	4298	3 886
BR Deutschland (2)	2	9	19	19	19	19	19	19	20	19	19
Hellas	323	296	298	218	317	287	182	216	387	287	273
España	1 026	1 144	1 240	1 074	903	1 020	1 005	1 187	954	953	941
France - Domestic	5 130	4 446	3 562	3 957	3 953	3 410	3 649	4 045	3 868	4 364	4 069
France - DOM (3)	317	309	263	300	296	305	303	328	198	245	250
Ireland	168	222	197	222	174	186	223	195	214	226	213
Italia	2 048	1 180	1 244	1 275	1 244	1 719	1 718	1 480	1 729	1 458	1 509
Nederland	1 044	1 130	743	934	915	1 239	979	989	1 140	1 232	1 046
Portugal	9	9	9	5	4	5	2	2	3	2	2
United Kingdom	1 092	1 419	1 062	1 323	1 211	1 323	1 226	1 307	1 267	1 241	1 220
Share of world production (%)	16	15	13	14	14	14	13	14	15	16	15

(1) including former East Germany in 1990/91
(2) From molasses
(3) DOM: Départements d'outre mer (French overseas departements) are Guadeloupe, Martinique, Réunion
Source: CEFS

Table 4: Sugar
Number of sugar factories

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
EC	238	233	225	220	218	214	207	194	190	226	201
Belgique/België	15	15	15	15	14	14	14	12	12	11	11
Danmark	6	6	6	6	6	6	6	6	6	5	5
BR Deutschland (1)	49	48	48	47	46	44	42	38	38	79	60
Hellas	5	5	5	5	5	5	5	5	5	5	5
España	32	30	29	27	25	25	24	24	24	24	24
France	57	57	57	56	55	54	54	52	50	50	48
Ireland	4	4	4	4	4	4	3	3	2	2	2
Italia	47	45	38	37	40	39	37	33	33	31	29
Nederland	10	10	10	10	10	10	9	8	8	7	7
United Kingdom1	3	13	13	13	13	13	13	13	12	12	10

(1) including former East Germany in 1990/91
Source: CEFS

(which is recognised to be between 0.1 and 0.2). Per-capita consumption of sugar varies considerably (according to national eating habits), being lower in the Mediterranean area than in northern regions.

Supply and competition

EC production levels consistently remain above consumption. This is partly attributable to EC sugar policies (see Regulations section) that guarantee producers secure returns surpluses. Internal competition is limited by EC sugar policies, which set price supports in relatively high cost countries. Moreover, domestic firms are protected from foreign competition by import tariffs.

The industry is presently experiencing a process of rationalisation as evidenced by the steady decline in the number of factories. This has been accompanied by an increase in average plant size. Capacity for the vast majority of establishments is now above 5000 tonnes per day while 15 years ago it was between 2000 and 5000 tonnes per day. This has certainly reduced average costs which are estimated to remain above sugar world market prices in certain European countries

INDUSTRY STRUCTURE

Companies

The European sugar industry is a highly concentrated sector composed of a very small number of companies. At the European level, a 14% share of the market is held by Eridania (also controls Béghin Say). Sudzucker group, after the acquisition of the Belgian RT in 1989, has attained about 13% of the European market. Tate & Lyle (which controls the Portuguese Alcantare) has a market share of 9%.

Given that European firms are not confronted with very fierce internal nor external competition (due to market regulation and protection), strategies are focused mainly on cost reduction and expansion into extra-EC markets. For example, Italy's Ferruzzi group has recently agreed to acquire control of three large Hungarian sugar companies. Tate & Lyle has attempted to acquire control of the Australian company Bundaberg Sugar and has lately acquired a 30% stake of the Hungarian sugar producer Hajdusagi Cukorgyar.

REGULATIONS

Since 1968, the production of sugar has been based essentially on a quota system coupled with a mechanism of guaranteed minimum (or intervention) prices for sugar produced within basic quotas. Each EC country is allocated a national quantity of white sugar distinguished between an A and B quota corresponding to expected internal consumption (plus a safety margin). In turn, each national quota is allocated both among processors and growers.

Table 5: Sugar
Per capita consumption trends

(kg/capita)	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
EC	34.0	33.7	33.1	33.7	33.3	34.1	33.5	33.5	34.1	34.9
Belgique/België	36.1	37.1	38.5	37.9	38.3	36.9	37.5	37.7	42.4	42.8
Danmark	41.2	39.7	39.0	39.0	39.8	37.9	38.6	39.4	38.6	38.8
BR Deutschland (1)	35.2	35.6	34.7	36.1	35.2	35.2	35.5	35.1	36.5	37.0
Hellas	29.3	29.5	30.6	31.4	31.8	30.6	32.0	30.3	30.5	30.7
España	27.0	27.1	26.2	23.9	27.5	25.8	27.2	26.8	28.4	29.0
France	36.0	34.9	34.1	33.9	33.4	36.5	35.0	34.9	35.5	35.6
Ireland	40.5	39.8	39.7	38.8	38.6	37.9	39.2	37.9	37.5	37.5
Italia	27.8	26.7	25.7	28.9	26.8	26.7	26.0	26.7	27.5	27.2
Nederland	39.4	38.3	28.3	38.5	39.1	39.3	38.4	36.3	37.4	38.0
Portugal	27.1	29.1	30.3	34.2	30.1	31.0	29.8	31.2	30.6	30.6
United Kingdom	40.8	41.0	40.2	40.1	40.5	42.3	39.6	40.2	39.2	36.8

(1) including former East Germany in 1990/91
Source: CEFS

Table 6: Sugar
Total sugar consumption (1)

(thousand tonnes)	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
EC	10 995	10 855	10 686	10 890	10 790	11 068	10 869	10 902	11 112	11 639
Belgique/België	370	379	393	387	392	378	384	386	434	438
Danmark	211	203	200	199	204	194	198	202	198	200
BR Deutschland	2 276	2 193	2 127	2 203	2 148	2 155	2 168	2 152	2 254	2 785
Hellas	284	289	301	310	316	305	320	303	306	308
España	1 041	1 043	1 009	925	1 002	1 013	1 052	1 049	1 116	1 122
France	1 990	1 938	1 915	1 907	1 892	2 074	1 996	1 995	1 993	2 029
Ireland	141	140	140	137	137	134	138	134	132	132
Italia	1 561	1 519	1 465	1 649	1 534	1 528	1 494	1 539	1 584	1 667
Nederland	564	549	551	556	569	576	567	539	556	560
Portugal	273	294	306	345	304	313	300	314	308	308
United Kingdom	2 283	2 308	2 278	2 271	2 293	2 398	2 252	2 289	2 231	2 091
Share of world consumption (%)	12	12	11	11	11	11	10	10	10	11

(1) white sugar equivalent
Source: CEFS

Both A and B quotas can be bought by national intervention agencies at the minimum guaranteed price. By contrast, C sugar denotes sugar produced above these tonnages and has no price nor disposal guarantees.

The quota system should be reviewed once every five years. Reviews, however, have been rather irregular. The present quota arrangement applies to a period of two years only, 1990/91 - 1991/92. It is an extension of a previous arrangement, amended to increase Germany's quota following German reunification.

The application of the quota system has generally kept European sugar prices above the world market price. In order to sustain domestic prices, a number of import taxes have been levied. Exports of A and B sugar surpluses are subsidised in proportion to the difference between European and foreign world prices. The cost related to financing exports is entirely supported by the sugar sector through production contributions from growers (60%) and manufacturers (40%), as listed below:

- A basic tax of 2% on the intervention price for A and B sugar quotas;
- A tax of 37.5% on the intervention price for B sugar quotas;
- An 'elimination tax' for A and B sugar quotas set at 1.31% of the 1985/86 intervention price. The purpose of the elimination tax is to clear the export account deficit accumulated during the third five-year quota period;
- Finally, to eliminate any further deficit, an extra tax may be collected at a rate which is calculated on the basis of the marketing loss to be covered.

There is no tax on C sugar production as manufacturers are compelled to export non-quota sugar at their own expense.

OUTLOOK

Due to modest population growth and low income elasticity for demand for sugar, EC consumption is expected to show only marginal increases in the short, medium and long term. Expansion in consumption will arise mainly from increased industrial rather than domestic demand.

Sugar production depends heavily on climatic conditions: yields (in tonnes of sugar per hectare) can vary as much as 30% within the same country therefore production forecasts can be highly imprecise. Production of 15.1 million tonnes would be obtained in 1996 if past trends of the period 1985-91 continued. This forecast contrasts with a more optimistic World Bank projection of 16.5 million tonnes by 1995, based on trends for EUR 9 between 1961 and 1982. Long-term production will depend crucially on how sugar policies will

Table 7: Sugar
Consumption 1990/91

(thousand tonnes)	B	DK	D	GR	E	F	IRL	I	NL	P	UK
Total consumption	437	200	2 785	308	1 122	2 029	132	1 667	560	308	2 091
(kg/capita)	42.8	38.8	37.0	30.7	29.0	35.6	37.5	27.2	38.0	30.6	36.8
of which:											
Feedstuffs	1	1	0	4	0	0	0	0	1	0	6
Chemical industry	1	5	35	1	25	28	0	10	24	1	31
Human consumption	435	194	2 750	303	1 097	2 001	132	1 657	545	307	2 054
(kg/capita)	42.5	37.8	36.5	30.3	28.4	35.1	37.4	27.0	37.0	30.4	36.1
of which:											
Direct	120	51	600	123	440	587	53	878	105	131	559
(kg/capita)	11.7	9.9	8.0	12.3	11.4	10.3	15.0	14.3	7.1	13.0	9.8
Industrial	315	143	2 150	180	657	1 414	79	779	440	176	1 495
(kg/capita)	30.8	27.9	28.5	18.0	17.0	24.8	22.4	12.7	29.9	17.4	26.3

Source: CEFS

Table 8: Sugar
Company profiles

Company	Country	Market share
Eridania ZN	Italy	57%
British Sugar	UK	49%
Tate & Lyle	UK	43%
Südzücker	Germany	40%
Pfeifer & Langen	Germany	15%
Beghin Say	France	30%
Eurosucre	France	30%
Kio Ebro	Spain	32%
Azucarera	Spain	21%
CIA	Spain	19%
Raffinerie Trilemontoise	Belgium	80%
Damsco	Denmark	95%
Hellenic Sugar	Greece	70%
Greencare	Ireland	80%
Suiker Unie	Netherlands	55%
CSM	Netherlands	45%
Alcantara	Portugal	57%
Rar	Portugal	20%

Source: ISMEA, 1991

be revised, possibly taking into account the outcome of the GATT Uruguay Round, which will also affect export trends.

In summary, risks for the sugar industry focus largely on the emergence of a handful of influential sugar companies that might affect EC decisions on market regulation by restricting competition in the industry even further. Over-production might also increase the cost of implementing EC sugar policies. The foremost opportunity is the possibility of expansion into East European markets.

Table 9: Sugar
Expected real annual growth rates

(%)	1993-96
Consumption	0.1
Production	-0.2
Extra-EC exports	-0.1

Source: Prometeia

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The industry is represented at the EC level by: Comité Européen des Fabricants du Sucre (CEFS). Address: Avenue de Tervuren 182, B-1150 Brussels; tel: (32 2) 762 0760; fax: (32 2) 771 0026.

Cocoa and sugar confectionery, ice cream

NACE 421

This sector is one of the most highly concentrated in the food and drink industry, although some Member States still have a fragmented industry structure. All major European and North-American food multinationals operate in the competitive arena. Although production and consumption are increasing, changes in consumer demand due to health concerns are affecting the industry significantly. Ageing population has also affected consumer demand. Market trends show a steady growth in most industrialised countries and generally provide above average margins.

INDUSTRY PROFILE

Description of the sector

The industry can be divided into three main subsectors:

- cocoa and chocolate confectionery: chocolate bars, pralines and boxed assortments
- sugar confectionery: chewing gum, pastilles, jellies, boiled sweets, toffees and nougat
- ice cream: figures refer only to industrially made ice cream, although some assessment is made of artisanal production.

Some of the most important and highly diversified multinational groups operate in these segments, next to national specialised companies.

Main indicators

Since 1988, production and apparent consumption have shown a steady increase. In 1991, production at current prices and apparent consumption grew significantly in nominal terms. Trade is a small part of production and consumption, but the trade balance is positive.

Growth rates for production and apparent consumption were much higher in the second half of the 1980s than in the first half. Extra-EC import growth was slightly stronger in the second half of the decade, but growth of extra-EC exports slowed significantly. Exports recovered strongly after the declines of 1986 and 1987, and the export/import ratio is well above the 1982 level.

Since the early 1980s, total production of industrial ice cream has grown steadily. Chocolate and sugar confectionery also show a stable growth rate in production, although the growth rate is lower than that of ice cream. The increase in per capita consumption is significant in all countries, with the exception of the more mature markets, particularly Germany and UK.

Recent trends

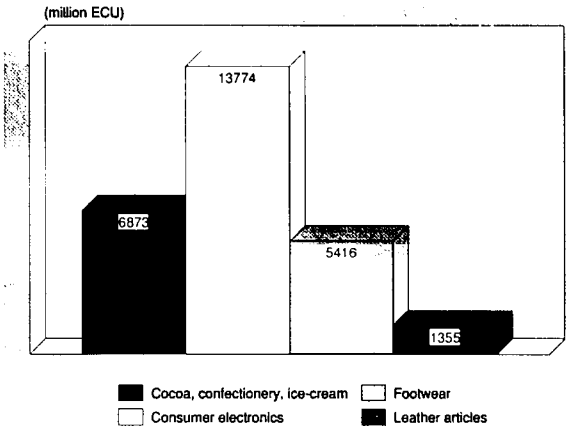
Production and apparent consumption trends, in real terms, seem to be highly influenced by the evolution of the economic cycle. Only since 1988, in fact, has this industry had significant growth rates, along with the strong, expansive economic cycle in almost all EC countries. Employment, which in the 1980s had been significantly reduced, has also increased in recent years, although it has not reached the levels of the early 1980s.

Foreign trade

Extra-EC trade is still modest compared to intra-EC trade. Less than 8% of EC production is exported to non-EC markets and imports account for less than 4% of the EC market. After a significant fall both in nominal terms and in volume, extra-EC exports recovered remarkably by the beginning of the 1990s. The terms of trade has been declining steadily since 1986.

Compared to 1986, extra-EC exports in 1991 are destined for increasingly diverse markets. In 1986, the four primary markets for EC exports (EFTA, USA, OPEC, and Canada) accounted for more than 70% of total extra-EC exports, while in 1991 the percentage fell below 60%. Imports, on the other hand, are increasingly coming from EFTA countries. Extra-EC imports, although steadily increasing, account for a small, and decreasing, share of EC consumption.

Figure 1: Cocoa and sugar confectionery, ice cream Value added in comparison with other industries, 1991



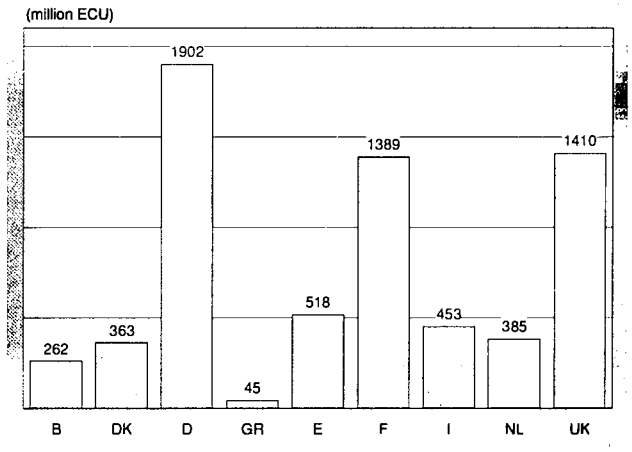
Source: Eurostat

MARKET FORCES

Demand

Traditionally, ice cream sales are very seasonal. However, growth in freezer and refrigerator ownership have become a determining factor of sales growth. The majority of new ice cream products have focused on premium lines, since major markets are nearing saturation. By introducing high quality, adult-oriented products, manufacturers aim to expand the market; this is particularly necessary in light of ageing population. Ice cream can be further segmented between impulse and

Figure 2: Cocoa and sugar confectionery, Ice cream Value added by Member State, 1991



Source: Eurostat

Table 1: Cocoa and sugar confectionery, ice cream
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	14 743	13 924	15 422	16 945	16 603	16 559	17 687	18 321	19 940	22 102	24 005
Production	15 227	14 462	16 088	17 679	17 290	17 208	18 364	19 141	20 875	23 053	25 012
Extra-EC exports	878	975	1 244	1 359	1 230	1 144	1 150	1 311	1 466	1 495	1 592
Trade balance	483	538	666	734	688	649	676	821	935	951	1 007
Employment (thousands)	209.4	180.1	175.9	175.8	165.8	164.8	166.0	163.3	167.8	172.2	174.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Cocoa and sugar confectionery, ice cream
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-0.8	3.6	2.1
Production	-0.3	3.5	2.2
Extra-EC exports	9.0	3.0	5.0
Extra-EC imports	4.3	5.1	4.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Cocoa and sugar confectionery, ice cream
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	878	975	1 244	1 359	1 230	1 144	1 150	1 311	1 466	1 495
Extra-EC imports	395	437	578	625	542	495	473	490	531	544
Trade balance	483	538	666	734	688	649	676	821	935	951
Ratio exports/imports	2.22	2.23	2.15	2.17	2.27	2.31	2.43	2.67	2.76	2.75
Terms of trade index	116.9	118.4	104.6	100.0	110.0	115.3	123.2	131.5	138.6	142.8
Intra-EC trade	1 588	1 656	2 057	2 484	2 357	2 416	2 499	2 876	3 240	3 681
Share of total imports (%)	77.8	74.9	74.2	76.5	77.9	79.6	80.2	85.4	85.9	87.1

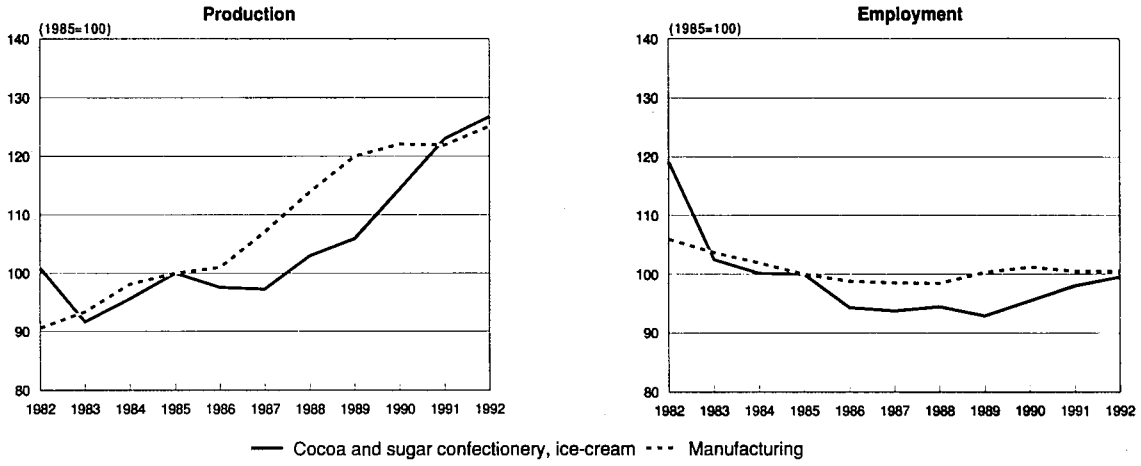
(1) Estimates
Source: Eurostat

Table 4: Cocoa and sugar confectionery, ice cream
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	27.7	28.6	27.3	27.6	31.6	32.8	35.5	35.8	38.1	39.9
Productivity index	100.4	103.5	99.1	100.0	114.6	118.8	128.7	129.8	138.0	144.7
Unit labour costs index (3)	81.5	86.9	92.8	100.0	102.2	105.8	112.8	120.0	125.2	N/A
Total unit costs index (4)	67.4	76.2	91.0	100.0	100.4	98.1	102.6	109.1	114.6	121.4

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Cocoa and sugar confectionery, ice cream
Production and employment indices compared to EC manufacturing



Source: Eurostat, Census of Manufacturers

household sectors. The increase in take-home sales derives from the development of individual countlines and multipacks.

Sharp price fluctuations in cocoa and other key raw materials deeply affected the sugar and confectionery market. Falling cocoa prices had a significant influence on new product development, as well. The growth in consumption has been the result of lowering unit prices for chocolate confectionery.

Another factor which has influenced the market is the European consumer's increasing interest in products at the health end of the market. The emergence of niche markets based on sugar-free/low-fat products mirrors this general health trend; at the same time, there has been an contrasting trend towards premium products, which offer the consumer occasional "self-indulgence."

Looking at a broad breakdown of the confectionery market, chocolate products are dominant in the key markets of France, Germany, and the United Kingdom.

Supply and competition

Under financial pressure brought about by a fall in cocoa prices and faced with the growing power of multinational confectioners, the cocoa processing industry is consolidating itself.

Industry globalisation and concentration continue to be the dominating trend in the market. The European market is now concentrated around a handful of major multinationals.

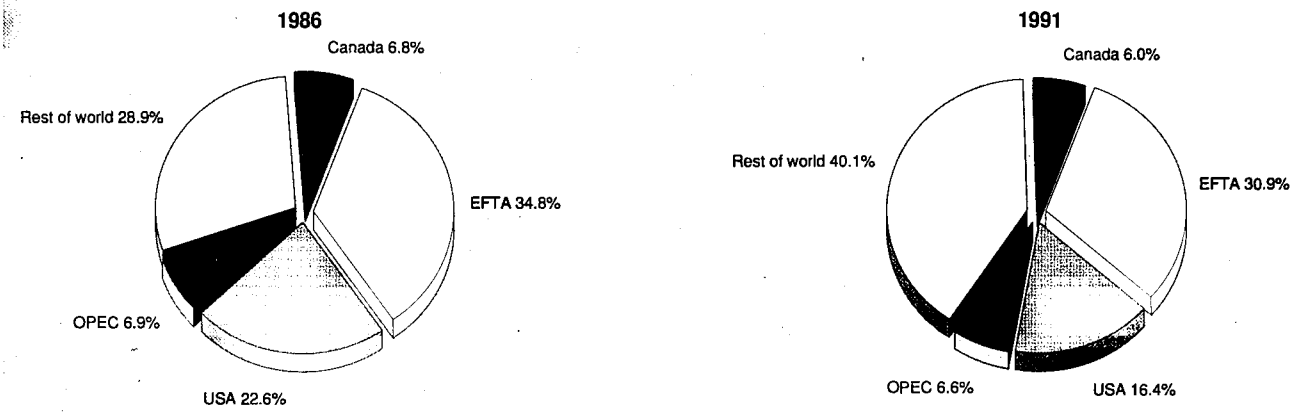
In the ice cream sector, the artisan industry represents a significant part of the market in some Member States, especially Italy, Greece, and Portugal.

Production process

In France, Germany, Luxembourg, and the United Kingdom, ice cream is still considered a pure "dairy product," and national legislation forbids the use of vegetable fat. This explains the variable proportion of butter and vegetable input in different countries.

The European chocolate industry consumes the largest amount of cocoa in the world. However, this industry is also influenced by national regulations regarding the use of vegetable fat is concerned, despite the fact that in 1987, the EC voted on the definition of chocolate, which aimed at liberalising trade in those countries where the use of vegetable fat was banned.

Figure 4: Cocoa and sugar confectionery, ice cream
Destination of EC exports



Source: Eurostat, Census of Manufacturers

Table 5: Cocoa/chocolate/sugar confectionery
Production and per capita consumption, 1989

	Per capita Consumption (kilogrammes)	Production (thousand tonnes)
EC (1)	4.23	4 201
Belgique/België, Luxembourg	5.85	287
Danmark	5.45	64
BR Deutschland	6.65	1 153
Hellas (2)	1.10	28
España	1.70	248
France	3.60	597
Ireland	5.95	114
Italia	2.05	322
Nederland	5.80	511
United Kingdom	6.05	872
Portugal (3)	N/A	5
USA	N/A	2 131
Japan	N/A	305

(1) Excluding Portugal
(2) Estimated
(3) Sugar confectionery production figures are not available
Source: CAOBISCO and Statistical Bulletin of IOCCC

Industry productivity as a whole saw, during the 1980s, the highest increase among all food and drink industries in Europe.

INDUSTRY STRUCTURE

Companies

The ice cream and chocolate confectionery industry is rather concentrated and is controlled by a few industrial groups, in Europe and in the rest of the world. The sugar confectionery subsector is less concentrated.

In the sugar confectionery sector Philip Morris (US), Cadbury (UK), Wrigley (UK), Nestlé (CH), Mars, and Ferrero (Italy) hold all together a 30% to 35% share of the European market.

In the chocolate confectionery sector Nestlé, Mars, Philip Morris, Ferrero and Cadbury combined have a 60% to 65% share.

In the ice cream sector Unilever (UK-ND), Schöller, Ortiz Mico (German), Nestlé and Sme (Italy) (mostly throught the brand Motta) together hold a 50% to 55% share, with artisanal products having a share of about 20%.

Table 6: Industrial ice cream
Production by country, 1991

(million litres)

EC	2118.7
Belgique/België, Luxembourg	171.0
Danmark	70.4
BR Deutschland	500.7
Hellas	46.0
España	172.0
France	287.0
Ireland	32.5
Italia	323.2
Nederland	89.0
United Kingdom	427.0

Source: Euroglaces

Strategies

All the strategies adopted in the 1980s were aimed at increasing the degree of concentration and globalisation. In the confectionery sector, acquisition activity appears to be focusing more on the sugar sector, for instance, with the Cadbury's acquisition of Bassett Foods and Trebor, and United Biscuits' acquisition of Callard & Bowser in the United Kingdom. In mid 1990, Philip Morris bought most of Jacob Suchard's operation and RJR Nabisco sold its candy brands to Nestlé.

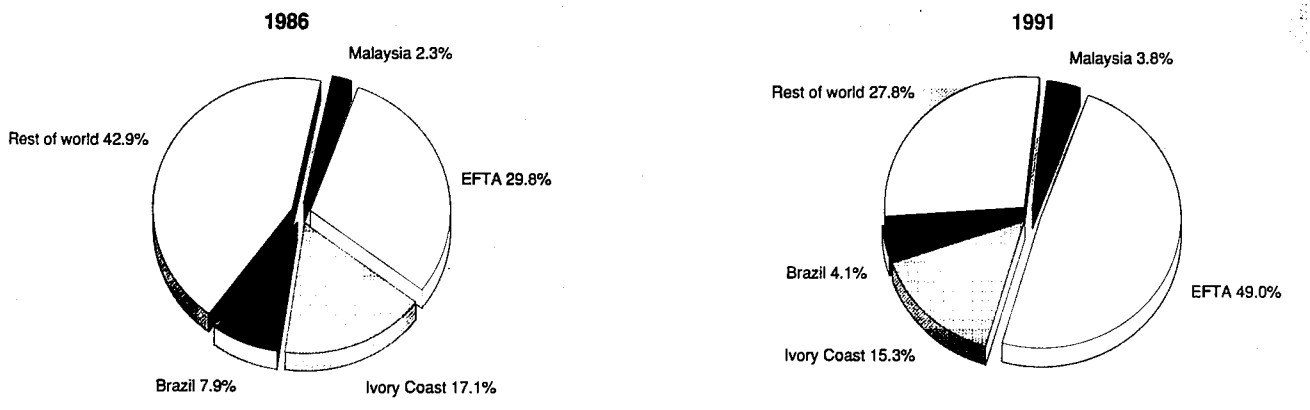
The industrial ice cream multinationals are examining possible acquisitions of dairy producers, especially in Europe, where dairies are placing greater emphasis on value added products. The ice cream industry itself has already attracted some of the largest food conglomerate, including Mars, Coca Cola, Philip Morris (following its acquisition of Kraft) and Grand Metropolitan (following its acquisition of Pillsbury).

Marketing strategies centre on the attempt at a further segmentation of the market by targeting products specifically to adults and children. Effort is being made to seize the opportunities deriving from the "health" and "indulgence" ends of the market.

REGIONAL DISTRIBUTION

Production, is concentrated in Germany, the UK and France, although Italy and Spain are experiencing steadily increasing production. Germany, France and the UK account for about

Figure 5: Cocoa and sugar confectionery, ice cream
Origin of EC imports



Source: Eurostat

70% of the value added produced by the EC industry. The remaining 30% is equally distributed among the other major countries.

In 1991, with a 15% increase in produced volumes, Germany became the primary producing EC country, outperforming the UK.

REGULATIONS

The primary regulations concern the use of vegetable fat, whose use is limited, if not banned, in some countries. EC regulations designed to normalise standards will have a great effect on the industry by opening up those markets to other producers.

OUTLOOK

The growth in the number of adults and the decline in the child population have led to the need to lessen the emphasis on impulse products and to develop more adult-oriented ones. Smaller growth in the market is expected, particularly in those countries with an already high per capita consumption level. "Health" and "indulgence" ends of the market are the areas with the most room for expansion.

Table 7: Cocoa and sugar confectionery, ice cream
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.1	3.1
Production	3.0	3.0
Extra-EC exports	4.0	4.0

Source: Prometeia

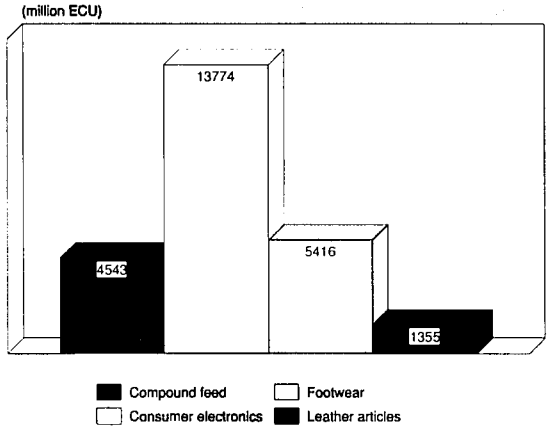
Ice cream multinationals foresee considerable market opportunities developing in the Far East and within the Eastern bloc. The industry is already highly internationalised; the realisation of the Single European Market, therefore, should not bring major changes to it.

Written by: Prometeia Calcolo Srl
The industry is represented at EC level by: Association des industries de la chocolaterie, Biscuiterie et Confiserie (Caobisco). Address: Rue Defacqz 1, Box 7 B-1050 Brussels; tel: (322) 539 1980; fax: (322) 539 1575; and,
Association of the Ice Cream Industries of the EC (Euroglaces). Address: Rue Fondary 51-53, F-75015 Paris; tel: (33) 1 45798075; fax: (33) 1 45796129.

Compound feed
NACE 422

The two sectors of the compound feed industry for animals, compound feed for animal breeding and pet foods, have for some years been characterised by divergent trends. While the compound feed sector is obliged to operate with a largely under-exploited productive capacity within a saturated market, the pet food sector is going through a phase of full-scale growth, both in the traditional sectors of cat and dog feed, and in the newer market of fish feed.
The drop in demand for animal feed has brought about strong competition among the companies in the sector, which have to develop market strategies while bearing in mind slender profit margins. The need to produce better quality and more diversified kinds of feed has pushed the sector to continually introduce innovations and build new plants, which keeps the industry well below capacity.
The industry's future strategies will be focused on greater price competitiveness the blend of primary materials, along with research into higher quality standards from nutritional, hygienic and environmental standpoints.

Figure 1: Compound feed
Value added in comparison with other industries



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

This sector's activities include production of compound feed for livestock farms such as cattle feed, pig feed and poultry feed, and pet food, such as dog food, cat food and food for other pets, including birds and fish.

Main indicators

The output of the entire EC industry approached 30 billion ECU in 1991, an increase of about 3.5% in current values compared to the previous year. The trade balance in 1991 also recorded a significant improvement, doubling its value compared to 1990. However, many previously net-importing countries are developing their own industries, so the slight increase in exports to those countries in 1991 should not be taken as an indicator of future trends.

The consistent drop in employment over the last decade can be traced to the changing structure of the industry. Since 1982, the EC compound feed industry has shed more than 8,000 workers, as a result of the closure of obsolete labour intensive plants, which were replaced with technologically advanced and capital intensive plants.

The analysis of value added in the compound feed industry in the various EC countries highlights the dominant position held by France, which accounts for a quarter of value added of the EC, followed by the United Kingdom (17.3%), Spain (11.9%), the Netherlands (10.5%) and Italy (9.2%). Altogether, these five countries contribute three quarters of added value in the EC industry. The results in Italy and Spain are particularly interesting because their industry has low concentration of companies, being made up of many small and medium sized firms which still achieve high levels of technology and good economic performances.

Recent trends

EC consumption and production at constant prices have risen constantly since 1986. However, the strong expansion which characterised the second half of the 1980's has come to an end. At that time the positive market trend in compound feed production (a 3.9% average yearly increase) triggered off a recovery in employment figures in this sector and an increase in exports. This phase was accompanied by significant growth in exports to non-EC countries, which increased after 1985 at an average annual rate of 5.2%.

The slowdown in real production growth recorded in the early 1990s should be a factor into the mid 1990s as well, bringing a further drop in employment. The strong growth in extra-EC exports will not be easy to repeat in the future.

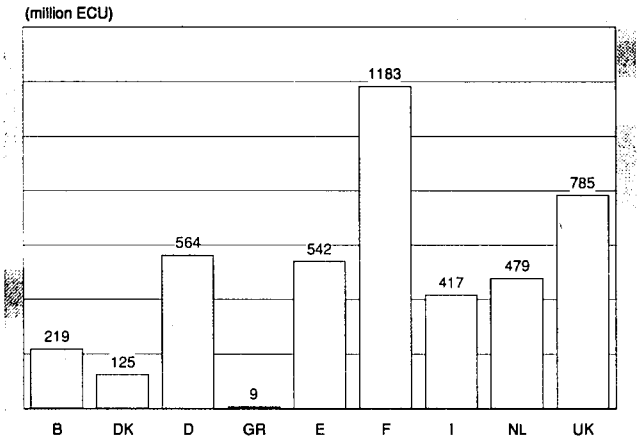
Foreign trade

Although the sector has a positive trade balance, it has been decreasing since 1982. The fluctuating trend underscores the difficulties the sector is experiencing in foreign markets, where several traditional importing countries have developed their own domestic output and are reaching self-sufficiency. In 1991, however, the highest trade balance in 6 years was recorded, with export values nearly 40% greater than import values. 1991 terms of trade improved as well when compared to 1990.

The positive effects of EC integration are visible in the trend of intra-EC trade, which has been growing steadily over the last decade, increasing its share of total imports.

Exports to EFTA countries have been increasing over the last five years, while exports to OPEC countries have fallen.

Figure 2: Compound feed
Value added by Member State, 1991



Source: Eurostat

Table 1: Compound feed
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	21 481	23 314	25 226	24 520	23 436	24 294	26 248	28 218	28 389	29 400	30 900
Production	21 812	23 567	25 652	24 819	23 634	24 405	26 400	28 381	28 504	29 629	31 100
Extra-EC exports	773.1	746.1	914.3	797.8	718.5	620.3	733.0	824.6	747.7	864.4	920.0
Trade balance	331.8	253.3	426.4	299.0	197.7	111.2	152.7	162.6	115.2	229.5	200.0
Employment (thousands)	96.3	93.8	92.4	88.1	85.8	88.8	90.1	89.2	88.9	88.4	88.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Compound feed
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.5	4.0	3.5
Production	2.4	3.9	3.4
Extra-EC exports	-1.5	0.9	0.1
Extra-EC imports	3.1	5.2	4.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Compound feed
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	773.1	746.1	914.3	797.8	718.5	620.3	733.0	824.6	747.7	864.4
Extra-EC imports	441.3	492.8	487.8	498.7	520.8	509.1	580.3	662.0	632.6	634.9
Trade balance	331.8	253.3	426.4	299.0	197.7	111.2	152.7	162.6	115.2	229.5
Ratio exports/imports	1.8	1.5	1.9	1.6	1.4	1.2	1.3	1.2	1.2	1.4
Terms of trade index	95.7	88.5	87.9	100.0	107.7	108.4	98.6	102.3	114.6	109.8
Intra-EC trade	1 084.2	1 237.3	1 368.7	1 463.	1 595.7	1 507.6	1 772.1	2 017.9	2 089.3	2 359.0
Share of total imports (%)	71.1	71.5	73.7	74.6	75.4	74.8	75.3	75.3	76.8	78.8

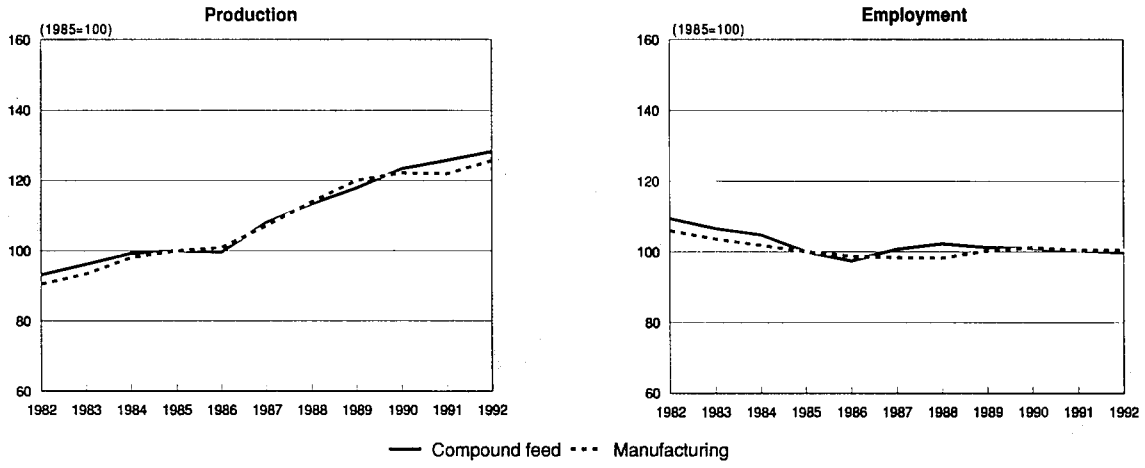
(1) Estimates
Source: Eurostat

Table 4: Compound feed
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	32.5	33.4	34.2	39.1	40.9	44.7	45.3	48.5	49.5	51.4
Productivity index	83.2	85.4	87.4	100.0	104.4	114.2	115.8	123.9	126.6	131.3
Unit labour costs index (3)	80.9	85.9	92.5	100.0	103.3	108.5	113.0	121.1	127.3	N/A
Total unit costs index (4)	82.9	93.9	100.6	100.0	96.3	95.6	104.3	110.7	111.2	115.6

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Compound feed
Production and employment indices compared to EC manufacturing



Source: Eurostat

The United States has strengthened its position as net exporter to the EC. From 1986 to 1991, EC exports to the United States remain stationary at a very low level, while EC imports from the United States increased from already high levels. Currently, about 30% of EC compound feed imports come from the United States. Another third of EC imports comes from Chile and Peru, but while Peru has improved its share of EC imports since 1986 , the value of Chile's exports to the EC have been almost halved. Extra-EC imports make up only about 2% of total EC consumption, and are not significant to the industry.

Between 1982 and 1991, the volume of intra-EC exports experienced continual growth, especially after 1987. The growth in intra-EC exports doubled that of production. Extra-EC exports growth, which was subject to considerable fluctuation throughout the 1980's, is consistently below the production volume growth.

MARKET FORCES

Demand

Overall demand for compound feed in the EC has dropped since 1985, as a result of the decrease in the cattle sector, which has not yet been adequately compensated for by increases in the pig and poultry sectors. The drop in demand has also had repercussions in the share of animal feeds bought in relation to intermediate consumption, which stays at around 40% of the overall value of the purchases. Among EC countries, the Netherlands and Italy have the highest expenditure figures on feeds.

The general compound feed price index showed minimal variations over the last decade, a result of increasing prices for simple feeds and decreasing prices for compound feeds since 1985.

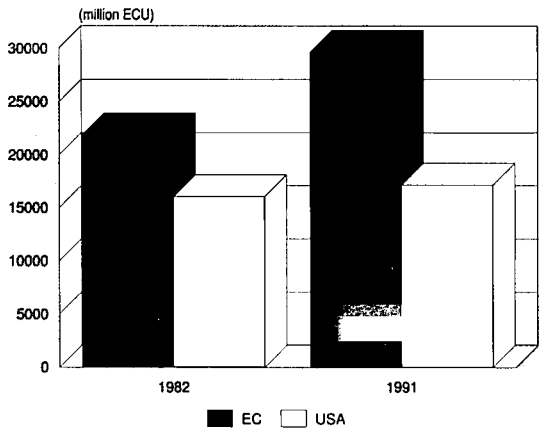
The composition of the compound feeds also takes into account the price variations of primary materials, which have for some years favoured a trend towards the replacement of cereals with soya (oil cakes and meals) and proteins. Livestock consumption of cereals should continue to fall, given the low world price of Soya and the relative price advantage of cereal substitutes, such as manioc (mainly from south-east Asian countries and from China) and sweet potatoes. Currently, 30% of the industrial consumption of primary materials is made up of cereals, about a quarter consists of soya, less than 20% consists of by-products of the food industry, and manioc makes up 5-6%. The different composition of the feeds therefore has an immediate effect on the production costs of livestock breeding, which as a consequence varies significantly within the EC. Dutch big breeders use a compound feed high in manioc and low in cereals, with corresponding low production costs. In Italy, however, pig feed is still typified by heavy use of cereals (60%), making compound feed more expensive for the Italian pig-breeders, and raising production costs. The percentage of cereal in compound feed is about 50% in Italy and Spain, about 30% in France and the United Kingdom, and 15% to 20% in Germany and the Netherlands.

Supply and competition

In 1990 the production of compound feed by the EC industry exceeded 100 million tonnes, while FEFAC estimates for 1991 point to an increase of over 2%. German unification has increased EC production by about 3% in quantitative terms. The production of the former East Germany is a significant share of the EC's stocks of both cattle and pig feed.

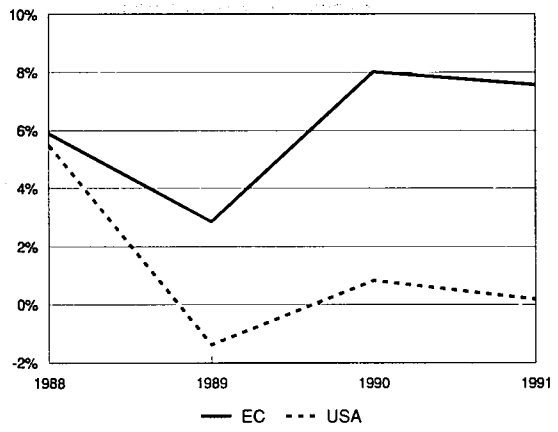
The composition of compound feed per product line is 34.6% for pig feed, 31.2% for cattle feed and 28.1% for poultry feed. Within the EC, France and the united Germany each hold about 20% of the total EC output. In 1991, Germany

Figure 4: Compound feed
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Compound feed
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

strengthened its leadership in the production of cattle feed to about 25% of the EC total, while Dutch production of pig feed has recorded a sharp downturn of 6.5% , suffering more than other countries from the entry of the former East Germany in the EC. In the poultry feed sector France is the leading producer, followed by Italy, reflecting the poultry meat processing industry's strong development in these two countries.

In the pet food sector total production has reached about 4 million tonnes, 54.8% of which is dog food, 36.3% is cat food and 9% other pet foods, mainly for birds and fish. This last segment has recorded strong growth over the last few years, and increased by 288% in 1990 over 1989. All the productive segments show significant increases, although increases in tinned foods are more modest.

Production process

The large animal feed companies usually have several plants spread throughout the home country they belong to. Among the exceptions, it is worth mentioning Purina, a company with its head office in the United States, and which has several plants in the main producing countries of the EC which retain close contact with the parent company in the United States.

The reasons for this national characteristic of the animal feed industry can be found in the different nutritional attitudes of

Table 5: Compound feed
Production per livestock class, 1991 (1)

(thousand tonnes)

Cattle feed	33 082
Pig feed	36 095
Poultry feed	30 130
Other	6 620
Total	105 927

(1) Excluding Greece, Luxembourg and ex-DDR
Source: FEFAC

the livestock breeders which, as is stated above, vary from country to country. However, the important changes involving intra-EC mergers and acquisitions that have been taking place of late could change the nature and production specialisation of several companies.

Generally, the sector's productivity is on the rise, fuelled by a general fall in employment which is always concurrent with the introduction of new technologically advanced plants that reduce the need for human intervention. This accounts for the strong increase in the value added/employment ratio over the last decade, which however is lower than the increases recorded in that period by the unit labour costs.

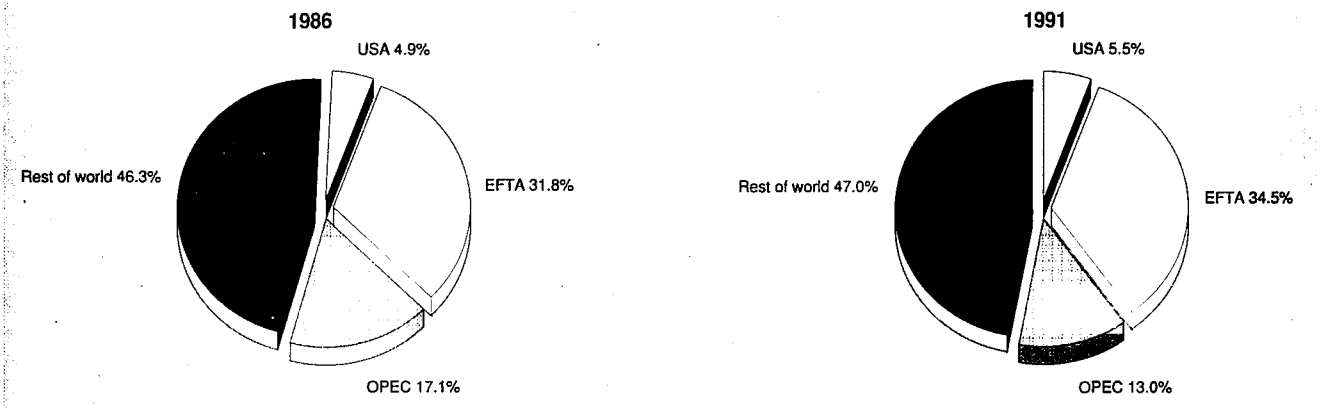
INDUSTRY STRUCTURE

Companies

In 1991, there were approximately 1600 plants operating in the EC, but that number will decrease during the early to mid 1990s as a result of the restructuring processes that are affecting the whole sector. The animal feed production industry is highly decentralised, with plants of varying production capacities. Alongside the large plants which produce the overwhelming majority of compound feed, there are some plants that process very small quantities and which play a marginal role in total production. Plants tend to be located in regions a with high concentration of livestock breeding areas. In particular, small firms need to be close to their primary customers: small family-run livestock farms.

Special importance is attached to the co-operative plants in this sector which, according to FEFAC estimates, account for one third of the EC's compound feed output. The co-operative organisations have only a limited role in the United Kingdom

Figure 6: Compound feed
Destination of EC exports



Source: Eurostat

Table 6: Compound feed
Percentage of cereals in compound feed production

(%)	1985	1989	1990
EC (1)	38.3	30.1	30.0
Belgique/België	23.7	14.5	13.0
Danmark	38.1	29.1	27.8
BR Deutschland(2)	24.2	19.8	20.8
España	67.8	56.1	54.1
France	45.8	31.5	31.9
Ireland	41.0	21.9	23.3
Italia	52.3	47.1	46.6
Nederland	15.7	12.9	13.0
Portugal	52.4	21.1	20.8
United Kingdom	41.8	35.4	33.9

(1) Excluding Greece and Luxembourg
(2)Excluding former East Germany
Source: FEFAC

and Belgium, whereas in the other countries their contributions can range between 40% and 50% of total production.

Within the pet food sector, the European market is dominated by four primary companies with firms spread over the EC. Mars (USA) has over 50% of the market, and its national companies have the leadership in their respective countries (Unisabi in France, Elfem in Germany and in the Netherlands, Doima in Italy, Pedigree P.F. in the United Kingdom). Quaker (USA) controls 15% of the EC market, while Nestlé (CH) and Dalgety (UK) each control less than 10%.

Strategies

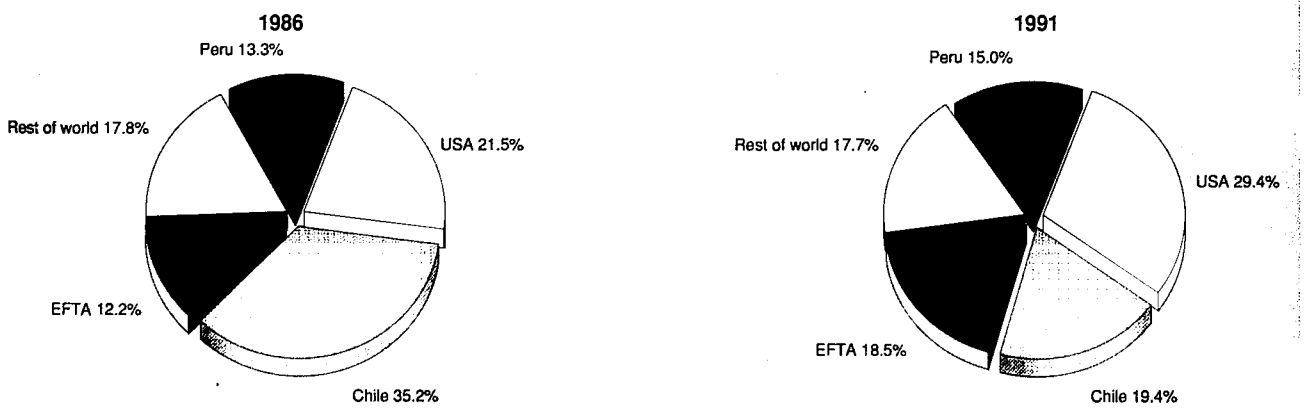
EC industry operates under conditions characterised by an underutilisation of production capacities, which often fail to exceed 35-40% of the potential output. The drop in overall demand has forced the companies to cut the overall supply, while trying at the same time to produce better quality feed, an objective that has led to an improvement in the efficiency of the plants. The high technological levels of the plants is a decisive feature of the animal feed industry, and represents the necessity of dealing with new demand characteristics for compound feed, which are no longer merely focused on quantity but also qualitative aspects and the mix of primary materials utilised. The market now demands feed with high nutritional balance and a certain degree of hygiene and healthiness achieved during the productive phase. Processes have

Table 7: Compound feed
Industrial consumption of raw materials (1)

(thousand tonnes)	1988	1989
Cereals	30 644	30 654
Manioc	6 324	5 686
By-products from food industry	16 490	17 341
Oils and fats	1 550	2 161
Cakes and meals	25 802	24 841
Pulses	N/A	4 696
Animal meals	2 528	3 162
Dairy products	1 134	1 326
Dried forage	2 558	2 463
Minerals, additives, vitamins	2 033	3 464
All others	10 674	4 458
Total	99 737	100 252

(1)Excluding Greece, Luxembourg and ex-DDR
Source: FEFAC

Figure 7: Compound feed
Origin of EC imports



Source: Eurostat

Table 8: Compound feed
Pet food market shares in selected countries, 1988

% retail value	F(1)	I	UK	D(2)
Mars	51.5	65.0	61.0	60.0
Quaker	24.3	25.0	7.0	23.0
Nestlé	9.8	3.0	0.0	4.0
Dalgety	0.0	0.0	16.0	0.0
Others	14.4	7.0	16.0	13.0
Total	100.0	100.0	100.0	100.0

(1) 1989, % volume
(2) Excluding former East Germany
Source: Euromonitor

included those to eliminate dust from the end-product which had resulted from the processing of the primary material, to reduce cross-contamination risks.

REGULATIONS

Among the regulations affecting the industry are those concerning the relative price advantage of various raw materials such as manioc and sweet potatoes, which are included in produce of enclosure D of EC Reg. 2727/75. The substitute products are not subject to import duties, while cereals are. The difference in price thus allows firms to substitute these inputs for the higher priced cereals. A change in the import duties will have a significant effect on the industry and on profit margins, which are already slim.

OUTLOOK

A slight increase in demand for compound feeds is expected in the near future, due to expected increases in the pig and poultry sectors that will more than proportionately offset the decrease in the cattle sector. A further decline in use of cereals as primary inputs is expected for cereals, following the trend since 1984. Cereals will be replaced by high energy and protein value components.

Table 9: Compound feed
Expected real annual growth rates

(%)	1992-93	1993-96
Apparent consumption	2.2	2.2
Production	2.0	2.0
Extra-EC exports	1.0	1.0

Source: Prometeia

The achievement of high technological levels is crucial in order to respond to the new demands being made by a continually evolving market, which calls for medium run strategies. Without such strategies the industry will find itself ill-prepared for the competition which will cross the national borders that still represent an important barrier for the EC.

The EC industry is facing a saturation point in the demand for compound feed, as several importing countries are developing their own production capabilities. The decline of the EC cattle sector has also caused a decline in the demand for cattle feed within Europe. On the other hand, certain subsectors of the industry should see an increase within the EC, especially in poultry and pig feed, in response to the decline of the cattle industry. Firms are also finding low-priced substitutes for the cereals which are increasing in price. These substitutes still benefit from a relative price advantage in the EC, and have been found to contain high protein levels and energy value., thereby increasing the quality of the feed. New technologies are also helping to maintain health and hygiene requirement

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The industry is represented on EC level by: Fédération Européenne des Fabricants d'Aliments Composés (FEFAC). Address: Rue de la Loi 223, B-1040 Brussels; tel: (32 2) 230 8715; fax: (32 2) 230 5722.

Miscellaneous food products
NACE 417, 423

The demand for the primary products of this sector, pasta, coffee and tea, is generally increasing. The consumption of pasta, in particular, is on the rise in Europe thanks to the increased popularity of the Mediterranean diet of which pasta is a basic component. In many EC countries the consumption of coffee and tea is still growing, as is the EC trade balance. The most important multinationals of the food industry operate in almost every subsector of miscellaneous food products.

INDUSTRY PROFILE

Description of the sector

The sector includes the manufacture of pasta, spaghetti, macaroni etc. (NACE 417) as well as the manufacture of other food products: the processing of coffee and tea, the production of roasted chicory and other roasted coffee substitutes, the manufacture of vinegar, mustard and other condiments, the manufacture of ice, the specialised manufacture of infant and dietetic foods, the manufacture of food preparations for making puddings, custards, table creams, and the manufacture of soups, broth and sauces (NACE 423).

Main indicators

Pasta

Consumption and production of pasta nearly doubled in the period between 1982 and 1991. Since 1986, extra-EC exports have increased as well, to a larger extent than have extra-EC imports, resulting in an increase in the EC trade balance between 1986 and 1991. Exports are only 5% of production, while imports are 0.7% of apparent consumption, so trade is a minor portion of the industry. Employment remained stable, after a period of variability at the beginning of the 1980s.

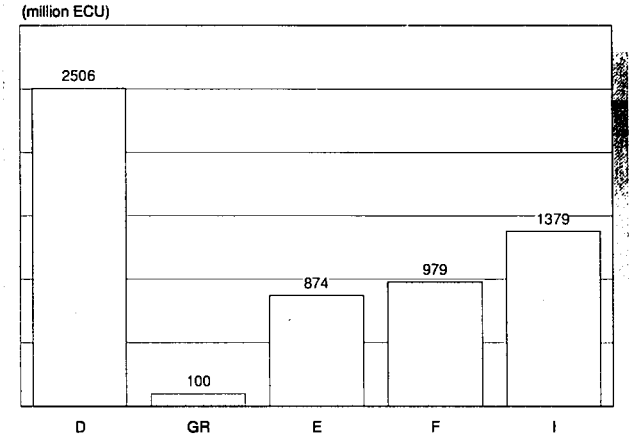
Italy, which has been promoting the consumption of pasta throughout Europe, has the highest value added for the industry, and a 49% share of total EC value added in 1991. France, with a growing domestic market, has experienced an increase in French companies operating in the pasta sector, which account for 17.5% of the EC total of value added. BSN, for example, is present in the sector with the brand Panzani. The German industry operates mainly in domestic and northern European markets; production consists mostly of soft wheat pasta, which is less popular than the durum wheat pasta produced in Italy. Germany's value added was 6% of the EC total in 1991. Greece and Spain each have a small proportion of EC value added.

Other food products

Coffee, tea and infusions are the primary products of the other foods sector. The trade balance, consumption, production and exports all steadily increased after 1987. Employment also increased after 1988. As with pasta, trade in the products of NACE 423 is a small amount of production and consumption, although the proportion of imports to apparent consumption is somewhat higher than that of pasta, at 4%. Intra-EC trade is four times extra-EC imports.

The German industry has the highest value added, and accounted for 26% of EC value added in 1991. France, Italy and Spain have similar value added, although significantly lower than that of Germany, at 8% to 9% each. The coffee sector has become increasingly concentrated through M&A activity in Spain and Italy.

Figure 1: Miscellaneous food products Value added by Member State, 1991



Source: Eurostat

Recent trends

Pasta

During the first half of the 1980s, pasta consumption had a high rate of growth, which tapered off after 1985. Import growth was considerably lower than extra-EC export growth, leading to a nearly 300% increase overall in the trade balance from 1982 to 1991, although trade remained a small portion of industry activity.

Other food products

Consumption and production of other food products increased significantly between 1985 and 1991, after slow growth in the early 1980's. Exports grew slowly between 1985 and 1991, after a period of substantial growth from 1982. Intra-EC trade grew considerably faster than extra-EC trade from 1982 to 1991.

Foreign trade

Pasta

Intra-EC trade is very important to the EC pasta industry; accounting for nearly 80% of total imports in 1991. More than 50% of exports were traded within Europe. There have been some important changes in the import source structure since the early 1980s; in particular imports from developing countries have increased. The weight of exports on production and of imports on apparent consumption is very low, thus indicating a low degree of external dependence.

Other food products

Intra-EC trade has shown the highest increase in other food products as well. Coffee imports from South American countries have increased, although their share of total imports is decreasing. Goods are exported to various countries, in particular to developing countries and to European countries, whereas exports to the USA are decreasing. Also for these products the weight of exports on production and of imports on apparent consumption is quite low even though intra-EC trade volume is rapidly increasing.

MARKET FORCES

Demand

Pasta

The popularity of pasta in northern Europe is due to the spread of the Mediterranean diet from Italy and to increasing concern

Table: Pasta (1)
Main Indicators at current prices (2)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(3)
Apparent consumption	2 565	2 969	3 586	3 931	4 065	4 393	4 534	4 937	5 224	5 528	5 732
Production	2 658	3 050	3 702	4 065	4 186	4 522	4 676	5 125	5 415	5 779	6 010
Extra-EC exports	105	96	136	160	145	154	167	216	221	287	300
Trade balance	93	81	116	134	122	129	142	188	192	251	278
Employment (thousand)	24.8	24.1	24.8	24.1	24.1	24.7	24.8	24.6	24.7	24.7	24.7

(1) NACE 417
(2)Estimates are used if country data is not available, especially from 1989 onwards. However, for trade, only 1991 has had to be estimated
(3) Prometeia estimates
Source: Eurostat

Table 2: Other food products (1)
Main indicators at current prices (2)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (3)
Apparent consumption	16 692	17 861	21 204	22 380	24 813	24 321	24 843	27 642	29 086	31 918	32 945
Production	17 177	18 405	21 459	23 167	25 631	25 286	25 913	28 857	30 352	33 252	34 542
Extra-EC exports	1 439	1 607	1 882	2 185	1 941	1 903	2 060	2 294	2 383	2 527	2 639
Trade balance	484	544	255	788	818	965	1 070	1 215	1 265	1 334	1 597
Employment (thousand)	165.8	164.8	163.9	164.6	174.1	179.5	173.5	181.3	183.9	188.1	188.3

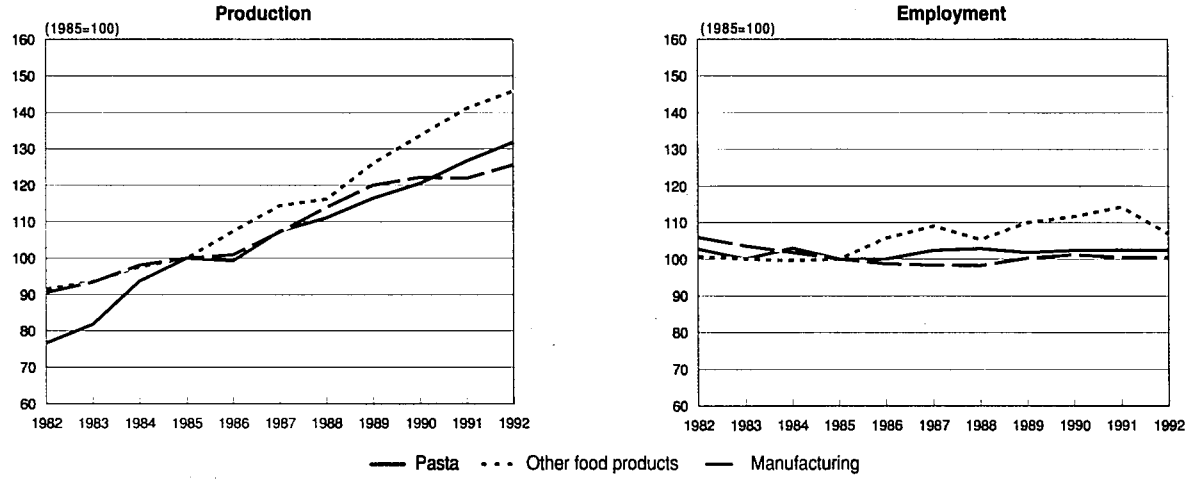
(1) NACE 423
(2)Estimates are used if country data is not available, especially from 1989 onwards. However, for trade, only 1991 has had to be estimated
(3) Prometeia estimates
Source: Eurostat

Table 3: Green coffee
Imports by volume

(tonnes)	1985	1986	1987	1988	1989	1990	1991	% of total 1991
EC	1 551 704	1 537 300	1 645 341	1 651 344	1 649 089	1 819 822	1 773 463	100.0
Belgique/België,& Luxembourg	101 247	81 624	88 668	95 718	76 953	77 786	61 708	3.5
Danmark	46 296	46 455	50 844	50 019	55 065	50 570	51 606	2.9
BR Deutschland	423 427	452 888	487 026	492 399	500 238	580 743	609 773	34.4
Hellas	20 292	12 500	21 361	22 734	22 410	23 682	8 604	0.5
España	133 390	149 092	147 198	148 966	158 110	175 326	170 387	9.6
France	275 750	281 515	297 020	303 001	304 068	312 933	322 061	18.2
Ireland	530	654	756	858	924	984	1 020	0.1
Italia	281 087	251 547	263 318	259 401	270 565	307 930	267 003	15.0
Nederland	144 750	141 203	155 465	150 731	137 895	151 529	150 564	8.5
Portugal	22 051	20 831	27 420	25 190	25 681	29 730	30 740	1.7
United Kingdom	102 884	98 991	106 265	102 327	97 180	108 609	99 997	5.6

Source: EUCA

Figure 2: Miscellaneous food products
Production and employment indices compared to EC manufacturing



Source: Eurostat

Table 4: Tea
Imports by volume

(tonnes)	1985	1986	1987	1988	1989	1990	% of total in 1990
EC	208 837	225 802	195 142	215 800	216 325	197 047	100.0
Belgique/België, Luxembourg	1 295	1 498	1 214	1 300	1 587	1 486	0.8
Danmark	2 317	2 432	2 155	2 200	2 109	2 024	1.0
BR Deutschland	15 500	15 500	14 700	14 800	14 600	14 000	7.1
Hellas	300	300	300	300	400	400	0.2
España	734	719	730	740	770	800	0.4
France	9 154	10 036	9 148	10 155	10 090	11 056	5.6
Ireland	10 656	11 295	10 885	10 376	10 607	11 512	5.8
Italia	3 876	3 295	3 489	3 500	3 500	3 500	1.8
Nederland	9 361	9 429	9 725	9 500	9 551	10 125	5.1
Portugal	285	232	217	230	250	250	0.1
United Kingdom	155 359	171 066	142 579	162 699	162 861	141 894	72.0

Source: CEdT

Table 5: Pasta
Consumption by Member State, 1989

	(thousand tonnes)	1984/89 (%)	per capita (kg)
EC	1 795	1.8	7.5
Belgique/België, Luxembourg	22	3.0	2.1
Danmark	8	4.2	1.6
BR Deutschland	294	8.4	4.7
Hellas	70	2.4	7.0
España	148	3.2	3.8
France	387	2.1	6.9
Ireland	4	7.4	1.1
Italia	1 318	-0.1	22.9
Nederland	26	3.3	1.8
Portugal	60	2.7	5.7
United Kingdom	98	7.2	1.7

Source: Prometeia

Table 6: Coffee, tea and cocoa
Consumption by Member State, 1989

	(thousand tonnes)	1984/89 (%)	per capita (kg)
EC	1 015	2.1	7.9
Belgique/België, Luxembourg	106	-0.7	10.7
Danmark	66	0.0	12.9
BR Deutschland	712	2.7	11.6
Hellas	43	1.5	4.3
España	205	7.8	5.2
France	462	2.1	8.2
Ireland	23	2.8	6.4
Italia	323	4.1	5.6
Nederland	167	1.0	11.3
Portugal	40	4.6	3.9
United Kingdom	428	-0.8	7.5

Source: Euromonitor

for healthy eating habits. Consumption is increasing strongly, especially in the United Kingdom and Germany but in south European countries as well, such as Spain and Greece. On the other hand, in countries where consumption is already very high, such as Italy, consumption is stable or decreasing. Pasta consumption is spreading because it is healthy, easy and fast to prepare.

Other food products

Consumption of primary miscellaneous food products other than pasta is increasing, especially for caffeinated drinks. Instant coffee, for example, has been gaining in popularity in southern Europe, except Italy, which still has the lowest per capita consumption. The consumption of tea is decreasing in those countries, such as the United Kingdom and Ireland, where consumption is extremely high. Per capita consumption of vinegar has remained constant, but the use of distilled alcohol as the basic input has been declining in favour of wine and other materials such as cider. In 1990, EC vinegar production reached 455 million litres, an increase of less than one percent from 1989. This is a decline from the growth rates of the preceding three years.

Supply and competition

Pasta

Due to the success of pasta in the European market in recent years, some multinationals have started to operate in this sector by acquiring production companies and established brands, especially in Italy. Competition from extra-EC producers is almost absent.

Other food products

The other food product industry is characterised by the dominance of a traditional group of firms operating in the various sectors of the industry. No significant changes in the competitive scenario within the EC took place during the 1980s, apart from some redistribution of market shares due to M&A activities. Within the EC, the development of a large distribution system is increasingly important in the development of marketing strategies for the industry's products. Currently, many companies use advertising and brand policies to apply a premium-price on these products; the large distribution system, however, will have a contractionary influence on price policies, resulting in lowered prices and shrinking industry margins.

Production process

During the 1980's, there was little product innovation, although productivity increased due to process innovations. As in other food sectors, these innovations are capital intensive rather than labour intensive. Raw materials are produced for the most part within the EC, while the so-called colonial goods, like tea, coffee and cocoa, are imported primarily from Africa and South America and are affected by price fluctuations on international markets.

INDUSTRY STRUCTURE

Companies

The market structure of the pasta and other food products sectors is very concentrated, and dominated by a few large multinational companies. In the pasta sector Barilla (I) is the market leader, accounting for more than 30% of the EC market. BSN (F) and Nestlè (CH) have attained sizeable shares by acquiring famous Italian brands like Agnesi and Buitoni. These two companies together account for 25% of the EC market. In the coffee sector Philip Morris (USA), Sara Lee, Nestlè, and Lavazza (I) account for 60% of the EC market and have significant shares in the sector of coffee substitutes and tea as well. Unilever (UK-NL) is also a strong presence in the tea sector.

Table 7: Instant coffee
Consumption by Member State, 1990

(tonnes)	1990
EC	98 466
Belgique/België, Luxembourg	1 460
Danmark	479
BR Deutschland (1)	12 500
Hellas	5 153
España	9 600
France	17 400
Ireland	2 115
Italia	1 759
Nederland	1 450
Portugal	1 400
United Kingdom	45 150

(1) 1990 including Eastern Germany
Source: AFCASOLE

Table 8: Vinegar
Production by Member State

(thousand hl)	1988	1989	1990
EC	4 318	4 521	4 553
Belgique/België	168	182	206
Danmark	133	154	152
BR Deutschland	1 235	1 269	1 362
Hellas	80	80	N/A
España	405	413	417
France	1 051	1 230	1 130
Ireland	9	8	11
Italia	535	550	550
Nederland	N/A	N/A	N/A
United Kingdom	702	635	725

Source: CPIV

Strategies

The strategies adopted by the primary companies are based on the popularity of product brands and on strong investments in advertising. Product innovation is poor even though production is differentiated on the basis of quality to price, especially in the pasta sector (durum wheat pasta vs. soft wheat pasta), in the coffee sector (raw material quality, Robusta, Arabic) and in the tea sector.

OUTLOOK

Increases in demand for many of the products in NACE 417 and 423 could come from a homogenisation of nutritional habits in the various European countries. Pasta and caffeinated drinks clearly show this trend. Foreign trade, on the other hand, will be limited by transportation and trade costs. In countries with a potentially large market, direct investment in production capacity is generally preferred to importing by producers. Thus, production seems connected to the domestic consumption trend. An increase in intra-EC trade, on the other hand, is expected with the harmonisation of regulations and greater ease of transportation within the EC.

The risks associated with this industry include significant differentiation of products and an excess of supply. The market, however, is expected to increase slightly, as products gain popularity in non-traditional countries, as is occurring in the pasta industry. Negligible competition by extra-EC products can also improve the opportunities of producers.

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The industry is represented at the EC level by: Association des Fabricants de Café Soluble des Pays de la CEE (AFCASOLE).and Europeen Tea Committee (Comité Européenne du Thé) (ETC/CET). Address: 51-53 rue Fondary, F-7501 Paris; tel: (33 1) 45 79 80 75; fax: (33 1) 45 79 61 29; and,
Fédération Europeenne des Associations de Torrefacteurs de Café (EUCA). Address: Boulevard Baudouin 21, 7ième étage, B-1210 Brussels; tel: (32 2) 223 0141; fax: (32 2) 223 1244; and,
Comité Permanent International du Vinaigre (CPIV). Address: Reuterstrasse 15, D-5300 Bonn; tel: (49 228) 21 20 17; fax (49 228) 22 94 60.

Alcohol and spirits
NACE 424

The alcohol and spirit sector has been experiencing weakened demand for many years. Due to a change in food habits, consumption is more and more directed to high-income consumers and to specific and Designation of Controlled Origin (DCO) products. During the 1980s, this sector became more concentrated through the acquisition of national trade-marks in order to increase the variety of products offered. Exports to the Far East, where certain aspects of western life style are becoming more prevalent, are increasing.

INDUSTRY PROFILE

Description of the sector

The alcohol and spirits sector as classified under NACE 424 include ethyl alcohol from agricultural origin, and spirits. Most production is consumed directly in the food processing areas (e.g. vinegar) but some semi-manufactured products go to other industries such as pharmaceuticals and cosmetics.

Main indicators and recent trends

EC consumption is consistently less than production of which about 30% is destined for sale in non-EC countries. Although nominal consumption increased throughout the eighties, the data reflect a shift in demand towards more expensive products while physical quantities consumed declined steadily over the past 10 years. The decrease in the number of employees reflects both a decrease in production and a substitution of labour to capital intensive production technologies.

Overall, consumption and production have decreased since the beginning of the 1970s. Extra-EC exports and imports have increased remarkably since the second half of the 1980s.

1991 value added data show the highest values in the UK and France. Among the EC countries, the United Kingdom's industry is the most concentrated. The main products produced in the UK include Scotch whisky, gin and vodka. As for concentration and value added, the French industry holds second place in Europe. A key role is played by Designation of Controlled Origin (DCO) high quality products (mainly meant for export) like cognac, armagnac and calvados, which belong to the high-quality market segment.

Spanish, Italian and German industries show a medium value added. Specific products are sherry and brandy in Spain, "grappa" in Italy and corn brandy in Germany. Many of these products are exported. In contrast, the Greek alcohol and spirits industry shows a very low value added and produces mainly for the domestic market.

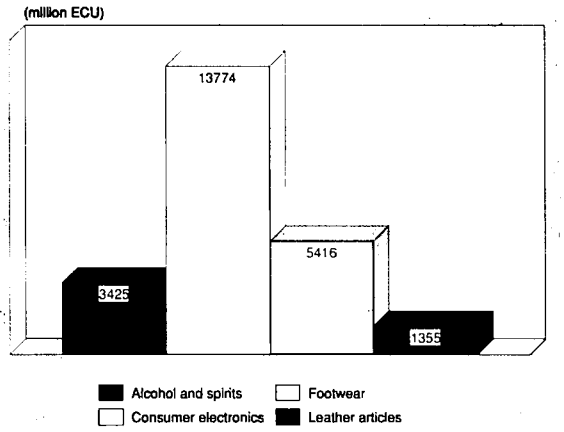
International comparison

The EC remains the world's largest producer of alcohol and spirits, with an output more than four times that of the United States in 1991. The steady contraction in demand for alcohol and spirits is shown clearly in Figure 5 for both the EC and the United States.

Foreign trade

In 1991, the EC exported 27% of its production of alcohol and spirits to non-EC markets, up from 20% in 1982. Import penetration, by comparison, is less than 5%, although it has risen considerably since the early eighties. Since 1986, the United States and Trinidad and Tobago (the EC's largest suppliers of alcohol and spirits) have significantly gained market share at the expense of the Bahamas and Martinique. The EC's key export markets are the United States, Japan and Hong Kong. A comparison of export markets shows that East Asia is becoming an increasingly important end market compared to the USA and the EFTA countries. Intra-EC trade is quite high (about 85% of total imports).

Figure 1: Alcohol and spirits
Value added in comparison with other industries, 1991



Source: Eurostat

MARKET FORCES

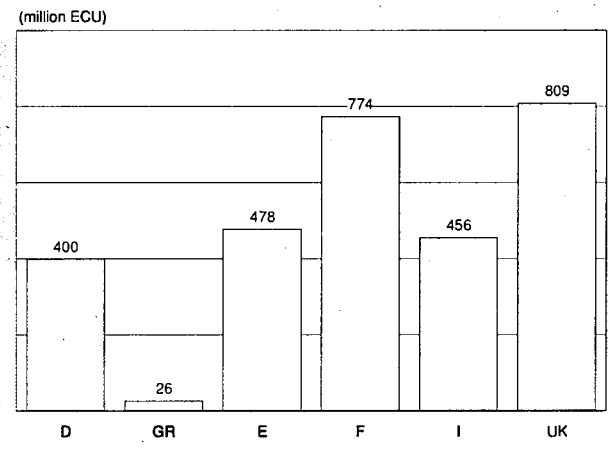
Demand

With the exception of Greece, per capita alcohol and spirits consumption has been decreasing for many years in all European markets due to changes in gastronomic habits. A rising standard of living and changing lifestyles have led to a shift in demand to higher quality products for occasional consumption. The consumption of liquor is strongly affected by its substitution with other products such as wine and beer, and non alcoholic beverages, particularly in bars, pubs and restaurants. The market differs depending on the specific products of the various European and extra-European areas.

Supply and competition

Firms operating in this industry face a homogeneous EC market. The most well-known trade-marks operate on a pan-European market. Many firms are diversified, own more than one brand and often import products such as vodka and rum

Figure 2: Alcohol and spirits
Value added by Member State, 1991



Source: Eurostat

Table 1: Alcohol and spirits
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	8 384	8 936	9 064	9 181	9 095	8 946	9 019	8 923	9 121	9 581	9 821
Production	10 298	10 769	11 122	11 408	11 079	10 983	11 328	11 624	12 014	12 575	12 952
Extra-EC exports	2 056	1 982	2 216	2 395	2 160	2 235	2 505	2 958	3 219	3 334	3 650
Trade balance	1 913	1 833	2 057	2 227	1 984	2 036	2 309	2 701	2 893	2 994	3 131
Employment (thousands)	69.8	66.0	62.7	58.1	54.3	50.4	47.9	47.5	47.2	46.6	46.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) 1992 are Prometeia estimates
Source: Eurostat

Table 2: Alcohol and spirits
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	0.0	-1.9	-1.3
Production	-0.2	-1.0	-0.7
Extra-EC exports	-0.7	2.7	1.6
Extra-EC imports	0.8	7.6	5.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Alcohol and spirits
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 056	1 982	2 216	2 395	2 160	2 235	2 505	2 958	3 219	3 334
Extra-EC imports	142	149	159	168	176	199	196	256	326	340
Trade balance	1 913	1 833	2 057	2 227	1 984	2 036	2 309	2 701	2 893	2 994
Ratio exports/imports	14.45	13.30	13.97	14.25	12.25	11.26	12.79	11.53	9.87	9.80
Terms of trade index	96.9	93.1	94.9	100.0	95.8	94.0	88.7	85.8	89.7	90.5
Intra-EC trade	919	974	1 020	1 188	1 281	1 314	1 523	1 704	1 864	2 115
Share of total imports (%)	86.1	86.5	86.4	87.5	87.8	86.8	88.1	86.5	84.7	85.7

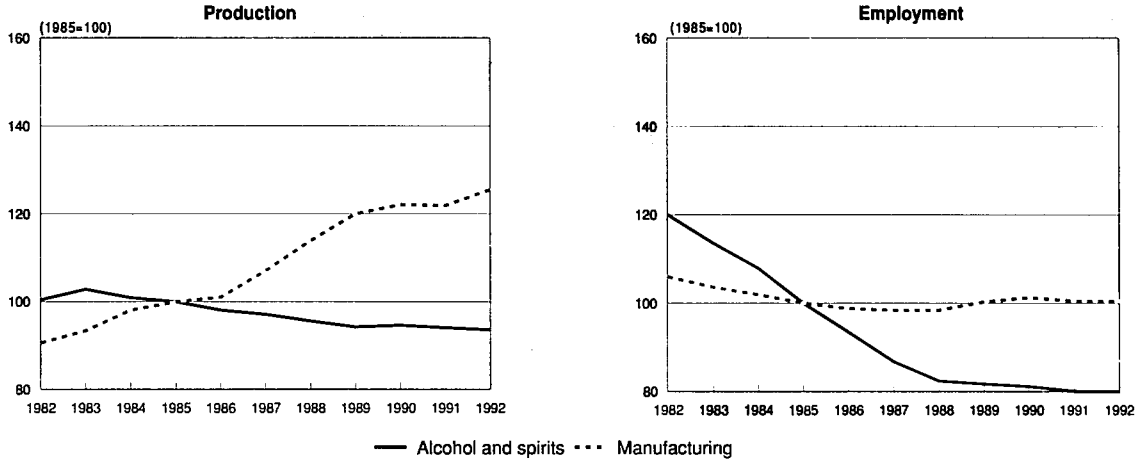
(1) Estimates
Source: Eurostat

Table 4: Spirit drinks
Estimated annual production (in pure alcohol)

(thousand hl)	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC	9 252	8 863	9 388	9 207	9 284	9 696	10 277	11 516	N/A
Belgique/België	74	74	74	64	64	60	57	51	N/A
Danmark	79	87	93	77	74	69	70	70	68
BR Deutschland (1)	1 080	1 055	1 031	997	976	1 010	1 010	1 231	1 365
Hellas	105	105	105	105	105	105	105	149	N/A
España	1 070	1 070	1 214	1 201	1 129	890	899	1 057	1 025
France	2 200	1 800	2 150	2 100	2 060	2 280	2 460	2 700	N/A
Ireland	125	125	125	120	120	100	100	82	N/A
Italia	900	850	800	750	700	609	678	694	N/A
Luxembourg	3	2	2	2	2	2	2	2	2
Nederland	378	325	311	306	296	311	286	250	N/A
Portugal (2)	88	90	83	85	78	80	80	80	N/A
United Kingdom	3 150	3 280	3 400	3 400	3 680	4 180	4 530	5 150	N/A

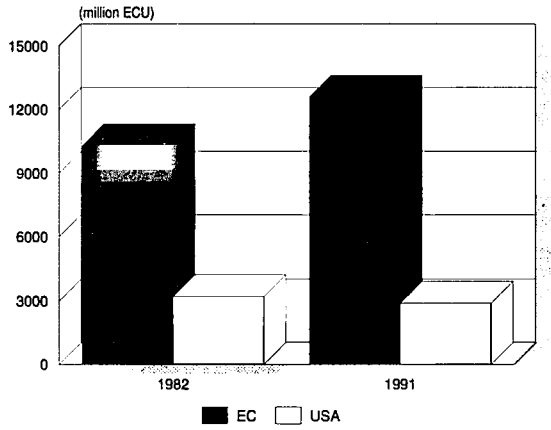
(1) 1990-91 including former East Germany
(2) including wine distillates
Source: National associations and UEAES

Figure 3: Alcohol and spirits
Production and employment indices compared to EC manufacturing



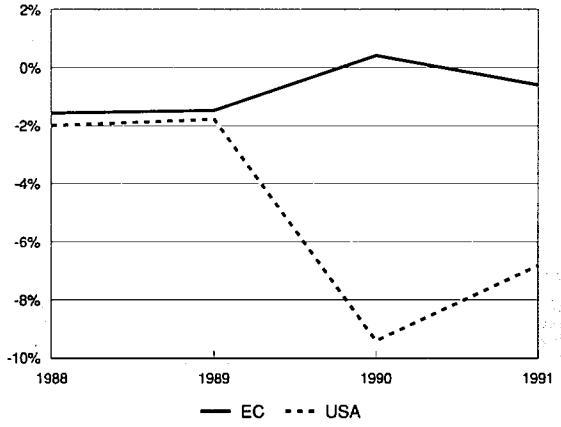
1992 are Prometeia estimates
Source: Eurostat

Figure 4: Alcohol and spirits
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Alcohol and spirits
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

under license. Although consumption is increasingly oriented towards high quality products, prices remain stable because of a high level of market saturation. Because the market clearly differs depending on typical DCO products and the type of distillate, competition (both intra- and extra-EC) is based more on consumer preferences for certain types of distillate rather than price. Given this situation, products such as rum, vodka and whiskey are mainly imported. Moreover, the main enterprises operate in almost all EC markets with different brands. Each sector of the market is differentiated by a separate quality and/or price policy.

Production process

The production process is very similar for all of the main products which are based on fermentation and filtering of fruits, grapes and cereals. As in a number of the main food sectors, the degree of automation and technological innovation is low. During the 1980s, labour productivity increased less than unit labour cost and total cost.

Table 5: EC whiskies and brandies
Main export markets

(tonnes)	Whiskies (mainly Scotch)	Brandies (mainly cognac)
USA	90 300	51 364
Japan	41 354	39 851
Asean	18 039	14 627
EFTA	14 259	10 216
Eastern Europe	10 969	12 031
Australia	11 402	1 943
Thailand	13 173	3 173
ACP	12 058	4 118
Canada	8 343	5 624
Brasil	9 515	334
Singapore	2 250	5 395
Hong Kong	2 350	19 469

Source Eurostat, UEAES

Table 6: Alcohol
Consumption per capita by country, 1990

(litres)	Spirits (1)	Beer (2)	Wine (2)	Total (1)
Belgique/België	1.20	120.7	24.0	9.9
Danmark	1.30	126.2	21.3	9.9
BR Deutschland	2.23	143.1	26.1	10.6
Hellas	N/A	39.8	32.6	5.9
España	2.70	71.8	37.4	10.8
France	2.51	41.5	73.1	12.7
Ireland	1.70	117.0	4.4	7.2
Italia	0.75	23.0	61.4	8.7
Luxembourg	1.57	121.4	58.2	12.2
Nederland	1.98	90.0	14.5	8.2
Portugal	0.80	65.1	47.5	9.8
United Kingdom	1.71	110.2	11.6	7.6

(1) litres pure alcohol
(2) litres in state
Source: Produktschap voor Gedistilleerde Dranken, World Drinks Trends 1992

INDUSTRY STRUCTURE

Companies

The industry is characterised by a few large multinationals. There are, however, many small firms focused on local production of a specific product.

The six largest firms of the sector (Guinness, Pernod Ricard, Grand Metropolitan, Allied Lyons, Martini & Rossi, Seagrams) together have a 35% to 40% share of the EC market.

Strategies

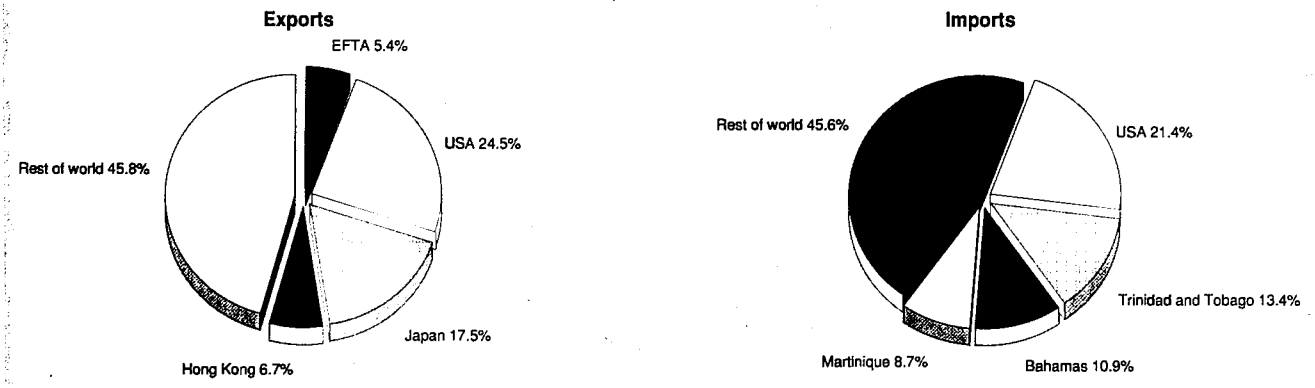
The decrease in demand caused by new consumption patterns has forced firms to invest in both high quality production and advertising. Many enterprises acquire production licences and market imported products in order to differentiate their own range of products. Product innovation is quite low because the success of a marketing strategy lies in the uniqueness of the product. Some local producers try to differentiate their own products by using ingredients typical of their regions.

During the 1980s, the industry witnessed several acquisitions which have expanded the variety of products offered by the main firms operating in Europe. Another strategy has been the diversification into other segments such as beer, wine or non-alcoholic drinks. This kind of diversification capitalises on similar distribution channels for each product.

OUTLOOK

Decreased consumption will continue due to changes in gastronomic habits and consumption patterns. Mergers and acquisitions, however, will continue to increase the degree of concentration for this industry. Firms will tend to gain the highest quality/price ratio of the market by specialising in their own products. Increases in exports will come largely from an emerging market in East Asia.

Figure 6: Alcohol and spirits
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Table 7: Alcohol and spirits
Expected real annual growth rates

(%)	1992-93	1993-96
Apparent consumption	-0.3	-0.3
Production	-0.4	-0.4
Extra-EC exports	0.5	0.5

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Union Europeenne des Alcools, Eaux de Vie Et Spiritueux (UEAES). Address: Avenue de Tervuren 192, Bte 6, B-1150, Brussels; tel: (32 2) 771 7735; fax: (32 2) 772 0109.

Wine
NACE 425, 426

The demand for wine in Europe is falling. The decrease in consumption is most pronounced in the table wines sector in which strong price competition has grown. the fear of adulterated wine has also penalised wine exports. quality wines, on the other hand, have been less affected by competition from non-EC countries, and have seen growth in their export markets. In both France and Italy, the cooperative have reinforced their market presence owing to the need for close integration with the vine growers.

INDUSTRY PROFILE

Description of the sector

The sector includes the production of wine and other beverages based on fresh grapes (NACE 425) and the manufacture of cider and of wines (including sparkling wines) and other beverages obtained by fermenting fruit juices other than grape juice (NACE 426).

Main indicators

Production and consumption figures expressed in current values do not show the reduction that is clearly highlighted by the change in physical quantities; the positive trend in the figures is due partly to an inflationary effect and partly to the reorientation of production and consumption towards high quality wines.

The trade balance for 1990 and 1991, though positive, reflects decreasing exports in those years after a sizeable increase in 1989.

Employment levels, which decreased sharply in 1978, through to be mid-eighties stabilised after 1988.

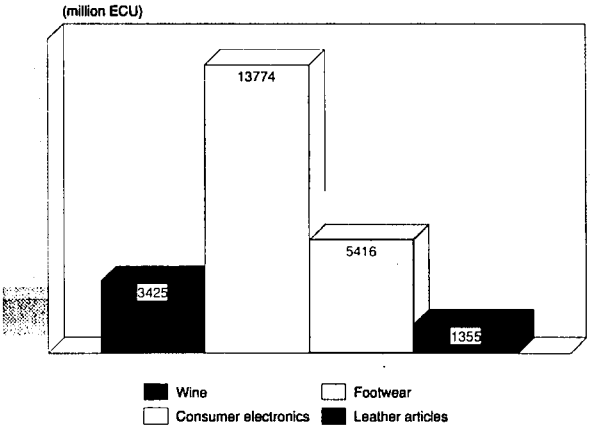
France had the highest of value added in 1991, more than 30% higher than the runner-up, Spain. France also has the highest vine and wine output in terms of amount produced, and is especially oriented towards high-quality, locally produced wines.

Spain's value added is also very high, compared to the other wine producing countries. In terms of actual quantities, between 1983 and 1991 Spanish production decreased. During those years, there was a shift towards higher quality production, which helped Spain retain its high value added in the face of decreases in production in volume terms.

Italy, the top wine-producing country in the EC until 1989, has not only been overtaken by France in terms of actual quantities produced, but also shows a value added level which has been more than halved compared to French levels. In Italy the substantial production of table wine has been penalised on both the domestic and international markets by the reduction in the daily consumption of table wines. In addition, continuing concern about methanol-adulterated wine following the scandal in 1986, has also had an effect on demand for Italian wine.

Germany and the United Kingdom have very similar value addeds. German production, which was generally stable during the 1980's, is targeted to a market that is increasingly oriented towards sparkling wines, which have a higher value added than that of still wines and which have been the object of a more intense brand-name policy. British production, negligible in terms of amount produced, is nevertheless aimed at a high-quality market segment.

Figure 1: Wine
Value added in comparison to other industries, 1991



Source: Eurostat

The low level of value added in Greece reflects both a fragmented supply system and the variable quality of its outputs.

Recent trends

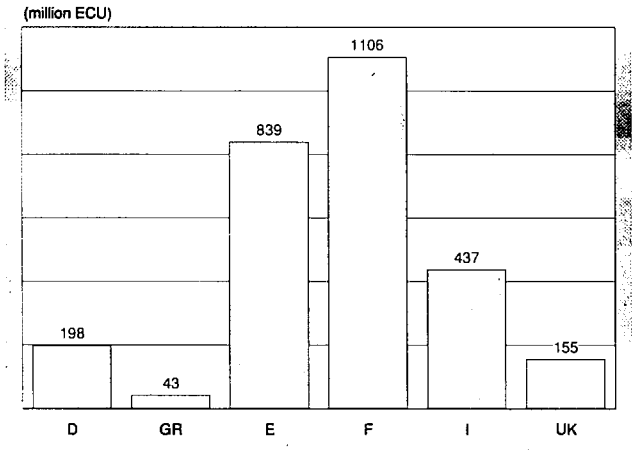
The positive production trend in constant prices, given the downswing shown in the actual quantities in the period between 1982 and 1991, reflects an increase in the average unit value of European production in real terms. The increase in the qualitative level also reflects the decreasing consumption as a whole.

Extra EC exports dropped between 1986 and 1988; this drop was influenced by the protectionist measures adopted by the United States and Japan, which especially affected exports of Italian table wine. Imports have a high growth rate, but are still a negligible portion of consumption

Foreign trade

As a result of the reduction in exports and the increase in imports from outside the EC, the ratio between the two more than halved between 1982 and 1991. Volume of intra-EC trade doubled in that time, and in 1991, growth was more than twice as high as that of extra-EC exports. Volume fluctuated between 97% and 98% of overall imports. The origin of imports has shifted from EFTA countries to the United States.

Figure 2: Wine
Value added by Member State, 1991



Source: Eurostat

Table 1:Wine
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	5 305	5 619	6 181	6 691	6 777	7 331	7 384	7 794	8 574	9 056	9 452
Production	5 891	6 233	6 891	7 462	7 480	8 026	8 068	8 548	9 276	9 713	10 066
Extra-EC exports	604	635	734	795	724	717	709	782	738	701	690
Trade balance	586	613	710	771	703	695	684	754	702	657	614
Employment (thousands)	57.7	57.8	58.0	56.4	54.1	54.0	48.8	48.4	49.0	48.8	48.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Wine
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	5.0	1.4	2.6
Production	4.7	0.4	1.8
Extra-EC exports	2.1	-10.8	-6.7
Extra-EC imports	7.0	7.7	7.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Wine
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	603.9	635.4	734.0	794.8	723.9	716.7	708.7	781.8	738.0	701.5
Extra-EC imports	17.7	22.1	24.0	24.1	20.9	21.6	24.7	27.7	35.9	44.1
Trade balance	586.1	613.3	710.0	770.7	703.0	695.1	684.0	754.1	702.0	657.4
Ratio exports/imports	34.02	28.78	30.57	32.98	34.61	33.20	28.72	28.27	20.53	15.92
Terms of trade index	86.2	92.0	96.9	100.0	97.6	89.4	127.4	131.2	133.1	132.0
Intra-EC trade	746	788	831	935	1 008	1 100	1 212	1 297	1 428	1 441
Share of total imports (%)	97.7	97.3	97.2	97.5	98.0	98.1	98.0	97.9	97.5	97.0

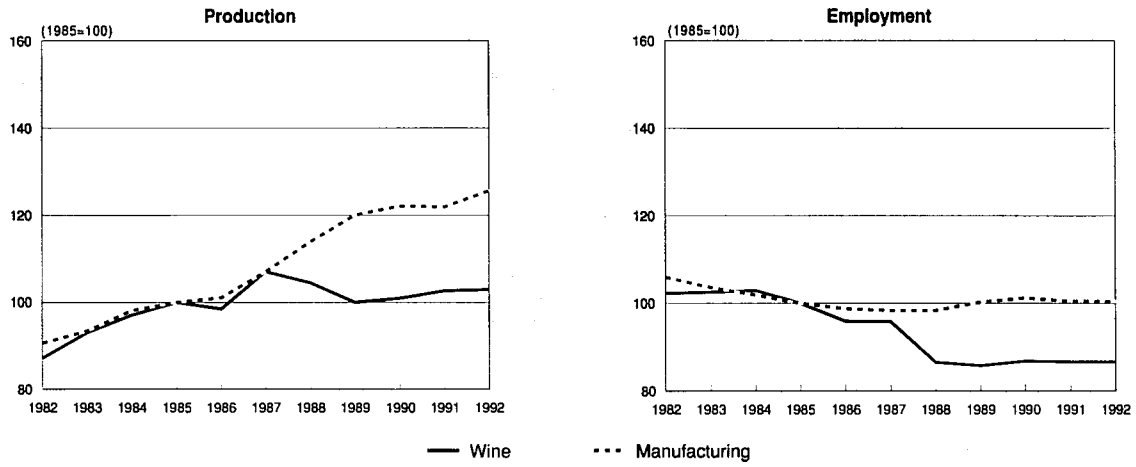
(1) Estimates
Source: Eurostat

Table 4: Wine
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	41.1	44.7	43.3	48.6	48.7	53.0	59.2	54.2	57.2	58.6
Productivity index	84.6	92.0	89.2	100.0	100.1	109.0	121.8	111.5	117.7	120.5
Unit labour costs index (3)	78.6	82.8	90.2	100.0	104.8	109.6	115.7	126.5	143.5	N/A
Total unit costs index (4)	75.6	80.8	87.7	100.0	106.0	115.3	122.0	136.2	146.5	154.6

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Wine
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

Exports to the United States have decreased, partly as a result of protectionist measures adopted in response to the normative restrictions imposed by the EC on American meat imports. The latest measures taken in the United Sates have set limits on the import of EC table wines containing procimidone, a fungicide widely used against grey mould. Exports to Japan have grown.

MARKET FORCES

Demand

Since the early 1970s, consumption of alcoholic beverages has experienced a reduction in demand linked to the evolution in patterns of food consumption. The progressive shift of increasingly large segments of the population from manual activities towards more sedentary activities, together with a rise in income levels, has led to increased dietary concern and the need for higher quality food products. Wine was used habitually as a caloric supplement, but the need for wine in this capacity has deteriorated.

Instead, demand for wines has been moving towards higher quality, while overall consumption has decreased. This has occurred in nearly all European markets and especially in countries with high per capita consumption levels: Italy, France, Greece, Spain and Portugal. The reduction in wine consumption has also been affected by the availability of non-alcoholic substitutes.

Supply and competition

Competition inside the EC is conditioned by the trend in favour of the higher quality-price segments. France, which has traditionally produced quality wines, overtook Italy in terms of actual quantity produced in 1990. In spite of the shrinking of the internal market, both intra and extra-EC French exports have made significant steps to catch up with Italian levels. Table wine is the most significant portion of Italian production. Italian wine is greatly affected by the competition from Spanish, Greek or North African wines, whose musts are already imported in quantity in Italy, due to a much lower cost structure.

Although Italy regained the world leadership in volume exports in 1990, which had been lost as a result of the methanol

Table 5: Wine
Consumption, 1989

	(million litres)	1989/84	Per capita (litres)
EC	14 766	-3.9	36.8
Belgique/België	241	15.3	24.3
Danmark	116	23.4	22.6
BR Deutschland	1 640	17.1	26.6
Hellas	313	-14.3	31.1
España	1 490	-11.9	38.1
France	5 050	-0.2	90.0
Ireland	38	15.2	10.8
Italia	4 300	-10.0	74.5
Nederland	240	17.1	16.2
Portugal	590	-36.9	57.2
United Kingdom	748	27.0	13.1

Source: Euromonitor

Table 6: Wine
Production in volume

(1000 hl)	Average (1983-85)	Average (1986-88)	Average (1989-91)	Growth % (1989-91/1983-85)
EC	206 226	200 713	172 805	**-16.2**
Belgique/België	2	2	2	**0.0**
BR Deutschland	12 801	8 907	11 322	**-11.6**
Hellas	4 925	4 528	4 134	**-16.1**
España	34 556	36 399	30 732	**-11.1**
France	70 135	70 368	60 539	**-13.7**
Italia	74 539	70 715	58 156	**-22.0**
Luxembourg	198	136	175	**-11.6**
Portugal	9 056	9 652	7 730	**-14.6**
United Kingdom	14	6	15	**7.1**

Source: Eurostat

scandal, yield on Italian exports is rather low. The problem of increasing the quality of Italian vineyard production is all the more complex because of its low-level export market. Small margins leave little room for investments aimed at increasing quality.

European production also has to cope with growing extra-European output. Argentina, ex-USSR countries, the United States, and South Africa have reached high production and quality levels. The United States, Bulgaria and the former Yugoslavia have also established themselves as important exporting countries.

Production process

The productive process has not undergone any recent changes. A strong integration with the primary agricultural sector affects this field. The techniques of vine cultivation, implantation and maintenance are fundamental in determining the quality of the wines. Growing, harvesting, processing, bottling and ageing are thus strongly integrated. Hence, both in Italy and in France the cooperative method of production plays a significant role. During the 1980's the increase in productivity in the EC was lower than the trend in overall unit and labour costs.

INDUSTRY STRUCTURE

Companies

The cooperative companies in France have about 60% of the market share in French table wines, about 40% in quality wines, and about 36% in champagne. The market share of table wines controlled by cooperatives is estimated to be higher in Italy than in France. Cooperatives are significant in the quality wines segment of Italy as well. The quality still and sparkling wine market contains old, established, traditional family concerns such as Gancia and Antinori, although they tend to have low market shares.

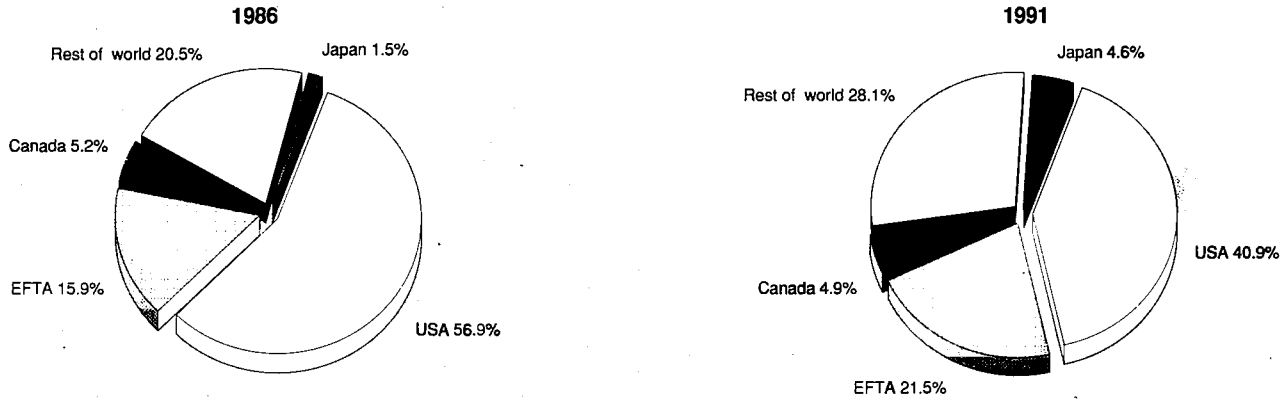
There are very few companies that operate in significant levels in more than one EC market. These include Pernod Ricard, Allied Lyons, Seagrams, LVMH, Castel, and Grand Metropolitan. Altogether, these companies control less than 15% of the EC market share.

Strategies

Market structure determines the adoption of different strategies that are often followed simultaneously.

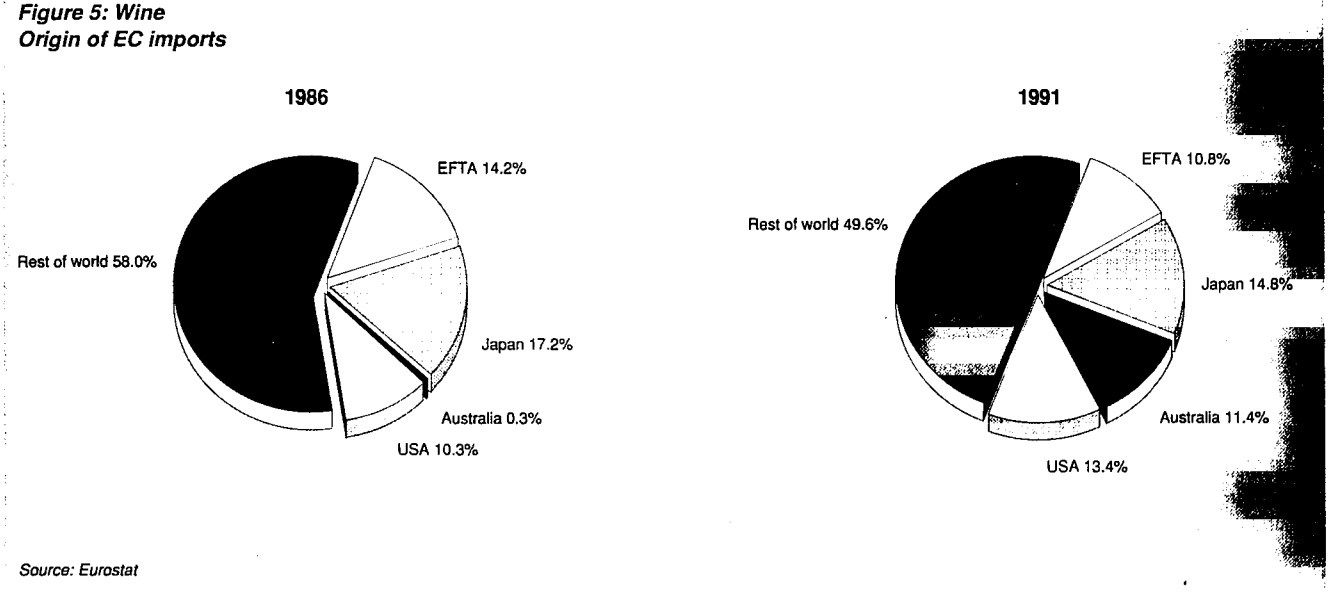
The cooperatives, which are especially strong in the table wines sector, acknowledge that their strength is the close integration with agricultural production. Although there have not been any significant innovations in the production process of the wine itself, research into hybrids, the adoption of mechanised techniques of pruning, ploughing, pesticide sprinkling

Figure 4: Wine
Destination of EC exports



Source: Eurostat

Figure 5: Wine
Origin of EC imports



Source: Eurostat

Table 7: Wine
Expected real annual growth rates

(%)	1993	1993-96
Apparent consumption	0.4	0.4
Production	0.3	0.3
Extra-EC exports	-7.0	-7.0

Source: Prometeia

and harvesting have strongly increased agricultural output, thus contributing to cost containment.

In the quality wines sector, a good deal of attention is paid not only to the quality of the raw material, but also to fermentation, bottling and ageing, all of which are crucial in the determination of a particular kind of wine-making. A brand-name policy is pursued by way of advertising campaigns.

ENVIRONMENT

The pesticide methods used in grape growing are among the most polluting phases of the process, if the growing of grapes is included as part of wine-making. However, this is a problem which affects all agricultural cultivation. From the point of view of the actual production process, there are no aspects with any particular environmental impact.

Packaging, especially disposable glass, creates a waste disposal problem which Europe has been dealing with for some years by means of differentiated refuse collection and the establishment of recycling consortiums.

OUTLOOK

The well-established trend towards a fall in consumption in the EC is expected to continue through 1995 and probably longer. The incentives adopted by the EC to encourage the uprooting of vines (27,000 hectares in France, 15,000 in Italy and 1,000 hectares in Greece) has not been effective because of the increase in average agricultural yields. For this reason, in 1990 and 1991, output surpluses built up. It is believed that the measures presented by the EC during 1990, aimed at cutting back the surplus, may start being effective between 1992 and 1995.

Exports will continue along a stable path. The table wines will continue to be strongly affected by price competition from East European and North African countries. The quality wines, in a higher price-quality segment, will undergo an increase in export volume.

Producers will thus have an opportunity to expand into the quality wine segment to offset decreased consumption of table wines. However, it is difficult to establish and to maintain a position in the quality wines sector.

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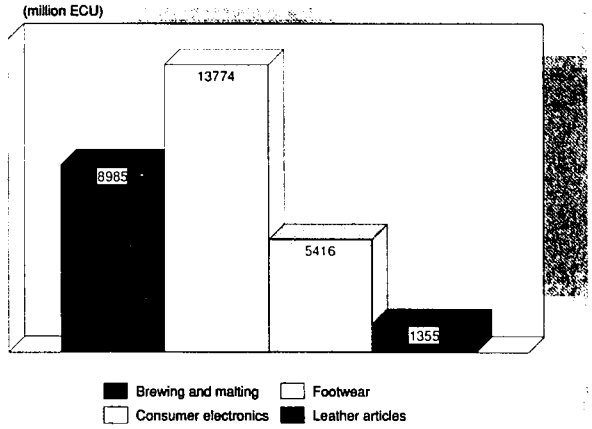
The industry is represented at the EC level by: Comité de la communauté économique européenne des industries et de commerce des vins (COMITE VINS). Address: Rond Point Schuman, 9, Bte 4, B-1040 Brussels; tel: (32 2) 230 9970; fax: (32 2) 230 4323.

Brewing and malting
NACE 427

The brewing and malting sector is undergoing worldwide consolidation due to mergers, acquisitions and joint venture activity. In northern Europe (where beer consumption is heavy), demand is stable and has almost reached saturation level, while in smaller beer markets, like Italy, Portugal and Spain, demand is increasing. The recently marketed low and non-alcoholic beers are gaining popularity among consumers. Changes in European life styles have partly altered the beer distribution system which has caused a decline in home deliveries in favour of supermarket sales. This sector may be negatively affected by the current decrease in the 18 to 35 year old age population, which is usually characterised by heavier beer consumption.
In Europe, this sector holds a dominant position in comparison to other alcoholic drinks. European production of malt accounts for about 40% of world total production.

Figure 1: Brewing and malting
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

Through a fermentation process, beer is obtained from malt. Its alcoholic degree is variable. According to its production process, beer may be classified into the following three main categories:

- low fermentation beer
- high fermentation beer
- spontaneous fermentation beer (typical of Belgium).

The sector also includes non-alcoholic beers, light beers (recently marketed), normal beers (table and premium DCO), special beers and double malt beers. According to the degree of malt toasting, beers can be divided into light and stout ales.

Main indicators

According to the industry's main indicators, the industry experienced a rise in consumption nominal terms which can be attributed to higher prices. In fact, the deflated index shows no real increase in volume consumed between 1990 and 1991.

In 1990 and 1991, extra-EC exports increased by more than 5% annually in nominal terms, strengthening the trade balance. Employment, after ten years of contraction due to the automation of some steps in the beer production process, experienced a slight increase in 1991 and 1992. Germany (West) shows the highest value added, followed by the UK and Spain, where the Spanish beer market has increased remarkably in the last five years.

Recent trends

After a negative trend between 1982 and 1985, beer consumption has almost reached saturation in countries where per capita consumption is already high. Domestic supply has undergone the same trend as demand, contracting by 1.7% per year between 1982 and 1985 and increasing thereafter.

The increase in imports from extra-EC countries is high but, as imports are but one-tenth the level of exports, the trade balance continues to remain positive.

International comparison

EC production has expanded considerably since 1982. Most of this increase however can be attributed to higher prices rather greater production as increases in volume have been limited. While production in the USA has remained relatively stable (as measured in million ECU), production in volume experienced a downturn of 7% in 1991.

Foreign trade

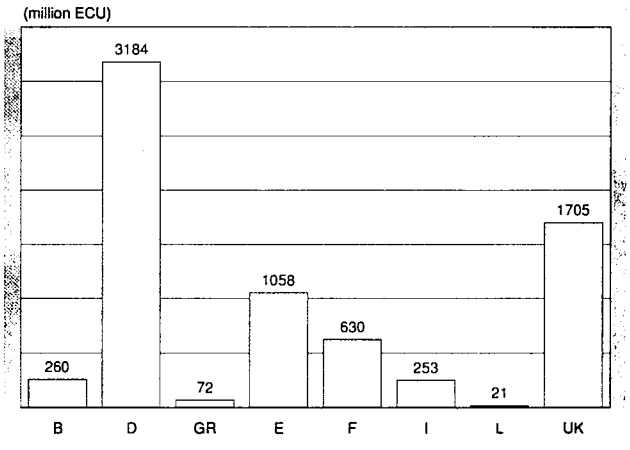
Intra-EC trade increased remarkably during the beginning of the 1990s. Exports, however, increased less rapidly than total imports, thus causing a decrease in the export to import ratio. In 1986, almost half of the total European beer exports were directed towards the USA. Five years later this share has decreased to only 37%.

Intra-EC trade increased and in 1990 and 1991 outperformed extra-EC exports in value terms, however, both account for a very low share of EC production.

In 1991, Mexico gained a predominant position among EC supplier countries by supplying almost a quarter of the total beer imported by the EC. Mexico appears to have absorbed the decrease in imports coming from the EFTA countries.

As for malt (one of the inputs necessary for the production of beer), about 2.5 million tonnes were exported in 1991, whereas little more than 1 million tonnes were imported. 36% of malt is exported to North and South America (of which 40% goes to Brazil), 33% to Asia (of which 65% goes to

Figure 2: Brewing and malting
Value added by Member State, 1991



Source: Eurostat

Table 1: Brewing and malting
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	17 760	18 814	18 719	19 178	19 590	19 817	21 012	21 602	23 226	24 537	26 204
Production	18 549	19 684	19 649	20 127	20 504	20 620	21 803	22 517	24 204	25 531	27 240
Extra-EC exports	823	910	969	992	958	846	840	970	1 049	1 108	1 186
Trade balance	789	870	930	949	914	803	791	914	979	994	1 036
Employment (thousands)	176.6	171.7	163.9	157.8	153.4	147.1	142.4	140.1	138.6	139.0	139.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Brewing and malting
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-1.3	1.2	0.4
Production	-1.1	1.2	0.4
Extra-EC exports	2.6	2.5	2.5
Extra-EC imports	9.6	20.3	16.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Brewing and malting
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	823	910	969	992	958	846	840	970	1 049	1 108
Extra-EC imports	34	40	40	43	44	43	49	56	70	114
Trade balance	789	870	930	949	914	803	791	914	979	994
Ratio exports/imports	24.07	22.83	24.37	22.92	21.85	19.89	17.17	17.37	15.00	9.69
Terms of trade index	86.2	84.4	88.6	100.0	104.2	107.3	113.1	115.8	112.0	110.3
Intra-EC trade	542	588	629	707	739	807	873	962	1 131	1 273
Share of total imports (%)	94.0	93.6	94.0	94.2	94.4	95.0	94.7	94.5	94.2	91.8

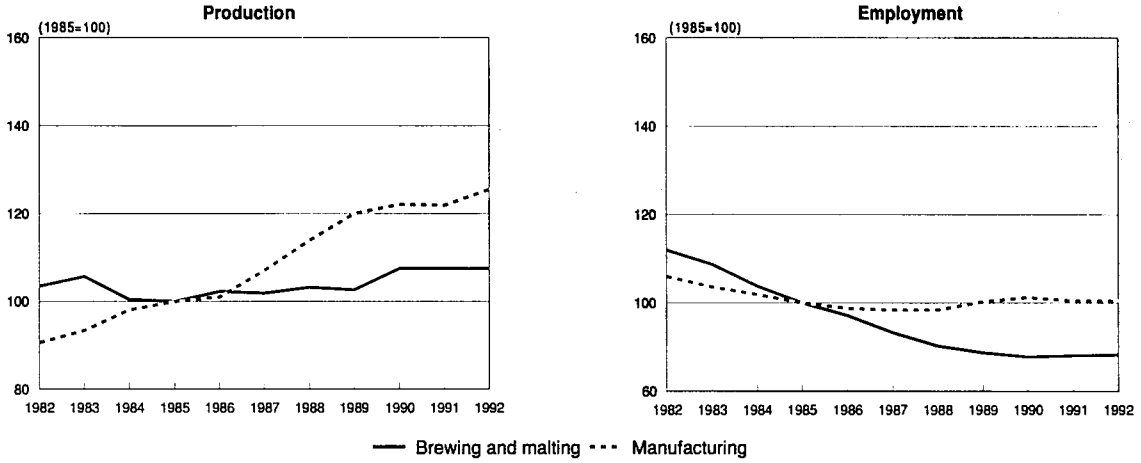
(1) Estimates
Source: Eurostat

Table 4: Brewing and malting
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	49.4	52.0	48.3	51.2	56.2	59.5	60.7	61.1	64.4	64.7
Productivity index	96.5	101.4	94.3	100.0	109.7	116.2	118.5	119.2	125.8	126.2
Unit labour costs index (3)	84.0	90.0	95.5	100.0	104.2	110.0	113.6	120.9	126.4	N/A
Total unit costs index (4)	83.4	91.6	97.3	100.0	107.1	112.3	124.5	133.9	145.4	152.0

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Brewing and malting
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

Japan) and the 22% to Africa (of which 37% goes to South Africa).

The main European malt exporting countries are France (where intra-EC and extra-EC exports are high), the UK, and Germany.

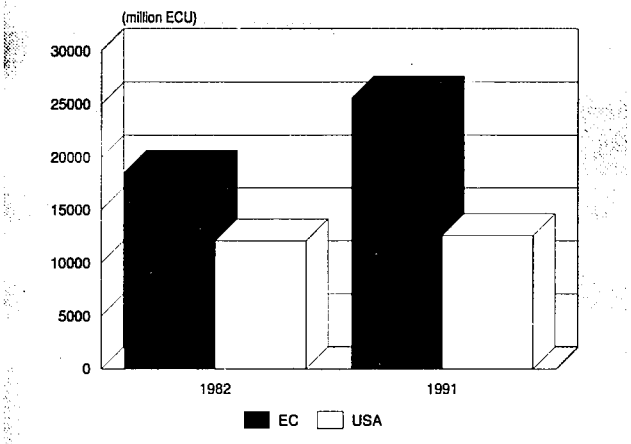
MARKET FORCES

Demand

Beer is traditionally consumed in many European countries. In countries where wine is preferred, such as France and Spain, beer has also become popular. In southern Europe, demand is rather seasonal (in Italy 40% of consumption of beer is between June and September).

In northern European countries, strong and medium beers are preferred (in Sweden their consumption has increased by 50.4% and 20.9% from 1985 to 1989, respectively), despite the fact that distribution is in some cases controlled by public authorities.

Figure 4: Brewing and malting
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Beer is consumed mainly in restaurants, hotels and pubs, but home consumption is rapidly increasing due to changes in purchasing habits following improvement in the distribution system. Young people between 18 and 35 years old are the main beer consumers. In some countries, like Spain, the consumption of beer by young women is increasing.

In Europe the per capita consumption of beer varies between 100 litres (in the UK, Germany, Benelux, Denmark, Austria and Ireland) and little more than 20 litres per year (in Italy). In northern Europe, beer prices are high (Norway, Sweden, and Finland). Prices tend to be more competitive in countries where consumption is relatively low. One exception is Switzerland, where prices are high although consumption is not particularly significant.

Supply and competition

From 1985 to 1989, exports decreased domestic demand increased. In the same period, extra-EC imports increased by 30%. Intra-EC trade has allowed to satisfy the demand in specific kinds of beers. Countries with a negative domestic export/import ratio are Italy, Spain, Portugal and England. Germany, Denmark and Holland, on the other hand, mainly export high quality beers.

The brewing and malting industry is generally run by few companies, but in Germany it is extremely fragmented (1200 beer producers, 70 of which account for 70% of the market). From 1982 to 1984, sales and profit margins decreased. From 1985 onwards the decrease in raw material and energy prices has caused profits to return to 1982 levels.

Industrialisation and mass production have caused the closing of many small local companies and a decrease in the number of employees in the industry. Some steps in the production process have been automated, thus increasing production capacity (Spain excluded).

Production process

The cost of labour is high in Belgium, Germany and France, whereas in Portugal it is lower. In Spain the industry is undergoing a modernisation process which will be completed by 1995.

The malt industry has a structure similar to the beer industry. In 1991, Germany owned about 62% of European malt producing firms; however, global production capacity accounts

Table 5: Brewing and malting
Beer statistics, 1991

	Number of breweries	Number of employees	Total production (1000 hl)	Imports world (1000 hl)	Exports world (1000 hl)	Per capita consumption (litres)
Belgique/België	121	9 000	13 799	459	3 145	112.0
Danmark	22	4 450	9 672	16	2 560	125.9
BR Deutschland	1315	65 000	117 993	2 809	6 174	142.7
Hellas	N/A	N/A	3 670	175	58	N/A
España	30	15 000	26 447	1 389	249	71.0
France	33	N/A	20 991	2 906	1 017	40.5
Ireland	7	3 023	6 395	651	2 615	123.0
Italia	21	4 166	10 699	2 476	165	22.5
Luxembourg	5	312	572	42	181	116.1
Nederland	16	8 532	19 893	771	7 025	90.5
Portugal	8	3 610	6 882	N/A	376	63.0
United Kingdom	N/A	44 000	57 359	5 329	1 842	106.2

Source: CBMC

Table 6: Brewing and malting
Maltings, 1991

	B	DK	D	F	IRL	I	NL	UK	Total
Independent	8	4	73	8	2	3	4	12	114
Associated to breweries	4	2	29	1	2	0	1	5	44
Associated to other industries	0	0	0	0	1	1	0	5	7
Total	12	6	102	9	5	4	5	22	165

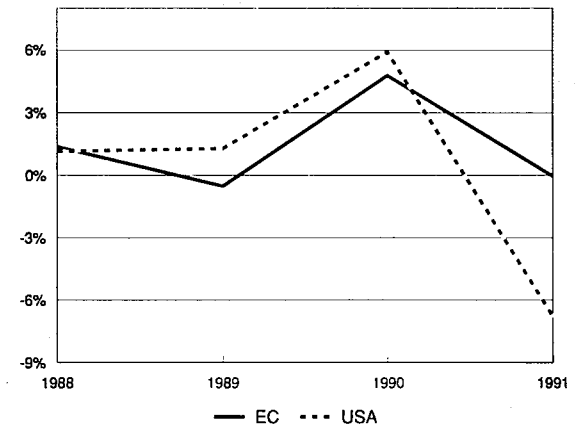
Source: EUROMALT

Table 7: Brewing and malting
Number of malting plants by capacity size, 1991 (1)

Capacity size (thousand tonnes)	0-49		50-199		200+		Total	
	No. of plants	Capacity	No. of plants	Capacity	No. of plants	Capacity	No. of plants	Capacity
Belgique/België	5	151	7	535	0	0	12	686
Danmark	5	97	1	73	0	0	6	170
BR Deutschland	95	1 120	6	380	1	300	102	1 800
France	2	28	4	563	2	809	8	1 400
Ireland	4	72	1	90	0	0	5	162
Italia	4	122	0	0	0	0	4	122
Nederland	3	66	2	152	0	0	5	218
United Kingdom	13	148	7	819	2	591	22	1 558
Total	131	1 804	28	2 612	5	1 700	164	6 115

(1) All maltsters whether independent or associated with the brewing distilling or other industries are included
Source: EUROMALT

Figure 5: Brewing and malting
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

for only 29%. France and England, on the other hand, have few malting plants, but production capacity is high.

Although in most of Europe, 70% of malt producing companies are independent, in Germany one-third of malt firms are associated with the beer industry. In Europe, malt production has increased after 1990 and is expected to further increase up to 300 000 tonnes from 1992 to 1993. This increase is also expected in extra-EC countries.

INDUSTRY STRUCTURE

Companies

European beer producers are made up of large multinationals and domestic companies. Heineken NV is the third largest beer producer in the world and the largest in Europe. It accounts for 3% of the world market, and in Holland accounts for 58%, in Italy for 20%, in France it accounts for 25%, and maintains a stable market position in Spain and Greece. BSN, by purchasing 22% of the third largest Spanish firm in the industry, has become the second largest beer producer in Europe.

Among domestic producers, Italian Peroni has a good market position and production has increased by more than one third since 1988 when the firm purchased Wuhrer from BSN. The French company Francaise de Brasserie resulted from the fusion between Union de Brasserie, Brasserie Pelforth and Heineken France.

Strategies

Beer producers try to increase their profits by increasing their market shares and persuading consumers to pay a high price for higher value added products. Moreover, they differentiate their products on the basis of taste and an enhanced marketing strategy.

Main producers are starting to market new "dry" beers whose success is uncertain. One challenge for "dry" beers is establishing whether or not its taste is truly different and not just a marketing gimmick. A second problem is posed by competition from low alcoholic products which are favourably accepted at the moment.

The investments made in the 1980s have allowed the automatisation of certain steps in the production process in order to increase productivity. Large advertising investments have also been made.

In comparison to local companies, beer multinationals are better positioned for increased international sales. In order to establish global brands, consolidation and globalisation are needed, thus multinationals are expanding through mergers, acquisitions and joint ventures. Spain, in particular, is a open market for beer multinationals looking to increase their capacity.

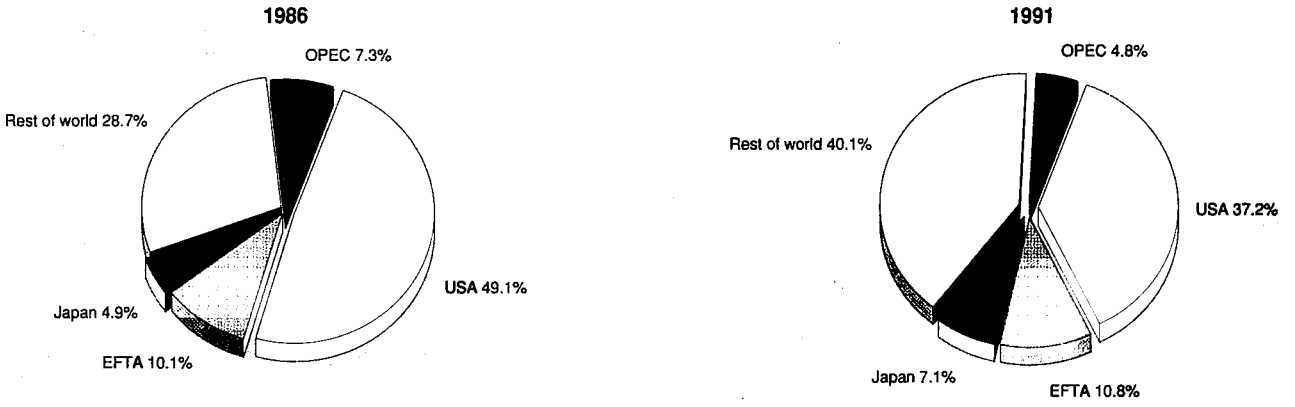
In 1990, the British company Guinness became the fourth largest beer producer in the world in terms of operating profits through the acquisition of the Cruzcampo, the main Spanish beer producing company.

In 1992, BSN acquired 22% of Cervezas San Miguel, the third largest Spanish brewing company. Looking beyond the EC's borders, Heineken is expanding into East European countries (notably Hungary). In addition, the British company Grand Metropolitan has merged with the Australian company, Elders.

ENVIRONMENT

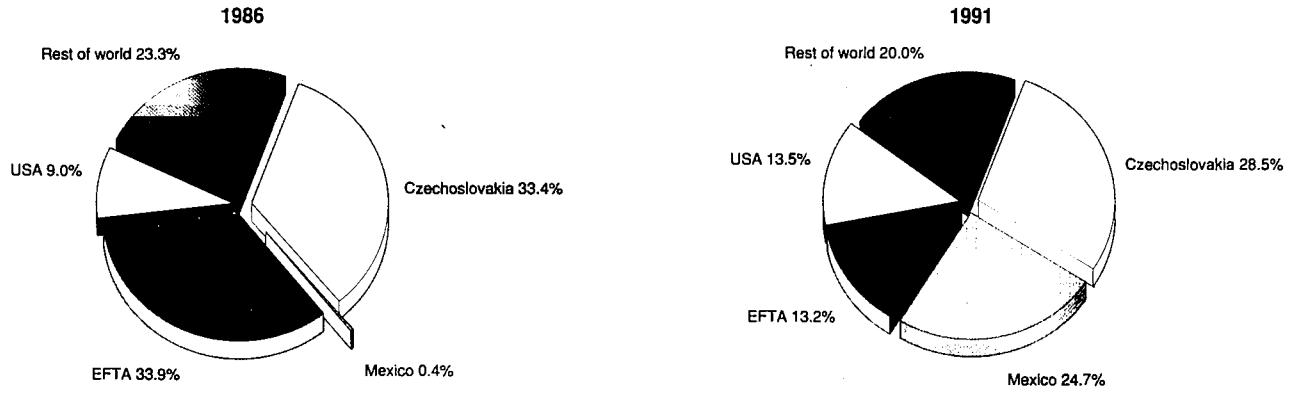
The main environmental issue for the beer industry is recycling. For home consumption, 330ml bottles are mainly used but the expansion of supermarket sales has made returnable empties unpopular. Can packaging restricts recycling efforts

Figure 6: Brewing and malting
Destination of EC exports



Source: Eurostat

Figure 7: Brewing and malting
Origin of EC imports



Source: Eurostat

as no widespread aluminium recycling networks have been established.

REGULATIONS

The revocation of the purity law in Germany ("reinheitsgebot") is expected as this law limits imports. According to this law, beer must be made of only four ingredients: hop, malted barley, yeast and water.

In order to cover the yearly purchasing and processing cycle of the breweries, EC malting plants need licences with a validity of 12 months.

OUTLOOK

In the main beer producing countries, stable demand is expected over the next few years while in small markets like Italy and Spain, demand is expected to increase. In Italy, a 2% to 3% average growth rate per year in volume is expected due particularly to demand from younger segments of the population and increased advertising.

In Germany and in the UK, an increase in demand will be difficult because of anti-alcoholic campaigns in defence of public health and an increase in wine consumption (which is considered to pose lower health hazards). Beer consumption, therefore will probably be stable for the next two or three years as consumers are not expected to change their consumption habits drastically.

Table 8: Brewing and malting
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-0.1	0.0
Production	0.0	0.1
Extra-EC exports	4.0	5.0

Source: Prometeia

Written by: Prometeia Calcolo Srl
The industry is represented at the EC level by: Confédération des Brasseurs du marché commun (CBMC). Address: Boulevard du Souverain 191-197; Box 10, B-1160 Brussels tel: (32 2) 672 2392 fax: (32 2) 660 9402; and,
Comité européen des Malteries de la CE (EUROMALT). Address: Avenue des Gaulois, 9; B-1040 Brussels tel: (32 2) 733 1264 fax: (32 2) 734 6702.

Soft drinks, mineral waters

NACE 428

The consumption of soft drinks and mineral waters is increasing in all European countries due to the use of PET plastic containers. The difficult disposal of plastic materials, however, has caused serious environmental issues that have slowed consumption growth in some countries. During the 1980s, the mineral water industry moved towards increased concentration through M&A activity. In the soft drinks sector, isotonic beverages are experiencing significant expansion.

INDUSTRY PROFILE

Description of the sector

The sector includes soft drinks which are ready-to-drink, water-based drinks, optionally sweetened, acidulated, carbonated and which may contain fruit, fruit juices and salts. The flavour may derive from vegetable extracts or flavourings.

The sector also includes natural mineral waters, spring waters or table waters, all of which can either be sparkling or still.

Main indicators and recent trends

During the 1980s, apparent consumption increased significantly, particularly between 1985 and 1990, due to the fact that mineral waters were undergoing a significantly expansive trend in the major European markets. Production data mirrored consumption trends although they tended to be slightly higher. Exports also rapidly increased even though they were low with respect to production (2.4%). The trade balance was positive. Because of a strong increase in consumption and production, employment rebounded in 1987.

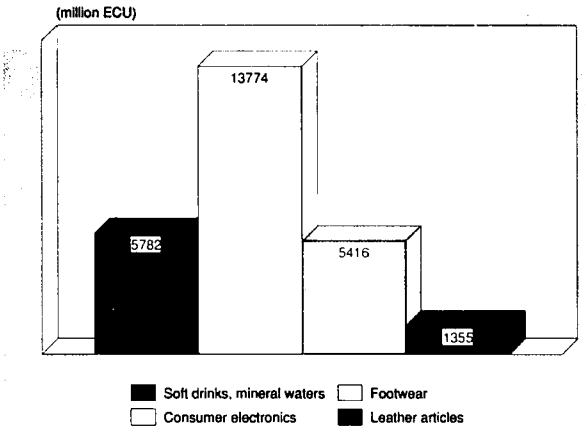
The German non-alcoholic beverage industry has the highest value added in the EC. Germany's production of both mineral waters and soft drinks increased strongly over the last several years. Average prices for soft drinks and mineral waters in Germany are also among the highest in Europe. Spain, the UK, France and Italy show a medium value added. Greece and Belgium show the lowest value added. The Greek market is characterised by a low consumption combined with a strong seasonal component

Consumption of mineral waters and soft drinks in Belgium is rapidly increasing with a substantial share of mineral waters imported from France.

Foreign trade

Intra-EC trade is twice as large as extra-EC exports and accounts for about 90% of total imports. This is due to difficulties in transporting mineral waters and to the ease with which production facilities for soft drinks may be set up near the final markets. As a result, trade volume decreases as the distances to final markets increase. Imports from EFTA countries account for more than 70%. Interestingly, exports are mainly directed towards the United States, with particular emphasis on flavoured sparkling waters, with Perrier as the market leader. Exports to East European countries such as Poland increased and exports to EFTA countries remain high. The extra-EC export to production ratio is increasing but is still very low (2.3% in 1982 and 2.4% in 1991). In 1991, the extra-EC import to apparent consumption ratio was less than 1%.

Figure 1: Soft drinks, mineral waters
Value added in comparison with other industries, 1991



Source: Eurostat

MARKET FORCES

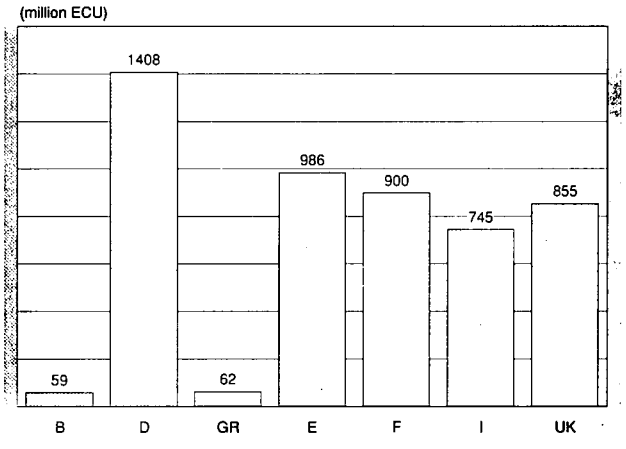
Demand

The increase in demand for this sector in recent years, especially for mineral waters, may be attributed to various factors. The first is the increase in average income in Europe, given the high income elasticity of mineral waters and soft drinks. The second reason for an increase in mineral water consumption is the concern of consumers regarding the quality of tap water.

The third reason is connected to packaging technology, in particular to the adoption of PET. PET is a special plastic material which allows the transportation of sparkling water in plastic bottles, which was not possible with PVC plastic materials. In many markets, the use of PET allows the product to be channelled through the main distribution system, with non-returnable, empty bottles or "empties". In Germany, however, a one DM deposit has been introduced for each PET bottle, which discourages foreign exporters from entering the market as difficulties arise in collecting empty bottles.

The soft drink market is increasing even though its growth rate is lower than that of the mineral waters market. Growth rates are low in areas where per capita consumption is high.

Figure 2: Soft drinks, mineral waters
Value added by Member State, 1991



Source: Eurostat

Table 1: Soft drinks, mineral waters
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	7 674	8 401	8 562	9 540	10 567	11 309	12 654	15 272	16 252	17 520	18 765
Production	7 835	8 568	8 773	9 746	10 766	11 509	12 855	15 511	16 523	17 872	19 184
Extra-EC exports	177	186	237	233	230	232	246	308	341	422	485
Trade balance	161	167	211	206	199	199	201	239	272	353	419
Employment (thousands)	102.8	100.9	97.1	96.3	95.8	95.0	98.0	100.7	102.8	103.8	103.8

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Soft drinks, mineral waters
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.0	6.5	5.3
Production	3.0	6.6	5.3
Extra-EC exports	5.0	9.5	8.0
Extra-EC imports	22.5	14.4	17.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Soft drinks, mineral waters
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	177	186	237	233	230	232	246	308	341	422
Extra-EC imports	16	19	26	27	31	33	45	69	70	69
Trade balance	161	167	211	206	199	199	201	239	272	353
Ratio exports/imports	11.41	9.86	9.26	8.57	7.35	7.10	5.48	4.46	4.91	6.09
Terms of trade index	83.9	85.2	90.3	100.0	95.2	103.3	90.2	84.7	94.3	92.4
Intra-EC trade	250	267	313	332	395	470	544	698	779	861
Share of total imports (%)	94.1	93.4	92.4	92.4	92.7	93.5	92.4	91.0	91.8	92.6

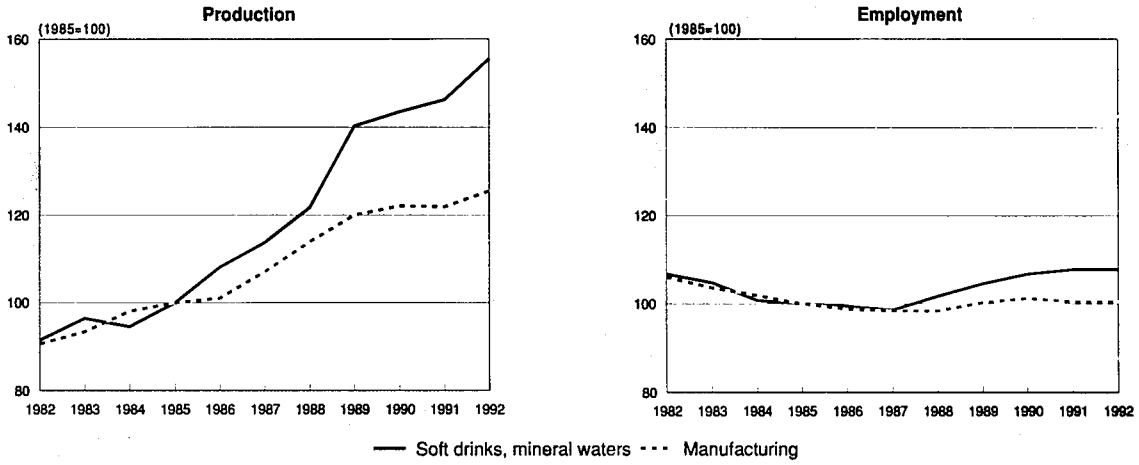
(1) Estimates
Source: Eurostat

Table 4: Soft drinks, mineral waters
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	42.1	45.0	43.9	45.3	48.6	51.3	52.7	53.9	55.9	55.7
Productivity index	93.0	99.3	97.1	100.0	107.5	113.4	116.5	119.2	123.6	123.1
Unit labour costs index (3)	81.3	87.1	92.8	100.0	104.9	110.3	116.1	125.4	132.1	N/A
Total unit costs index (4)	72.7	82.9	90.0	100.0	109.2	116.7	121.5	146.3	151.6	167.4

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Soft drinks, mineral waters
Production and employment indices compared to EC manufacturing



1992 are Prometeia estimates
Source: Eurostat

Isotonic drinks, recently introduced in Europe, are remarkably successful source of refreshment which is particularly useful in sports.

Supply and competition

Some factors which affect competition between producers inside the EC countries have already been mentioned in the analysis of demand. In Germany, for instance, the deposit on plastic bottles and the enforcement of a 50 year old law pertaining to "heilwasser" caused a remarkable decrease in exports (particularly from France.) Competition is also limited by transportation costs, which affect both intra-EC and extra-EC trade.

Production process

Changes in the production process are attributed mainly to innovative bottling techniques. The use of PET materials has allowed increases in internal plastic bottle production and sparkling-water bottling. This new process has caused concentration of production due to the existence of scale economies in PET bottle production. During the 1980s, the labour productivity index increased significantly, although total unit costs and labour costs were higher.

INDUSTRY STRUCTURE

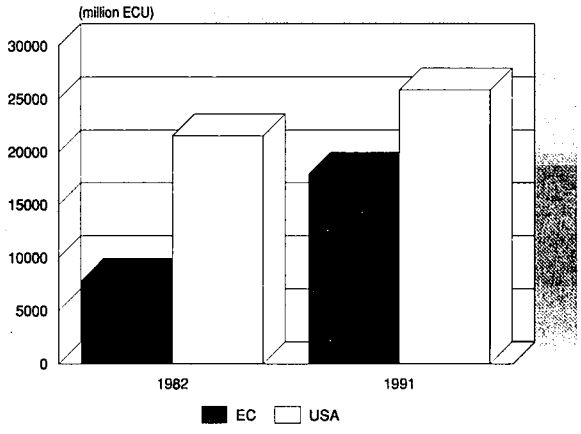
Companies

Within the soft drinks industry, a major distinction exists between the firms which market particular brands and the firms which actually bottle and distribute such products. Although certain brands are owned by multinational firms, many bottling plants operating in the soft drinks industry are small and privately owned. During the 1980s, market concentration through acquisitions occurred as larger firms attempted to increase their market share. As most mineral water companies are physically concentrated around a specific source of water, the distinction between the brands and the bottling firms in that sector tends to be much smaller.

The main companies operating in the mineral waters sector are BSN (Evian), Perrier, Nestlé and Brau & Brunner, which accounted for a total market share of approximately 35% to 40%.

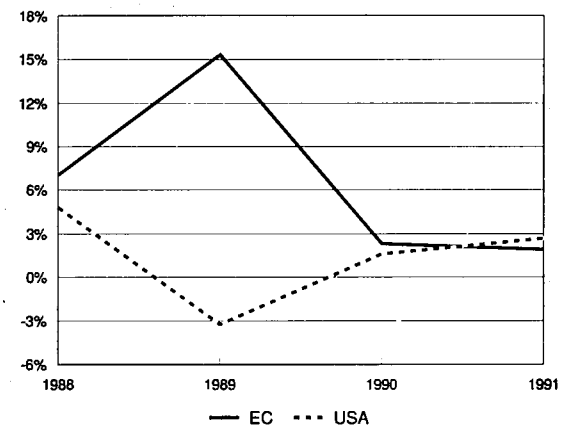
In the soft-drinks market, the top companies are Coca-Cola, Cadbury Schweppes and Pepsi-Cola, which combined have a 50% share of the EC market.

Figure 4: Soft drinks, mineral waters
International comparison of production at current prices



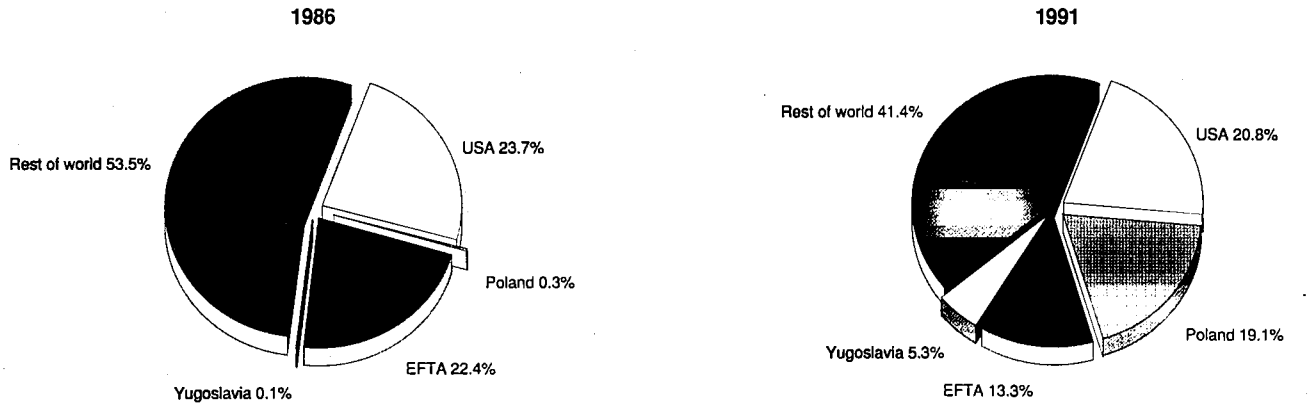
Source: Eurostat, Census of Manufacturers

Figure 5: Soft drinks, mineral waters
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Soft drinks, mineral waters
Destination of EC exports



Source: Eurostat

Strategies

The firms operating in the mineral water industry have adopted various strategies. Some have increased production to keep prices stable. With respect to PVC materials, the use of PET materials has allowed for more wide-spread transport of bottled products, especially sparkling water. The increase in production, the wider distribution area and non-returnable empties (Germany excluded), have allowed the channelling of products through the main distribution system. Subsequently, the products are advertised on a more national level.

Another strategy consists of differentiating flavoured waters on the basis of their specific source. This strategy allows for the setting of a premium price. Perrier is the leader in this strategy, attaining considerable market shares not only in Europe but also in the United States, where flavoured waters are targeted for the high-quality end of the non-alcoholic beverage market.

Another strategy adopted by firms is to operate in a local market ("niche strategy") which allows firms to manage returnable empties more efficiently.

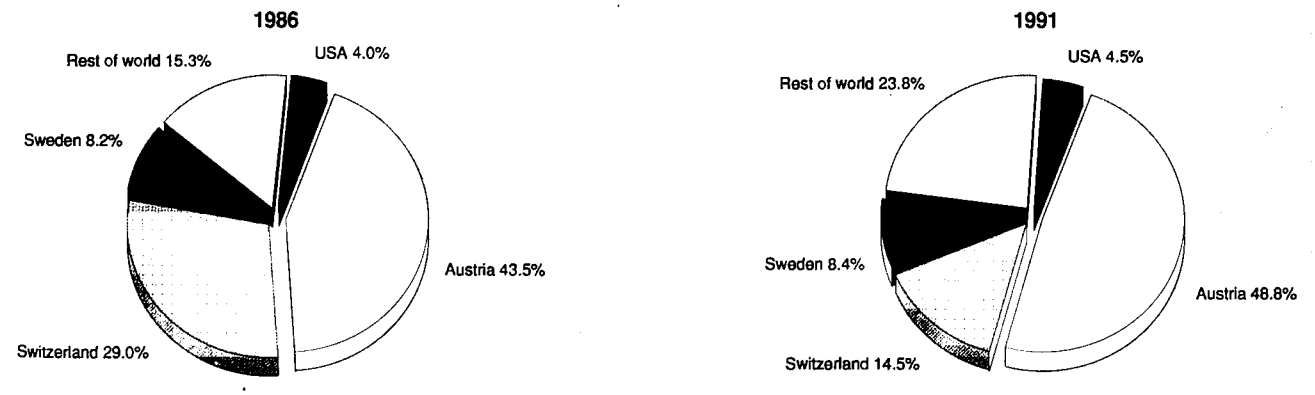
Firms operating in the soft drink industry are global firms which can take advantage of combining the production of homogeneous products with global advertising campaigns. The predominant firms using this strategy are Coca-Cola and Pepsi.

The mineral water industry has been characterised by strong merger and acquisitions activity which has caused a redistribution of competitors' market share. The most remarkable example is represented by the acquisition of Perrier by Nestlé.

ENVIRONMENT

The environmental impact of production is primarily concerned with the disposal of plastic and glass bottling materials. The use of returnable empties and differentiation in collecting urban solid wastes are the two main solutions to pollution problems. Germany has responded to this problem by passing a deposit law in 1988 which favours the collection of packaging waste. Coca-Cola and Pepsi were the first firms to introduce returnable plastic empties in Germany. For 1992, Italian law 474/88 mandates the recycling of 40% of plastic materials used for containers in that country. The establishment of a

Figure 7: Soft drinks, mineral waters
Origin of EC imports



Source: Eurostat

Table 5: Soft drinks
Main indicators by country, 1990

(million litres)	B	DK(1)	D	GR	IRL	NL (5)	P	UK
Consumption (2)	884.9	240.2	5 612.7	535.0	235.5	1 057.0	359.2	6 716.9
Net exports	15.6	0.6	-45.6	N/A	-26.9	241.1	N/A	N/A
Production for home market	696.8	283.4	5 330.4	535.0	180.0	916.8	359.2	N/A
Consumption per capita (3)	89.0	47.0	85.0	52.1	67.3	71.0	35.9	N/A
Number of enterprises (4)	N/A	7	190	15	17	15	63	N/A
Employment (number)	N/A	N/A	22 900	3 243	2 700	2 313	3582	N/A

(1) Only carbonated soft drinks
(2) Production for home market + imports
(3) Litres
(4) Enterprises with 20 or more employees
(5) Number of enterprises and employment-1989 figures
Source: UNESDA

Table 6: Mineral waters
Main indicators by country, 1990

(million litres)	B	D	E	F	I	P
Apparent consumption	851	5 319	1 882	3 995	5 449	266
Production	676	5 200	1 890	5 217	5 450	278
World exports	284	34	15	1 312	74	12
Trade balance	-175	-119	8	1 222	1	12

Source: GESEM, UNESEM, Eurostat

disposal syndicate for plastic containers which would force firms to take part is also being endorsed.

All these measures might hamper free circulation of goods in the Single Market, the Commission has proposed a directive to set up criteria for harmonising those measures. The discharge of Denmark, announced by the Court of Justice on September 20, 1988, from the accuse of having introduced restrictions in the trade of drinks, on the basis of ecological reasons, should be interpreted in this light.

OUTLOOK

In the short run, the increase in consumption and production of non-alcoholic drinks is expected as more consumers decide to substitute such beverages for drinks containing alcohol. The high-income elasticity rate will lead an increasingly large share of the population to reach European consumption rates in richer EC countries. Mineral water consumption will increase as distrust in the quality of tap waters grows. Demand may be hindered, however, as the industry will be required to pay for the disposal and recycling of plastic containers, causing both costs and prices to rise. Mineral water exports will increase with product differentiation in the high-income consumer markets.

Table 7: Soft drinks, mineral waters
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	6.2	6.2
Production	6.3	6.3
Extra-EC exports	9.7	9.7

Source: Prometeia

Risks for the industry include a possible excess supply of the mineral waters, forcing prices and margins to decrease. Another risk is the damaging of mineral water quality through pollution and noxious residuals at the source. The industry will also encounter higher costs from legal measures connected to the disposal of plastic containers.

A major opportunity can be found in the rapid expansion of the market.

Written by: Prometeia Srl
The industry is represented at the EC level by: Union of EC Soft Drinks Associations (UNESDA). Address: Boulevard Louis Schmidt 35 Bte 14, B-1040 Brussels; tel: (32 2) 735 3749; fax: (32 2) 732 5102.

Tobacco
NACE 429

In 1991 the value of production and consumption at constant prices of tobacco products increased in the EC. This expansion is explained mainly by social and demographic changes in Germany, the main consumer and producer of tobacco products in the EC. Before these recent developments, both production and consumption at constant were declining.

INDUSTRY PROFILE

Description of the sector

Within the tobacco sector the following activities can be distinguished:

- growing and initial processing of tobacco;
- manufacturing of tobacco products.

The main products of the industry are cigarettes, cigars and cigarillos. Other tobacco products include smoking tobacco, snuff, chewing tobacco, cut cigarette rag and agglomerated sheet.

Main indicators

In 1991, the real value of EC consumption of tobacco increased quite substantially (5.5%). Germany and the UK, the most important consumers, accounted for a large part (77%) of this increase. In the same year, the real value of production increased by 5.7%. Again, the main part of this expansion was explained by increased production values in Germany and the UK. These two countries are also the main producers of tobacco products; in 1991 they accounted for 65% of the production value and for 47% of the value added for the EC tobacco industry. Employment in the EC tobacco-processing industry fell by 3.6% in 1991. Almost half of this fall in employment is explained by job losses in the UK.

Recent trends

Production and apparent consumption in constant terms displayed similarly descending trends between 1982 and 1986, followed by a period of stagnation and by a significant recovery in 1991 (5.4% for both variables). The 1991 increase in production was almost entirely accounted for by Germany. Employment has steadily fallen since 1983.

The profitability of the industry was enhanced by recent shifts in demand towards the more expensive light cigarettes. This element, together with the drastic reduction in employment experienced by the industry in recent years, contributes to explain the ascending trend of the ratio between value added and employment since 1986.

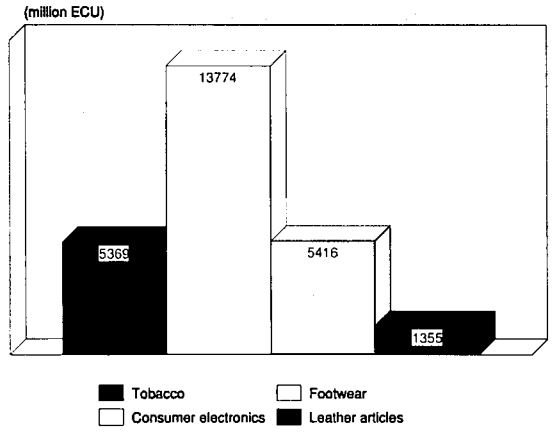
International comparison

Limiting the analysis to cigarettes, the major producers are China (1775 billion pieces in 1988), the USA (694.5) and the EC (625.3). China is also the most important consuming country (1600 billion pieces in 1989), followed by the EC (575.5) and the USA (550).

Foreign trade

EC trade balance of processed tobacco is positive and has improved in recent years. Although extra-EC imports have increased quite substantially (particularly imports from the Canary Islands) extra-EC exports have increased even more (particularly to Hong Kong.) The UK is the major EC exporter to extra-EC countries.

Figure 1: Tobacco
Value added in comparison with other industries, 1991



Source: Eurostat

Intra-EC trade of processed tobacco is not particularly high but becomes quite significant when considered in relation to the value of extra-EC trade. Since 1982, the ratio of intra-EC trade to total imports has never been below 75%. Moreover, intra-EC exports have consistently more than doubled the value of extra-EC exports.

Major net importers from other EC countries are France and Italy while the most important intra-EC exporters are the Netherlands and (to a lesser extent) Germany.

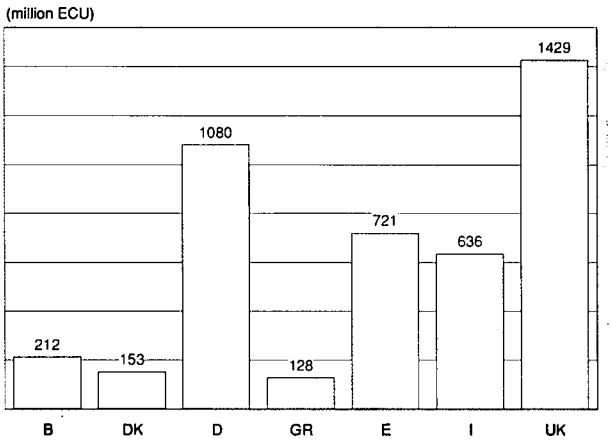
In general, however, exports (both intra and extra-EC) and imports cover a very small proportion of EC production and consumption of processed tobacco.

MARKET FORCES

Demand

EC demand in terms of volume for all tobacco products is declining due to a growing awareness of the health risks of tobacco consumption. Demand of non-cigarette tobacco products in particular shows the most significant contraction as fewer young people are attracted to this market.

Figure 2: Tobacco
Value added by Member State, 1991



Source: Eurostat

Table 1: Tobacco
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	24 650	26 850	27 886	28 343	28 650	29 984	30 386	31 968	33 274	37 052	38 719
Production	24 902	27 251	28 323	28 939	28 986	30 232	30 735	32 427	33 852	37 794	39 306
Extra-EC exports	608	705	665	713	612	595	648	740	890	1 211	1 308
Trade balance	252	402	437	596	336	248	349	459	579	742	587
Employment (thousands)	112.7	113.4	106.5	100.4	96.3	91.3	86.9	82.8	80.8	77.9	74.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Prometeia estimates
Source: Eurostat

Table 2: Tobacco
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-1.6	0.8	0.0
Production	-1.2	0.7	0.1
Extra-EC exports	3.5	6.1	5.2
Extra-EC imports	-34.5	32.3	4.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Tobacco
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	608	705	665	713	612	595	648	740	890	1 211
Extra-EC imports	356	303	229	117	276	346	299	280	311	470
Trade balance	252	402	437	596	336	248	349	459	579	742
Ratio exports/imports	1.71	2.32	2.91	6.09	2.22	1.72	2.17	2.64	2.86	2.58
Terms of trade index	111.0	99.0	91.7	100.0	106.9	118.8	140.4	143.8	155.7	159.3
Intra-EC trade	1 392	1 461	1 481	1 962	1 785	1 768	1 917	2 096	2 259	2 499
Share of total imports (%)	75.3	79.0	82.7	90.1	82.4	79.1	82.1	83.6	84.2	81.4

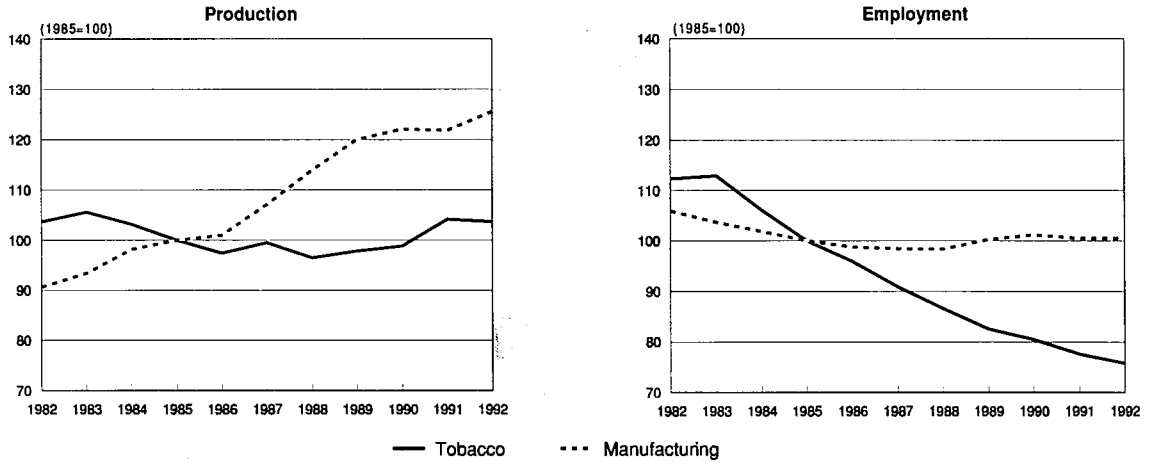
(1) Estimates
Source: Eurostat

Table 4: Cigarettes
Production

(millions)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC	631 945	637 616	640 408	649 352	630 849	624 387	625 339	626 707	626 790	695 300
Belgique/België, Luxembourg	28 710	28 042	27 650	28 363	26 928	26 877	27 046	25 884	25 600	25 900
Danmark	9 920	9 763	10 583	10 966	11 246	11 162	11 144	11 170	11 170	11 400
BR Deutschland	148 166	155 942	162 055	165 587	169 048	162 940	162 092	160 666	164 000	215 000
Hellas	24 533	25 336	27 018	28 523	29 000	28 853	28 780	28 533	28 450	29 500
España	68 220	63 600	75 100	77 270	76 500	80 500	78 400	78 500	79 500	85 000
France	62 510	62 147	60 729	67 376	59 122	54 160	53 307	54 225	53 000	56 500
Ireland	8 136	7 534	7 389	7 735	7 720	7 700	7 750	7 800	7 850	7 850
Italia	80 550	83 672	80 435	78 774	75 585	70 339	66 486	67 759	65 000	63 000
Nederland	42 977	45 303	45 101	46 711	49 935	52 355	61 724	63 000	65 000	78 000
Portugal	13 613	14 329	13 875	14 077	13 743	14 966	14 610	15 170	15 220	15 460
United Kingdom	144 610	141 948	130 473	123 970	112 022	114 535	114 000	114 000	112 000	107 690
USA	694 200	667 000	668 800	665 300	658 000	689 000	694 500	677 200	700 000	N/A

Source: FAO, CRB Commodity Yearbook, 1991

Figure 3: Tobacco
Production and employment indices compared to EC manufacturing



Source: Eurostat

Regarding cigarettes (which account for 90% of tobacco use) consumption trends vary according to a number of factors: anti-smoking campaigns have affected demand of dark tobacco cigarettes (which have lost ground to blonde tobacco cigarettes). Moreover, consumer preferences have shifted toward cigarettes with low tar and low nicotine content. While demand for cigarettes in the EC is declining, consumption is increasing world-wide (+2% in 1990), particularly in LDCs. These countries, together with Eastern Europe and the former Soviet Union, represent potentially lucrative export markets.

Supply and competition

Market segmentation and product differentiation are prominent features of competition between tobacco manufacturers. Cigarettes can be categorised differently, depending on whether they are made from dark or light tobacco and on their nicotine and tar content. The major private companies operate in each of these market segments with one or more brands. Brand loyalty and the oligopolistic nature of the industry contribute to reducing price competition. The latter is further limited in countries with state-controlled tobacco industries and administratively-controlled prices.

Table 5: Cigarettes
Consumption, 1990

	Total (billions)	Per capita (number)
EC	606.2	1 855
Belgique/België, Luxembourg	17.6	1 714
Danmark	8.1	1 577
BR Deutschland (1)	146.0	N/A
Hellas	28.8	2 859
España	81.9	2 083
France	95.8	1 701
Ireland	5.8	1 645
Italia	92.3	1 601
Nederland	15.9	1 065
Portugal	15.7	1 592
United Kingdom	98.3	1 714

(1) Including East Germany in 1990
Source: USDA FT, Eurostat (Bise), CECCM

INDUSTRY STRUCTURE

Companies

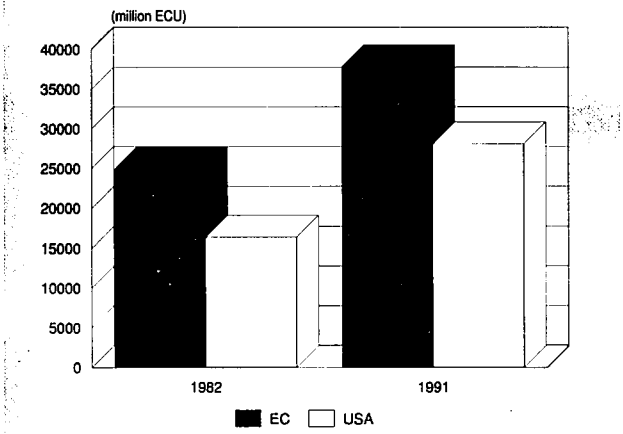
Italy, France, Spain and Portugal have state-owned tobacco monopolies which control both the manufacturing and the retailing of tobacco products. Belgium, Germany, Greece, Ireland, the Netherlands and the UK have private tobacco companies. In particular, some of these countries, like Germany and the UK, host multinational corporations such as American-based Philip Morris and R.J. Reynolds, or the British BAT Industries. Often, these multinational companies are also firmly established in European countries with state-controlled tobacco enterprises where they export or have licensing agreements with the national monopoly. An example of this is provided by France, where in 1988 the Government company SEITA maintained a 53% estimated share of the cigarettes market while a large part of the residual supply was due to Philip Morris (19%), Rothmans (10%) and R.J. Reynolds (6%). In Spain, the public monopoly Tabacalera produces cigars and 'blonde' brand cigarettes under licence for Philip Morris and BAT.

In Germany there are five leading private companies that together control 93.5% of the total cigarette market: Philip Morris (33%), Reemtsma (23.5%), BAT (21.1% in 1990), Brinkmann (9.4%) and R.J. Reynolds (8.1%). Philip Morris, Reemtsma and R.J. Reynolds have all acquired former East German tobacco companies and brands.

REGIONAL DISTRIBUTION

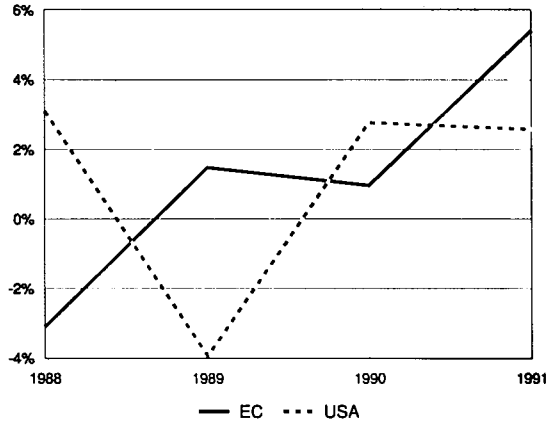
The EC is both a producer of tobacco leaves (424 thousand tonnes in 1991, 6% of world production) as well as a manufacturer of tobacco products. Tobacco leaf is grown in seven of the twelve EC countries. Italy has been the largest producer throughout the 1980s with a 40% share of EC tobacco production; however, Greece has been a close contender and actually exceeded Italy's production in 1986. These two countries grow different varieties of tobacco. Greece is specialised in more labour intensive, oriental varieties while Italy tends to grow less labour intensive, light air-cured and flue-cured varieties. In 1991 Italy and Greece together accounted for 78.8% of EC production. Spain is the third largest producer (11.2% of EC production) followed by France (6.9%), Germany, Belgium, and Portugal which each supply very small quantities of tobacco leaves. It has been estimated that in

Figure 4: Tobacco
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Tobacco
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

1990 tobacco growing required the equivalent of 208 500 full-time jobs.

Each country in the EC has its own tobacco manufacturing sector. Limiting the analysis to cigarette manufacturing, the major producers are Germany, the UK and Spain. In 1990, these countries accounted for 26.2%, 17.9% and 12.7% of EC production of cigarettes in volume terms, respectively.

REGULATIONS

Regulations in the tobacco sector can be distinguished between those concerning growing and first processing of tobacco leaves and those regarding marketing of tobacco products. Since 1970, production of tobacco in the Community has been supported by a system based on:

- guaranteed minimum prices (or intervention prices) at which intervention agencies buy tobacco from producers;
- transformation subsidises transferred to first processors of tobacco;
- import tariffs and export subsidies (reg 727/1970).

In 1992, new regulations should be introduced featuring, among other things, a system of production quotas, according to which each EC country is allocated a national quantity of tobacco to be processed. National quotas are to be distributed among firms involved in the first processing of tobacco on the basis of their production in the last three years.

Regarding the sale of tobacco products, some regulations have been issued and concerning restrictions on direct and indirect advertising, banning of smoking from public places, and tough requirements on health warnings to be carried out by cigarettes packets. Further measures are presently under discussion.

OUTLOOK

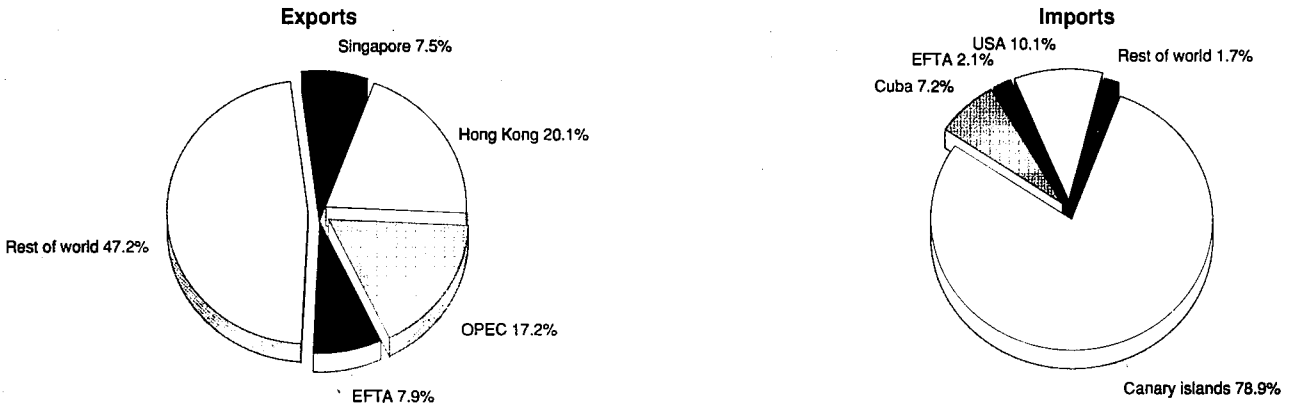
Despite the growth in consumption and production in recent years, it must be recognised that this expansion is largely explained by recent demographic and social changes in Germany. A declining trend in consumption is expected to re-emerge once the effects of reunification have subsided. In

Table 6: Tobacco leaf
External trade

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Imports world	1 487	1 428	1 433	1 415	1 375	1 394	1 303	1 389	1 369	1 446
EC	604	617	605	604	577	609	550	597	555	592
Five largest non-EC importers										
USA	243	209	213	202	207	221	196	180	170	220
USSR	124	101	103	95	67	54	49	50	50	50
Japan	84	80	75	61	68	88	69	86	65	83
Egypt	43	49	49	44	47	42	35	43	48	45
Bulgaria	20	26	42	30	41	21	38	32	28	34
Exports world	1 429	1 334	1 383	1 391	1 330	1 336	1 373	1 458	1 436	1 555
EC	216	215	240	222	232	285	256	287	316	345
Five largest non-EC exporters										
USA	260	238	246	249	217	195	218	225	230	225
Brazil	166	177	187	199	176	174	199	200	195	200
Zimbabwe	86	84	90	98	99	100	103	117	114	137
Turkey	105	70	70	103	82	106	78	110	90	95
India	110	79	76	64	62	53	38	56	61	72

Source: FAO

Figure 6: Tobacco
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Table 7: Tobacco products
External trade

(thousand tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Imports world	429	416	403	418	447	368	398	401	418	489
EC	152	161	178	195	186	109	113	118	120	130
Five largest non-EC importers										
USSR	67	73	75	76	77	75	61	55	50	100
Saudi Arabia	33	32	36	34	34	17	16	13	13	19
Japan	6	6	7	9	13	36	41	46	47	52
Colombia	2	11	11	11	11	13	14	15	15	12
USA	81	52	4	5	4	2	2	1	1	1
Exports world	441	434	451	484	505	399	450	508	618	714
EC	218	233	234	254	243	153	167	169	196	222
Five largest non-EC exporters										
USA	81	72	73	79	107	100	119	143	165	196
Bulgaria	62	61	72	75	72	75	73	69	61	67
India	21	9	9	10	10	1	1	1	2	3
Switzerland	11	10	10	7	8	9	9	13	15	16
USSR	2	2	2	2	2	1	1	0	0	0

Source: FAO

Table 8: Tobacco
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-0.5	-0.5
Production	-0.4	-0.4
Extra-EC exports	5.0	5.0

Source: Prometeia

particular, overall sales in terms of cigarette volume are expected to decline, with low tar cigarettes increasing their market share at the expenses of full flavour cigarettes. Production may decline to a lower extent than consumption due to expansion of export markets like East Europe and the former Soviet Union.

Major risks for the industry are the national measures concerning health (smoking forbidden or limited in public and working places). Opportunities for tobacco will most likely be caused by increases in cigarette consumption in LDCs.

Written by: Prometeia Calcolo Srl

Textiles, leather, footwear and clothing

NACE 43, 44, 45

The sector can be divided into the upstream industries of textiles and leather and the downstream industries of clothing and footwear. There is significant linkage between the two with the clothing industry absorbing half of the output of the textile industry and the footwear industry absorbing almost half of the leather production.
The industry is an important employer, with a labour force of around 3 million people in 1991. This, however, represents a decline of some 16% over the previous decade. Growth in production in the sector lagged behind growth in consumption between 1982 and 1991, leading to a sizeable balance of trade deficit.
The output of the industry can be either mass-produced items or higher quality goods serving market niches. The former is now subject to intense competition from low cost producers in developing countries and EC companies have yielded market share to these countries in the recent past. The higher quality end of the market is less determined by price, and EC firms possess a competitive advantage in relation to design, market response and distribution.
Much of the industry operates in the context of the Multi-Fibre Arrangement (MFA) and the expected conclusion of this regime is likely to liberalise trade. The EC Commission has set certain conditions for a phasing out of the MFA including the removal of barriers to the expansion of EC exports.
Price and profit levels in the sector are subject to fluctuations due to raw material price changes, and profit levels are generally low, at between 2 and 3% of sales. EC producers also face increased costs due to the relatively high level of environmental regulation imposed.

INDUSTRY PROFILE

Description of the sector

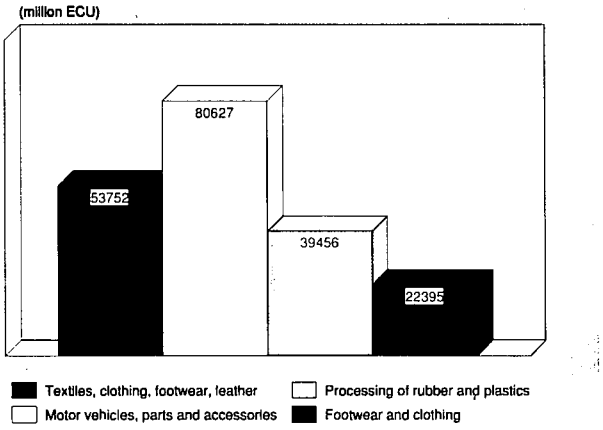
This overview covers the four related industries of textiles, leather, clothing and footwear. NACE 43 covers the textile industry which produces natural and synthetic fibres. NACE 44 covers the tanning and dressing of leather from bovine and ovine raw hides and the dyeing and finishing of leather. NACE 451 and 452 comprise the footwear industry covering mass produced indoor and outdoor footwear, hand-made footwear and other speciality footwear. NACE 453 covers the manufacture of clothing and clothing accessories from various materials.

The two upstream industries, textiles and leather, are partly dependent on demand conditions in the two downstream industries of clothing and footwear. Clothing absorbs about half of the output of the EC textiles industry, although this proportion is declining, while the footwear industry absorbs just under half of leather output in the EC, with the garment industry accounting for over one fifth.

Main indicators

Textiles is the dominant industry of the four subsectors, accounting for 58% of the sector's output, followed by clothing accounting for 28%. Eurostat data suggests that textiles also accounts for half of the total employment in the industry. However, the clothing sector has many small companies of less than 20 employees, and much of the employment in is on an 'out-worker' basis, so employment figures are low. It is likely that employment in the clothing industry is at least as high as in the textile industry.

Figure 1: Textiles, leather, footwear and clothing Value added in comparison with other industrial sectors, 1991



Source: Eurostat

The sector as a whole has a trade balance deficit. The trade balance is negative in the three larger industries, with only the leather industry showing a positive trade balance.

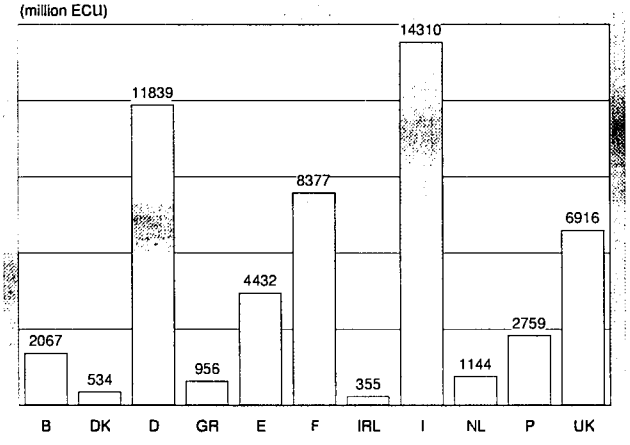
Footwear is the most export oriented of the four industries with over one quarter of its output going to extra-EC markets. The other three sectors have similar export orientation with about one-sixth of production value sold outside the EC.

Italy and Germany together account for almost half of the total value added in the sector in the EC.

Recent trends

Consumption rose significantly faster than production in the period 1982 to 1991, with production in volume actually falling in 1991. Production growth was higher in textiles and clothing than in leather and footwear. Production growth was sluggish in the latter half of the 1980's, partly a result of the poor export performance in that period.

Figure 2: Textiles, leather, footwear and clothing Value added by Member State, 1991



Source: Eurostat

Table 1: Textiles, clothing, footwear and leather
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	101 382	110 662	122 820	129 453	130 514	139 547	146 847	155 000	161 357	167 635	175 215
Production	100 786	109 499	122 950	130 828	130 632	135 828	141 672	150 624	154 277	154 528	155 672
Extra-EC exports	14 709	16 229	20 785	23 669	22 310	21 886	22 679	26 731	27 566	27 374	27 708
Trade balance	-596	-1163	130	1375	117	-3719	-5175	-4376	-7080	-13107	-19543
Employment (thousand)(3)	N/A	N/A	N/A	N/A	N/A	N/A	3342	3227	3130	3021	2940

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Fitzpatrick estimates
(3) Including firms with less than 20 employees for the textile and clothing sector
Source: Eurostat, Cotance, OETH, Associations

Table 2: Textiles, clothing, footwear and leather
Breakdown by major industries of the sector, 1991

(million ECU)	Apparent consumption	Production	Extra-EC exports
Textiles	92 388	89 473	15 578
Clothing	52 883	42 879	6 683
Footwear	15 435	14 950	3 940
Leather	6 929	7 226	1 173

Source: Eurostat, Cotance

Table 3: Textiles, clothing, footwear and leather
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.6	3.3	3.1
Production	3.3	1.1	1.8
Extra-EC exports	10.2	0.8	3.9
Extra-EC imports	5.9	11.4	9.6

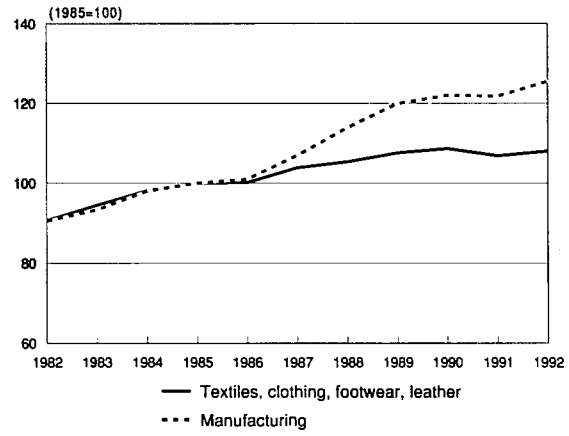
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat, Cotance

Table 4
Textiles, clothing, footwear and leather
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	14 709	16 229	20 785	23 669	22 310	21 886	22 679	26 731	27 566	27 374
Extra-EC imports	15 305	17 392	20 656	22 293	22 193	25 606	27 854	31 107	34 647	40 481
Trade balance	-596	-1 163	130	1 375	117	-3 719	-5 175	-4 376	-7 080	-13 107
Ratio exports/imports	0.96	0.93	1.01	1.06	1.01	0.85	0.81	0.86	0.80	0.68
Intra-EC trade	24 223	25 473	29 514	32 817	36 053	38 044	38 857	42 962	47 138	49 877
Share of total imports (%)	61.3	59.4	58.8	59.5	61.9	59.8	58.2	58.0	57.6	55.2

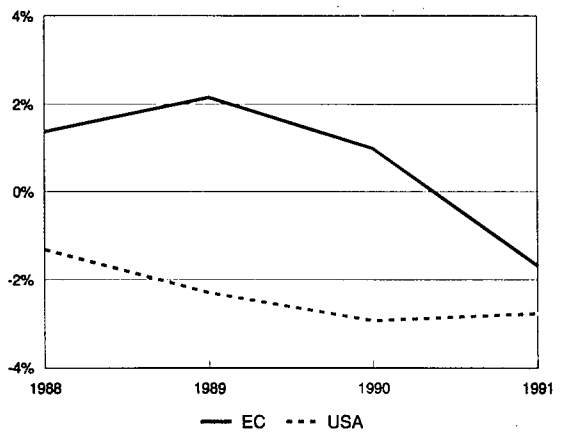
(1) Estimates
Source: Eurostat, Cotance

Figure 3: Textiles, leather, footwear and clothing
Production index compared to EC manufacturing



1992 are Fitzpatrick estimates
Source: Eurostat, Cotance

Figure 5: Textiles, leather, footwear and clothing
International comparison of production growth at constant prices



Source: Cotance, Eurostat, Census of Manufacturers

Extra-EC exports grew rapidly in the early 1980s, dipped in the 1986 to 1988 period, then recovered to a 1991 level 40% above the 1982 level in real terms. Extra-EC imports grew at only half the rate of extra-EC exports in the early part of the 1980's, but rose dramatically thereafter. Between 1982 and 1991, the total import growth rate was two and a half times the exports growth rate.

Employment fell in the sector by a total of 12%, from 1988 to 1991. The largest fall in percentage terms was in the leather industry, in which employment fell by 26%.

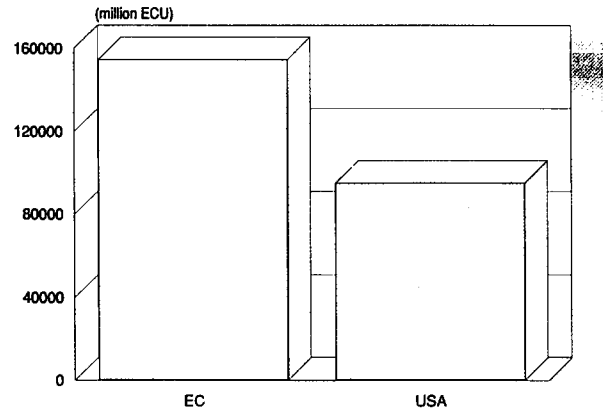
International comparison

The EC is a major force in the clothing industry, accounting for 30% of world exports, and is the origin of 10% of world production and 20% of world exports of footwear. In the leather industry, Europe (primarily the EC) represents nearly half of world trade, with leather production close to double the level of US and Japanese production combined.

Foreign trade

The ratio of exports to imports hovered around parity up to 1986 but subsequently fell to just over two-thirds in 1991. Leather is the only industry to display a ratio in excess of one, while the trade imbalance in the clothing industry now shows imports at two and a half times that of exports. Textiles, which had a ratio of close to one during the 1980s, fell into a significant deficit in 1991. Footwear, which had a ratio of 2:1 in the early to mid 1980s dropped below one in 1991. Consistent with the deterioration in the trade balance, extra-EC imports now account for a greater proportion of total trade than in 1982.

Figure 4: Textiles, leather, footwear and clothing
International comparison of production at current prices, 1991



Source: Cotance, Eurostat, Census of Manufacturers

EFTA countries were the principal destination for EC exports in 1991, ranging from 46% in the clothing sector to 19% in the leather industry. The USA remained the second most important destination, although its significance has decreased in relative terms since 1986. However, the USA is still of particular importance for footwear exports, and accounted for 26% in 1991.

China has doubled its percentage share of EC imports since 1986 and is now the single most important source of imports. In particular it accounts for over one quarter of footwear imports. Other East Asian countries are also important sources of materials and goods: Taiwan, South Korea, Thailand and Indonesia in the leather and footwear industries and Hong Kong in the textiles and clothing sectors. Turkey is also a significant textile and clothing supplier to EC markets.

Total production in the EC rose 18% from 1982 to 1991. In that period, the proportion of production exported to extra-EC markets increased 40%. Intra-EC trade rose over 60%. This suggests a declining dependence on national domestic markets and increased geographical diversification.

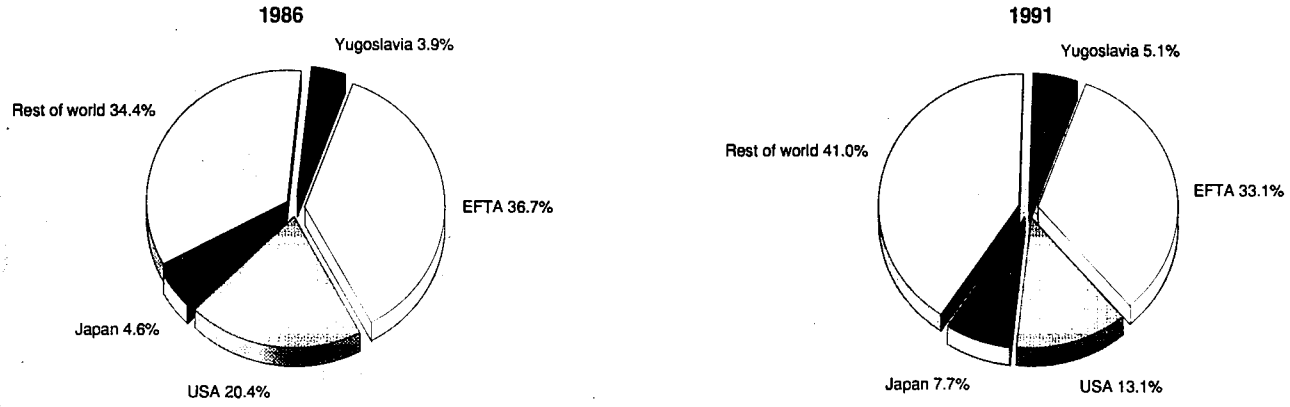
Import penetration rose to almost one quarter of total consumption in 1991 from under one sixth in 1982. Penetration is highest in clothing, at almost 32%, and in footwear, at almost 46%. Apart from the leather industry, which experienced an increase of only 2%, import penetration has increased significantly in each of the other sectors.

MARKET FORCES

Demand

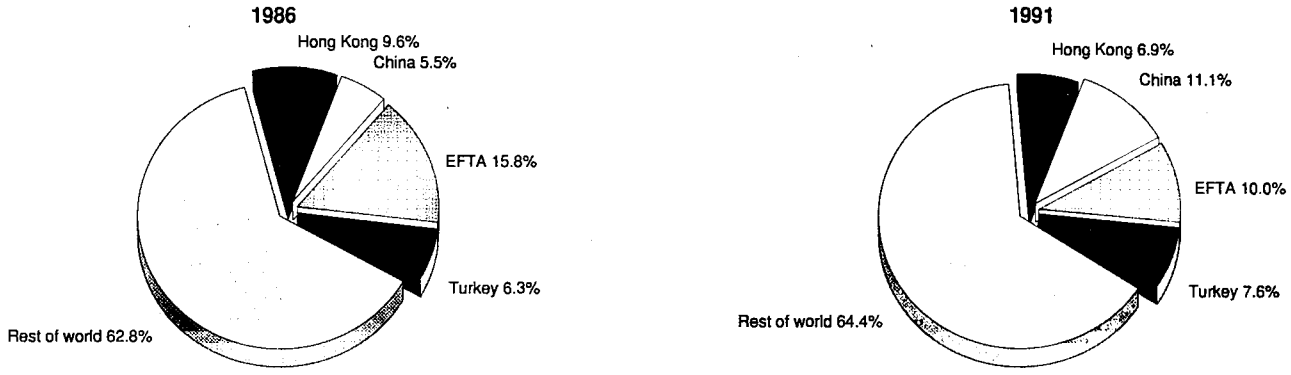
The output of the clothing and footwear industries is directed almost completely to final consumer markets and is therefore affected by income developments in the general economy. Some output is sold to manufacturing or service industries, especially medical clothing or protective footwear. On the other hand, textiles and leather are largely used as inputs in the clothing and footwear industries, rather than being sold to end consumers .

Figure 6: Textiles, leather, footwear and clothing
Destination of EC exports



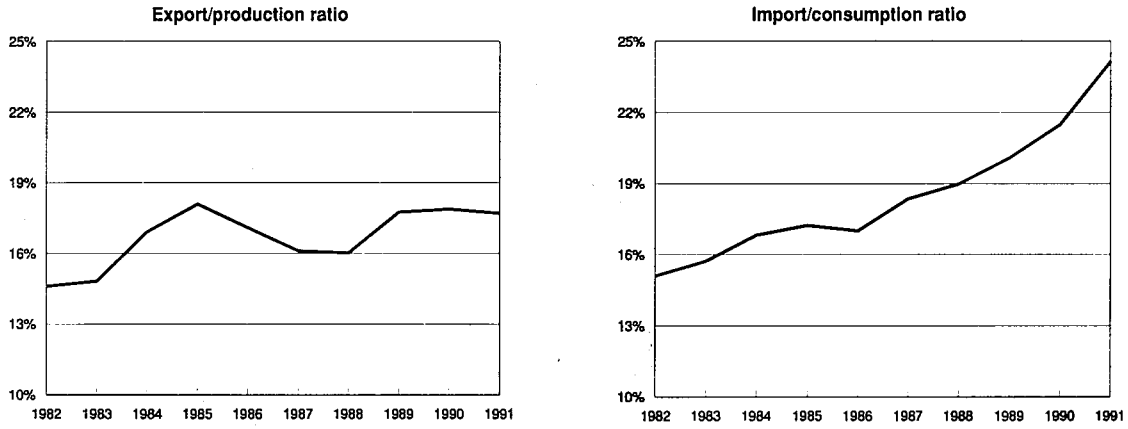
Source: Eurostat

Figure 7: Textiles, leather, footwear and clothing
Origin of EC imports



Source: Eurostat

Figure 8: Textiles, leather, footwear and clothing
Trade intensities



Source: Eurostat, Cotance

Although footwear and clothing are both necessities up to a certain income level, they become discretionary beyond that level.

The EC market for these two products can be divided into mass produced items and high quality goods for which price is less of a determinant. The market for mass produced items is being increasingly supplied by low-cost imports from newly industrialised or LDCs. In the mass production market, price remains a key consideration and EC producers have lost market share because of the inability to compete with firms whose labour costs, in particular, are much lower than their own. In the high quality products, price is not as important and price elasticity is lower.

The nature of the products is such that fashions and tastes are key factors in determining demand. Product life cycles can be very short as fashions change quickly. This forces companies to be ready to respond very quickly to shifting demand requirements. A key aspect of this strategy has been the developments of links between manufacturers and retailers especially in the clothing industry and also the integration of some clothing and textile firms.

Many of the primary fashion centres of the world are located in the EC. Paris, Milan and Barcelona, and thus EC producers, have a competitive advantage in relation to speed of response to demand changes.

Product innovation in the downstream industries is driven by changing fashions and the developments of new fabrics in the textile sector. Thus, developments in the textile industry itself allow innovations in the clothing sector, such as the development of thermal fabrics. In the textile sector, new fabrics have been developed by combining natural and existing synthetic fibres in varying quantities.

Supply and competition

Production in the EC lagged behind growth in consumption between 1982 and 1991, as cheaper imports gained increasing market share. Much of this was due to the competitiveness of firms in countries with lower labour costs, especially in East Asia. This fall in production was accompanied by a structural rationalisation in the sector, with larger firms closing plants and some smaller firms closing altogether.

Distribution in the industry has become increasingly concentrated as some of the larger producers have either developed their own retailing networks or entered into alliances with existing retail chains.

Investment in the sector in the recent past has focused on modernisation and automation rather than expansion, and overcapacity is not a problem, particularly in up-market products.

Much of the industry operates in the context of the Multi-Fibre Arrangement (MFA) governing imports into the EC, except the footwear industry which is not covered by the MFA. Countries which have preferential agreements with the EC include Malta, Turkey, Morocco, Tunisia, Egypt, Cyprus, Hong-Kong, China and Malaysia. It is unclear what the impact of the current round of GATT talks will be on this agreement, but it is likely that a freer trade regime world-wide will emerge. The EC has set pre-conditions for the phasing out of the MFA in the clothing and textile sectors. These include:

- the opening up of markets in developing countries;
- action to curb dumping of surplus production on EC markets;
- the removal of certain state subsidies, e.g. export subsidies, in some of the better developed countries with low input costs;
- action to curb counterfeiting of EC brands.

In the context of the completion of the EC internal market, national quotas will disappear and the use of Article 115 of the Treaty of Rome, which allows a country to exclude imports which would cause a serious market disruption, is likely to be greatly reduced.

Export development, seen as a key strategy throughout the sector, is hampered by trade restrictions in some of the potential destinations. Japan, for example, operates a restrictive trade policy vis-à-vis footwear and leather production.

Production within the EC is also hampered by the difficulty and the cost of obtaining raw materials from LDCs. Increasingly, LDCs are attempting to develop downstream industries, and retain their raw materials for domestic value-added production. A case in point is the leather industry, where rawhides previously exported by LDCs are being processed further in the country of origin.

Profitability in the industry is somewhat vulnerable to the volatility of world commodity prices, e.g. wool, cotton and raw hides. Profitability has been squeezed in the EC in recent years as wage cost outstripped productivity gains, and the pressure of cheap imports prevented EC producers from increasing their own prices. Other costs, such as those due to expanding up-market output ranges, and the associated advertising and promotional costs to establish a market foothold, have squeezed margins further. However, the EC industry possesses a significant competitive advantage in the areas of design and quality.

Production process

Employment in the industry has decreased sharply since the MFA was introduced in 1973, falling in textiles alone from 4.5 million to 1.1 million in 1991. Much of this decline can be attributed to technological advances and the inevitable shedding of labour. There is substantial use of outworkers, particularly in clothing, but also in footwear and certain sectors of the textiles and leather goods industries. Labour productivity rose rapidly in the 1980s on foot of the technological developments. However unit labour costs rose more quickly. The textile industry has thus become more capital intensive in the EC, and the capital-labour profile is very different from that in developing countries which still rely much more on labour intensive methods of production. While the introduction of technology in the clothing and footwear sectors was more limited than in textiles and leather, the application of computer aided design (CAD) and computer aided manufacturing (CAM) have become more widespread.

The use of just-in-time (JIT) systems has also become an important feature within the industry particularly in the clothing and footwear sectors. An example of an integrated JIT manufacturing and retailing is the Benetton group which links retailers, production units and warehousing and allows rapid response to market changes or trends.

In addition, the level of labour skills is higher in the EC than elsewhere (including the US), giving EC producers a competitive advantage in the production of higher quality products. The introduction of the EC-sponsored RETEX programme will enhance the quality of labour in the regions where it is being implemented. The FORCE and EUROFORM programmes also assist in the vocational training of workers for the industry.

Product innovation and development is an important strategy for EC industry, particularly in the context of declining competitiveness for mass produced goods. In the textile industry, technological advances have allowed for greater variety in the production of fabrics. The combination of natural and synthetic fibres in varying proportions allows materials possessing different characteristics to be developed, e.g. waterproof, windproof, and thermal fabrics. Technical textiles, the

fastest growing textile sub-sector, have been developed with a wide range of industrial and environmental applications.

Product innovations in the clothing industry are largely based on the development of new fabrics in the textile sector, indicating the degree of interdependence and integration in the sector overall.

INDUSTRY STRUCTURE

Companies

There are around 290 000 firms in the EC industry employing three million people, despite the sharp reduction in the number of employees over the past decade. About 90% of firms are small, employing less than 20 people. These firms account for over one quarter of total employment but less than one quarter of total turnover. In the clothing and textiles sectors, in particular, there has been an increase in the number of smaller firms.

Most of the smaller firms supply domestic or neighbouring markets and the level of extra-EC exports from these firms is low.

Some of the larger firms in the sector span both the clothing and textile sectors e.g. Benetton (Italy), with a turnover of 1.3 billion ECU in 1990, Coats Viyella (UK) which recently merged with the Tootal Group (UK), and Courtalds (UK).

Strategies

Faced with competition from low cost producers abroad, EC producers have reacted by moving up-market into the production of higher quality goods which are less price sensitive and are not amenable to the same degree of mass production as standard items. This strategy is consistent with the spirit of the MFA as originally constituted. Northern European countries in particular have moved towards producing higher quality goods. Countries such as Spain, Greece and Portugal have not moved as quickly towards up-market goods, and remain vulnerable to low cost competition from outside the EC. They will be particularly sensitive to increased competition following the expected liberalisation of trade in the context of the GATT negotiations.

In the downstream industries of clothing and footwear the move away from mass produced items has necessitated increased investment in advertising, branding, adoption of quality management systems of production and distribution, and the implementation of JIT systems. In the leather sector as well, companies have identified smaller more profitable market niches.

The prospect of a move up-market by East Asian producers however, will increase the competitive threat faced by the industry in the EC and further strengthen the need for quality in production and distribution.

Part of the global strategy of EC producers has involved relocating or expanding production to areas within the EC where costs are lower, such as Portugal, or to locations outside the EC.

Other firms, particularly in the footwear sector, now sub-contract parts of the production process to firms located in Taiwan, Hong Kong, China, Thailand, and Brazil. Out processing trade (OPT) has also been an important structural change for EC clothing producers, and has reduced overhead costs, allowing EC producers to retain a certain level of competitiveness.

REGIONAL DISTRIBUTION

The industry is of considerable social and economic importance in certain regions of the EC, which tend to have both the upstream and downstream industries For example, clothing and textiles accounts for over half of manufacturing employment in the Donegal region of Ireland, while they account for a quarter of manufacturing employment in Northern Ireland. In Braga, Portugal these industries accounted for 60% of manufacturing employment. Therefore, structural changes affecting the industry tend to have a disproportionate effect on these regions. Aware of the selective regional impact of the decline in the industry, the Commission has introduced the RETEX programme, which is designed to assist regions in decline which were heavily dependent on the clothing and textile sectors. It will provide support to improve both labour skills and management capabilities, provide assistance for improving production methods and will aid design, research and measures to combat pollution.

At EC level, the four largest countries, Germany, France, the United Kingdom and Italy, account for the bulk of employment and output. Italy is particularly important in the footwear sector, accounting for 37% in volume terms of total EC production and in the leather industry, with three quarters of the EC's tanneries located in Italy.

Table 5: Textiles, clothing, footwear and leather
Breakdown by size of enterprise, 1988 (1)

(employees)	number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	262 396	89.4	27.2	23.6
20-99	25 531	8.7	26.5	26.4
More than 99	5 594	1.9	46.3	50.0

(1) refers to the whole of NACE 43, 44 and 45
Source: Eurostat

ENVIRONMENT

The production process in the upstream industries can be damaging to the environment, if not controlled. The major impact is on water courses into which effluent is poured, particularly with the processing of natural fibres and with tanning. There is some concern emerging regarding the danger to employees from the production process in the tanning industry. Some air pollution is also possible in the production of viscose.

In the clothing and footwear sectors the production process itself is not so much an environmental problem as the disposal of worn-out items. Synthetic fabrics are not biodegradable and take up space in landfills.

Compliance with national and EC regulations imposes costs on EC producers which are not felt by producers in other countries where such regulations and controls are much more limited or not implemented vigorously by the authorities.

Environmental awareness can produce opportunities for the industries. Environmentally friendly fabrics have been devel-

oped to meet the requirements of the green consumer movement, including biodegradable or easy to recycle garments.

REGULATIONS

Much of the industry is governed by the MFA. However, it is expected that trade in the sector will be liberalised when the current round of GATT negotiations are complete. The EC also has trade agreements with a host of African, Caribbean and Pacific countries under the Lomé Convention.

In the footwear industry, bilateral trade arrangements existed at the national level to control the import of low cost products from Asian and East European countries. These have been largely phased out and trade policy is increasingly determined at the EC level. Many EC countries also provided assistance to domestic producers but most of these subsidies have been phased out as well, and are being replaced by centralised EC programmes.

The EC has been a leader in environmental damage control in the industry. The most important measure in this regard is the directive on the control of dangerous substances (76/464/129).

OUTLOOK

The expected upswing in world economies will lead to increased demand for the output of the industry although there may be some shifting of the importance of specific products within the sectors. For example, household and technical textiles may grow in importance while textiles for use in the clothing industry may become less important.

Imports are likely to continue to make inroads into EC markets due to greater price competitiveness and the impact of a freer trade regime. Countries with low import penetration at present may be most at risk. Export market development will continue to be a key strategy for EC producers. The success in this regard may depend on gaining access to markets currently protected, such as the Japanese market.

In the longer term the ability of EC producers to develop higher quality products, to find new uses for existing products, and to respond quickly to market changes will determine their performance. The threat of East Asian producers following EC firms up-market cannot be discounted and only serves to emphasise the need for quality and service in the manufacture and distribution of products.

The increased demand from Eastern Europe provides an opportunity for EC producers, but one in which they will face substantial competition from the lower-cost producers. The admission of greater quantities of imports from Eastern Europe will increase competition at the lower end of the EC market.

The completion of the EC internal market can be expected over time to increase merger and acquisition activity in the EC across national boundaries.

Increased use of sourcing in developing countries may make EC firms more competitive but it will involve some job loss within the Community. Likewise, the potential for relocation either within the EC or to Eastern Europe will impact on the structure of the EC industry.

Table 6: Textiles, clothing, footwear and leather
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	3.3
Production	1.3	1.6
Extra-EC exports	1.5	2.1

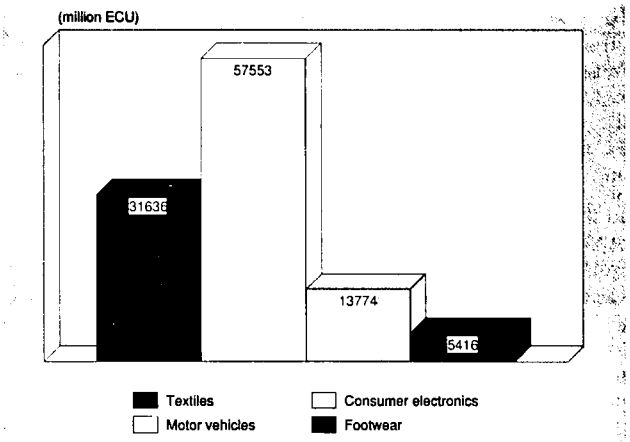
Source: Fitzpatrick

Written by: Fitzpatrick Associates

Textiles
NACE 43

The textile industry is very heterogeneous with demand heavily dependent on other industries, particularly clothing and home furnishing but also other industrial sectors such as automobiles. EC textile consumption substantially outstripped production over the last decade with the excess filled by extra-EC imports. International trade in the sector is governed by the Multi-Fibre Arrangement (MFA) and significant trade barriers remain worldwide. Strong price competition from extra-EC textiles has induced many EC firms to move into high quality and less price-sensitive niches and to reduce labour intensity through substantial investment in capital equipment. The main product innovations, and potential for growth, are based on varying the proportion of natural and synthetic fibres to provide a greater variety of fabrics with different features and the development of new markets for technical textiles, mainly used in industrial and environmental applications.

Figure 1: Textiles
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

One of the dominant features of the textile industry (NACE 43) is the heterogeneity of its output which can be differentiated according to fibre used (wool, cotton, synthetic fibre), end use (clothing, household furnishing, technical textiles) or production process (weaving, spinning, knitting). Textiles also differ according to product quality ranging from mass produced cotton for low cost garments to fine wools, linens and silks for designer clothes. NACE 43 also covers textiles which are inputs to other industries such as fabric for car upholstery or technical textiles for filters and linings.

Main indicators

The textile industry employs 1.5 million workers. In terms of production and consumption value, knitwear is the largest sub-sector followed by cotton and wool. Value added figures for Member States in 1991 show that the countries with largest value-added, in order of size were Italy, Germany, France and the United Kingdom. This reflects the size of their economies and the industry is of strong relative importance in other Member States, particularly Belgium and Portugal.

Recent trends

EC production of textiles increased during the early part of the 1980s but increasing pressure on profit margins from low-cost producers, particularly in Asia has resulted in little growth over the 1989-91 period. Since 1985, EC consumption of textiles has increased much more rapidly than production with resultant import growth leading to a sharp deterioration in the EC's balance of trade in textile products. Employment declined steadily throughout the 1980s, with a total fall of 20% between 1982 and 1991, including a fall of nearly 4% in 1991. Output prices for the textile industry vary widely across sub-sectors and across Member States, but on average production price increases have been relatively low over the second half of the 1980s.

International comparison

Production of textiles in the EC measured in value terms was more than twice the level of Japanese production in 1991. This relative size gap has increased over the past decade, EC production being 80% above the Japanese level in 1982.

Production growth has been stronger in the EC than in either Japan or the USA over the past four years with Japan suffering real declines in each of the years 1989, 1990 and 1991. US production fell in both 1990 and 1991.

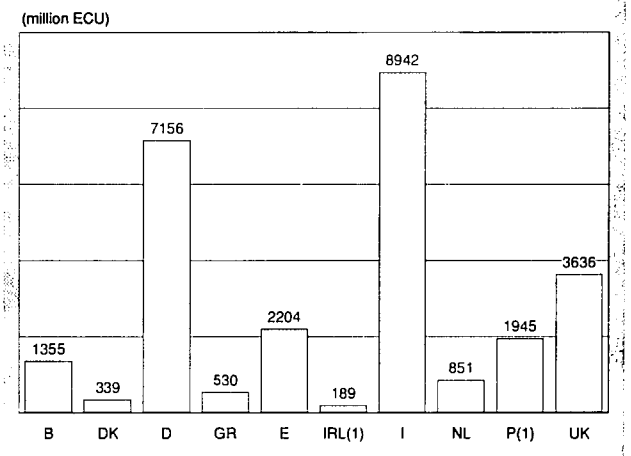
Foreign trade

The data presented in Table 4 have to be taken carefully, since they include the raw materials (fibres). In fact, the Community has a large trade deficit in the trade of textile fibres, since it imports most of natural fibres used in the production process. On the contrary, the EC has a significant trade surplus in the trade of transformed textiles: Comitextil data show that in 1991 the EC trade surplus for textiles was of about 1.2 billion ECU.

The proportion of trade with the developing countries has increased during the 1986-1991 period, mainly to the detriment of trade with the EFTA countries. This is particularly true as far as imports are concerned.

However, the EC textile industry remains the largest exporter of textiles in the world and Germany is the world's single largest exporter with 11% of total world textile trade, followed by Italy with 8%. France and Belgium/Luxembourg are also among the top 10 exporting countries.

Figure 2: Textiles
Value added by Member State, 1991



(1) Eurostat estimates
Source: Eurostat

Table 1: Textiles
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (2)	1992(2)
Apparent consumption	58 329	63 194	71 237	74 936	74 604	78 761	81 808	88 201	89 857	92 388	93 380
Production	58 682	63 075	71 716	75 749	75 368	78 146	81 240	88 241	89 065	89 473	89 924
Extra-EC exports (3)	8 562	9 738	12 007	13 335	12 440	12 397	13 349	15 245	15 543	15 578	15 889
Trade balance (3)	353	-119	479	813	764	-616	-569	40	-792	-2 916	-5 456
Employment (thousand)(4)	1 761	1 724	1 696	1 633	1 605	1 571	1 697	1 648	1 589	1 529	1 468

(1) Estimates are used if country data is not available, especially from 1989 onwards.
However for trade, only 1991 has had to be estimated.
(2) Fitzpatrick estimates
(3) Trade data include both natural fibres and transformed textiles
(4) Data sources are different. From 1988 to 1991: including firms with less than 20 employees; also including manufacture of household textiles and other made-up textile goods; data calculations by OETH, based on Eurostat and Associations' sources From 1982 to 1987: Comitextil employment figures.
Source: Eurostat. OETH, Associations

Table 2: Textiles
Breakdown by product line, 1991

(thousand tonnes)	Apparent consumption	Production	Extra-EC exports
Yarn and spun yarn	3 831	3 465	350
of which spun yarn	2 483	2 161	142
Woven fabric	1 700	1 532	523
Hosiery	371	372	53
Simple ready-made goods	415	313	55
Carpets	1 095	1 194	234
Non-woven fabric	294	330	94
Others	N/A	N/A	96

Source: SOEC - DB DGIII Textiles, OETH

Table 3: Textiles
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.8	3.0	2.9
Production	3.0	1.6	2.1
Extra-EC exports	9.3	1.5	4.0
Extra-EC imports	8.4	8.7	8.6

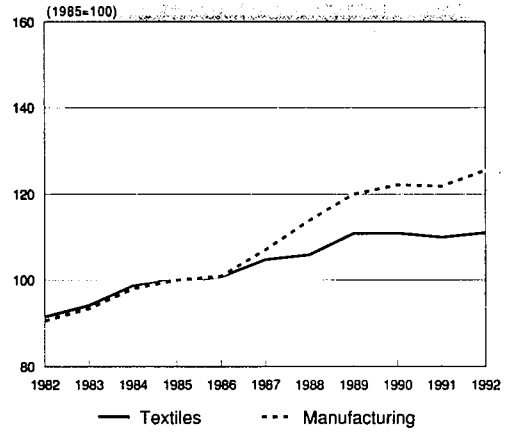
(1) Estimates are used if country data is not available, especially from 1989 onwards.
However for trade, only 1991 has had to be estimated.
Source: Eurostat

Table 4: Textiles
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)
Extra-EC exports	8 562	9 738	12 007	13 335	12 440	12 397	13 349	15 245	15 543	15 578
Extra-EC imports	8 210	9 857	11 528	12 522	11 676	13 012	13 917	15 205	16 335	18 494
Trade balance	353	-119	479	813	764	-616	-569	40	-792	-2 916
Ratio exports/imports	1.04	0.99	1.04	1.06	1.07	0.95	0.96	1.00	0.95	0.84
Terms of trade index	100.6	101.4	98.9	100.0	109.6	114.1	114.3	116.3	119.7	119.7
Intra-EC trade	14 969	15 566	18 028	20 029	22 134	23 417	24 344	26 698	28 754	30 160
Share of total imports (%)	64.5	61.2	60.9	61.5	65.4	64.2	63.6	63.6	63.7	61.9

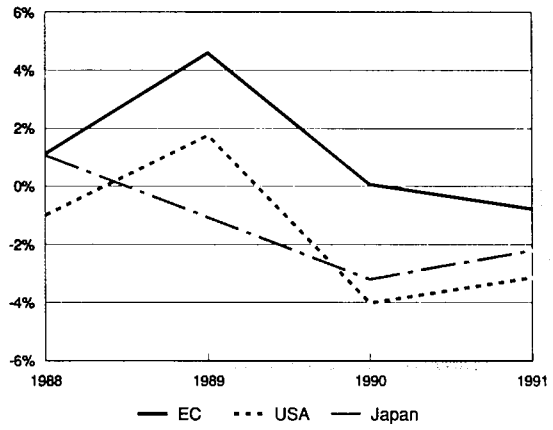
(1) Trade data include both natural fibres and transformed textiles
(1) Estimates
Source: Eurostat

Figure 3: Textiles
Production index compared to EC manufacturing



1992 are Fitzpatrick estimates
Source: Eurostat

Figure 4: Textiles
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Extra-EC textile exports have grown slowly in recent years principally because the markets with the greatest growth potential, those of the developing countries are effectively closed to EC exports through the imposition of very high tariffs and non-tariffs barriers This explains why the EC stressed the necessity of an opening of those markets in the Uruguay Round negotiations. Another factor was the strong price competition on the EC's traditional export markets from developing and newly industrialised countries. EC exports retained their competitiveness throughout the 1980s in the markets of developed countries through constant improvements in quality.

The EC trade surpluses with the industrialised countries has declined in the past two years. On the EFTA countries' and on the North American markets, textile exports faced a fierce price competition from product originating from developing countries. This decline of competitiveness is also due to the dramatic fall of the value of the US dollar. The Japanese market, because of its size and the purchasing power of its consumers is seen by EC exporters as having great potential for expansion, but is difficult to penetrate because of many subtle barriers to trade.

Exports to Eastern Europe fell between 1985 and 1990. However, increased exports of household textiles through investment in both new and upgraded buildings are expected. Outward processing by EC clothing manufacturers to eastern Europe should also increase demand for EC fabrics from these countries. Despite barriers to trade, EC exports to developing countries have increased considerably in recent years, rising from 23% of total exports in 1985 to 36% in 1990. But imports of textiles from developing countries have risen faster than exports. EC exports to less developed countries can be expected to increase if the existing trade barriers are removed as agreed in the Draft Text of the Uruguay Round negotiations.

MARKET FORCES

Demand

Consumption of textiles in the EC rose slowly in the past decade, although there was a growth spurt during the upturn in the international economy between 1986 and 1990. The output of the textile industry is purchased by clothing and knitwear (45% of EC fibre use), by the home furnishings companies (17%), by the carpets industries (13%) and by a variety of other industries which use technical textiles (25%), among the largest of which is the automobile industry.

Demand for textiles has a low price elasticity and EC producers concentrate to a considerable extent on high quality textiles for which price is a less important factor than quality. Consumption of textiles is income elastic and the higher fibre consumption per capita in the USA than in the EC over the past decade has been attributed to the faster growth in the US economy and the higher disposable incomes in the USA.

Clothing

In 1989 EC households devoted 6% of their expenditure to purchases of clothing and finished textile products for household use. The share of spending on clothing and footwear in total EC spending is declining. Even if clothing is a basic necessity item and the growth in demand is related to population growth, presently quite low in the EC, expenditure on clothing depends largely on income levels and on fashion influences which play a great role in the EC markets.

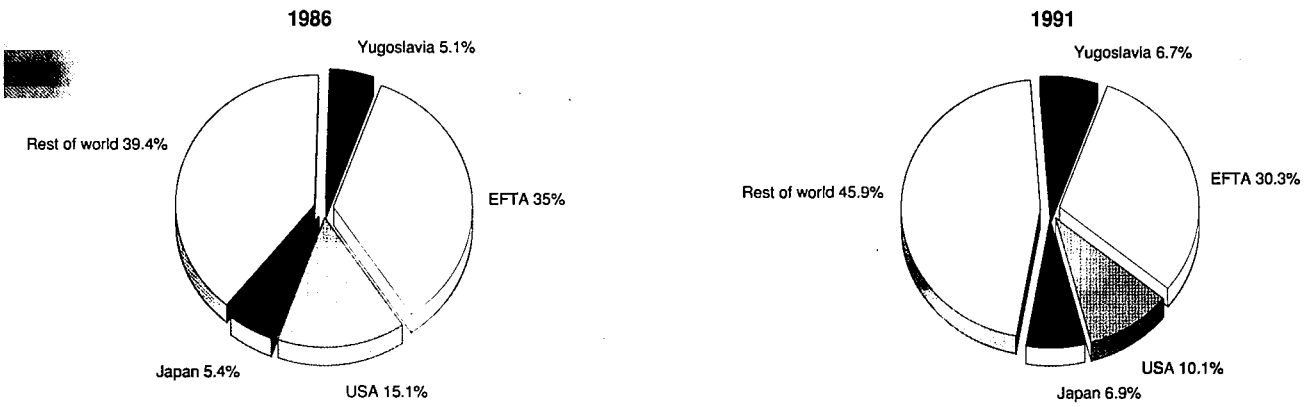
Specific aspects relating to the production of clothing production are important for the EC textile producers. EC clothing manufacturers are increasingly focusing on quality, reliability, technical ability and design capability as well as price for their subcontractors, and also on other factors, particularly delivery time lags and other risks. This evolution will increasingly favour sourcing of many garments in countries near to the EC, through the Outward Processing Traffic which favours EC textile fabrics producers. This is especially true for those who have moved their production in the less price-sensitive markets segments.

Household textiles

Besides fashion trends, sensitivity to income growth is very important in the demand for home furnishings, as well as the increasing number of single persons household are the key element explaining the strong growth in demand for carpets and household textiles (bed linen, table cloth curtains, etc.) during the second half of the 1980s. Other factors with a positive influence on demand are the construction of new dwellings in Germany to accommodate migrants from former Eastern Germany, and the possible faster economic growth in the poorer regions of the Community which would result in an upgrading of the housing stock there.

About 75% of textile floor coverings are purchased by private households while the contract market accounts for 20% and the automobile industry purchases the remaining 5%. Hotels and offices are the largest sectors of the contract market which is extremely important for home furnishing products and which will grew faster if the growth in tourism demand will continue.

Figure 5: Textiles
Destination of EC exports



Source: Eurostat

Technical textiles

Technical textiles has been the fastest growing subsector over the last five years and demand for these textiles is growing rapidly. Technical textiles are the textile product in which the EC's export cover over imports is highest (158% in 1988). The EC exported 2,000 million ECU's worth in 1988. An increasing proportion of the technical textiles used in the USA is supplied by EC firms. New technical textiles and new applications of existing products are constantly emerging. Technical textiles are used for a variety of industrial and environmental purposes such as water and gas filters, stabilisation of soils, protection of crops from weather and pests, etc.

Supply and competition

In general, capacity is not excessive since most recent investment has been in modernisation rather than the expansion. The proportion of turnover reinvested rose from 3% to nearly 8% during the 1980s and the EC textile industry modernised faster than the industries of most of the other countries. Production of fabrics with low design content has been decreasing relative to upmarket fabrics, where EC firms have now built up a strong presence. Price competition among EC producers of high quality textiles is limited because quality, customer service and creativity are more important buyer considerations than price.

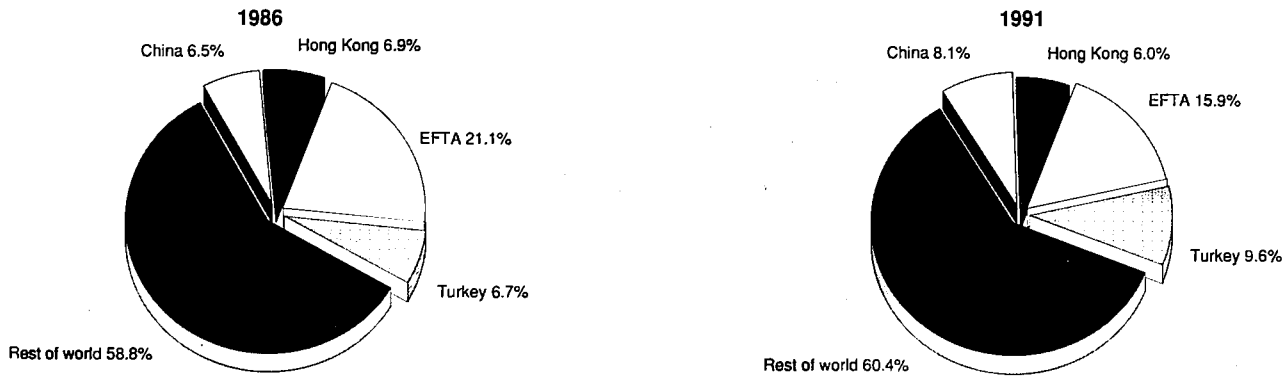
Internal competition after 1993

Intra-EC trade has grown rapidly over the past decade and this trend is likely to accelerate after the completion of the internal market. The Single Market will increase competition between firms in different Member States by reducing or eliminating administrative costs incurred in crossing frontiers. The removal of these barriers may also increase competition from extra-EC imports by facilitating the movement of these imports throughout the EC and by the removal of national quotas established in response to the Multi Fibre Arrangement (MFA). The suppression of national quotas could lead to exporters targeting specific national markets and the textile industries of the smaller Member States would be particularly vulnerable to such targeting.

Competitiveness and profits

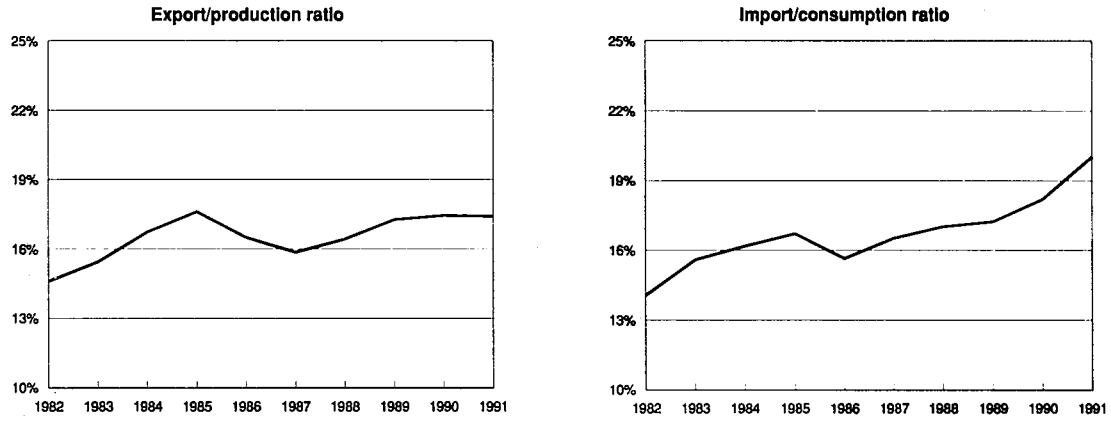
The cost of raw material in finished textiles range from 25% in the case of elaborate lightweight fabrics to 60% in the case of yarns. In the case of cotton fabrics, the textile industry in the USA faces lower raw material costs for cotton, while cotton-producing developing countries often subsidise the price of cotton. The cost of polyester staple is also lower in

Figure 6: Textiles
Origin of EC imports



Source: Eurostat

Figure 7: Textiles
Trade intensities



Source: Eurostat

developing countries, up to 30% lower than that of polyester staple originating in the EC.

At present, the world wool market is oversupplied and wool prices are unlikely to increase significantly in the first half of the 1990s. On the other hand, some increase is expected in cotton prices, about 20% by 1995, as world stocks of cotton are relatively low at present and are not expected to increase much in the medium term.

Output price trends have varied considerably across Member States. Overall, Comitextil estimate production prices increased by 14% between 1985 and 1990, ranging from a decline of 6% in Belgium where investment levels have been particularly high to an increase of 68% in Greece.

In general profit margins in recent years have been relatively low on average but with wide variations across different segments. The IFM (Institut Français de la mode) report suggests that higher margins are achieved on more differentiated fabrics.

The degree of structural adjustment since the MFA was first introduced is evident in the sharp fall in employment in textiles, from 4.5 million in 1973 to 1.5 million in 1991. While much of this reduction was driven by competitive pressures, rapid advances in technology enabling higher labour productivity was the primary driving force. Little of the investment in the EC textile industry in recent years has been aimed at increasing capacity. Labour productivity as measured by value added/employment rose rapidly throughout the 1980s, although unit labour costs rose faster.

All this explains why, in general, increased labour productivity has maintained the competitiveness of some sectors of the industry, textiles can nevertheless be produced in Asian countries at a small fraction of the cost of production in the EC. The average cost per man hour in the EC soft goods (textiles, clothing and footwear) industries is 10 times the average cost in Asian countries. The low wage countries also have minimal regulation of working conditions and minimal environmental restrictions. Some Asian producers, particularly Hong Kong, have invested heavily in new technology and this combined with their advantages of lower labour costs and administrative burden, makes their products very competitive on EC markets.

Two major innovations in textile technology in the past 20 years have been shuttleless looms, although most shuttle looms are regarded as giving better performance at present, and open ended rotors for spinning yarn. Shuttle looms account for 70% of weaving machinery in the EC, about 50% in the USA and Japan and 38% in the rest of Asia. Of the spinning machines used in the EC, 22% are open-ended rotors compared to 20% in the USA, 9% in Japan and 5% in the rest of Asia.

INDUSTRY STRUCTURE

Companies

1988 data from Eurostat indicates that 85.4% of enterprises had less than 20 employees, and only 18% of turnover. Only 3.5% of enterprises had more than 99 employees, yet 57.8% of turnover. There were 76 860 textile firms operating in the EC in 1990 according to Comitextil estimates. Firm size ranges from giant multinational companies like Coats Viyella which employs about 60,000 people to thousands of small firms employing only a few workers. Eurostat estimates, which are

Table 5: Textiles
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	18.7	19.9	20.1	21.2	22.8	24.3	24.6	26.0	26.8	27.8
Productivity index	88.1	93.7	94.6	100.0	107.4	114.3	115.7	122.4	126.1	130.9
Unit labour costs index (3)	82.0	87.0	94.0	100.0	104.4	109.0	115.3	121.9	128.3	N/A
Total unit costs index (4)	70.0	80.6	92.5	100.0	100.1	106.0	114.6	128.4	130.7	137.3

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Table 6: Textiles
Top ten EC textile firms by turnover, 1990

Company	Turnover (mio ECU)	Employees	Country
Coats Viyella	2 408	58 400	UK
D.M.C.	1 497	14 585	F
Courtalds Textil	1 381	29 600	UK
Benetton	1 346	N/A	I
Chargeurs	1 296	10 123	F
Marzotto	945	8 816	I
V.E.V. Prouvost	832	11 683	F
Freudenberg	757	5 700	D
Tootal	744	5 700	UK
Beaulieu	734	4 693	B

Source: Comitextil

not strictly comparable, indicate that the total number of enterprises in the industry rose by 4% between 1980 and 1988 to 78 500 but the number of firms employing more than 20 people fell by 16% in the same period. The increase in the number of smaller firms occurred mainly in the knitwear industry while the concentration occurred mainly among firms producing higher value-added products.

In 1990 the top EC textile manufacturer, ranked by turnover, was Coats Viyella (Table 6), although expansions and mergers have caused some changes to the listing in the interim. In particular the merger between the UK-based firms Coats Viyella and Tootal will have paced them well ahead of the next four firms who are clustered around the a 1.3 to 1.5 billion ECU range - indeed, more recent estimates quotes by Werner International place Chargeur as the number two firm in terms of turnover, reflecting turnover growth of 19% in the French firm during 1991. Most of the small textile enterprises in the EC operate on a national market or at most, on the markets of one or two other EC countries, while the larger firms sell their products throughout the EC and export outside the EC. Coats Viyella, D.M.C., Courtalds, Benetton and Chargeur in addition to being the top 5 EC firms are also among the top 10 textile firms in the world.

The level of concentration in the EC textile industry increased throughout the 1980s. The governments of the UK and France in particular encouraged mergers in the belief that only large firms could exploit effectively the latest advances in textile technology. The emergence of the giant Coats Viyella group in the 1980s and the restructuring of the Courtalds group represent the most significant UK rationalisations in the 1980s.

Annual investment in the EC textile industry more than doubled in the 1980s. Most of this investment was in modernisation and development of new processes and products. Germany and Italy together accounted for more than half of total new investment during the period in the EC. Benelux has the highest investment per worker followed by Germany and Italy. Investment per worker is lowest in Portugal and Greece.

Slow growth of demand in EC markets and growing competition from imports have caused the EC textile industries to direct a good deal of attention to the promotion of exports.

The industry has been assisted by the EC Commission to survey markets outside the Community and to identify obstacles to trade with a view to their removal. Thus, opening extra-EC markets featured strongly among EC demands in the recent negotiations on phasing out the MFA and bringing the textile industry under GATT rules.

REGIONAL DISTRIBUTION

Reflecting the size of their economies, the four largest textile producing countries are Italy, France, Germany and the UK with Italy having a significantly higher share of total European output and employment. Spain and Portugal's share is significantly higher for employment than for output indicating higher labour intensity in these countries. Within Member States the textile industry is concentrated in certain regions, generally regions which are also strongly dependant on the clothing sector, although in Belgium and the Netherlands textiles are considerably more important than the apparel sector. Regional concentration is not simply a feature of traditional textile industries, the Rhône-Alpes region, for example, accounts for around 75% of French technical textile output, with a particularly strong concentration around Lyon and to a lesser extent at Saint-Etienne.

ENVIRONMENT

The production of textiles requires the use of large volumes of water for certain processes, for example synthetic fibre production, natural fibre cleaning, and general dyeing and finishing. This adds considerably to the costs of textiles if environmental controls are enforced. In addition to EC legislation, the governments of most Member States have legislation which limits various effluents into water and air and these have a considerable impact on the textile industry (see under Regulations).

Different fibre types have different impacts. Pre-treatment will include for wool, a degreasing using strong detergent, the removal of sericin gum coating silk in a similar way. For cotton boiling in a caustic often chlorine based; compound,

Table 7: Textiles
Regional distribution of output and employment, 1989

Country	% of total EC output	% of total EC employment
Belgique/België, Luxembourg	6.3	3.3
Danmark	1.1	0.9
BR Deutschland	19.5	13.9
Hellas (1)	3.4	4.2
España	7.9	10.8
France	16.2	12.2
Ireland (2)	0.9	0.6
Italia	24.8	29.4
Nederland	2.5	1.5
Portugal	3.7	9.1
United Kingdom	13.8	14.0

(1) 1986
(2) 1988
Source: Comitextil, National statistics

and for removing the mineral spinning oils from manmade fibres adapted detergents are required. All yarn is then "sized" or coated in a flexible protective film which will prevent it breaking during weaving. These sizes have to be removed from the finished fabric by washing, and synthetic (polyvinyl) compounds frequently used today are not biodegradable and waste water from their removal depletes oxygen in water courses.

The coloured effluent from the dyeing process, creating unreactive coloured molecules in sewage systems, is usually thought of as the most polluting aspect of textile production. The mordants used for fixing colour in certain dyestuffs are based on heavy metals such as chrome, tin and titanium whose discharge into water courses is now prohibited in some EC countries. Dye carriers, needed to achieve complete penetration of polyester, are highly toxic carcinogens and are included in the EC Dangerous Substances Directive List 1 substances.

Acrylic is produced from a concentrated solution of polymers in a solvent and this solvent is reclaimed and recycled. To produce polyester and polyamide, polymers are heated until molten before being formed into fibres and there is no effluent from their production though some scientists claim that in the production of nylon, nitrous oxide a chemical which attacks the ozone layer, is released into the atmosphere.

After polyester fabrics are de-sized, they are kept wet until dyeing takes place. During this time, bacteria form on the fabric which would cause uneven dyeing and these are removed with biocides which kill the bacteria needed to break down sewage if released into sewage systems.

The textile industry can respond to the problem of pollution in three ways: it can prevent the problem occurring: it can treat the pollution; and, it can pay a third party to deal with the problem. Prevention of pollution requires the development of technologies which utilise new processes or different, less polluting chemicals. Progress is being made in a number of areas. Vald Hendriksen, a Danish firm has produced a textile dyeing system which greatly reduces the use of water and energy and produces a less polluting effluent.

Progress has also been made in reducing the level of formaldehyde in textile production and research is being undertaken to improve wool scrubbing technology in order to clean up effluent. Treatment of effluent by the firm itself requires the use of filters or scrubbers or chemical processes which break down the harmful emissions. This an expensive option but may be the only one available if the factory cannot discharge its effluent into sewage treatment works.

Although textile recycling dates from the last century, and there is a well developed market for fibre for recycling, only a small part of waste textiles, in the form of clothing and household textiles is recycled. Acrylic, nylon, polypropylene and polyester are not biodegradable except by UV light. While polyester can be produced from recycled plastic and hence make a positive environmental contribution, the problem of disposing of polyester and acrylic remains a major environmental challenge.

EC producers of textiles must incur additional costs in order to reduce the adverse environmental impact of their processing by-products, treatment substances, and to a degree, even the products themselves but this puts them at a disadvantage relative to producers in developing countries who have few environmental measures to contend with. Also, there can often be a conflict between job creation and environmental protection in the textile industry, particularly in the less developed regions of the Community where governments under pressure to expand or maintain employment may resent having to comply with EC Directives aimed at protecting the environment.

OUTLOOK

The general economic climate, combined with the tensions on the currency markets does not provide an incentive to final consumers to increase their consumption of textiles, nor the producers to invest to maintain their competitiveness.

The textile sector currently undergoes a recessionary cycle which looks very much like the one the sector suffered in the early 1980s, which had a profound effect on the industry.

The fall of the US dollar has involved the Asian currencies which are linked to it. This has made imports from these countries more attractive and reduced the number of outlets for EC exports. This situation is aggravated by a stagnating domestic market, except for technical textiles.

Although exports rose in 1991, the increase was very modest compared to the increase in imports. The near stagnation of exports is due to very strong price competition from developing and newly industrialised countries on the EC's traditional markets. These trends, reinforced by the admission to the EC of greater quantities of imports of textiles from Eastern Europe, are likely to continue in the short run and while EC demand is likely to increase by maximum 1.5-2% per annum in the period 1993-1995, it is unlikely that EC production will increase at more than an average annual rate of 2% over the next three years.

The medium term prospects for the EC textile industry will also be dominated by the outcome of the GATT talks. While not finalised it appears that quotas would be phased out over the next decade, while on the positive side for EC producers greater efforts to open extra-EC markets would be made so that, exports to these countries would grow rapidly.

As there are few remaining barriers to intra-EC trade in textiles, the impact of the Single Market may not be very great. With the completion of the Single Market, there are likely to be more joint ventures between textile companies in different Member States and at least some inter-country take-overs. In the late 1980s, the UK group, Coats Viyella, was exploring the possibility of forming an EC "mega company" which could take on low cost competition by exploiting economies of scale made possible by new technology in the textile and clothing industries.

In the long term, the EC textile industry's growth will depend on its ability to develop new products and new uses for existing products. The growth in demand for technical textiles offers tremendous opportunities to the EC industry because of its technical superiority and its capacity for research and development. The development of "green" textiles whose production and disposal do not damage the environment is another opportunity for growth for the industry.

Table 8: Textiles
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.5	2.5
Production	1.6	2.1
Extra-EC exports	1.8	2.4

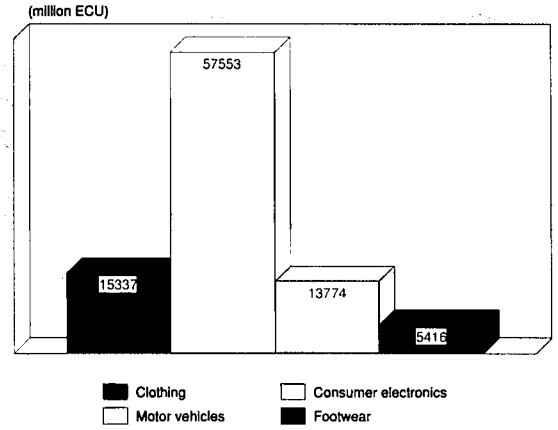
Source: Fitzpatrick

Written by: Fitzpatrick Associates
The industry is represented at the EC level by: Coordination Committee for the Textile Industries in the EC (COMITEXTIL). Address: Rue Montoyer 24, B-1040 Brussels; tel: (32 2) 230 9580; fax: (32 2) 230 6054.

Clothing
NACE 453

One of the top ten industries in the EC in terms of employment, the clothing industry is strongly concentrated in certain regions, and remains highly labour intensive with a share of 2% of EC manufacturing output. Over the past decade the clothing industry has experienced considerable structural change with an increased concentration of its production, a sharp decline in employment, and greater specialisation in high quality garments with low cost clothing now being supplied largely by imports, mainly from Asia. Increasing concentration of retailers contains both threats and opportunities for the industry - while their bargaining power and influence is growing and they often source production in low-cost producer countries, increasing emphasis on time-based competition and back-up services favours EC suppliers. The future success of the EC clothing industry also depends on the extent to which technology can be applied to the labour intensive operations and on the outcome of the current GATT negotiations on international trade in textiles and clothing.

Figure 1: Clothing
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The clothing industry comprises the manufacture of clothing and clothing accessories of various materials, i.e. woven, knitted or crocheted fabrics, or fully fashioned parts. Most knitwear products, though sharing much the same demand and supply characteristics as other clothing, are not included in NACE 453. Rather, they are included in NACE 43 as part of the textile sector. Within the clothing sector product categories are generally defined according to functional use, women's outerwear, men's underwear, etc. A report by Institut Français de la Mode (IFM) for ELTAC (European Largest Textile and Apparel Companies) used price sensitivity to distinguish between different segments of the clothing market, a distinction which is generally more useful for analytical purposes than functional characteristics. The report distinguished between totally price sensitive markets (e.g. man-made fibre shirts), medium price sensitive markets (e.g. cotton blouses) and price-insensitive markets (e.g. branded jeans).

The clothing and textile industries are strongly linked - the clothing industry purchases 50%, 70% and 40% respectively of the outputs of the cotton, wool and silk industries. The two industries have common features and trends. They both experienced periods of expansion up to 1973, followed by prolonged stagnation. High and increasing penetration by extra-EC imports characterises both industries.

Main indicators

The clothing industry is one of the top 10 industries in the EC employing about 1.15 million people in 1991. While dominated by large companies, the bulk of the industry's firms are small to medium sized enterprises, many employing less than 20 persons. In addition, the industry has a high proportion of part-time employees and out-workers who are not always captured in official employment statistics. Thus, the employment impact of the clothing industry is likely to be considerably higher than the official estimate.

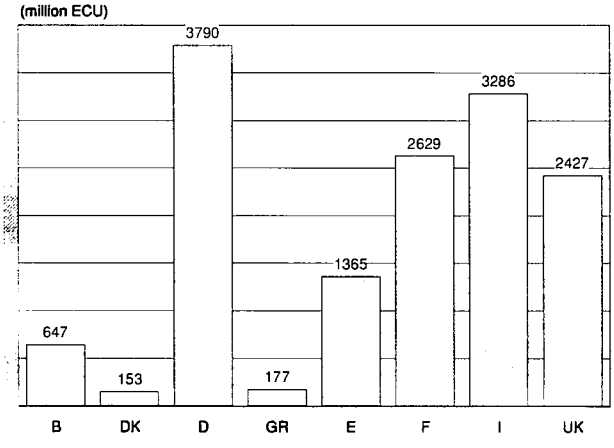
Germany, Italy, France and the United Kingdom account for about 76% of the EC's clothing employment and 85% of its output, although this dominance reflects the size of their economies rather than the relative importance of the industry. Value added is highest in the more developed EC countries - in Germany, France, Italy and the United Kingdom. In the southern Member States such as Greece and Portugal while the clothing industry is important in terms of employment (see Table 10), it produces mainly low value-added garments.

Recent trends

Apparent consumption of clothing in real (1985) terms increased twice as fast as EC production over the period 19821991, accompanied by a deterioration in the EC's clothing trade balance with non-EC countries. The share of the clothing industry in total EC manufacturing output fell over the past decade, while structural adjustments in response to increased competition from imports has resulted in a decline in employment and in the numbers of clothing firms.

Despite the deteriorating trade balance, extra-EC exports increased substantially in real terms (by over 80%) over the 1982-91 period, although export growth was faster the first half of the 1980s than in the years 19861991. However, with much faster growth in extra-EC imports, the 1991 deficit in the EC's clothing trade in current prices was more than four times its 1982 level. Not all EC countries have clothing extra-EC trade deficits - Greece, Portugal and Italy recorded surpluses between 1982 and 1991.

Figure 2: Clothing
Value added by Member State, 1991



Source: Eurostat

Table 1: Clothing
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	28 882	31 456	33 819	36 111	37 194	40 883	43 119	45 348	49 149	52 883	56 697
Production	26 545	29 201	31 278	34 012	34 444	36 490	37 816	39 629	42 095	42 879	44 390
Extra-EC exports	3 031	3 324	4 240	5 058	5 133	5 040	5 093	6 218	6 727	6 683	7 092
Trade balance	-2 337	-2 255	-2 541	-2 099	-2 749	-4 393	-5 303	-5 718	-7 054	-10 004	-12 307
Employment (thousand)(3)	N/A	N/A	N/A	N/A	N/A	N/A	1270.8	1213.9	1185.2	1149.1	1136.1

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Fitzpatrick estimates
(3) Including firms with less than 20 employees; data calculations by OETH, based on Eurostat and Associations' sources
Source: Eurostat, OETH, Associations

Table 2 : Clothing
Breakdown by product line, 1990

(thousands)	Apparent consumption	Production	Extra-EC exports
Shirts (1)	406 384	143 928	24 264
Blouses (2)	368 657	206 024	38 928
Mens' coats and raincoats	22 980	11 895	2 450
Womens' coats and raincoats (2)	83 700	51 669	9 334
Mens' suits	37 057	16 215	4 263
Womens' suits (2)	57 985	26 836	5 979
Skirts	222 198	171 541	24 039
Dresses (2)	172 010	111 833	10 981

(1) Excluding Greece
(2) Excluding Spain
Source: AEIH

Table 3: Clothing
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	1.9	4.7	3.8
Production	3.2	1.2	1.9
Extra-EC exports	14.3	3.2	6.8
Extra-EC imports	3.0	15.6	11.2

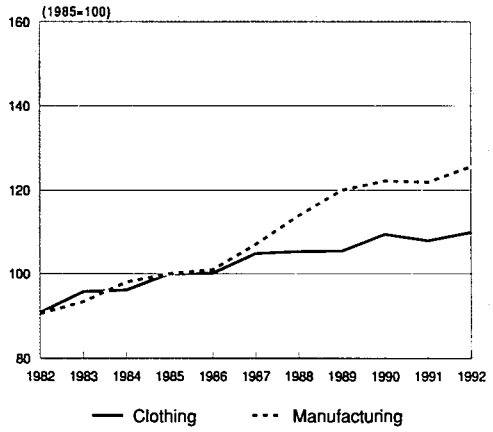
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Clothing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	3 031	3 324	4 240	5 058	5 133	5 040	5 093	6 219	6 727	6 683
Extra-EC imports	5 367	5 579	6 781	7 157	7 882	9 432	10 396	11 937	13 781	16 687
Trade balance	-2 337	-2 255	-2 541	-2 099	-2 749	-4 393	-5 303	-5 718	-7 054	-10 004
Ratio exports/imports	0.56	0.60	0.63	0.71	0.65	0.53	0.49	0.52	0.49	0.40
Terms of trade index	109.4	110.6	101.6	100.0	110.0	109.5	113.1	113.0	113.8	112.2
Intra-EC trade	5 049	5 335	6 132	6 853	7 591	8 077	8 130	9 347	10 964	11 974
Share of total imports (%)	48.4	48.8	47.4	48.9	49.0	46.1	43.9	43.9	44.3	41.8

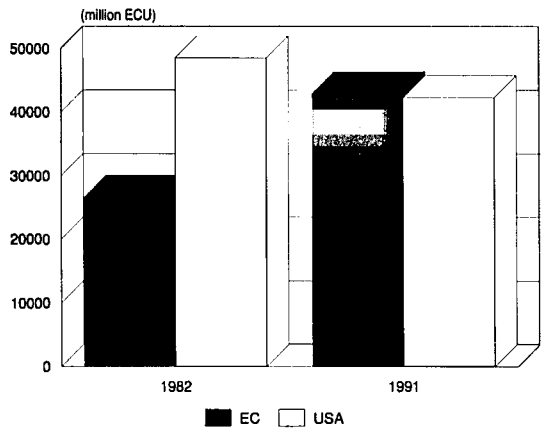
(1) Estimates
Source: Eurostat

Figure 3: Clothing
Production index compared to EC manufacturing



Source: Eurostat

Figure 4: Clothing
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Employment in the EC clothing industry declined by 10% between 1988 and 1991. The decline was greatest in the wealthier Member States, and, contrary to EC trends, employment and output have grown in Spain, Portugal and Greece. Analysis undertaken by Texco/Kurt Salmon Associates for the EC Commission, and recent trends, indicate that countries whose proportionate consumption is out of line can be more easily subject to changes which would bring them closer to the European average.

International comparison

Per capita clothing consumption is slightly higher in the USA than in the EC and is much higher in Japan, although in the latter case this also reflects higher price levels. However, in the latter half of the 1980s, clothing consumption rose more slowly in Japan than in the EC, and fastest in the USA. The value of clothing output in the EC is approximately 75% greater than in Japan or the USA.

The EC is a major force in world clothing trade, accounting for 30% of world clothing exports (of which intra-EC trade accounts for 19% and extra-EC trade 11%). The USA accounts for only 2.2% of world clothing exports and Japan accounts for 0.6%.

Foreign trade

The EC's clothing trade with the rest of the world was in substantial deficit throughout the 1980s and the ratio of exports to imports in current values fell sharply between 1982 and 1991 despite an improvement in the terms of trade for clothing.

The destinations of EC clothing exports changed in order of importance between 1986 and 1991. The proportion of exports going to EFTA countries fell slightly and the share of exports to Japan more than doubled. The USA's share of EC exports fell substantially while the proportion of exports to developing countries and state trading countries fell marginally.

The main sources of EC clothing imports are China and Hong Kong followed by Yugoslavia and Turkey. Hong Kong's share of total imports fell between 1986 and 1991 while China's share tripled in the same period. The proportion of imports from state trading countries and from the USA and developed countries, other than Japan, rose between 1986 and 1991.

Extra-EC import penetration, largely attributable to an increase in imports from developing countries and in particular China, rose very sharply, albeit from a low base in 1982. Import penetration is highest in Belgium, Denmark and the Netherlands and lowest in France, Portugal and Italy.

Intra-EC trade grew faster than extra-EC exports between 1982 and 1991 but intra-EC trade as a proportion of total imports fell over the same period. Extra-EC exports also rose much faster than EC production in the years 1982-91. Intra-EC trade is dominated by France and Germany although the share of the larger countries in intra-EC trade has fallen throughout the 1980s.

MARKET FORCES

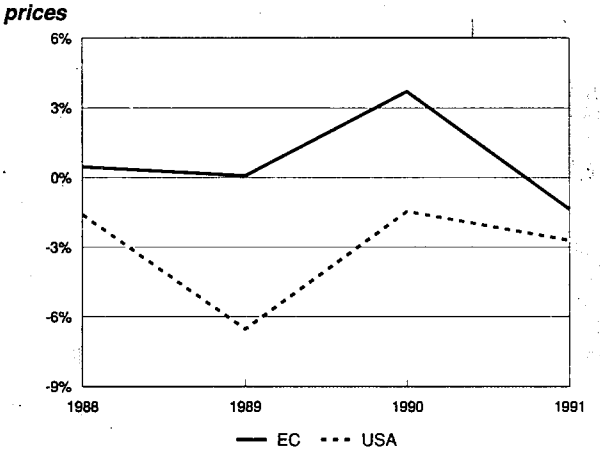
Demand

Clothing is an essential commodity, but once incomes exceed subsistence levels, people demand variety in clothes and most spending on clothes becomes discretionary. In general, spending on clothing does not rise as fast as disposable income although there is some evidence that beyond a certain threshold level of wealth, a greater proportion of household income is devoted to clothing. This is reflected to some extent in that the share of spending on clothing in the wealthier EC Member States is higher than in the other countries. Spending on clothing is highly cyclical: expenditure is reduced or deferred during economic downturns with compensating surges when economies are buoyant.

The EC clothing market comprises two main segments, the market for mass produced low cost clothes and the market for high quality products. Demand for mass produced clothes is relatively price elastic, while demand for high quality clothes is determined to a greater extent by non-price considerations, although the evidence of recent years indicates that price remains an important overall determinant of expenditure levels. Increasing sensitivity to price has been mainly driven from the supply side as the availability of low-cost garments increased and their quality improved.

More than most products, the demand for clothes is determined by fashion and tastes. The demand for fashion elements is growing, appearing in segments traditionally less sensitive to such trends, e.g. underwear. As clothes are non-durable and fashions change frequently, the life cycle for a particular garment may be very short, in some cases as short as a few weeks. The enormous variety of styles, colours and fabrics now available has produced an extremely heterogeneous clothing industry comprising mainly small firms. Manufacturers have considerable scope for specialisation in market niches but this often requires strong links between the manufacturer and final consumer to enable manufacturers quickly to accommodate changes in consumer tastes. This quick response

Figure 5: Clothing
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

system is best exemplified by the large manufacturing and distribution chains such as Benetton, discussed below.

The demand for high quality clothes from the EC remains buoyant in other developed countries which are its main markets. The advantages which the EC enjoys in terms of design and quality of production has ensured a positive trade balance with these developed countries. The EC clothing industry enjoys the considerable advantage of including firms which are the world leaders in production of high fashion clothes. Paris and Milan are the centres of world fashion and the status of firms such as Pierre Cardin, Yves St Laurent and Valentino Cerutti remains largely unchallenged.

Most product innovation is based on changing fashions but is also strongly linked to the development of new textiles. Two such innovations in recent years have been the development of micro fibres and anti-bacterial fibres leading to differentiated high value added products. Materials based on micro fibres such as Ameretta, Sofrina or Belsetta combine the appearance of leather with the texture of velvet and absorb the humidity of the body. The development of new textiles are particularly important in widening the range of leisurewear, sportswear, weather proof garments and protective or specialist clothing.

Supply and competition

Supply capacity

The EC's self sufficiency ratio, i.e. the ratio of production to apparent consumption fell from 94% in 1985 to 81% in 1991, although 1991 data includes the spurt in consumption in post-reunification Germany. In 1991, of the ten countries on which data are available, only Italy and Portugal had self sufficiency ratios of more than 100%. The decline of the EC's self-sufficiency in clothing is reflected in the increase in imports as a percentage of EC consumption shown in Figure 8. Import penetration is high in the Netherlands, Belgium and Denmark while the bigger economies still service large shares of their home markets from domestic production. The lowest levels of import penetration are in Italy and Portugal.

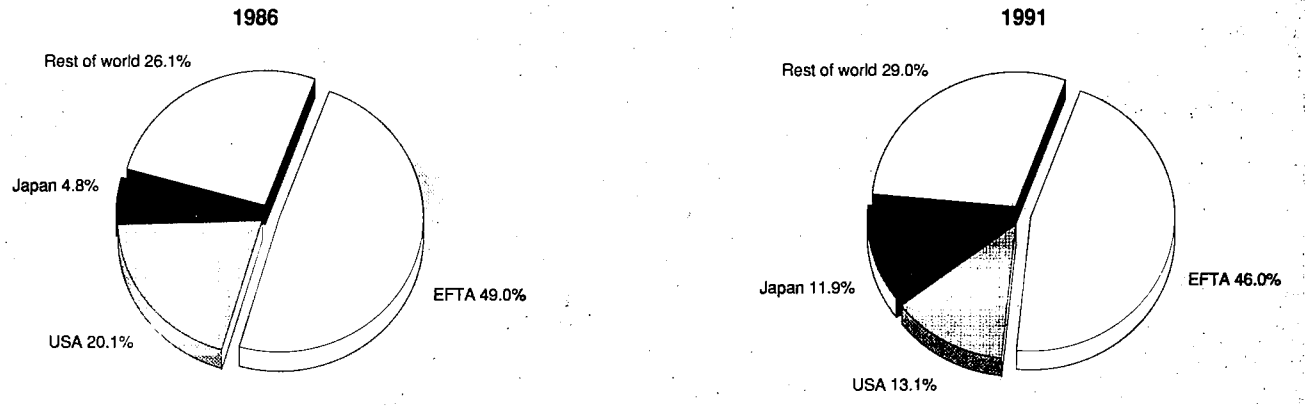
Although down from its 1985 level of 48% the share of intra-EC imports in total imports at 42% in 1991, indicates the importance of intra-EC trade to the EC clothing industry. The countries most dependent on intra-EC trade are the most recent members of the Community, Greece, Spain and Portugal.

Market power of major customers

Over the last decade the distribution and retailing of clothing has become increasingly concentrated, sometimes also internationalised, and the influence and bargaining power of distribution has become much stronger, particularly in areas such as product design. The concentration of distribution remains, however, very different across Member States, being particularly concentrated in the United Kingdom and least concentrated in the southern Member States, indicated by the relatively high share of independent retailers in Spain, Italy and Portugal (see Table 5). The increasing competitive pressure coming from the large retail and distribution groups is also forcing increasing concentration and cooperation among independent retailers.

This trend towards concentration has a number of consequences for the downstream clothing industry. Firstly, as noted, the bargaining power and influence of major customers increases. Secondly, distributors are increasing the share of their purchases sourced in low-cost countries, often designing the products themselves - a lot of the major distributors and retailers now have permanent structures specialising in the sourcing of purchases in the most cost-efficient locations. Thirdly, and related to the last point, certain functions traditionally performed by manufacturers are increasingly being taken over by distributors and retailers and a major feature of the industry

Figure 6: Clothing
Destination of EC exports



Source: Eurostat

Table 5: Clothing
Clothing distribution patterns in EC countries, 1988
(% shares of outlet types)

	Independent retailers	Multiples	Department/ variety stores	Hyper/ supermarkets	Mail order	Other
Belgique/België	40	17	11	13	9	10
BR Deutschland	44	28	12	3	10	3
España	60	7	15	4	0	14
France	38	14	10	18	10	11
Italia	70	12	5	1	1	11
Portugal	76	8	0	4	2	10
United Kingdom	20	28	31	1	10	10
Total	45	20	14	5	7	9

Source: Economist Intelligence Unit, based on information in Texco International/KSA report for DGIII in the EC Commission

in recent years has been the growing importance of manufacturer-retailers. By 1991, many of Europe's top clothing manufacturers - Benetton, Bidermann, Escada, Burberrys, Laura Ashley, Hugo Boss - were also retailers. In addition to establishing their own retail outlets manufacturer-retailers are also expanding their retail operations, particularly outside their home markets, through franchising, licensing, and joint ventures. The impact of closer integration between EC economies, the opening up of markets in Eastern Europe and closer cooperation with EFTA countries will aid continued expansion and concentration of the major distributors throughout the European clothing market.

Increasing concentration of clothing distribution has another advantage for manufacturers. More professional organisation of distribution has helped to emphasise the importance of time-based, rather than cost-based, competition, thus conferring an advantage to nearby EC producers. Linked to this development the major speciality chains emphasise higher quality clothing offering more individual style. Catering to these requirements generally requires close communication between distributors and manufacturers, for example using Epos (electronic point of sales) systems, which facilitate quick response. Similarly increased emphasis on shorter production runs militates against the labour-intensive mass production runs of many extra-EC manufacturers.

The Institut Français de la mode (IFM) report for ELTAC found that a number of other important factors were also influencing EC distributors which favoured sourcing closer to their main European market base, particularly reliability and quality. Sourcing in faraway markets carries substantially more risk generated by the time lags, distance and other factors - the study reported that to take account of risks involved some distributors compute an additional cost percentage varying from 9% for EC countries up to 20% for NICs and ASEAN countries and as high as 30% for countries such as Pakistan, China, India and Bangladesh. Additional costs such as transportation, clearance, insurance, currency risk, letters of credit, financing and quality control which are negligible when sourcing takes place within the EC, were estimated to account for 7% and 11% of the cost in near non-EC and faraway suppliers respectively. Nevertheless for many clothing products, and in particular for large orders with long lead times, distributors will favour cheaper "faraway" suppliers.

Internal EC competition from 1993

While the barriers to internal trade in clothing are relatively few, the completion of the single market is likely to reduce transport costs directly by about 5% and to allow faster delivery through the removal of administrative barriers. The harmonisation of indirect taxation will also diminish delay and administrative expense.

Liberalisation of public procurement will have little effect on the clothing industry because the public procurement market (mainly for military, police and health worker clothing) is small.

The major external impact of the single market will be the ending of national quota allocations (under the Multi-Fibre Arrangement) on imports, considered to be incompatible with the free circulation of goods within the EC.

Foreign competition

The EC's clothing imports come mainly from low cost countries which have "preferential" agreements with the EC such as Malta, Turkey, Morocco, Tunisia, Egypt and Cyprus or the developing countries covered by the EC's "textile policy". These are mainly South East Asian countries (particularly Hong Kong, Malaysia and China) whose trade is governed by the MFA. Extra-EC exports are mainly to high income countries (Switzerland, USA, EFTA, Japan and Saudi Arabia) and more recently to newly industrialising countries, particularly Hong Kong.

EC imports are mainly low price, mass-produced clothes while exports are mainly high quality products. These trade patterns reflect two dominant characteristics of the EC clothing industry, its relatively high labour costs relative to less developed producers and its superior know-how in areas such as product quality, marketing, industry organisation and design. The long run competitiveness of most EC clothing firms lies in their ability to supply high income markets, where mainly non-price factors determine consumer choice. Technological and organisational innovations may increase labour productivity but it will not make EC firms as competitive as those in Asia in the production of low price garments. The competitive advantages which the EC clothing industry enjoys lie in design and marketing, quality of fabric and finishing of garments. EC know-how also exerts an influence on EC imports with includes products designed in Europe and carrying European brands - a report by Texco\KSA for the EC Commission estimates that a third of EC clothing imports are controlled by EC manufacturers.

In most product areas the EC clothing industry's competitiveness depends less on price than on the ability to deliver high quality, well-designed and branded garments quickly and efficiently. To facilitate fast and flexible response to changing fashions and retailer demands, the larger firms in the industry have rationalised production and distribution. In particular, just in time (JIT) production methods were widely adapted in the clothing industry during the second half of the 1980s. The study by IFM estimated that average lead time for first orders varied from 2-4 weeks for most EC-based manufacturers, 3-6 weeks for nearby countries and 4-5 months for Far East suppliers, although up to seven months in the case of China and Bangladesh.

Partly successful to remain cost competitive against cheaper extra-EC producers, has been the growth of outward processing trade (OPT) in the EC clothing industry. This involves sourcing the most labour intensive stages of production which cannot be effectively automated in countries with cheap labour supplies. This system had its roots in the early 1980s West German practice of exporting ready cut pieces of garments to low wage countries to be sewn up, initially in Eastern Europe but later extended to Turkey, Portugal, Hong Kong, China and other countries in North Africa and Asia. While Germany is still the largest user of outward processing, the system is also used by firms based in other northern Member States. Because of the time lags involved, low to medium priced products are best suited for OPT and in general the method is not compatible with fast response strategies. While OPT will continue to be important in the 1990s, it inevitably has a limited life span, mainly because the EC clothing industry produces a diminishing share of world output of low cost clothes. Increasingly EC firms have turned to importing and distributing low cost garments produced in developing countries or in some cases engaging in joint ventures with native firms in such countries.

While the Uruguay Round of the GATT negotiations is not yet complete, the package for the clothing and textile industry is expected to include a phasing out of the MFA quota arrangements over a transitional period of around ten years. Major pre-conditions specified by the EC as part of such agreement are likely to include the opening of markets in developing countries, action to curb dumping of surplus products on EC markets, the removal of certain state subsidies (particularly export subsidies) to the clothing industries in the more developed low-cost exporting countries and action to curb counterfeiting of EC brands.

Price and profit trends

The price of clothing to consumers in the EC remained generally stable in the 1980s in the three largest producing countries, Germany, France and Italy but prices fell in the United Kingdom as a result of the inflow of cheap imports from developing, mainly Commonwealth, countries. Falls in import prices from 1985 to 1990, partly due to a decline in the value of the dollar, compelled EC producers to reduce their own prices of mass produced clothing in intra-EC and external trade resulting in a profit squeeze. But rising unit prices for EC high quality clothing exports in the late 1980s did not significantly reduce the volume of exports because of demand for high quality products is not very price elastic.

Profitability is low in the EC clothing industry with high contributions to raw material and labour costs. The Texco/KSA report estimates average return on sales in the clothing industry at 3%, with higher profitability evident in larger firms. Profitability in the industry has been declining because of a variety of factors including pressure on prices linked to competition from developing countries, increased labour costs above those justified by productivity gains, the costs of expanding the variety of output, advertising and promotional costs associated with establishing brands or market positions and delays and/or defaults in payments by the trade.

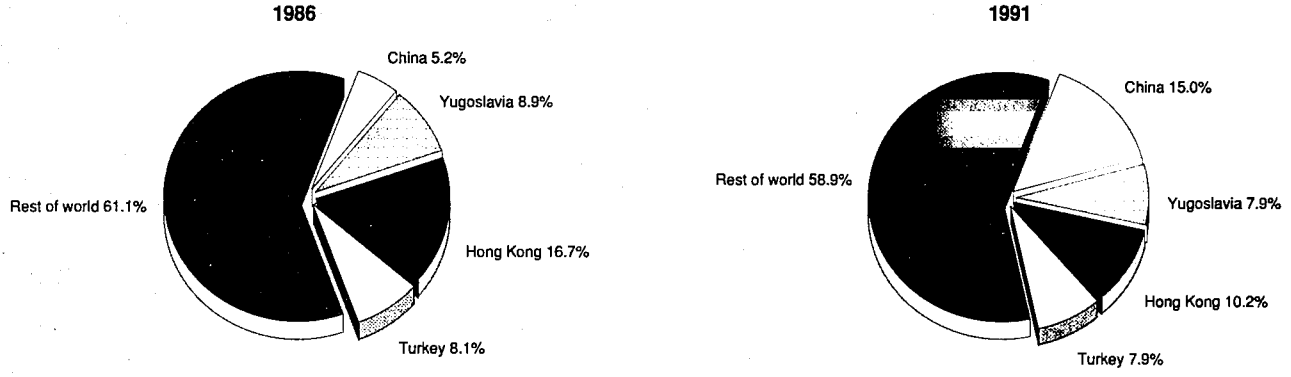
Production process

The major input into a garment is a natural or synthetic artificial fabric. The EC textile industry produces an abundance of both types of fabrics and has been in the forefront of innovation in the design and production of textiles for the clothing industry. Many textile producers co-operate with clothing manufacturers in textile design and innovation and the degree of vertical integration between the two sectors is high. The production of a garment involves four basic operations -product initiation, pre-assembly, assembly and finishing. Product initiation is a purely creative function involving the design of the garment and the selection of fabrics which requires a high level of expertise. EC firms excel at design although there is serious problem with the copying of EC designs by producers, particularly in Asia, who attach copied brand marks and logos to garments.

Throughout the 1980s unit wage costs increased faster than productivity as measured by value added per person employed. The limited introduction of new technology into the clothing industry was sufficient to increase labour productivity. The investment rate in the clothing industry is lower than in most other industries. The countries with the most capital intensive clothing industries are Belgium, Germany and France.

The introduction of technology in the EC clothing industry has helped slightly to reduce the cost gap between Member States but differentials in wage costs remain high. There are wide differentials in labour costs between the wealthier and the less developed Member States. Labour costs in Germany are over 5 times those in Portugal and the share of labour costs in total costs is 40% in Germany compared to 18% in Portugal, although high wage EC countries such as Germany, France, and the Netherlands had higher productivity levels, as measured by turnover per employee in 1989.

Figure 7: Clothing
Origin of EC imports



Source: Eurostat

Table 6: Clothing
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	16.1	16.6	16.6	17.1	17.3	18.1	18.3	18.6	19.4	19.5
Productivity index	94.2	97.2	96.7	100.0	101.2	105.6	107.1	108.6	113.3	113.8
Unit labour costs index (3)	82.5	87.7	93.6	100.0	102.7	106.3	110.7	119.4	127.3	N/A
Total unit costs index (4)	74.9	82.4	89.3	100.0	105.5	112.8	120.4	131.9	139.9	151.2

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

INDUSTRY STRUCTURE

Companies

The majority of firms in the clothing industry are small with those employing less than 20 people accounting for 22% of total output in 1990. This polarised structure of a few large firms and a multitude of small to medium, particularly small, firms is common within all Member States. The Texco\KSA analysis indicated that in the seven major clothing producing Member States the industry was most concentrated in Belgium and least concentrated in France. In general, concentration of production is greatest in the smaller EC states.

The top two EC clothing firms in 1990 in terms of turnover were both Italian, Benetton and Gruppo GFT (Table 7). Since then, however, there have been a number of mergers in the industry, the most important of which was that between the UK companies Coats Viyella and Tootal, whose combined turnover would now place them alongside Benetton, while the French company Bidermann's acquisition of Cluett Peabody will have moved it up the rankings. Concentration of production among the largest firms has increased in the past decade, although small firms still pre-dominate. This has been paralleled by concentration of distribution which has increased the influence and bargaining power of distributors over product design, price and conditions of supply.

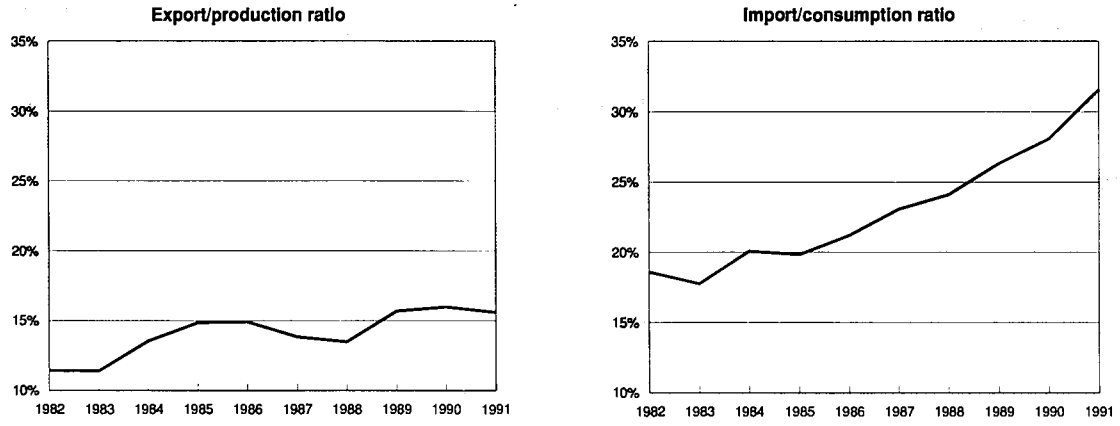
Strategies

The strategies employed by EC manufacturers are largely geared to distinguishing their products (and associated services) and maintaining their competitive advantage vis-à-vis low-cost producers from outside the EC. Thus, strategies for markets outside the EC have concentrated on capitalising on Europe's competitive advantage in terms of design and product quality and have embraced greater investment in branding, increasing adoption of quality management philosophies, and continued concentration on high value-added markets. Within the EC this has been supplemented by increased reliance on time-based competition embracing quick-response strategies and JIT systems, increased cooperation with retailers and cross-border alliances and mergers aimed at establishing a larger and more uniform presence in the more integrated EC internal market. These strategies to improve quality and service competitiveness have been supplemented by those aimed at reducing cost disadvantages. Thus, the importance of OPT has increased, production and distribution systems have been subject to rationalisation and the use of technology both in terms of automation and through the introduction of flexible management systems has continued to increase.

The importance of these different strategy elements varies across firms. The Economist Intelligence Unit report "The Clothing Industry and the Single European Market" (1991) grouped EC clothing companies into three categories. The first category were dynamic efficient firms, mainly located in France, Italy, Germany and the United Kingdom, the second category were the many firms in the Netherlands and Belgium who are increasingly substituting trade and distribution for production and, thirdly, the industries of the less developed EC Member States which have been sheltered from competition and are more vulnerable to trade liberalisation.

Many of the dynamic firms now consider the EC as their domestic market and are most concerned with expanding sales

Figure 8: Clothing
Trade intensities



Source: Eurostat

Table 7: Clothing
Top ten clothing companies in the EC, 1990

	Country	Turnover (million ECU)	Rank among industrialised countries
Benetton	Italia	1 332	5
Groppo GFT	Italia	959	10
Levi Strauss (Eur)	Belgique/België	871	14
Steilman Group	BR Deutschland	819	15
Triumph Gruppe	BR Deutschland	770	16
Tootal Group	United Kingdom	739	17
Courtalds	United Kingdom	691	19
Bidermann	France	643	22
Adidas	BR Deutschland	635	23
Coats Viyella	United Kingdom	630	26

Source: Comitextil bulletin 91/5

in extra-EC markets. The main threat to these firms is the movement upmarket of East Asian producers that may diminish the advantages which these firms enjoy.

Table 8: Clothing
Number of enterprises, 1990

EC	18 384
Belgique/België, Luxembourg	479
Danmark	340
BR Deutschland	2 074
Hellas	1 200
España	2 605
France	2 786
Ireland	350
Italia	2 965
Nederland	212
Portugal	1 000
United Kingdom	4 373

Source: AEIH

Production costs are becoming less and less decisive in determining competitiveness in the EC clothing industry. A study commissioned by the EC Commission shows that the service incorporated in the product is rapidly becoming the key factor in supply strategies, as it reduces the level of services which have to be added subsequently and saves on management costs, storage, quality control and sales strategies. These savings enable retailers to improve co-ordination of supply and demand and avoid unsold stock.

Table 9: Clothing
Production by country, 1991

(million ECU)

Belgique/België	1 706
Danmark	418
BR Deutschland	11 450
Hellas	411
España	3 933
France	6 930
Italia	10 083
Portugal	1 221
United Kingdom	5 659

Source: Eurostat

Improving coordination between the stages of production and distribution is a vital element in the EC clothing industry's strategy. This explains the trend for greater integration between manufacturing and distribution which characterises the larger EC firms. Increasing backward linkages to the textile industry has been less important as a strategy element. Many of the larger companies straddle both the clothing and textile sectors and while this feature of the industry has become more pronounced with the increase in mergers and acquisitions in recent years establishing strong backward linkages has not generally been the prime motivation.

Investment in the EC clothing industry has increased throughout the 1980s and most of this investment has been in improving technology rather than in increased capacity. Investment per worker in the clothing industry is lower than in most EC industries and most investment is concentrated in the pre-assembly stage of production. There are wide disparities in investment per employee across Member States with higher levels in more developed northern states.

REGIONAL DISTRIBUTION

The relative importance of the clothing industry varies across Member States and tends to be further concentrated in certain regions within each Member State. In general, the clothing industry also tends to be located in the same regions as the textile industry, so that structural changes impacting on both industries may have a multiplicative impact at a regional level.

Studies undertaken by the EC Commission's DG XVI confirmed the heavy dependence and vulnerability of a number of sub-regions, usually relatively less developed, within some EC Member States. For example, textiles and clothing accounted for over half of manufacturing employment in Ireland's least developed region Donegal, while clothing accounted for 14% (and textiles a further 10%) of manufacturing employment in Northern Ireland, the least developed region in the United Kingdom. Similarly in Portugal, 60% of industrial employment in Braga was in textile and clothing and including neighbouring regions of Porto and Aviero accounted for 72% of Portuguese employment in clothing and textiles in 1990. The relative importance of the industry at a regional level was less important in more developed Member States.

ENVIRONMENT

The production process for clothing does not give rise to any significant threat to the environment but the disposal of waste from clothing manufacture and of used clothing may cause an environmental problem. Waste cut-offs, referred to as rem-

Table 10: Clothing
Share of clothing industry output and employment in total manufacturing output and employment, 1989

	Clothing as a % of manufacturing output	Clothing as a % of manufacturing employment	Clothing output as a % of EC total	Clothing employment as a % of EC total
Belgique/België, Luxembourg	3.7	2.2	2.9	3.7
Denmark	2.4	2.3	1.4	1.3
BR Deutschland	2.9	1.4	23.7	19.6
Hellas	2.3	4.5	3.2	3.9
España	4.0	3.1	9.1	10.3
France	2.9	2.3	18.8	19.7
Ireland	5.9	1.3	0.6	1.3
Italia	5.6	3.0	20.6	16.7
Nederland	0.7	0.6	1.3	1.3
Portugal	2.8	8.5	3.8	3.0
United Kingdom	3.0	1.7	14.6	19.0

Source: AEIH

nants, may be sold for the manufacture of clothes if they are sufficiently large. Where the remnants are small they can be sorted into waste suitable for pulling into flock (called "mungo" or "shoddy") that can be used for the manufacture of lesser quality textiles. Small off-cuts can also be used as industrial wipers.

The recycling of clothing is carried on mainly by charitable organisations who run shops to which used clothes are donated and which the charity sells for very low prices to finance their activities. This form of recycling postpones the problem of final disposal of clothing waste. Woollen garments can be recycled by unravelling the wool fibre and reusing it. This is the oldest form of clothing recycling and technology has existed for 150 years to reduce old woollen garments to fibre. Recycled wool is not redyed and does not have to be scoured, resulting in savings on water use and energy. Recycled wool fibre is used primarily for upholstery fabrics in contract work for hotels and offices. A UK company, Evergreen Recycled Fashions, has recently launched a range of clothes using recycled wool.

The disposal of clothing, particularly of synthetic clothing can present an environmental problem. Synthetic fabrics are not biodegradable and take up substantial space in landfill sites. Europe's largest apparel manufacturer, Klaus Steilman, has pioneered the manufacture of a range of "environmentally friendly" garments. These garments are made from textiles produced using few chemicals. They are easier to recycle and will biodegrade when disposed of in landfill sites. The fibre used is a blend of linen and viscose, both of which are biodegradable. Klaus Steilman consider that environmental awareness among consumers will ensure a market for this clothing.

OUTLOOK

The EC clothing industry faces a number of major challenges in the years ahead. Competition from East Asia is likely to increase with the possibility that Hong Kong producers may move into the production of higher quality clothes and acquire distribution outlets in the EC. Low cost imports from Eastern Europe will increase as trade restrictions against these countries are lifted. To maintain competitiveness, the EC industry needs to invest in technology and develop more integrated methods of production and distribution. The clothing industries of the less developed Member States face the greatest challenge as they are more dependent on low cost labour to maintain competitiveness.

Free and fair trade in clothing in the short term is unlikely to emerge from the current GATT talks, it is likely that import quotas to the EC will be progressively increased. With the completion of the Single Market national quotas will be eliminated posing a particular threat to countries which have low import penetration at present.

The completion of the Single Market is compelling EC clothing manufacturers to develop EC-wide, and in some cases, global strategies. Very large firms are emerging which have integrated all stages of production and distribution. These firms are also investing in new technology which increases labour productivity. Recent advances in technology made in Japan suggest that an effective method of automating sewing may soon be developed.

Table 11: Clothing
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.6	4.0
Production	1.9	2.0
Extra-EC exports	3.6	4.6

Source: Fitzpatrick

The opening of the economies of Eastern Europe offers the possibility of increasing internationalisation of the EC clothing industry through the opening of subsidiaries in Eastern Europe where labour costs are likely to remain lower than in the EC for the foreseeable future.

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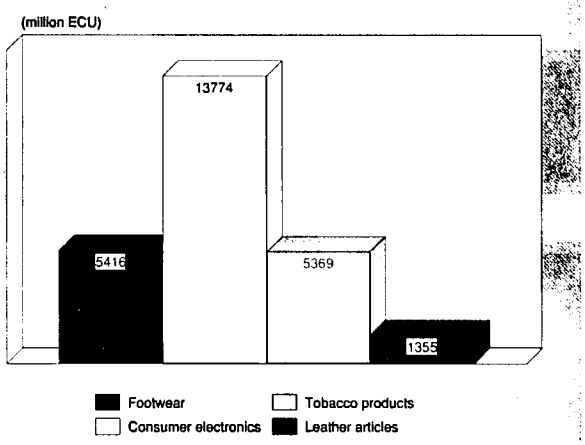
Footwear
NACE 451, 452

The EC is one of the world's largest footwear markets but increasing consumption has been accompanied by a sharp decline in production and rapid growth of extra-EC imports over the last decade. Italy accounts for a third of the value of EC production and over 50% of extra-EC exports, but increased competition from low-labour cost countries has led to relocation of manufacturing facilities within the Community to lower labour cost Mediterranean countries, and to developing countries. The structure of distribution is changing - a number of large manufacturers are developing their own retail chains, while some of Europe's large fashion groups now have manufacturing interests in footwear. Technology developments in the industry, particularly computer-based applications, have shortened production lead times enabling faster response to fashion changes.

Figure 1: Footwear
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The different types of footwear produced within the Community are classified in NACE 451 and 452 as follows: mass produced outdoor footwear (451.1); mass produced indoor footwear (451.2); special types of footwear (451.3); and handmade footwear (452). It is also common to classify footwear into broad groups by the major material of the upper - leather, synthetic, rubber, textile, and other. Some of Europe's large fashion groups have interests in a number of sectors which include footwear - Benetton, primarily a clothing company, manufactures footwear which it sells through its own outlets.

Main indicators

The main indicators for the EC's footwear industry point to continued contraction. The problems facing the industry are reflected in falling production and employment, despite increasing Community consumption. It is estimated that in 1991 EC production volume decreased of almost 10%. The EC's trade balance deteriorated substantially, recording a deficit, for the first time, in 1991 (485 million ECU). Employment is also falling, with a total workforce of approximately 337 000 in 1991 (including firms with less than 20 employees).

Italy is Europe's major footwear producer accounting for a third of the total value of Community production in 1991. The next largest producer, France, accounted for 19%. Other major producers are Germany (14%), Spain (10%) and the United Kingdom (10%).

The Confédération Européenne de l'Industrie de la Chaussure (CEC) estimates 1991 footwear production at 1.177 billion pairs, with leather footwear accounting for approximately 65% of EC output. The importance of different types of footwear production varies across Member States. The production of leather footwear accounts for over 90% of the quantity of footwear produced in Denmark and Portugal and over 70% in Germany, Italy, the Netherlands and Spain. Nearly 50% of Belgium's production of footwear is slippers. Approximately 30% of footwear produced in the United Kingdom is synthetic or rubber uppered. In France, slippers account for 30% of production while textile uppered and synthetic uppered footwear account for 15% and 11% respectively.

Recent trends

The latter half of the 1980s was a difficult period for the European footwear industry. EC production levels fell although consumption grew, by 36% in the 1985-91 period. Overall trends mask considerable variation between Member States.

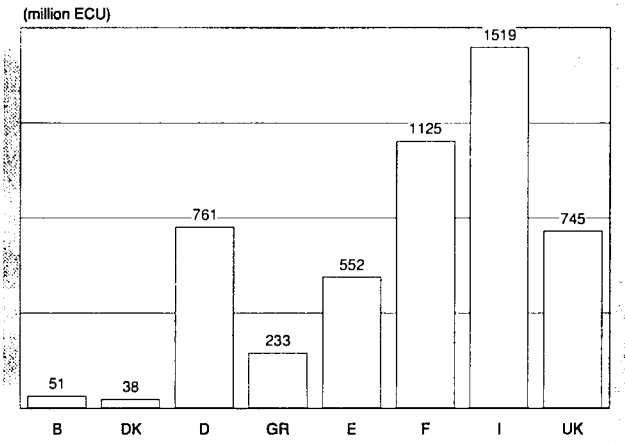
The footwear industry within the Community is dominated (in value terms) by five countries: Italy, France, Spain, the United Kingdom and Germany. Their relative importance has, however, declined. They accounted for 86% of the value of EC production in 1991, compared to 95% in 1982 and contractions in traditional producers such as Spain and the United Kingdom, have been partially offset by increases in other Member States, particularly those with the lowest labour costs, Portugal and Greece.

While the volume of all footwear produced fell by 4% between 1987 and 1990, the quantity of non-leather footwear production fell by 8%. The volume of leather footwear production increased in 1990 having fallen in 1988 and again marginally in 1989. Of non-leather footwear, plastic is most important although output volume has fallen since 1987. In contrast, the production of textile uppered footwear in the EC increased over the same time period.

International comparison

The EC is a major producer of footwear, accounting for approximately 10% of world footwear production and nearly 20% of world footwear exports. In contrast the USA accounts for approximately 3% of world production while Japan accounts for about 4%.

Figure 2: Footwear
Value added by Member State, 1991



Source: Eurostat

Table 1: Footwear
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	8 990	10 450	11 297	11 365	11 925	12 954	13 866	13 547	14 205	15 435	16 438
Production	10 369	11 570	13 297	13 726	13 791	13 980	14 327	14 445	14 985	14 950	14 158
Extra-EC exports	2 585	2 528	3 643	4 189	3 801	3 393	3 192	3 923	4 116	3 940	3 625
Trade balance	1 379	1 120	2 001	2 362	1 866	1 026	460	899	780	-485	-2 280
Employment (thousands)	314.3	322.7	328.1	307.5	306.7	313.6	302.3	295.5	292.8	282.6	278.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated.
(2) Fitzpatrick estimates
Source: Eurostat

Table 2: Footwear
Breakdown by materials, 1990

(million pairs)	Apparent consumption	Production	Extra-EC exports
Leather	737.0	756.6	176.2
Plastic	206.9	166.1	30.3
Textile	263.6	94.1	19.3
Others	40.1	11.4	15.3
Slippers	200.0	120.1	16.8

Source: CEC, Eurostat

Table 3: Footwear
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.1	3.3	3.2
Production	4.2	-1.0	0.7
Extra-EC exports	7.6	-4.8	-0.8
Extra-EC imports	4.4	13.7	10.5

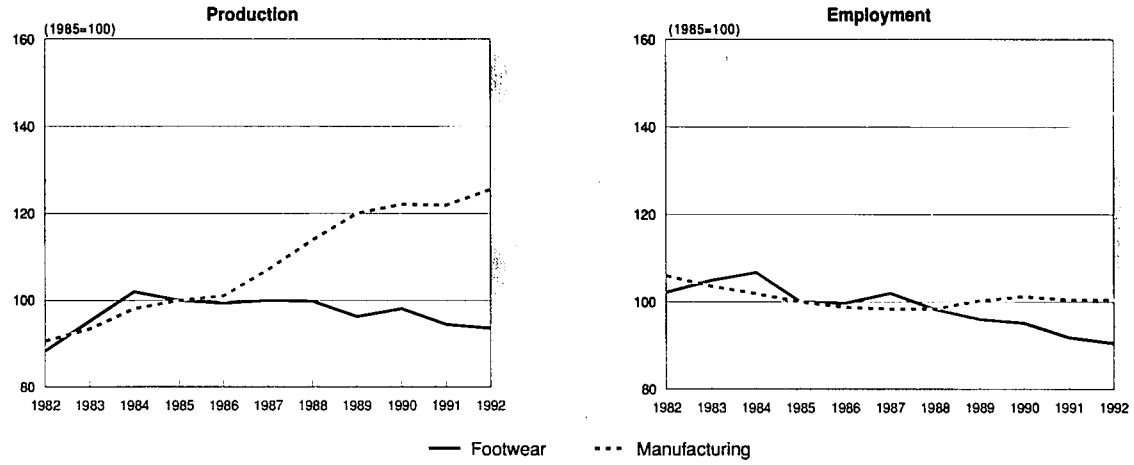
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Footwear
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 585	2 528	3 643	4 189	3 801	3 393	3 192	3 923	4 116	3 940
Extra-EC imports	1 206	1 408	1 642	1 827	1 935	2 367	2 732	3 024	3 336	4 425
Trade balance	1 379	1 120	2 001	2 362	1 866	1 026	460	899	780	-485
Ratio exports/imports	2.14	1.80	2.22	2.29	1.96	1.43	1.17	1.30	1.23	0.89
Terms of trade index	102.5	106.3	102.2	100.0	109.4	113.5	117.4	114.0	117.3	113.0
Intra-EC trade	3 475	3 720	4 209	4 681	5 085	5 266	5 045	5 517	6 090	6 525
Share of total imports (%)	74.2	72.5	71.9	71.9	72.4	69.0	64.9	64.6	64.6	59.6

(1) Estimates
Source: Eurostat

Figure 3: Footwear
Production and employment indices compared to EC manufacturing



1992 are Fitzpatrick estimates
Source: Eurostat

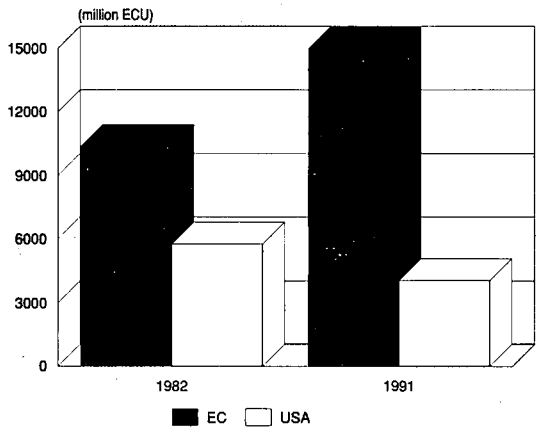
Foreign trade

International trade in footwear is not covered by the Multi Fibre Agreement (MFA) which governs trade in the textile and clothing sectors. The EC footwear sector is heavily dependent on international trade, with approximately 25% of EC production exported in 1991, although, in current prices, extra-EC exports have fallen by 6% since 1985. Between 1982 and 1991 the current value of extra-EC imports rose by 266% and in 1991 accounted for 29% of EC consumption. Traditionally the EC recorded a surplus in footwear trade but, having declined throughout the 1980s, a deficit of 485 million ECU was recorded in 1991.

Textile uppered footwear accounted for 33% of total extra-EC imports in 1990. Leather footwear accounted for only 28% of the volume of extra-EC imports in 1990. In contrast the majority of extra-EC exports were leather (68%) in 1990.

The EC has a trade surplus in footwear with the USA, Japan and the EFTA countries. However, it has a large trade deficit in footwear trade with developing countries and with the former Eastern Bloc. The leading market for extra-EC exports is EFTA countries, the other important market being the USA.

Figure 4: Footwear
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

However the importance of the USA as an export destination has been declining. Italy is the EC's major exporter, accounting for over half of extra-EC exports in value terms. Other major extra-EC exporters include Germany, Spain, France and Portugal. In 1991 Italy, Spain and Portugal maintained a surplus in the value of extra-EC trade.

The majority of extra-EC imports to the Community come from developing countries and their value has been increasing steadily. However, the largest growth in imports to the EC in nominal terms has been from China. The former West Germany is the largest importer of extra-EC footwear, importing nearly 39% of total extra-EC imports. France, the United Kingdom and Italy are also major importers in value terms. The penetration rate of extra-EC imports has increased from 16% in 1985 to 29% in 1991, although some of this increase includes growth in imports of partly finished shoes for further production.

Since 1986 the value of intra-Community trade has increased by 15%. Intra-EC imports account for 60% of total (intra and extra-EC) import trade. The main intra-EC purchasers are: Germany, accounting for 39% of the total value of intra-Community imports, France (19%) and the United Kingdom (13%). Intra-EC exports account for nearly 62% of the value of total (intra and extra-EC) export trade.

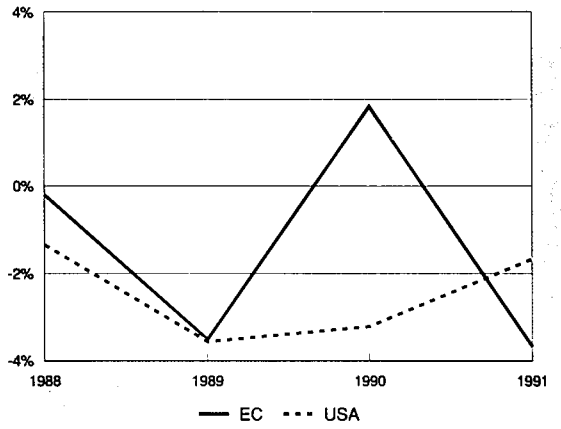
MARKET FORCES

Demand

Most footwear is purchased by individual consumers, while contract sales to major customers such as the military, or industries requiring specific work or safety footwear is an important niche market. According to the Economist Intelligence Unit report "Consumer Spending Patterns in the European Community: Forecasts to 1995", clothing and footwear together account for a declining proportion of total EC consumer spending. Spending on footwear also tends to be cyclical, expenditure being reduced or deferred during a recessionary period with a compensating upturn during a recovery.

While having a fashion content, footwear is seen primarily as a necessity and a smaller proportion of income is spent on footwear as income rises. Some niches within footwear, in particular the market for trainers are strongly influenced by fashion trends. Demand for sports footwear has also been

Figure 5: Footwear
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

boosted by higher levels of sports participation. Increased fashion demand has also resulted in increasing usage of coated fabrics and textiles, rather than leather, for uppers or lining material.

Both volume and value figures show the largest market for footwear in the EC is Germany. In value terms the former West Germany accounted for 36% of EC consumption in 1990 and subsequent reunification has further increased the size of this market. France is the second largest and has the highest per capita consumption of footwear, 6.04 pairs per annum in 1990 compared to an EC average of 4.52 pairs. Comparison between Member States show significant differences in prices paid per pair, reflecting to some extent greater quality and fashion consciousness. The price paid per pair is highest in Italy.

In the sports footwear sector, product innovation allied to substantial promotional expenditure was the key to maintaining competitiveness in the late 1980s. The proliferation of different shoes offering both technical and fashion gimmicks reflect this trend, as does the rapid inroads into European markets by top USA brands such as Nike and Reebok. Innovations have also taken place in manufacturing technology in the industry which has helped maintain the competitiveness of European footwear producers.

Supply and competition

Market power of major customers

Traditionally distribution of footwear was mainly through independent retailers, but distribution has become more concentrated leading to shifts in relative bargaining strengths. The importance of independent retailers has declined to the advantage of larger generalist stores and multiple retail chains. Some large manufacturers such as the Bata Organisation and Bally have also established retail arms with outlets in a number of European countries. Other manufacturers, such as André, Charles Jourdan, Eram, and Salamander AG also operate retail units both within their own domestic markets and in other Member States.

The key competitive advantages of EC footwear manufacturers, under pressure from lower priced imports, is based on time and service quality and successful EC manufacturers offer strong commitments on price, delivery performance and flexibility. In response to the needs of the retail groups, footwear manufacturers are increasingly adopting quick response strategies, although the number of companies using this strategy remains relatively low in comparison to the clothing sector.

Internal EC competition

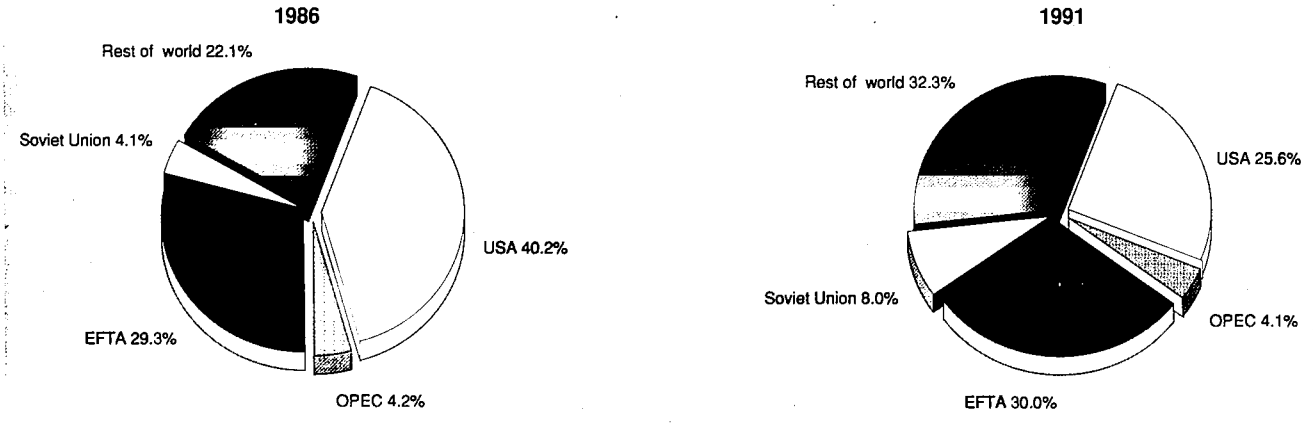
With a large number of firms, the presence of few restrictions on extra-EC imports, and of few barriers to intra-EC trade, the internal EC market in footwear is relatively competitive. Internal EC competition is expected to increase following the completion of the Single Market and some of the larger retail chains are presently expanding into other EC Member States.

The removal of customs and other physical barriers to intra-EC trade should lead to a reduction in transport cost and time. This will benefit firms who are dependent on markets in other Member States and should also benefit firms seeking to compete on the basis of quick response. One of the principal features of the Single Market for the footwear industry will be VAT harmonisation, to be implemented in 1997. EC countries with a low VAT rate on footwear, i.e. Ireland, Spain, Italy and Luxembourg, will experience tax rises by 1997.

Foreign competition

Imports of footwear into the EC originate mainly from low labour cost countries, traditionally China, Indonesia, South

Figure 6: Footwear
Destination of EC exports



Source: Eurostat

Table 5: Footwear
Per capita consumption 1990

	(number of pairs)
EC (1)	4.5
Belgique/België, Luxembourg	5.6
Danmark	4.4
BR Deutschland	5.4
España	3.7
France	6.0
Italia	2.5
Nederland	4.7
Portugal	3.4
United Kingdom	5.3

(1) Excluding Greece and Ireland
Source: Fitzpatrick, based on Eurostat data

Korea, Thailand and Taiwan, although imports from other developing countries, such as India and Brazil, are growing.

Extra-EC exports are generally high quality leather footwear to developed countries such as the USA, Canada, Switzerland, Austria and other EFTA countries. The volume of exports to destinations such as the USA and Canada has fallen, partially explained by the depreciation of the dollar during the latter half of the 1980s. The long run competitiveness of the EC footwear industry will depend on its ability to continue to supply high quality products to high income markets. Expansion into extra-EC markets is blocked in a major part of countries by high duty levels and tariff barriers, particularly in Japan. European production is also hampered by restrictions operating in countries which prevent the export of raw materials necessary for higher-value added production.

To help improve the prospects of EC footwear firms, there is a budget for export promotion voted by the European Parliament, whose aim is to improve access to markets of third countries and to reduce high levels of duty imposed on extra-EC exports by many countries. With respect to extra-EC footwear import controls, these will have to be at the single Community level only and will not vary between Member States. This will impact most on producers in Member States where low-cost import penetration is still relatively low.

Price and profit trends

A report by Texco International/Kurt Salmon Associates (1991) for the EC Commission found that profitability in the footwear sector is low, approximately 2.5% return on sales. Furthermore, non-leather footwear performs better in terms of profitability than leather footwear. The fragmented nature of the industry has meant that is difficult for manufacturers to benefit from economies of scale. Footwear prices in the Community have been under pressure from cheap imports from low wage countries. This pressure coupled with increases in the cost of labour has led to a decline in profitability in the sector. European manufactures trying to compete with cheap imports have tried to maintain market share by expanding their existing line of products, while companies responsive to changing fashions have smaller production lots and increased product costs.

Production process

Major inputs and their productivity

Traditionally the production of footwear has been a relatively simple labour intensive manufacturing process, which can be divided into a number of stages. The first stage, called "clicking", involves the cutting out and preparation of components for the upper and the sole. This is followed by "closing", when the components are stitched together to produce an "upper" and then the upper is shaped and an insole and a sole are affixed. Finally, the shoe is finished by cleaning the upper, inspected and boxed.

Footwear production is still mainly based around a stack of foot-shaped formers, the last, over which the upper is draped and constructed and to which the sole is joined. Mechanised footwear production has usually been organised in a track system along which progressively assembled shoes are carried and are lifted from the track by operatives to perform the next stage. The introduction of a "rink" system has increased productivity and has led to a significant reduction in the volume of rejects. The "rink" system involves arranging the various steps in the shoe-making process in sequence, generally in the shape of a horseshoe. Each function is the responsibility of an operator, although each operator should have the flexibility to perform a number of tasks. Work is passed from one operator to the next, one pair at a time. The team is responsible for quality control and inspects its own work.

Production of footwear within the EC is becoming more mechanised and specialised. The introduction of computer-aided design (CAD), which allows a shoe to be designed on computer and the details to be downloaded to production machines, has been one of the most important developments. The use of CAD allows the time span between design and production to be reduced to a few hours enabling manufacturers to respond quickly to changes in styles for fashion footwear. The use of CAD systems has been accompanied by computer aided manufacture (CAM) and computer integrated manufacture (CIM). CAD systems are increasingly being linked with computer aided cutting systems.

Labour unit costs within the Community increased by nearly 36% in current terms between 1982 and 1990. The need to rationalise costs to maintain competitiveness with developing countries has led larger companies in some Member States to transfer production facilities to lower labour cost countries, including Portugal within the EC. Unit labour costs in Portugal are approximately one third the EC average and nearly a quarter of unit labour costs in Germany. While the majority of EC countries are unable to compete with developing countries on price, due to higher labour costs, production within the Community can compete by adopting quick response strategies. However, any real European advantage may be negated if European manufacturers use CAD to transmit new designs on-line to production facilities in the low-cost countries.

INDUSTRY STRUCTURE

Companies

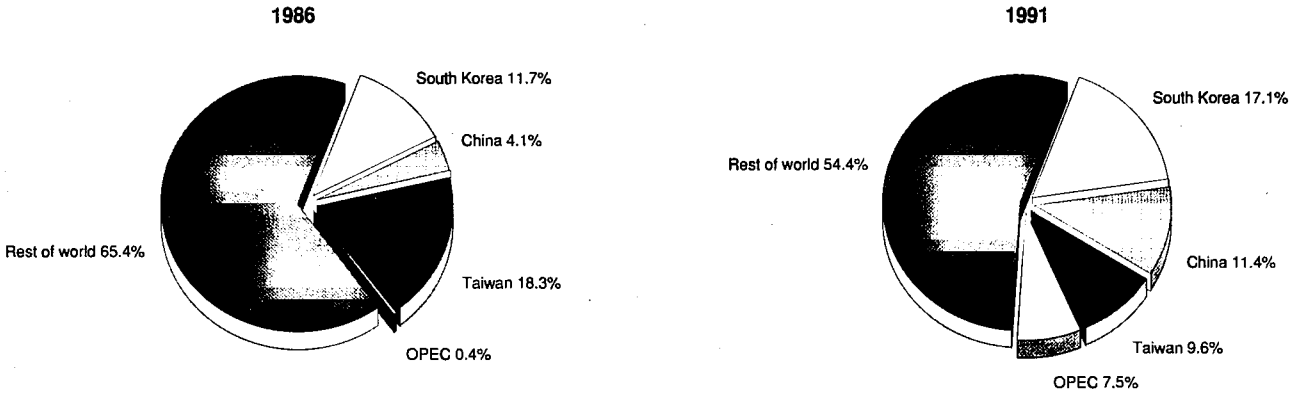
The footwear industry within the Community is highly fragmented, characterised by a large number of small business.

Table 6: Footwear
Number of enterprises, 1990

EC (1)	13 897
Belgique/België, Luxembourg	60
Danmark	14
BR Deutschland	233
España	2 582
France	328
Italia	8 811
Nederland	94
Portugal	1 010
United Kingdom	765

(1) Excluding Greece and Ireland
Source: CEC

Figure 7: Footwear
Origin of EC imports



Source: Eurostat

According to the CEC, there were about 15 900 footwear firms in the EC in 1990, employing an average of 21 workers. Major EC footwear manufacturers include Salamander AG (D), Romika & Co. KG (D), Eccolet Sko (DK), Eram (F), André (F), Clarks (UK), Simod SpA (I) and Filanto SpA (I).

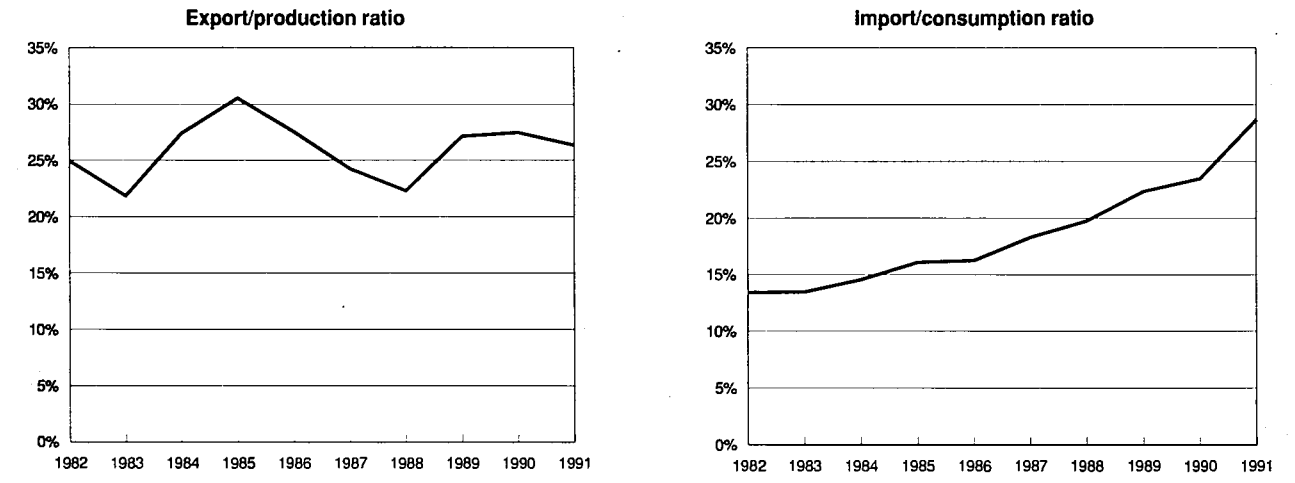
Strategies

The value of net investment in the EC in current prices increased marginally, by 4.5%, between 1985 and 1988. However, despite the absence of major investment in plant and machinery, EC footwear employment fell throughout the second half of the 1980s and into the 1990s, reflecting falling production. However, employment in some Member States, Portugal and Spain, increased, reflecting the sourcing strategies of major EC producers, although this has been accompanied by growth of indigenous Spanish and Portuguese manufacturers.

Examples of companies which have transferred production to lower-cost countries within the EC such as Spain and Portugal include the French company Charles Jourdan, that transferred production from the Rhône valley to Spain. Some French manufacturers now sub-contract to Portugal as well as to extra-EC countries such as Tunisia, Morocco and China. Eram, one of France's largest producers and distributors of footwear operates ten plants within France along with one in Portugal and one in Spain. Many German producers have transferred their production to Portugal and many also operate plants in Austria. The Danish footwear manufacturer, Eccolet, operates plants in Portugal and Czechoslovakia as well as in Denmark. Bata, the world's largest footwear organisation is to modernise a manufacturing facility in Czechoslovakia.

Many EC producers have also shifted operations to low labour cost developing countries outside of the EC. The German company Wortmann, has factories which manufacture inputs in Taiwan, Hong Kong, China, Thailand, Brazil as well as in different EC countries. Europe's leading sports footwear manufacturers such as Adidas and Puma also transferred substantial proportions of their production facilities to the Far East in the second half of the 1980s in order to remain competitive with their main competitors who already manufacture

Figure 8: Footwear
Trade intensities



Source: Eurostat

Table 7: Footwear
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.2	2.6
Production	-1.2	-1.1
Extra-EC exports	-3.3	-3.6

Source: Fitzpatrick

the majority of their footwear in the Far East. South Korea, Taiwan and Thailand are the most popular countries for sourcing as some of the lower cost countries are not yet as well organised or as reliable. The importing of uppers and other labour-intensive parts from low labour cost countries for assembly is also becoming common, although this is less popular in Italy and most popular in Germany, which pioneered such outward processing in Eastern Europe.

Some EC footwear firms, particularly sports footwear firms, are adopting global strategies, acquiring manufacturing and retail outlets or franchises outside the EC, as part of their expansion strategies. However, this process is also working in reverse with Japanese and South Korean companies such as Asics and Kukje establishing strong presence in Europe. This trend is not confined to sports footwear - the acquisition of part of Charles Jourdan, the French shoe maker, by Dickson Concepts, a Hong Kong retailing group in early 1992 indicates a similar trend in the classic footwear market.

REGIONAL DISTRIBUTION

Italy accounts for 25% of EC footwear industry employment. Other major employers include the United Kingdom (16%), France (14%), Germany (10%) and Portugal (10%).

Much of the EC's footwear industry is concentrated in particular countries and within regions in these countries. These regions also tend to be areas with little alternative employment to the footwear industry. Towns and areas such as Herzogenaurach and Pirmasens in Germany, the East Midlands in the United Kingdom, the Pays de Loire in France, Marche and Veneto regions in Italy and northern Portugal are highly dependent on the footwear industry. The impact of any adverse developments for the industry are therefore particularly concentrated within specific areas of the EC.

ENVIRONMENT

Environmental issues are more important in industries supplying the footwear industry than in the industry itself. The leather and tanning industry is a major source of raw materials to European producers. Suppliers in this sector are under pressure to use water and chemicals more carefully to reduce effluent. The need to install water effluent treatment equipment to meet increasing environmental standards will lead to increased tanning costs and an increase in costs of the raw material for the footwear industry, although there is already sourcing of materials outside the Community. Suppliers of raw materials for non-leather footwear production are likely to face increasing constraints from regulations on usage of polyurethane and polyvinylchloride (PVC).

REGULATIONS

Since after World War II most EC countries established quotas against imports from state trading countries. These regulations were summarised under EC directives 3420 - 1766 - 1765. Due to the Single Market, from 1993 onwards the control of national quotas becomes impossible, which calls for an EC-wide quota system. The EC authorities are still working on a global proposal, not restricted to footwear.

Whatever the outcome of Community trade policy developments, protection of national markets will be eliminated with the removal of customs frontiers. Article 115 of the Rome Treaty can preclude extra-EC footwear imports from circumventing Member State level import controls by their goods through another Member State. However, the implementation of the Single Market will phase out this control.

Following concerns about the impact that national legislation on footwear labelling in France and Spain would have on intra-EC trade, a proposal for an EC directive has been forwarded concerning the labelling of the materials used in the main components of footwear for sale to the final consumer. It deals primarily with indicating the composition of footwear by means of "pictograms" is likely to come into force on June 30, 1994.

OUTLOOK

The EC footwear industry faces a difficult future. The outlook for consumption over the next few years is for modest growth. Extra-EC imports are expected to grow while extra-EC exports will continue to decline due to lack of market access. Employment and production by EC firms are also expected to fall. While technology will assist the industry in its struggle to regain competitiveness it will not provide the complete solution. Increased cost effectiveness will also be needed along with greater emphasis on marketing and satisfying the changing demands of the consumer.

While the Community dominates the world quality leather footwear market, the outlook for demand in this niche is depressed in the short term. Poor economic conditions in the USA and Japan has slowed demand for luxury goods. The upturn in this niche will lag overall economic recovery in these countries and growth for high quality footwear can only be expected in the medium term.

Easier access to East Europe will allow European manufacturers to locate production facilities in these countries. Provided political stability is maintained the volume of extra-EC footwear imports from these countries seems likely to increase as does the volume of imports of uppers or part assembled inputs.

Written by: Fitzpatrick Associates
The industry is represented at the EC level by: European Confederation of the Footwear Industry / Confédération Européenne de l'Industrie de la Chaussure (CEC). Address: rue François Bossaerts 53, B-1030 Brussels; tel: (32 2) 736 5810; fax: (32 2) 736 1276.

Leather tanning and finishing

NACE 441

Tanners in the EC have been faced not only with the erosion of much of their traditional markets but also with rising costs and tougher environmental legislation. Shifting to quality and fashion segments, developing flexibility in production and quicker delivery times will help to consolidate the EC tanning industry's competitive edge. Trade restrictions in developing and developed countries including the non-availability of raw materials, continue to limit the growth of EC industry while distorting prices and competition.

INDUSTRY PROFILE

Description of the sector

The NACE 441 (tanning and dressing of leather) includes

- Tanning and dressing (NACE 441.1);
- Manufacture of imitation leather based on natural leather (NACE 441.2);
- Currying, dyeing and finishing of leather (at independent workshops) (NACE 441.3).

The NACE nomenclature includes (under subsector 441.2) activities which are not considered by the trade as leather production. Products resulting from this activity are not to be classified as leather according to the definition set by the International Council of Tanners (ICT).

Tanning and finishing consists of sequenced industrial processes where raw hides and skins are converted into leather which serves for the production of footwear, clothing, furniture, leather goods and other consumer goods. Leather manufacturing includes, therefore, companies involved in one or more of these processes during which value is progressively added to the raw material. Products can leave the production cycle at the semi-finished phase (wet-blue/crust) where the range of applications is still large, or at the end of the last process, after finishing (leather) where leather for shoes, clothing, upholstery or leather goods, etc., receive their characteristic touch.

Tanning is a traditional sector of industry which combines technical skills and technological know-how with fashion and design.

The tanning industry has not only significant linkages with the footwear, clothing and upholstery sectors, to which it provides raw material input, but also has strong links with the chemicals and agricultural sectors. The standard of animal husbandry has a significant impact on the quality of the raw hides used in the industry, while the chemical industry provides key material inputs for all wet and dry processes such as tanning salts and dyes.

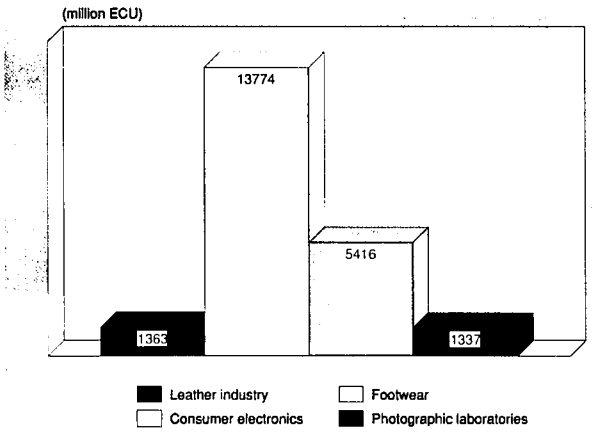
Main indicators

With a value of 7 billion ECU, the EC leather market is one of the world's leading trade areas for this industry.

The value of the EC leather production dropped in 1991 by 13% compared to 1989 where it reached a peak after a period of steady increases.

Since 1982, employment in the leather sector fell by 26% to about 60 000 people. The decline would be slightly higher at about 28% over the same period, if former East Germany were not included following reunification.

Figure 1: Leather tanning and finishing
Value added in comparison with other Industries, 1991



Source: Eurostat

The cattle and calf sector accounts for 70% of production and consumption in the EC, with the sheep and goat sector accounting for most of the remaining production.

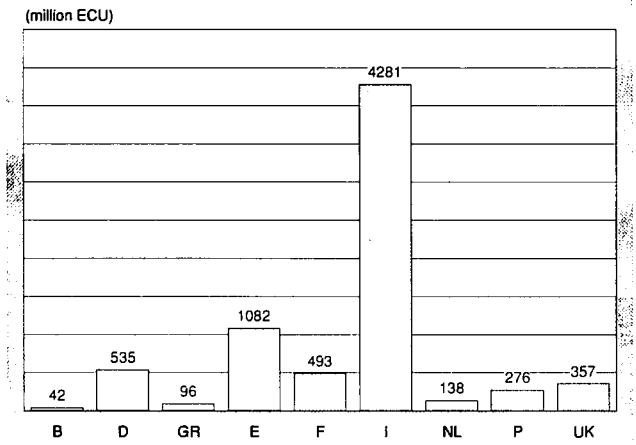
Italy accounts for more than 50% of total EC production, well ahead of Spain at 15% and France, Germany and the United Kingdom with 7%, 6% and 5%, respectively. Portugal now accounts for almost 3% of the total production value.

Recent trends

The EC leather industry is undergoing a process of structural adjustment to adapt to the new competitive environment. It is shifting from mass production of standard products (which is being increasingly taken over by developing countries) to smaller volumes of higher quality, higher value-added production. The reduction in output over the past three years partly reflects the shift from mass markets to smaller segments and the increasing penetration of the internal market by cheap imports from East Asian NICs and developing countries, which have developed strong export oriented leather industries.

The opening up of the former COMECON countries will offer consumption possibilities but also present threats to EC producers and will cause further restructuring within the EC, resulting in a further decline in the number of companies and the level of employment over the next decade.

Figure 2: Leather tanning and finishing
Production by Member State, 1991



Source: Cotance

Table 1: Leather tanning and finishing
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	5 181	5 562	6 468	7 051	6 791	6 949	8 053	7 905	8 146	6 929	6 700
Production	5 190	5 653	6 659	7 341	7 028	7 212	8 289	8 308	8 132	7 226	7 200
Extra-EC exports	531	639	896	1 087	936	1 057	1 044	1 344	1 180	1 173	1 100
Trade balance	9	91	191	290	237	263	236	403	-14	297	500
Employment (thousands)	81	81	80	78	77	75	72	70	63	60	57

(1) Including Eastern Germany
(2) COTANCE estimates
Source: COTANCE, Eurostat

Table 2: Leather tanning and finishing
Breakdown by product line, 1991

(million m2)	Apparent consumption	Production	Extra-EC exports
Cattle and calf	220	180	15
Sheep and goat	56	86	31
Others	22	7	4

Source: COTANCE

Table 3: Leather tanning and finishing
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.5	-1.0	0.5
Production	5.1	-1.3	0.8
Extra-EC exports	13.5	-0.4	4.1
Extra-EC imports	0.7	2.1	1.6

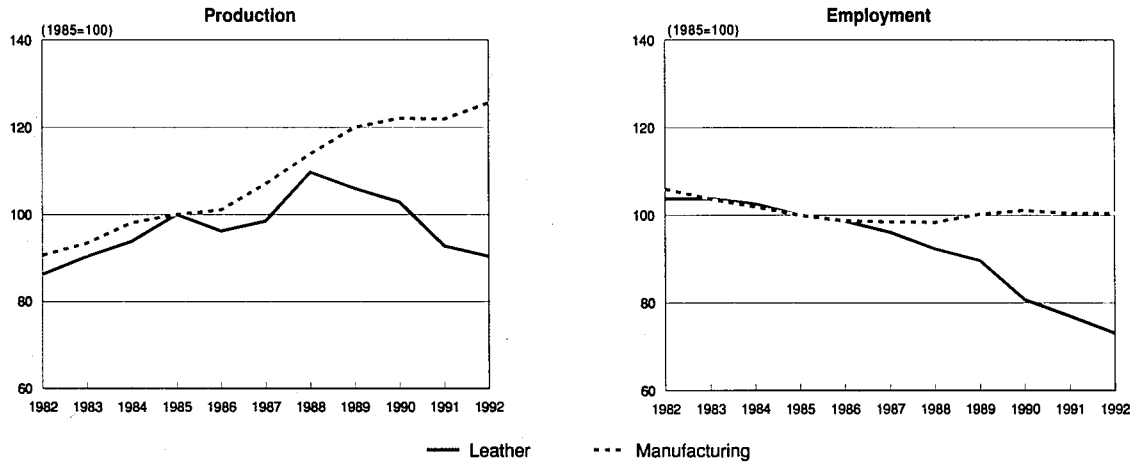
Source: COTANCE, Eurostat

Table 4: Leather tanning and finishing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	531	639	896	1 087	936	1 057	1 044	1 344	1 180	1 173
Extra-EC imports	522	548	705	787	699	794	808	941	1 194	875
Trade balance	9	91	191	300	237	263	236	403	-14	297
Ratio exports/imports	1.0	1.2	1.3	1.4	1.3	1.3	1.3	1.4	1.0	1.3
Terms of trade index	69.8	78.8	89.8	100.0	86.6	89.5	86.9	94.9	64.9	86.6
Intra-EC trade	729	852	1 145	1 253	1 243	1 283	1 338	1 400	1 330	1 219
Share of total imports (%)	58.3	60.9	61.9	61.4	64.0	61.8	62.3	59.8	52.7	58.2

Source: COTANCE, Eurostat

Figure 3: Leather tanning and finishing
Production and employment indices compared to EC manufacturing



1992 are Fitzpatrick estimates
Source:COTANCE, Eurostat

Production trends vary according to different types of leather. The production of cattle and calf leather registered an increase until 1987, levelling off at about 182 million square metres and 70% of total leather output by surface area in 1991. Output of sheep and goat leather fell sharply in the EC to 71 million metres and their share in total EC leather production by surface area declined from 42% in 1985 to 27% in 1991.

International comparison

The European tanning industry represents nearly 50% of total trade in leather. Compared to the USA and Japan, the EC is a much more significant player in finished leather. In 1991, production of EC leather was 7 226 million ECU. Leather production the USA is about 2 500 million ECU and Japanese manufacturers produce approximately 1 500 million ECU.

Among developing countries, East Asian countries account for over one-fifth of world trade while the Latin American region accounts for another 13%.

It is important to note that in the USA (which is the world's largest supplier of cattle hides) large meat packers tends to tan an increasing share of this by-product until the wet-blue stage. This trend, which is also evident in certain EC countries, is likely to revolutionise the global leather trade. The US leather industry could then regain its former position as one of the world's largest tanners.

Japan has become one of the USA's largest clients for wet-blue stage leather, and, protected from competition in the finished leather segment by a penalising tariff-quota system, has invested heavily in its tanning industry.

Foreign trade

Extra-EC exports remained static in 1991 following a significant fall of 12% in 1990. Extra-EC imports dropped by nearly 27% in 1991 from their 1990 peak. Although still representing 58% of total leather trade in the EC, intra-EC trade in leather also suffered from the overall recession in the sector falling by 8% in 1991. The leather trade balance recovered to a strong positive balance in 1991, following the small deficit recorded the previous year.

The EFTA countries, USA and Japan continue to be the main export markets for EC manufactured leather articles with 19%, 15% and 15% respectively in 1991. In finished leather, the EFTA countries now account for about 14% of EC export markets, the USA, 11%, and Japan, due to MITI's protectionism, 2%.

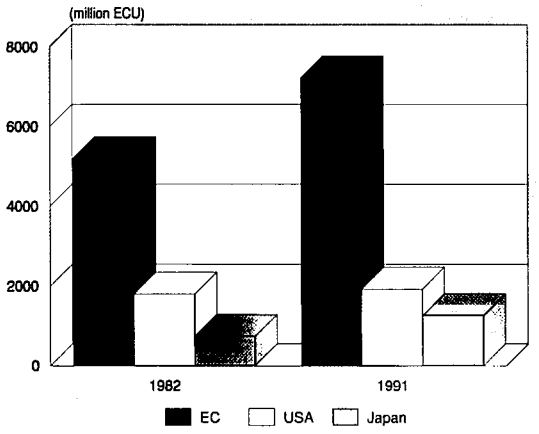
Due to the development of its leather articles manufacturing industry, Yugoslavia had become an important export destination for the EC tanning industry with 18% of total extra-EC exports in 1990. Such exports, however, have declined due to the political difficulties in the region.

South Korea, Hong Kong, and Taiwan in the Far East have maintained their importance as export markets with 10%, 7% and 2%, respectively of all EC leather exports.

China has become the single most important supplier of leather and leather articles with 27% of all EC imports in 1991 compared to just over 7% in 1986. The significance of other East Asian suppliers such as Taiwan and South Korea has decreased in relative terms.

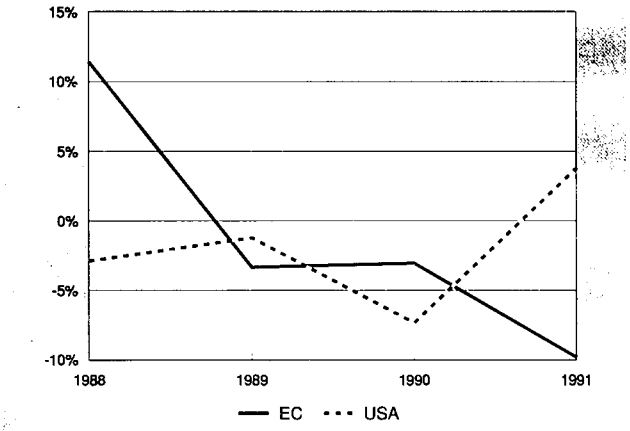
In finished leather, however, India continues to be the EC's most important foreign supplier with about 22% of all imports. Pakistan follows closely with 13%. Bangladesh has progressively developed its share in EC imports to 5%. EFTA and

Figure 4: Leather tanning and finishing
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Figure 5: Leather tanning and finishing
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

the USA account for 11% and 6% of all extra-EC imports of leather, respectively.

Intra-EC trade increased consistently over the period 1982-1989, rising by a quarter in real terms. EC production, although less consistent over the period, was 23% higher in 1989 than in 1982. In 1990 and 1991, however, the difficult market situation was reflected in a decline in both indicators. Intra-EC trade dropped by 11% and production by 12.5% over the two year period.

Extra-EC exports followed a similar pattern rising by over 50% between 1982 and 1989 and falling in 1990. However, they recovered in 1991 growing by 5% in real terms. Extra-EC exports represented about 16% of production in 1991, compared to 10% a decade ago. The import penetration rate has increased somewhat since 1982, reaching nearly 15% in 1990 and falling to under 13% in 1991. Extra-EC imports have doubled in value terms during the last decade.

MARKET FORCES

Demand

Leather is an intermediate product sold to industrial customers for the manufacture of a wide range of consumer goods and some technical applications.

The footwear industry remains the EC tanners' largest market, consuming 48% of all leathers. The garment industry follows well behind purchasing 22% of the EC leather industry's production and is likely to fall in importance as the upholstery market grows. It currently absorbs about 16% of leather output. In Germany and the Netherlands the upholstery market has become as important as footwear and in the United Kingdom and Italy the same pattern is likely to occur in the medium term. Leather for leather goods and other uses such as wallets, suitcases, etc., rank as the least important end use with 13%.

The leather industry is very sensitive to changes in economic activity, especially in consumer demand which depends on general income. The reduction of consumer spending in leather articles in the major markets during 1991 has depressed the leather trade globally. The recession in the USA and the impact of reunification of Germany (among other factors) have slowed down general consumption and thus had a negative impact on EC leather production.

Export development has become a key strategic element in the management of EC tanneries. The main target export markets are high income countries, of which the USA and the EFTA countries are the largest, but new markets for leather are emerging in East Asian NICs and Latin America as those regions have developed industries such as footwear, leather clothing, and leather goods.

The demand for "genuine leather" in the general public dominates consumer behaviour and attempts to develop markets in imitation products have been largely unsuccessful.

The proportion of leather-uppered shoes has increased steadily and accounts for about two-thirds of all footwear produced in the EC. In the furniture upholstery industry, alternatives to leather have not penetrated the market significantly but in the clothing industry, textiles fabrics continue to predominate. In the automotive sector, leather now dominates the upholstery in luxury cars and it is expected that this trend will develop into middle-range cars.

Product innovation plays a fundamental role in the leather industry as competition becomes more and more intense. Especially in the fashion industry, product improvement is a crucial element of success. The tanner must attempt to anticipate colour trends and consumer preferences. Product innovation has also brought forward qualitative improvements of leather. There are now waterproof and even washable leathers on the market. The emergence of environmental awareness has also brought new types of leather and there are already some "eco-leathers" appearing at fairs. Although environmental pressure has brought product improvements such as water-borne topcoats which are substituting solvent lacquers and lacquer emulsions in leather finishing, chrome tanning is unlikely to be replaced in the foreseeable future.

The manufacture of leather articles has boomed in East Asia and Latin America. South Korea has become the third largest export market for EC leather with 121 million ECU in 1990. EC tanners have not been able to benefit significantly from the growth in the Japanese leather market because of the maintenance of punitive tariff-quota system which precludes the development of sensible long term trade relations by applying duties at 60% in excess of a very small quota tariffed at 20%.

Latin American markets are still insignificant for EC industry. EC leather cannot compete in countries where leather production is boosted by governmental measures geared towards speeding up the development of their domestic industry. Mexico, however, with the dismantling of the protectionism and the signature of the North American Free Trade agreement has become a potential export market for EC tanners.

The crisis in Yugoslavia has caused a severe downturn in EC leather exports to that country, which was engaged in producing leather garments and other manufactures for major EC and US markets.

Supply and competition

Supply capacity

The EC tanning industry's supply capacity varies according to the different subsectors and the developments in the different user industries.

Between 1980 and 1990 bovine leather consumption and production grew in the EC due to an increased demand in the footwear and upholstery markets. EC production failed to keep pace with the growth in EC consumption in the second half of the decade. In the sheep and goat leather sector, lower priced imports of garment leather and leather clothing from developing countries and NICs have contributed to the increasing overcapacity in EC tanneries.

The EC leather industry has been forced to move towards the supply of smaller market segments where price considerations are less important than quality, fashion, and consistency with specifications and on-time delivery.

Market power of the major customers

Quick response and just-in-time (JIT) techniques are becoming more important as EC producers attempt to maximise the advantage of market proximity. By providing a more competitive service to manufacturers, EC tanners may find themselves in a position either to charge a higher price and/or to attract a more consistent level of orders.

Internal EC competition

The completion of the internal market will not have a significant effect on the EC tanning industry as intra-EC barriers to trade in leather are non-existent.

The progressive erosion of the internal EC market for leather due to the relocation of client industries in low wage countries has a more important impact on competition among EC tanners.

Foreign competition and EC competitiveness

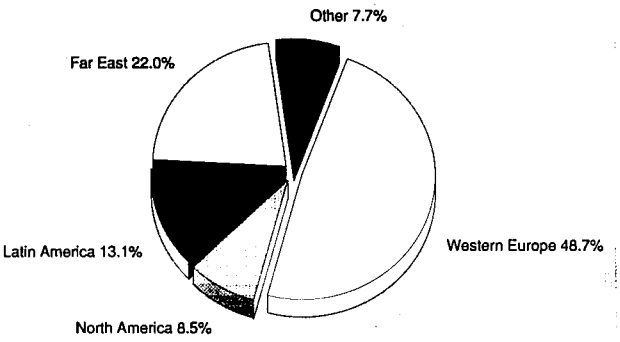
The EC tanning industry is increasingly being put under pressure by lower priced imports, particularly from lower cost producers in South America and Asia with protected access to raw materials.

Export restrictions on raw hides and skins have been implemented by a number of developing countries in order to speed up the growth of their domestic tanning industry. These trade restrictions can give companies located in those countries a considerable price advantage. Leather producers in Argentina, for example, have been able to undersell EC tanners by almost 20%.

Additional threats to the EC tanning industry are caused not only by the relatively high wages but also because of increasingly stringent environmental regulations. A recent study on industrial competitiveness and environmental protection made by SEMA for the EC Commission illustrates the different cost burdens for tanners in the EC and in developing countries. Whereas European tanners have to contend with labour costs of 20% to 25% of total production costs and a competitive disadvantage estimated at 2% to 4% of turnover for environmental protection, their counterparts in developing countries face production costs 5% to 15% lower due to lower wages and practically no environmental costs because of lack of regulations or of their effective implementation.

The competitiveness of the EC leather industry depends on its ability to secure reasonable access to potentially profitable export markets for its high quality output and so achieve economies of scale in production. Among OECD countries,

Figure 6: Leather tanning and finishing
Distribution of production by country, 1988-90



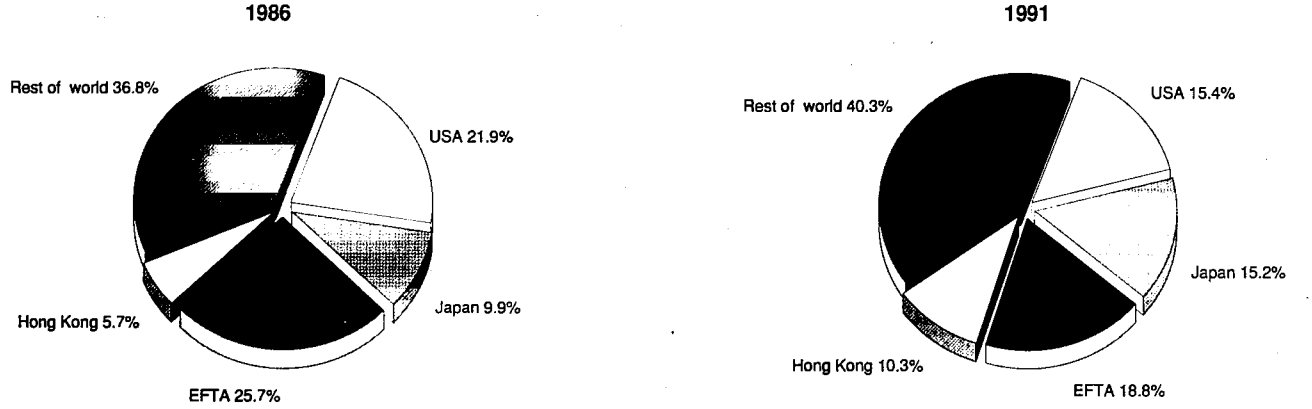
Source: Eurostat

which are target export markets for the leather sector due to their high level of discretionary consumer expenditure, Japan has been the only country that EC tanners have not managed to penetrate significantly. The principal reason for this is restricted access due to a tariff-quota system which effectively limits imports to a mere 1% to 2% of Japanese production. It is estimated by some European producers that exports to Japan could increase sixfold if that market were free. The present round of multilateral trade negotiations in the context of the GATT discussions may ease the level of Japanese protection.

Production process

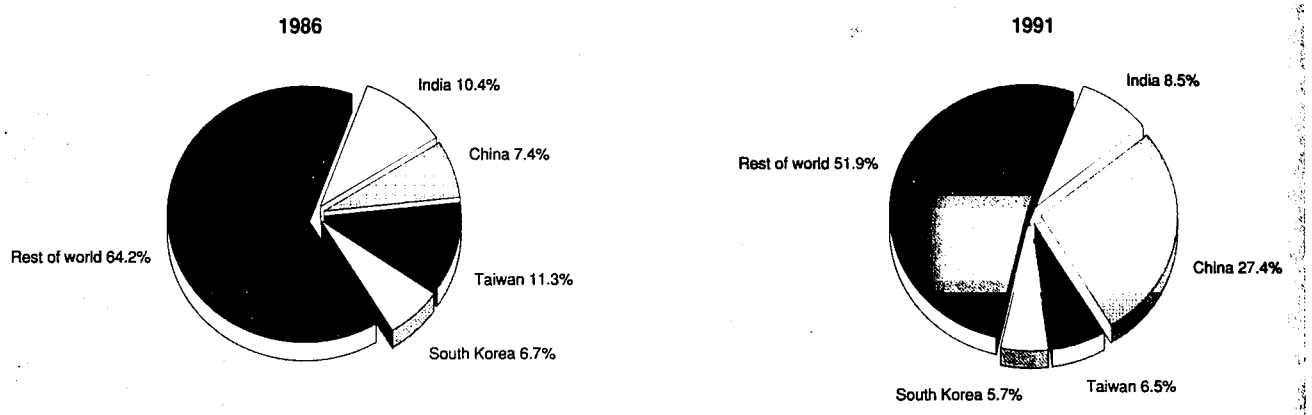
Raw materials for the production of leather are hides and skins, a by-product of stock breeding. Supply is thus independent from tanners' demand. Agricultural and trade related policies do influence the availability of raw materials on world markets. The introduction of milk quotas by the EC, for instance, has led to reductions in the size of dairy herds (and hence the supply of cow hides) in the EC. Export restrictions of raw hides and skins throughout the world have led to a situation where 24% of bovine hides and 22% of sheepskins were under protectionism at the beginning of the decade.

Figure 7: Leather tanning and finishing
Destination of EC exports



Source: FAO

Figure 8: Leather tanning and finishing
Origin of EC imports



Source: Eurostat

Hides and skins typically represent 50% of the costs of the finished leather making it very vulnerable to fluctuations in prices on world markets. The international market for hides and skins is predominantly supplied by the USA, Western Europe and Australasia

The protectionism which developing countries with large live stocks apply on raw materials in order to boost downstream leather production, and the trend of large meat packers and abattoirs in industrialised countries to process fresh hides and skins until the wet-blue stage, has resulted in fewer raw hides and skins coming on the market.

The EC has a large livestock of 196 million heads, including 81 million cattle and 114 million sheep and goats. While self-sufficient in hides and skins in quantity terms, quality requirements impose the use of varieties not available in the EC.

Over the past few years, a progressive deterioration in the quality of raw materials has been observed and this deterioration worries EC tanners. Dung, scratches, parasites and animal diseases are responsible for a number of damages caused to hides and skins which could be avoided through more animal care and better practices. Improper skinning and preserving techniques in the abattoirs cause grain strain and other detrimental quality losses in the raw material.

In spite of large scale initiatives (measures to prevent warble fly proliferation or against poor flaying techniques) or more modest ventures (field experiments on methods designed to improve the whole leather production chain, from the farm to the tannery), some European raw materials are having difficulties meeting the standards required for high quality leather.

A positive spin-off of the tanning industry is that it effectively contributes to a reduction of 5% to 15% in the price of meat by maximising the abattoirs return per animal through the sale of hides and skins.

Tanning is a capital intensive industry. The EC leather industry is well endowed with tanning machinery and chemical producers placing EC tanners at the forefront of leather technology both in terms of processing and anti-pollution treatment. However, the costs of such equipment causes substantial entry barriers to the industry.

EC tanners face a third challenge in relation to staff training and management renewal. The tanning sector is attracting fewer and fewer people. Newly-recruited staff often possess poor technical and professional skills. In order to counteract this negative development, the EC leather industry is participating in a continuing vocational training project in the framework of the EC FORCE programme.

INDUSTRY STRUCTURE

Companies

The number of enterprises operating in the EC tanning industry continued to decline in 1991, falling to 3423 companies. This represents a decline of 5.4% compared to 1990 and 15.4% compared to 1982. Northern European countries experienced the largest decrease in the number of establishments.

Europe's tanning industry is mainly composed of small to medium sized enterprises. With the exception of the Netherlands' average of 28 workers per plant, northern European tanneries tend to be larger than those in the southern Member States. Germany leads with an average of over 90 employees per plant, followed by Belgium and the United Kingdom with about 60 workers per plant. Portugal, Spain and France range from 20 to 50 people per tannery and Italy, the largest European leather producer, employs an average 11 workers per plant. The latter average could be explained by the extent of specialisation in Italian enterprises, which often just finishes leather roughly tanned by other operators. This phenomenon partly explains Italy's success in the sector since the small size of its tanneries makes them more flexible and adaptable to the market.

The leading companies in the different Member States include Gruppo Mastrotto (I), Grupo Colomer (E), Costil Tanneries de France SA (F), Lederfabrik Louis Schweizer GmbH & Co. (D), The British Leather Co Ltd (UK) and Conolly Leather (UK).

Strategies

Tanners in the EC are under threat from several directions:

- import penetration of leather products is eroding many domestic market shares;
- trade restrictions are limiting access to raw materials and allowing foreign competitors a price advantage;
- high wages and frequent difficulties in attracting qualified; and
- increasing environmental costs.

The EC tanning industry has taken up these challenges by orienting its production to smaller but more profitable market

niches in the high quality and top fashion segment, thus exploiting the advantage of its proximity to the consumer markets and the concentration of fashion expertise in Europe. This strategy, combined with the sector's efforts geared towards more flexibility in production and quicker delivery times, allow EC tanners to recover some competitive advantage over their Asian counterparts. It remains almost impossible, however, to compete simply on the basis of price.

Under the EC SPRINT programme, leather research institutes throughout Europe are preparing a model for EC tanneries with a view to assisting them in the implementation of quality assurance systems of the ISO 9000 series. Accreditation to ISO 9000 will allow companies in the leather sector to certify the high quality standard of their product.

As the gap between the stock of raw materials available and the level of global demand for finished leather is expected to widen in the medium term, the EC is seeking, in the framework of GATT, to open up the access to raw materials in countries implementing protectionist measures. Uruguay Round negotiations have, however, not brought yet any meaningful results in this issue, nor in the problem of the access to the Japanese market for leather.

EC tanneries have understood that with a shrinking internal market, export orientation is the only way to survive and grow. Extra-EC exports have been growing over the past decade by an average of 4% per annum in real terms illustrating the success of European tanners in penetrating new markets with open access.

Continuing vocational training in the leather sector and particularly for shop floor workers is perceived as a means to improve EC tanneries competitiveness and the quality of their leather.

Specialisation in the production of a single or limited range of products is progressively gaining ground in the EC leather sector. Again, northern European tanners tend to be more specialised than their southern counterparts. Whereas German tanners have concentrated on footwear and/or upholstery leather, many Portuguese tanners produce all types of leather in the same plant.

Due to the family owned structure of many of the smaller tanneries, mergers and acquisitions are not common features in the leather industry. Their importance may well increase in the future as new generations become more business conscious.

REGIONAL DISTRIBUTION

Tanneries exist in all Member States except Luxembourg. The contraction of the leather industry has affected northern European countries more severely but is presently also having an impact on the southern Member States. Most European tanneries are located around the Mediterranean Sea, Italy accounting for almost three quarters of the total. Spain follows with 285 tanneries and a share of 8%. France, Greece and Portugal host respectively 176, 150 and 130 establishments.

In some Member States, tanneries are regionally and/or locally concentrated: Santa Croce sul Arno, Ponte a Egola and Solofra in Italy, Vic and Igualada in Catalonia (Spain), Alcanena in Portugal, Graulhet and Mazamet in the south of France, and Backnang in Germany are examples of areas with a high concentration of tanneries, often playing an essential role in the local and/or regional socio-economic life.

In most of the larger countries there has been significant rationalisation of the industry. In Merseyside in the United Kingdom, for example, there were 40 tanneries in 1945 but only 4 survive today. In the case of Germany, a rationalisation of the tanning industry has restored the viability of the industry. The success of the leather industry in Germany has been partly based on its upstream link with the German chemical industry and many new raw materials have been tested through this link. Downstream, the presence of a major high quality automotive industry and footwear industry has boosted demand conditions.

ENVIRONMENT

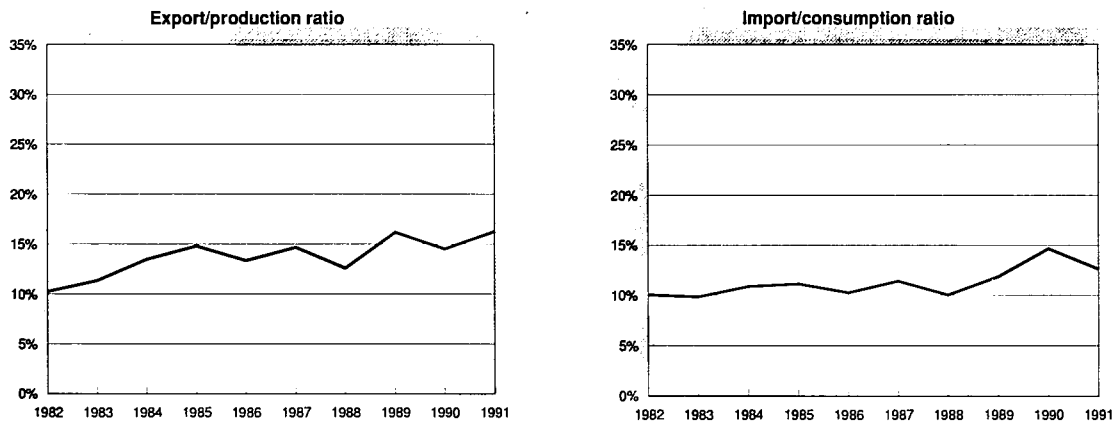
In profitably recovering a by-product of the meat industry which would otherwise have to be landfilled, the tanning industry helps to maximise the use of a renewable natural resource.

Leather tanning can be a source of considerable environmental impact. Air and water pollution, widespread odours, disposal of waste and the damage to sewage systems are among the problems that have been experienced in the leather industry.

Only 20% of the weight of a rawhide finally becomes leather leaving behind liquid effluents, solid wastes and by-products. Some of those could again enter the production chain as raw materials for gelatine, glue, leatherboard, grease, etc.

Water pollution may arise from spent or washed-out chemicals used in the process and therefore require appropriate treatment.

Figure 9: Leather tanning and finishing
Trade intensities



Source: COTANCE, Eurostat

Table 5: Leather tanning and finishing
Destination of output, 1991

	(thousand m2)	(%)
Footwear industry	130 715	48.4
Garment industry	59 862	22.2
Furniture and automotive industry	42 814	15.9
Other industries	36 322	13.5
Total	269 713	100.0

Source: COTANCE

Treatment plants, however, generate a different form of residue (generally sludge) which also has an impact on the environment. Recent research developments have proven that on a scientific level there is no observable effect of chromium containing sewage sludge when disposed on agricultural land, thus allowing its use in agriculture in replacement of chemical fertilisers or as a soil conditioner.

Solid waste arises from operations such as cleaning, scrapping, splitting and trimming. These residues, if not re-used, have to be disposed in landfills.

It is worth noting that part of the waste is inherited from operations upstream of the tanning process, deriving from improper hygienic conditions of animals when presented to the abattoir and salting and other chemical preserving operations after skinning.

The later washout of salt or chemicals may cause problems with effluent quality, as few waste water treatment systems are designed to remove such substances.

The concept of environmental protection and of a sustainable development is being integrated into the management strategies of EC tanneries. Recognising that pollution prevention is often cheaper than to apply "end-of-pipe" solutions, the industry is developing cleaner production technologies in experimental projects, often in cooperation with other EC tanners. In certain regions of the EC where there is a concentration of tanneries, such as Santa Croce sul Arno (Italy), Graulhet-Mazamet (France), Alcanena (Portugal), EC tanners are joining forces to tackle environmental issues together leading to the development of large effluent treatment plants.

The EC leather industry has taken positive steps towards improving environmental performance and minimising waste through the implementation of cleaner production processes. Investments in this field made by the tanning industry can be estimated at 2% to 4% of the sector's turnover or to some 150-300 million ECU per year.

The environmental regulatory framework in Member States sets almost equivalent burdens to tanners. However, in some countries, industry operators might be forced to assimilate faster new constraints as their national standards become more stringent. One example of such "first mover" initiatives, that subsequently have to be assimilated all over the EC, is the ban of PCP (Penta-Cloro-Phenol) in Germany. PCP, that is used as a treatment to prevent moisture absorption by the raw material, is dangerous to human health under long exposure and potentially causes toxic emissions when incinerated. Initiatives of this kind may cause problems for some countries and companies which are not ready for the implied changes.

The optimum for the EC tanning industry regarding environmental performance is to maximise the utilisation of all inputs, identify uses for any possible by-products, minimise waste and treat the inevitable residues.

Research and development is being financed by the EC tanning sector to find viable solutions to environmental problems in leather production, thus contributing to the global effort of sustainable developments in the leather industry.

REGULATIONS

Sector specific regulations are more frequent at local, regional or national levels rather than at EC or international level. Most regulations affecting the leather sector tend to be of a horizontal character and the particular provisions concerning tanneries are often subsumed into a global framework.

At EC level it is possible to distinguish three main areas where the leather industry is particularly addressed:

Trade related regulations: The EC common customs tariff in Chapter 41 provides for the import duties on leather. Those range from 3% to 7% and are among the lowest in the world. The General System of Preferences grants to developing countries a preferential access to the EC market, suspending the duties up to certain ceilings.

Technical regulations: The Commission has issued a proposal for a footwear labelling directive, laying down the means to be used for footwear labelling referring also to the constituent materials of it and thus defining leather. This draft directive takes over the definition of leather elaborated by the International Council of Tanners (ICT).

Ecological regulations: Apart from general legislation regarding health and safety and environmental protection which applies to all branches of industry, the tanning sector pays particular attention to an EC proposal for a directive laying down limits for chromium in sewage sludge to be used in agriculture.

At an international level the Uruguay Round of GATT negotiations may help determine future trade policy in the leather industry.

OUTLOOK

Leather production in the EC is expected to fall in the short term as there are no signs of recovery in the worldwide recession in the leather trade. The non-completion of the Uruguay Round leaves the general framework for trade somewhat vague, adding uncertainty to the leather industry. Cheap leather imports will continue to increase and exports are not likely to grow significantly because of a lack of reasonable access to the largest potential market, Japan.

In the medium term, the prospects for the EC tanning industry will depend on its ability to adapt to the changing international economic environment.

The EC leather industry will have to face increased competition from developing countries in the purchase of raw materials and in the markets for finished leather. Normal commercial developments in the USA, Europe, Australia and New Zealand will lead in the medium and long term to a situation where no untanned hide or skin will leave those countries. Environmental reasons also support the case for immediate processing either fresh or wet-blue raw materials as it obviates

Table 6: Leather tanning and finishing
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	-1.8	-0.9
Production	-0.8	-1.2
Extra-EC exports	0.3	0.7

Source: COTANCE

the need for salting and thus the need for the reverse process which requires the disposal of a heavy load of salt into waste water.

In the longer term, the buoyancy of demand relative to supply is expected to maintain the upward pressure on hides, skins and leather prices. The demand for various luxury leather products such as leather upholstered cars and high fashion garments will depend on the growth and distribution of wealth in high income countries. An increase in the demand for leather footwear is expected to be concentrated in lower income regions of the world.

Population growth in Asia (where per capita incomes also rise faster than the world average) will be an important factor in the expansion of world demand for meat and the availability of derived leather articles. Asia's share of world hide production will have increased from some 13% in 1970 to an estimated 25% by the year 2000. Asia and Latin America NICs will become vast new consumer markets for leather with the expansion of their leather articles manufacturing industry.

Written by: COTANCE and Fitzpatrick Associates
The industry is represented at the EC level by: Confederation of National Associations of Tanners and Dressers of the EC / Confédération des Associations Nationales de Tanneurs et de Mégissiers de la CE (COTANCE). Address: Rue Belliard 3, B-1040 Brussels; tel: (32 2) 512 7703; fax: (32 2) 512 9157.


MADE
IN
EUROPE

Wood processing
NACE 46

In 1991, the woodworking industry reached a production value in current prices of 34.9 billion ECU, an increase of 27% compared to 1985. Hit by recession in the early eighties, the woodworking industry has been growing at a faster rate than average manufacturing since 1986. Over the period 1992-1995, demand in the primary and secondary processing of wood industry is expected to grow by 2.9% per year.

INDUSTRY PROFILE

Description of the sector

According to the NACE definition of sector 46, woodworking can be divided into two parts, namely the first processing of wood (NACE 461) which includes sawmills and planemills and the second processing of wood (NACE 462 to 466). The second processing of wood includes:

- semi-finished wood products (Nace 462): particleboard, fibreboard, and plywood;
- wooden building components (Nace 463): carpentry, joinery and parquet flooring;
- wooden containers and pallets (Nace 464);
- other wood manufactures (Nace 465);
- cork, basketware and wickerwork, brushes and brooms (Nace 466).

In view of the typically SME character of these activities in all the EC countries, the output of these groups is considerably underestimated by the majority of statistical analyses since they generally ignore smaller businesses (less than 20 people employed).

Main indicators

In 1991, consumption in current prices amounted to 42.7 billion ECU, an increase of 1.9% compared to 1990. Production amounted to 34.9 billion ECU, an increase of 3.9% on 1990. Sawing, planing and drying of wood represents 16.9% of total wood products production, semi-finished wood products 23.1%, wooden building components 34.9% and other wood products 25.1%.

The trade balance improved in 1991, especially in the subsectors 461 (sawing, planing and drying of wood) and 462 (semi-finished wood products). The woodworking industry employed about 436000 persons in 1991.

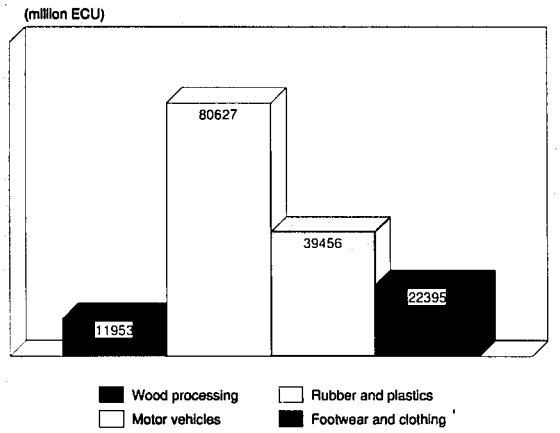
Recent trends

In constant prices, apparent consumption and production in 1991 had increased by 28% and 27% respectively since 1985. Extra-EC exports have remained stable since the 1989 jump, albeit with a very slight decline. Employment since 1985 has fluctuated around 430 thousand persons, and in 1991 was 1.7% higher than 1985 at 436 thousand.

Foreign trade

Extra-EC imports, after rising continually from 1985 to 1990, declined by 5% in 1991. The ratio extra-EC exports/extra-EC imports, after having reached a level of 23% in 1985, has remained stable at a level of roughly 20%. Intra-EC trade increased constantly during the period 1982-1991, amounting to 5 billion ECU in 1991 and represents 34% of total imports.

Figure 1: Wood processing
Value added in comparison with other industries, 1991



Source: Eurostat

MARKET FORCES

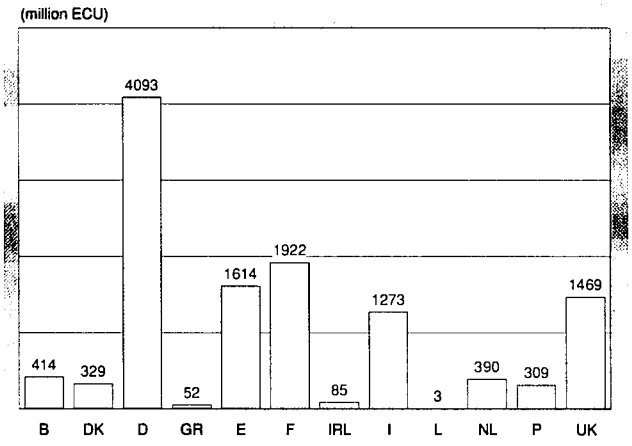
Demand

Since the products of the woodworking industry are very heterogeneous, these products have different types of buyers, i.e. industrial or final consumers.

Demand for the products of the woodworking industry largely depends on two sectors: the building or construction industry on the one hand and the furniture industry on the other hand. Since these two sectors are highly cyclical, demand for the products of the woodworking industry depends heavily on the evolution of general income and interest rates.

The expected general economic recovery is not yet likely to influence construction activity in Europe in the near future. The building volume is expected to experience a further slight reduction due to high interest rates, a surplus in buildings in many countries and the general cut-backs in state-subsidised construction. This decline is in contrast to the expected general economic growth rate of 2% which indicates that the trend of a decreasing contribution of the building sector to gross

Figure 2: Wood processing
Value added by Member State, 1991



Source: Eurostat

Table 1: Wood processing
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	25 036	27 268	28 812	28 858	29 345	32 258	36 210	40 109	41 889	42 703	44 972
Production	20 151	21 548	22 866	23 403	23 749	25 971	29 186	32 173	33 596	34 925	37 317
Extra-EC exports	1 263	1 412	1 617	1 626	1 611	1 652	1 776	2 056	2 034	2 019	2 034
Trade balance	-4 885	-5 720	-5 946	-5 455	-5 596	-6 287	-7 024	-7 935	-8 292	-7 778	-7 655
Employment (thousands)	466	455	448	429	411	421	430	433	439	436	433

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Cei-Bois estimates
Source: Eurostat

Table 2: Wood processing
Breakdown by major sectors, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Sawing and processing of wood	11 417	5 912	281
Semi-finished wood products	9 648	8 083	468
Wooden building components	12 525	12 179	422
Other wood products	9 113	8 750	847

(1) Estimates are used if country data is not available
Source: Eurostat

Table 3: Wood processing
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	0.8	4.2	3.1
Production	1.5	4.1	3.2
Extra-EC exports	3.1	-0.3	0.8
Extra-EC imports	-0.9	3.7	2.2

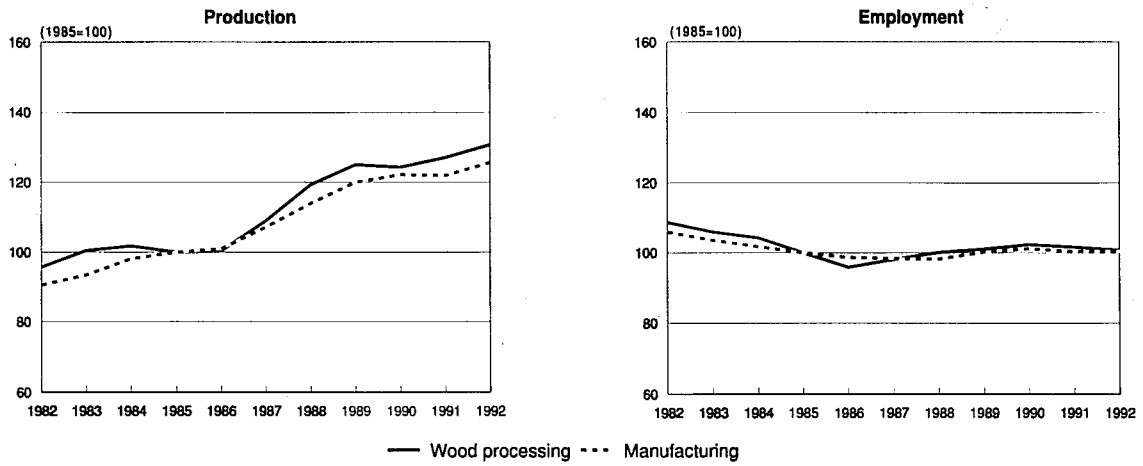
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Wood processing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 263	1 412	1 617	1 626	1 611	1 652	1 776	2 056	2 034	2 019
Extra-EC imports	6 148	7 133	7 563	7 081	7 207	7 939	8 800	9 991	10 326	9 798
Trade balance	-4 885	-5 720	-5 946	-5 455	-5 596	-6 287	-7 024	-7 935	-8 292	-7 778
Ratio exports/imports	0.21	0.20	0.21	0.23	0.22	0.21	0.20	0.21	0.20	0.21
Terms of trade index (2)	98.6	97.6	94.9	100.0	110.0	110.9	109.8	108.2	107.2	107.7
Intra-EC trade	2 362	2 603	2 964	3 145	3 326	3 574	4 026	4 549	4 907	5 045
Share of total imports (%)	27.7	26.7	28.1	30.7	31.5	31.0	31.3	31.2	32.1	33.9

(1) Estimates
(2) Includes the manufacture of wooden furniture
Source: Eurostat

Figure 3: Wood processing
Production and employment indices compared to EC manufacturing



1992 are Cei-Bois estimates
Source: Eurostat

domestic product continues. The expansion of renovation and maintenance activities has partly compensated fluctuations in new construction volume output during recent years. Industry experts anticipate a decline in the construction of new dwellings as well as in commercial and public building.

The year 1991 was not a very good one for the furniture industry. Except for Germany and the Netherlands, growth rates were just enough to balance inflation rates in nearly all the countries. The worst situations were encountered in France and the United Kingdom. Luckily, many countries increased their exports to Germany to satisfy the rapidly expanding demand. Except for Denmark and Portugal, whose exports increased strongly, the other countries' overall exports rose by moderate rates. The growth of imports was remarkably high in Germany, Portugal, Greece and Spain. Apparent consumption increased in nearly all European countries (except for France, the UK and Denmark) and in general, was covered by an increase in imports which was more significant than the increase in production.

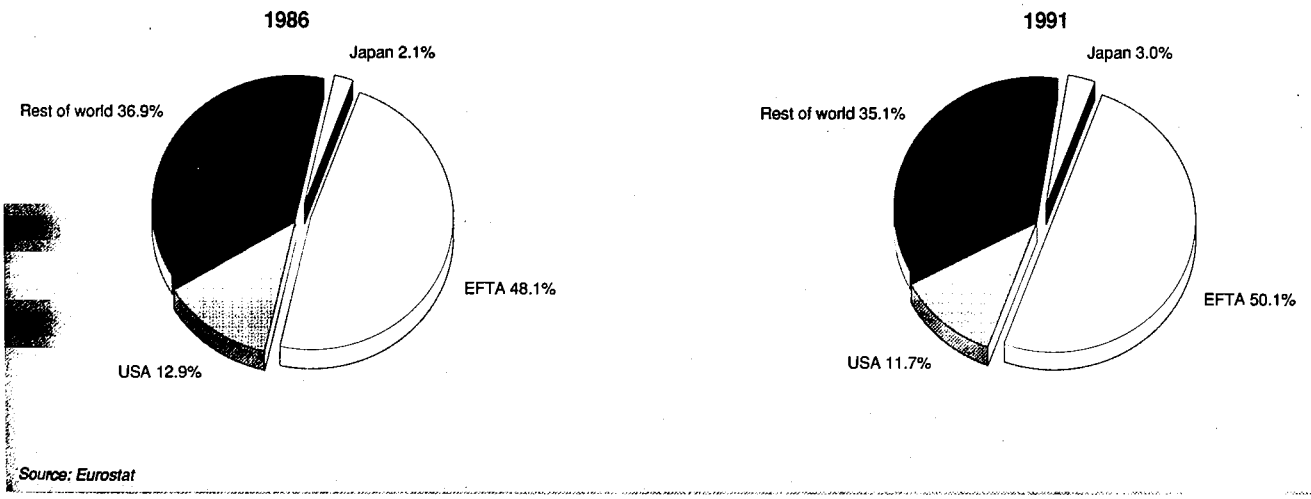
Supply and competition

The deficit in the Community trade balance can be explained by the dependence of important subsectors on tropical hardwood (and on sawn timber), imports of plywood from south east Asia (especially from Indonesia), hardboard from South America (especially Brazil), and the imports of wood products from the countries of central and eastern Europe at extremely low prices.

Although imports of raw materials like tropical hardwood will continue, an improvement in the trade balance of the sector can be achieved through a consolidation of the industrial system within the EC.

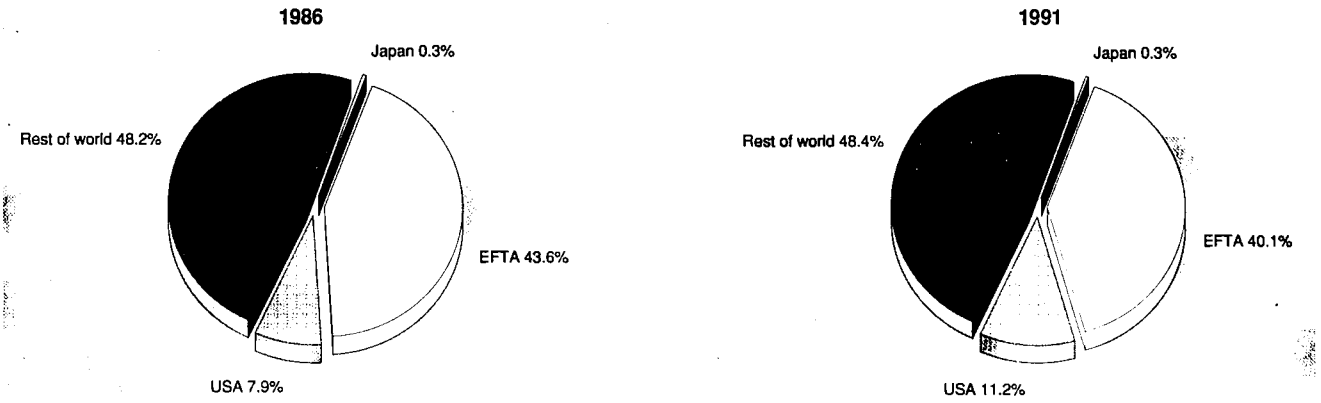
Moreover, depending on the Community's forestry policy, an increase in the domestic supply of wood may be achieved through the use of marginal land. As there are important surpluses of agricultural products within the EC, there is a tendency to convert agricultural land into forestry areas. This could lead to a further improvement of the trade balance of the EC woodworking industry and would also have a positive ecological impact.

Figure 4: Wood processing
Destination of EC exports



Source: Eurostat

Figure 5: Wood processing
Origin of EC imports



Source: Eurostat

Trade flows among Member States are more significant than extra-EC exports. This may partly be explained by the importance of transport costs which affect the trade in wood and wood products. In the period 1987-1991, the value of intra-EC trade increased by an average of 8.7% per year.

In the past, competition has been affected by a large number of technical barriers to trade between Member States (nationally oriented standards that have already been in existence for a long time, major differences in the procedures for technical approval, etc.). In the light of the integration of the EC market in 1993 the sector will be affected by the results of discussions on the short term implementation of European standards and technical reference documents. This technical integration is expected to result in an increase in trade between Member States.

The political and economic developments in the countries of central and eastern Europe will have important consequences, since these countries have very large wood reserves and a low wage labour force.

INDUSTRY STRUCTURE

Companies

The woodworking industry, including the manufacture of wooden furniture, has around 242 thousand companies, 94.2% of which are enterprises with less than 20 employees representing 46% of employment and 34% of turnover. Companies with more than 99 employees represent 0.6% of the enterprises but they realise 36% of turnover.

Strategies

Since woodworking started as an artisanal activity, the family structure of its small and medium-sized enterprises is still very important. The industry enjoyed a rapid growth between 1960 and 1974.

The woodworking industry went through a major crisis commencing in the second half of the 1970's, like most sectors of European industry. This crisis lasted until the beginning of the 1980's. Due to substantial investment efforts since 1983, the EC woodworking industry is heading for overcapacity problems in the beginning of the 1990's, despite achieving a balance in the late 1980's. This balance, in part, was due to a significant increase in the demand for products of the woodworking industry, as to meet this increased demand, the enterprises of the woodworking industry made substantial investment. Since new machines normally outperform older ones, new investments resulted in a rationalisation of the production process and an improvement of the efficiency and productivity.

As demand slowed down in the beginning of the nineties, investments were focused on the introduction of new products (e.g. oriented strand board, medium density fibreboard) and new production technologies.

In order to cope with extra-EC competition, many small and medium sized enterprises have adopted a strategy of diversification and specialisation.

ENVIRONMENT

Wood is a renewable raw material. Its transformation into finished products requires a minimum of energy and doesn't pollute air, water or soil. Some discussions have however arisen on the use of tropical timber, the recycling and disposal of packaging waste and the tax related to CO_2-emission. This evolution is certainly not unique to this sector, but has to be

Table 5: Wood processing
Breakdown by size of enterprise, 1988 (1)

(employees)	Number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	227 532	94.2	46.0	33.9
20-99	12 599	5.2	28.5	30.1
More than 99	1 532	0.6	25.5	36.0

(1) Estimates; includes the manufacture of wooden furniture
Source: Eurostat

seen in a much broader context, in which the whole of Europe is beginning to think "green".

Protection of tropical forests

The deforestation of the tropics is an extremely alarming situation which gives rise to general concern. The most important reason for this deforestation is the circle of poverty, population pressure, over indebtedness and economic underdevelopment which results in an increasing demand of land clearance for farming, industrial purposes and infrastructure at the expense of the forests.

Unqualified and destructive timber exploitation is an ecologically irresponsible action. In order to preserve the biological variety and protect endangered animal and plant species as well as to prevent erosion, it is necessary to turn large areas of forest into nature reserves where any kind of commercial exploitation is prohibited. The tropical forests must be protected, but adequate account has to be taken of their ecological, economic and social functions. This requires land planning which designates protection forests, commercially exploited forests and areas for agricultural, industrial and infrastructure purposes.

Environmentally sound and sustainable forest management schemes can contribute to a large extent to the preservation of forests. The European woodworking industry fully supports the introduction of these schemes. Generalised bans and boycotts do not necessarily contribute to the preservation of tropical forests. On the contrary: they may accelerate the deforestation of tropical areas due to the increase in poverty that could result from them. The ITTO guidelines for sustainable forestry, which have been adopted by all producer and consumer countries, constitute the first internationally recognised criteria for environmentally sound, sustainable forest management. It is essential to achieve the implementation of these guidelines before the target date 2000 agreed upon within ITTO.

The measures agreed upon in this context should be implemented in collaboration with competent environmental organisations. An important incentive for the realisation of sustainable forestry is the introduction of an attestation of origin. An attestation scheme can be established on a country basis or on a case by case basis. The interests of the wood producing countries of the Third World have to be considered appropriately when coordinating international measures for the protection of tropical forests. In the problem zone of the tropical forests, ecology and economy are no irreconcilable contrasts.

Recycling and disposal

During recent years, national as well as European authorities have begun to focus on packaging and packaging waste. Within the range of packaging materials, wood takes a specific place. As already stated, wood is a renewable raw material. Compared to other materials, wood needs only little energy for processing and therefore helps to reduce the use of valuable energy resources.

Woodwaste cannot be considered as real waste, since it can be and is used to manufacture other materials such as particleboard, fibreboard, and laminated wood etc. If this use of woodwaste is not possible, it can be used for energy production. For the time being, woodworking companies produce the necessary technical warmth, and heat the workplace, mainly from bark and woodwaste. Modern firing installations have reached a very high technical standard and, from an environmental point of view, have to be regarded as being highly efficient.

Based on the arguments above, wood is a well suited packaging material. It can be recycled to produce other materials, or can be used to produce energy. Treated or coated wood packaging can be burned in suitable firing installations together with household wastes.

The woodworking industry continues to argue for the re-use of timber packaging materials for energy production as one of the solutions for recycling.

CO_2-reduction policy

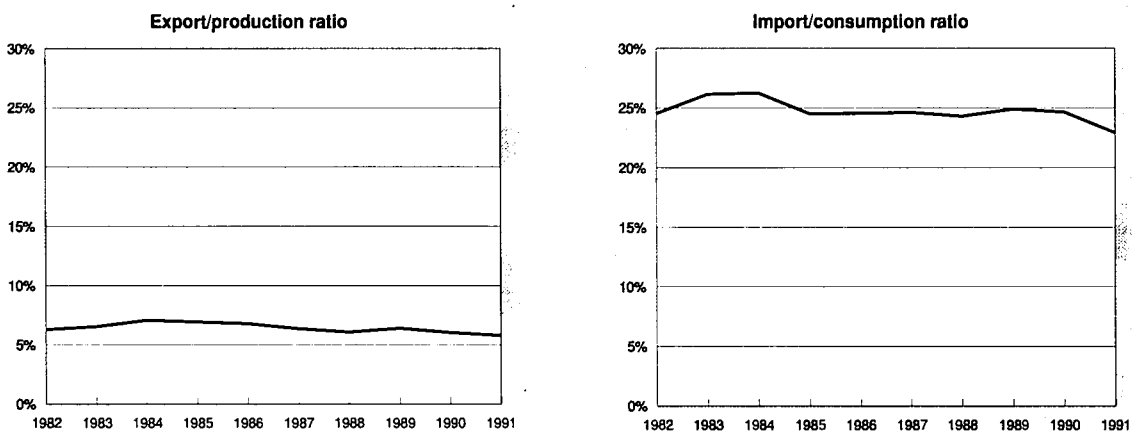
In the past, after considerable effort, the woodworking industry has managed to achieve some good results in the reduction of energy consumption. This branch of industry has an acute awareness of the necessity to reduce the emissions of CO_2 to protect the atmosphere on earth. Therefore, it will aim for further reduction, and support political concepts consistent with that purpose if they can be realised in an economic way and be combined with the necessary political measures.

The raw material wood should be promoted more extensively. This includes an increasing forest area as this leads to improved CO_2 absorption and helps to redress the balance against the disappearing of tropical rain forests.

Product promotion could include, for example, specific orders from public authorities for, say, anti-noise barriers along roads and railway tracks made from wood or wood based materials, as part of a positive attitude towards the use of wooden constructions.

Finally, the positive and expandable role of the thermic use of wood waste is important. This helps restrict the use of

Figure 6: Wood processing
Trade intensities



Source: Eurostat

other non-renewable energy sources, that are less "CO_2-friendly".

REGULATIONS

There are relatively few technical regulations in the woodworking industry, leading to the concept that the "single European market" is already practically realised. The "construction products directive" and the related European standardisation activities have helped. A similar effort is being made on the market of biocidal products (including wood preservatives), where an EC-directive is being prepared and should allow the removal of barriers to trade in this field. Finally, a lot of discussions are on-going related to the "phyto-sanitary" field and plant protection.

The following items are of specific concern for the woodworking industry.

German "Gefahrstoffverordnung"

In 1986 Germany notified a "decree on dangerous substances", introducing, between others, a requirement that wood based materials and furniture made thereof should not emit a concentration of more than 0.1 ppm of formaldehyde in a "testing chamber". This caused detailed opinions/observations from different Member States. Between 1986 and 1991 the subject has remained under discussion.

On 12 February 1991, the German government notified its "Prüfverfahren für Holzwerkstoffe" (test methods for wood based panels). These can be considered as the implementation of the formaldehyde regulation in the "Gefahrstoffverordnung". Again detailed opinions/observations were discussed by six Member States and the EFTA Secretariat as well as by the Commission itself.

In spite of this, a final decision was taken on the regulation, when, at the end of October 1991, the German government published the test methods for wood based panels in the "Bundesgesundheitsblatt".

Compared to the initial proposal of the German authorities, some beneficial changes were introduced. The main request of industry, that the results of the "derived test methods" (such as perforator and gas analysis values) should be considered as equivalent to the tests in "large chambers", was met.

In principle, however, industry remains opposed to this regulation and requires a lot more clarification.

Regulations related to wood dust

In some countries, there are very stringent regulations on the exposure to wood dust in workplace, due to its presumed risks for workers.

Presently, wood dust does not appear on the EC-list of carcinogenic substances at work places, because no direct relationship between exposure to pure wood dust and certain types of cancers of the higher respiratory system has been proved. Research, however, continues, the Industry has launched a research programme to be performed at the Cancer Research Centre in Heidelberg. The programme, which will be co-financed by the Commission of the EC, will take approximately 3 years. It is expected to provide vital scientific evidence in the wood dust debate.

German "Verpackungsverordnung"

The German "Verpackungsverordnung" (regulation on packaging waste) came into force on 1 August 1991. The main implications of this regulation are:

- from 1 December 1991 all transport packaging such as pallets and crates have to be taken back and recycled;
- from 1 April 1992 it should be possible for a consumer to return the "Umverpackungen", i.e. the packing material used for theft avoidance or used for publicity;
- from 1 January 1993, used selling packaging will have to be taken back by retailers and industry to be recycled and there will be an obligation for deposits on certain one way packages.

According to the this "Töpfer-law", recycling is equivalent to "material recovery". This poses specific problems for wood material as a "material recovery" is not always possible. The German law does not allow for energy recovery.

As a consequence, recycling systems for wooden packaging in Germany had to be developed on a very short term. The "Grow" label is already used for vegetable and fruit crates and will shortly become applicable to pallets. It still is difficult and costly to find industrial consumers of recycled wood.

As other countries, like France, already have a national law concerning packaging waste or are developing one, the problem is also being dealt with on the European level. The proposal for a European Directive does authorise energy recovery. This clearly is the best solution for certain woodwastes.

Volatile organic compounds

The Commission of the European Communities has developed a proposal for a Council Directive concerning the limitation of the emissions of organic solvents from certain activities and industrial installations. The aim of this directive is to reduce the emissions of organic solvents from certain industrial installations and processes. It forms part of a strategy for an overall reduction of the emission of volatile organic compounds in the Community.

The proposal covers two activities of the woodworking sector, namely coating of wooden surfaces and wood impregnation. It is based on the principle that all enterprises, using more than one ton of organic solvents per year, should apply a strict management plan. Those using more than 5 tonnes per year should also reduce their emissions considerably.

It could therefore have important implications for a significant number of SMEs in subsectors of the woodworking industry, such as furniture, joinery, and parqueting, etc. The discussions on this subject continue.

Customs tariffs

On December 16th 1991, the EEC signed the Association or Interim Agreements on trade and trade-related matters with Hungary, Poland and the Czech and Slovak Federal Republic. To apply these agreements from March 1st 1992 on, a number of Council Regulations had to be issued. These regulations were published in the Official Journal L 56 of 29 February 1992. They are summarised as follows:

- Council regulation 517/92 removes Hungary, Poland and the CSFR from the list of countries in annex to the EC regulations on import arrangements for products in State-trading countries and on common rules for imports from State-trading countries;
- Council regulation 518/92 (Poland), 519/92 (Hungary) and 520/92 (CSFR) on certain procedures for applying the Interim agreements on trade and trade-related matters, lay down specific provisions concerning general rules or common rules for imports and on the protection against dumped or subsidised imports from countries not members of the European Community. It specifies the procedures to be followed for applying safeguard measures that are provided for in the Treaty;
- Council regulation 521/92 opens and provides for the administration of Community tariff quotas and ceilings for certain industrial products originating in Hungary, Poland and the CSFR. Until 31 December 1992, imports of certain

Table 6: Wood processing
Expected real annual growth rates

(%)	1992-93	1992-95
Apparent consumption	2.9	2.9
Production	3.4	3.4
Extra-EC exports	-1.5	-1.4

Source: Cei-Bois

products originating in Hungary, Poland and the CSFR will be subject to Community tariff quotas or ceilings.

Customs duties on imports applicable in the Community to 4403 10 10 (poles of coniferous wood, injected or otherwise impregnated to any degree, not less than 6 m nor more than 18 m in length and with a circumference at the butt end of more than 45 cm but not more than 90 cm) originating in Hungary, Poland and the CSFR shall be progressively abolished:

- from the 1st of March 1992: 50% of the basic duty;
- one year later, elimination of the remaining duties.

Customs duties on imports originating in the EC and applicable in Hungary, Poland and the CSFR will be progressively abolished and reduced to zero by the end of the year 2000.

SKILL SHORTAGES

Due to the very fast evolution in production techniques, the sector is experiencing increasing difficulties in finding properly trained staff. This implies that considerable attention will have to be paid to higher training standards in this field, as qualified executives are required, as well as skilled workers. Furthermore, the absence of sound information concerning the material 'wood' in most architectural and engineering courses is a shortcoming with a direct negative influence on the state of knowledge of the specific behaviour of timber in the building sector.

OUTLOOK

Average real annual growth for the period 1992-1995 is estimated at 2.9% for consumption and 3.4% for production. Extra-EC exports are expected to decrease by 1.4% annually until 1995.

The increasingly stringent requirements with respect to health and environment will increase the costs of the industry. Additionally, European standardisation may lead to increased extra-EC imports. Nonetheless the implementation of European standards will have a beneficial impact on trade between Member States. Furthermore, the agreement signed in May 1992 between the EC and EFTA, substantially increases the available market by creating a European Economic Area of 400 million consumers.

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Sawing and first processing of wood
NACE 461

Although more than half of EC consumption of sawn, planed and dried timber is imported, the restructuring of the industry in the early 1980's has had a favourable impact on EC production, and may lead to a decrease in extra-EC imports in the 1990's. Structural changes have taken the form of increased vertical integration and/or the merging of small production units. This trend is expected to continue in the coming years.

INDUSTRY PROFILE

Description of the sector

The first stage in the processing of wood falls under NACE 461. This code groups the companies engaged in the following activities:

- saw milling;
- planing of wood;
- drying and seasoning of wood.

Main indicators

The improvement of the trade balance in 1991 was due largely to a sharper decrease in consumption than in production. As a result, imports (12%) decreased more than exports (7%) in 1991.

Production in 1991 amounted to 5912 million ECU and represented 17% of total production of the wood processing industry.

Employment has remained stable since 1988 at a level of about 80,000 people, representing 18% of total employment in the wood processing industry (NACE 46).

Recent trends

Apparent consumption, after a constant rise from 1985 to 1989, decreased in the beginning of the 1990's. Production rose sharply in 1988 (+12.4%) slowing considerably thereafter. Figure 3 illustrates the production of 1990, followed by weak growth in 1991 and 1992.

During 1985 to 1991, extra-EC exports declined at an average rate of 1% per year, a trend that is expected to continue in the coming years.

Foreign trade

The negative trend in the trade balance is reflected in the very low extra-EC export/extra-EC import ratio which has averaged 5% for the last decade. The share of intra-EC trade in total imports remains low albeit increasing slightly at the beginning of the 1990's.

Extra-EC imports mainly come from the EFTA countries (46% in 1991) and North America (21%). Although the import penetration rate remains very high (50.7%), EC producers have been successful in substituting extra-EC imports since 1984.

MARKET FORCES

Demand

Only 5% of EC production is exported while 8% of EC production is directed to the final consumer. The large majority of EC production goes to industry, more specifically to the pallets industry, the carpentry industry and the furniture industry. This situation will continue in the near future.

The maturity of the market has been masked by recent temporary effects, such as the economic growth in the eastern part of Germany and the huge projects that took place in Spain associated with the Seville exposition.

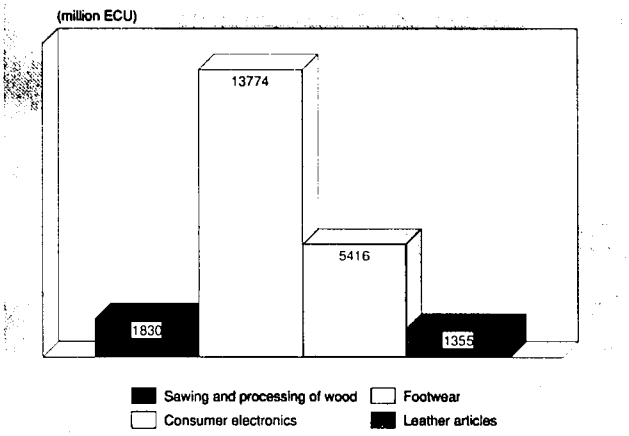
New products are emerging based on new techniques, such as gluing which will increase value added. There is important automatisation taking place in the large sawmills, and more specifically, in the softwood sector.

Supply and competition

Inside the European Community, there is strong local competition. In addition, there is significant pressure from foreign competition, more specifically in the saw milling sector which supplies the pallets industry, where cheap products are entering the EC market coming from Poland and Czechoslovakia. A considerable amount of imports are also coming from Scandinavia, North America and eastern Europe.

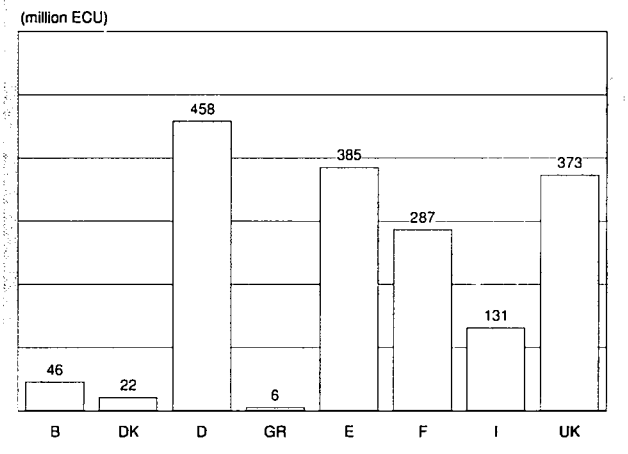
Factors such as lower labour costs, exchange rate developments (especially the US$), and the better availability of raw materials, play an important role in the competition taking place in EC and extra-EC markets. Factors such as higher produc-

Figure 1: Sawing, planing and drying of wood Value added in comparison with other industries, 1991



Source: Eurostat

Figure 2: Sawing, planing and drying of wood Value added by Member State, 1991



Source: Eurostat

Table 1: Sawing, planing and drying of wood
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	7 570	8 470	8 787	8 458	8 429	9 474	10 659	11 865	12 265	11 417	11 337
Production	3 588	3 788	3 894	4 046	3 982	4 518	5 286	5 664	5 983	5 912	6 279
Extra-EC exports	168	195	234	246	261	271	276	302	303	281	273
Trade balance	-3 982	-4 681	-4 893	-4 411	-4 448	-4 956	-5 373	-6 202	-6 282	-5 505	-5 058
Employment (thousands)	85	82	79	78	75	76	80	78	80	79	77

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Cei-Bois estimates
Source: Eurostat

Table 2: Sawing, planing and drying of wood
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-1.0	3.1	1.7
Production	0.8	4.4	3.2
Extra-EC exports	9.2	-1.0	2.3
Extra-EC imports	-2.0	1.7	0.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

tivity, trade practices, trade policies and technological advantages have only a marginal impact on competition.

INDUSTRY STRUCTURE

Companies

Some 3700 enterprises employing more than 0 persons operate in the first stage of the processing of wood in the EC as a whole. Altogether, about 80 000 persons were working in these companies in 1991. however, the sector is dominated by small and medium sized enterprises, so that total employment is likely to be considerably larger than the official figures.

Strategies

The investments that took place in the course of the 1980's contributed to the reorganisation of the industry, a necessity caused by the strong competition from non-EC producers. There were three main types of structural changes: the closure of non-profitable enterprises, the merging of small production units and an increased tendency towards vertical integration. Moreover, there is a growing demand for highly qualified personnel.

Investment focused on plant modernisation and existing investment projects. Investments are principally taking place inside the EC. There is a tendency for large companies to disinvest, mainly because of cash problems. Furthermore, there are a number of mergers and acquisitions taking place in the sector.

The main strategy for the enterprises of the first processing of wood is to produce goods with a higher value added. The enterprises tend to be subcontractors to the second processing of wood, instead of remaining simple raw material suppliers. By producing more custom-made goods for the second processing of wood, the EC enterprises are able to improve their competitiveness vis-à-vis extra-EC competitors.

Due to their geographical proximity, the enterprises of the first processing of wood can also respond in a more flexible way to the needs of enterprises of the second processing of wood (e.g. just-in-time delivery).

OUTLOOK

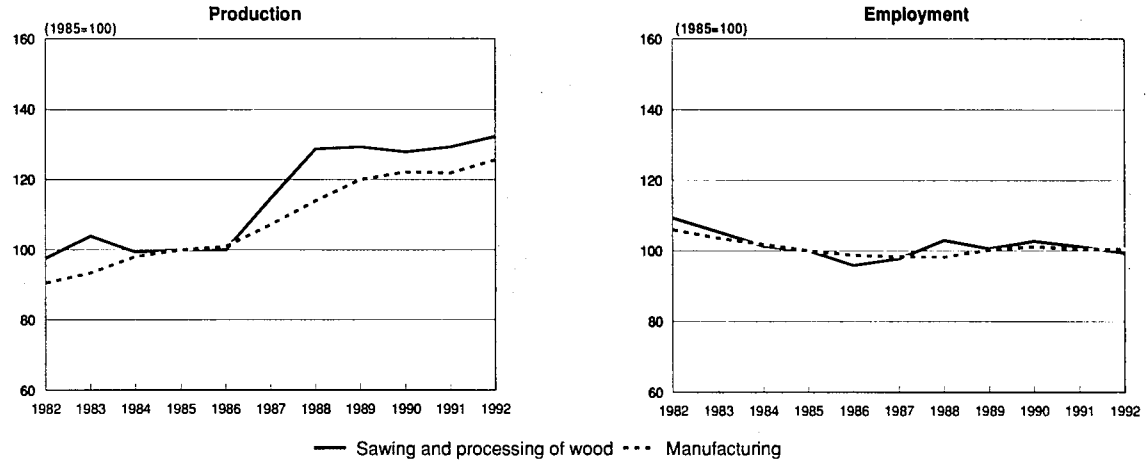
The decrease in consumption which began in 1991, will continue in 1992. In 1993, consumption will stabilise and increase slightly afterwards. Production, which has increased since

Table 3: Sawing, planing and drying of wood
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	168	195	234	246	261	271	276	302	303	281
Extra-EC imports	4 150	4 876	5 127	4 657	4 709	5 227	5 649	6 503	6 585	5 786
Trade balance	-3 982	-4 681	-4 893	-4 411	-4 448	-4 956	-5 373	-6 202	-6 282	-5 505
Ratio exports/imports	0.04	0.04	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05
Terms of trade index	106.1	100.1	93.5	100.0	113.1	114.9	107.6	103.8	104.5	108.1
Intra-EC trade	475	536	666	700	726	757	823	919	997	935
Share of total imports (%)	10.3	9.9	11.5	13.1	13.3	12.6	12.7	12.4	13.2	13.9

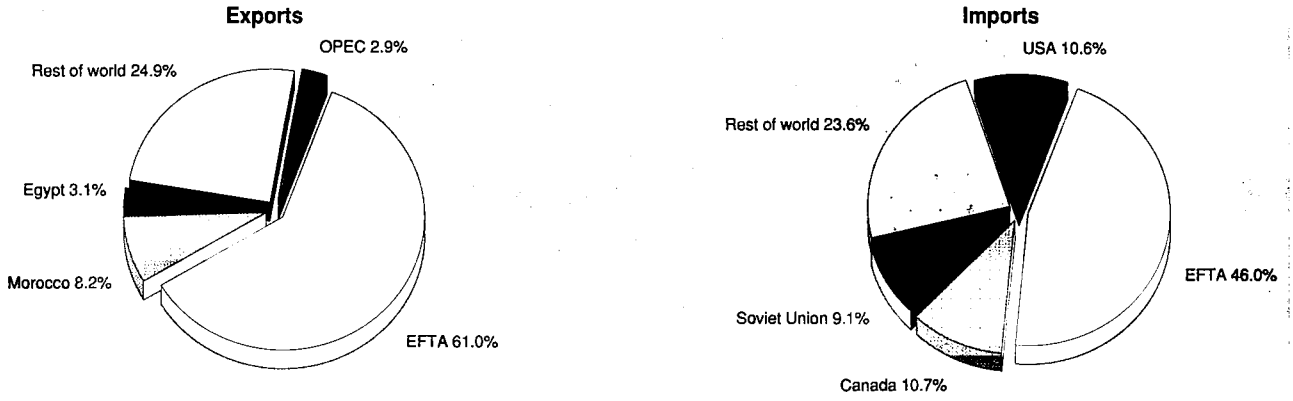
(1) Estimates
Source: Eurostat

Figure 3: Sawing, planing and drying of wood
Production and employment indices compared to EC manufacturing



1992 are Cei-Bois estimates
Source: Eurostat

Figure 4: Sawing, planing and drying of wood
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Table 4: Sawing, planing and drying of wood
Expected real annual growth rates

(%)	1992-93	1992-95
Apparent consumption	-0.8	-0.6
Production	2.7	2.7
Extra-EC exports	-4.0	-3.8

Source: Cei-Bois

1985 (in constant prices), is expected to increase further in the period 1992 to 1995 at an average of 2.7% per year. EC production will continue to substitute for extra-EC imports. Extra-EC exports are expected to decrease as attention is focused on the EC market.

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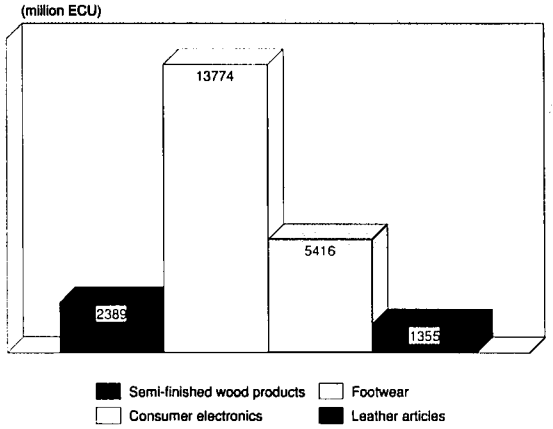
Semi-finished wood products

NACE 462

The manufacture of semi-finished wood products is the second largest woodworking sector, representing 23% of the total value of production in the secondary processing of wood. Approximately 1600 firms are involved in the manufacture of semi-finished wood products, employing about 67 000 people.
The average annual growth rate for the period 1992 to 1995 is estimated at 3% for consumption and 3.2% for production.

Figure 1: Semi-finished wood products Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

This group mainly covers wooden board material (particleboard, fibreboard, and plywood), which is in turn used as an intermediate product in the furniture industry or in building (the 'industry' circuit), or as a finished product (the 'do-it-yourself' circuit). Besides raw boards, there are also surface improved panels (boards covered with veneer, PVC or melamine resin impregnated paper).

NACE 462 also includes the enterprises that impregnate wood with chemical preservatives.

Main indicators

Apparent consumption in current prices amounted to 9 648 million ECU in 1991. Total consumption of raw wooden board material is divided into particleboard at 45%, fibreboard at 32% and plywood at 23%. EC particleboard is leader of the semi-finished wood products.

Production represents 23% of total production of the wood processing industry. Particleboard production in value represents about 50% of total production of wood based panels in the EC. In volume, the share of particleboard in total production is about 80%.

This sector employed 67 000 people in 1991, which represents 15% of total employment in the wood processing industry.

Recent trends

Apparent consumption in constant prices has increased constantly since 1982. In 1991, consumption was 25.6% higher than in 1985. Production has followed the same pattern (except for a decline in 1986), as have extra-EC exports (except for 1990 and 1991 when there was a slight decrease in exports). On the other hand, employment decreased from 1983 to 1986 and then stabilised at a level of about 67 000 persons.

Foreign trade

The EC trade balance, which steadily deteriorated from 1982, improved for the first time in 1991. The share of intra-EC trade in total imports reached 46% in 1991, following steady improvement during the last ten years.

The ratio extra-EC exports/extra-EC imports has remained stable during the last few years, with exports representing about 23% of imports.

The EFTA countries are the major trading partners for the subsector of the semi-finished wood products.

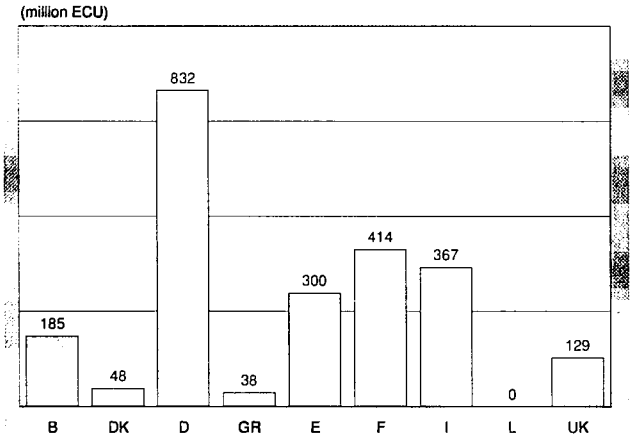
MARKET FORCES

Demand

The important gap in the particleboard market between production capacity and demand has made it very difficult for manufacturers to recover their heavy investments costs. Chipboard production is practically fully automated and the investment threshold, especially for the continuous lines, is high. Important modernisation and concentration has taken place during the last few years and the industry has reached a very high level of technology and efficiency. This ensures that the industry continue to match high quality standards and growing competition in the near future.

The trend in the buyer's preference has been to replace solid wood, tropical wood, plastics and other wood based panels by medium density fibreboard (MDF), especially for furniture manufacturing. MDF acts as a good substitute material for more expensive types of solid wood. Thin MDF is a strong competitor and a potential substitution product for thin plywood and hardboard. Since thin plywood is mainly produced in Indonesia, European competition is not affected by it.

Figure 2: Semi-finished wood products Value added by Member State, 1991



Source: Eurostat

Table 1: Semi-finished wood products
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	5 947	6 254	6 807	7 027	6 990	7 563	8 440	9 002	9 442	9 648	10 227
Production	4 979	5 122	5 614	5 872	5 783	6 292	6 958	7 495	7 807	8 083	8 616
Extra-EC exports	278	282	333	363	376	400	415	481	474	468	493
Trade balance	-968	-1 132	-1 193	-1 155	-1 207	-1 271	-1 482	-1 507	-1 635	-1 564	-1 611
Employment (thousands)	83	76	75	72	66	67	67	66	68	67	66

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Cei-Bois estimates
Source: Eurostat

Table 2: Semi-finished wood products
Breakdown by product line, 1991

(million ECU)	Apparent consumption	Production	Total Exports
Particleboard	4 044	3 914	735
Fibreboard (1)	2 683	1 929	109
Plywood	1 784	948	391

(1) Extra-EC exports, not world exports
Source: Cei-Bois, Eurostat

Table 3: Semi-finished wood products
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.1	3.9	3.6
Production	3.3	3.7	3.6
Extra-EC exports	2.7	2.4	2.5
Extra-EC imports	2.2	4.2	3.5

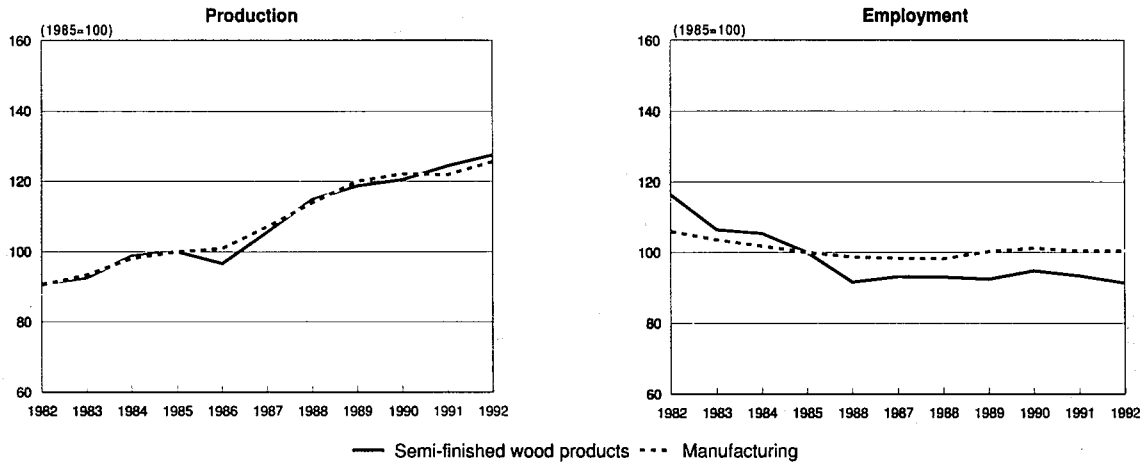
(1) Estimates are used if country data is not available, especially from 1989 onward. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Semi-finished wood products
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	278	282	333	363	376	400	415	481	474	468
Extra-EC imports	1 246	1 414	1 526	1 518	1 583	1 671	1 897	1 988	2 109	2 033
Trade balance	-968	-1 132	-1 193	-1 155	-1 207	-1 271	-1 482	-1 507	-1 635	-1 564
Ratio exports/imports	0.22	0.20	0.22	0.24	0.24	0.24	0.22	0.24	0.22	0.23
Terms of trade index	94.7	97.3	97.9	100.0	109.8	109.3	109.1	105.2	111.5	106.9
Intra-EC trade	882	972	1 066	1 154	1 225	1 305	1 467	1 632	1 682	1 735
Share of total imports (%)	41.3	40.5	40.9	43.0	43.4	43.7	43.4	45.0	44.2	45.9

(1) Estimates
Source: Eurostat

Figure 3: Semi-finished wood products
Production and employment indices compared to EC manufacturing



1992 are Cei-Bois estimates
Source: Eurostat

The development of new applications will continue to gather momentum. Since the extension of the thickness range, and the improvement of moisture resistance and fire retardance, more and more applications are opening in construction, furnishing and interior fitments. The possibility of forming MDF into moulded parts is the latest innovation in the field of MDF technology. The door industry is increasingly discovering the usefulness of MDF, and not only for door skins. Window frames are the next target area.

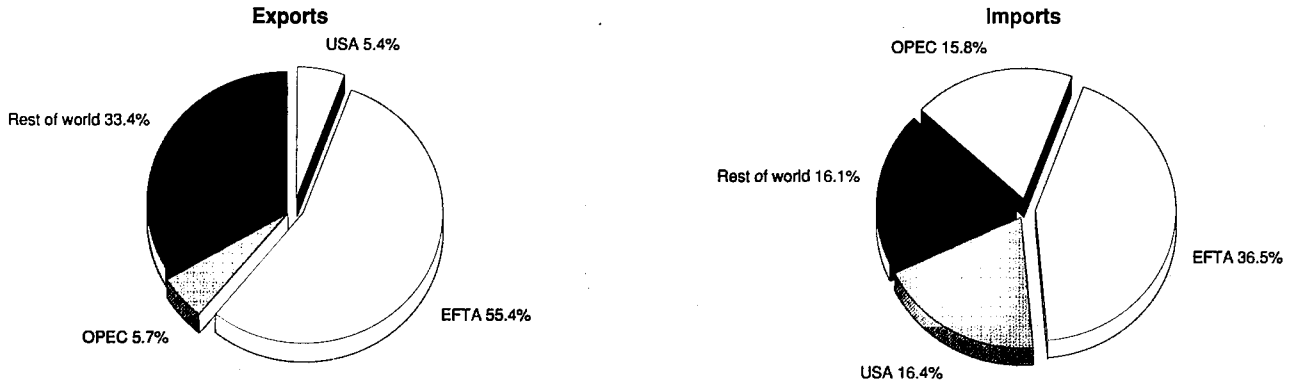
For plywood, the trends in buyer's preference remain stable. The sector has a saturated market due to substantial imports. There is little substitution occurring and the importance of product innovation remains negligible.

Oriented Strand Board (OSB) is a relatively recent type of wooden board material, at least in Europe. It is mainly used in the construction industry because of its mechanical properties. OSB also acts as a substitution products for plywood.

Supply and competition

Overcapacity has lead in many cases to the closure of mills. The EC industry has signalled its willingness to remain competitive. The necessary condition, however, is that extra-EC competitors respect the prevailing rules for international trade and competition. Large imports into the Community, from East European countries and countries benefiting from the Generalised System of Preferences (GSP), at very low prices are a real threat for the industry. The emergence of the single European market will be very difficult for the industry if imports from these countries are not controlled fairly. Pressure from foreign competition is favoured by exchange rate variations as well as less environmental friendly log harvesting methods. Pressure by foreign competition is also the result of low labour costs, trade practices and trade policies, such as dumping from countries of central and eastern Europe and the GSP countries or the US request in the context of GATT to reduce import taxes on wood to 0%. Technological advantages are not considered a factor affecting competition in EC and extra-EC markets.

Figure 4: Semi-finished wood products
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Table 5: Semi-finished wood products
Labour productivity and unit costs

(1985=100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (1)	21.3	23.0	25.3	25.6	28.9	31.4	33.7	34.4	34.2	35.7
Productivity index	83.3	90.0	98.7	100.0	113.0	122.8	131.8	134.4	133.4	139.5
Unit labour costs index (2)	79.2	84.1	93.0	100.0	103.7	108.8	115.7	118.8	126.1	N/A
Total unit costs index (3)	70.6	83.4	88.9	100.0	103.5	111.0	121.6	133.8	134.7	140.4

(1) Value added per person employed (1991 prices)
(2) Based on labour costs per person employed at current prices
(3) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

The deficit in the Community trade balance for semi-finished wood products is the consequence of large inexpensive wood reserves outside the EC (North America, Scandinavia and eastern Europe) and the huge import of plywood from North America and South East Asia and hardboard from South America and eastern Europe. For the plywood sector, the most important competitive advantages of the EC plywood manufacturers over the large single-product manufacturers in the USA and Indonesia is that the European industry specialises in the manufacture of small series of special, custom-made goods from very different types of wood.

For particleboard and MDF, there is a strong competition within the EC. For plywood and hardboard, there is a strong competition from outside the EC.

In the fibreboard sector the number of companies switching from the so-called wet to the dry process is expected to increase further due to strict regulations regarding environmental protection. Currently, replacement investment required to meet these regulations automatically results in an expansion of capacity, and hence may give rise to surplus capacity.

Oriented Strand Board (OSB) is mainly produced in the UK and France and the product has reached a high standard of acceptability in these and several other European countries. During this decade it is expected to become an important product in the European panel industry.

The realisation of the Single European market in 1993 offers many opportunities to the sector, as normally all barriers to trade will be removed. The creation of a European economic space could also contribute to the development of a flourishing market. Furthermore, the political events in the countries of central and eastern Europe and the resulting demand from radical economic changes, offer the possibility for further expansion of economic activities in the industrialised countries.

INDUSTRY STRUCTURE

Companies

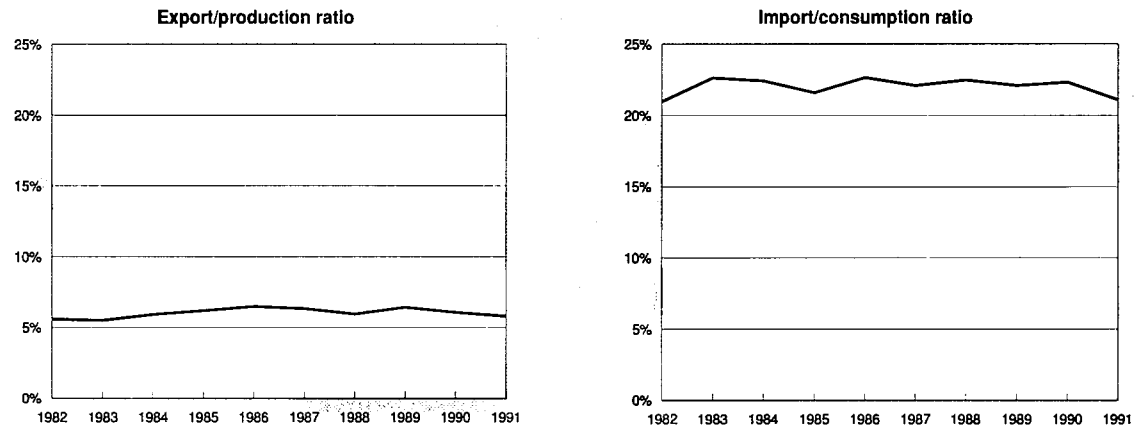
According to estimates about 1 600 firms are involved in the manufacture of semi-finished wood products. The particleboard industry accounts for about 120 companies, with an employment close to 20 000 persons. Total employment in the industry is around 68 000 persons, which means that the average number of employees per firm is 40, which is high compared to the other subsectors of the woodworking industry.

Strategies

The chipboard industry is a capital-intensive sector. Production is practically fully automated and the investment threshold, especially for the continuous production lines, is high. These circumstances imply that an average chipboard firm exceeds the SME dimension of the sector and that the added value in the case of this activity is lower than in the rest of the woodworking industry, where the high percentage of labour input raises the value added. The sector has gone through a major restructuring and it is apparent that concentration has taken place.

In the fibreboard sector, the nature of investment is to develop new products, to modernise existing products, to increase capacity and to switch to eco-friendly production methods (for example: converting from the wet process in the hardboard

Figure 5: Semi-finished wood products
Trade intensities



Source: Eurostat

industry to the dry process in the MDF industry). As far as firm structures are concerned, there are several new joint investments by board manufacturers (in France and Portugal) concerning MDF, but there are as yet no major changes in hardboard.

Until recently, the plywood sector was rather labour-intensive. Technological development and computer applications in production control and the operation of machinery have, however, lowered production costs to a great extent, and have at the same time enabled a substantial reduction in the percentage of wood waste. The sector is still highly suited to product diversification (with a greater utilisation of European wood species), certainly given the production methods that allow the manufacture of small series of special, custom-made goods. The nature of investments, carried out by the European companies themselves, is to modernise and to find new product developments.

REGULATIONS

Customs tariffs

The common external tariff on imports coming from outside the Community is the same for particleboard, fibreboard and plywood, and has been maintained for some time now at 10%.

The association agreements signed on 16/12/1991 between the EEC and Hungary, Poland and the CSFR changed the regulations formerly applicable to these countries.

Customs duties on imports applicable in the Community to particleboard and plywood originating in Poland, Hungary and the CSFR were abolished on the 1st of March 1992. Council regulation No 521/92 implies that fibreboard originating in Hungary, Poland and the CSFR will benefit from a suspension of customs duties on imports within the limits of annual Community tariff quotas amounting to 4.8 million ECU for fibreboard originating in Poland and the CSFR, and 8.05 million ECU for fibreboard originating in Hungary.

Annual import quotas on imports of particleboard and plywood originating in the Republics of Croatia and Slovenia and the Yugoslav Republics of Bosnia-Herzegovina, Macedonia and Montenegro, have been fixed from 1 January to 31 December 1992 by Council regulation No 545/92. This regulation was published in the Official Journal of the EC No L 63 of 7 March 1992. The annual ceiling for particleboard is 39,546 tonnes, while for plywood the annual ceiling reaches 153,925 m3. As soon as these ceilings have been reached, the levying of a customs tariff of 10% may be reintroduced by the Commission, by means of a regulation.

Table 6: Semi-finished wood products
Expected real annual growth rates

(%)	1992-93	1992-95
Apparent consumption	3.0	3.0
Production	3.2	3.2
Extra-EC exports	1.9	1.9

Source: Cei-Bois

OUTLOOK

Consumption as well as production in real terms for the sector of the semi-finished wood products is expected to grow in the coming years. The average growth rate for the period 1992 to 1995 is estimated at 3% for consumption and 3.2% for production.

In the particleboard industry, the outlook for 1992 is not a very optimistic one as depressed conditions continue in the Scandinavian countries and there are significant signs of slowdown in countries of central Europe, such as Germany. Only the relative optimism in the US economy as well as in the UK are likely to have positive implications.

In the fibreboard industry, the MDF industry represents a production potential of more than 3.5 million m3. In comparison to particleboard (30 million m3) and sawn timber (67 million m3), the share of MDF in the market of wood and wood products still appears quite moderate. Despite of this, the European MDF industry will increasingly open up export markets for its products outside the EC and EFTA, especially for special MDF boards.

The sector is facing a number of risks, including the additional costs associated with the increasingly stringent requirements with respect to health and environment, competition with imports, and the threat of overcapacity. However, the political reforms in the countries of central and eastern Europe offer an expansion potential of exports and possibly joint-ventures.

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Wooden building components
NACE 463

The manufacture of wooden building components accounts for 42% of the production value of the second processing of wood, making it the main subsector in the European Community. It depends heavily on trends in the building industry. A substantial opportunity has emerged in the field of renovation work, making the sector less dependent on cyclical new building construction.

INDUSTRY PROFILE

Description of the sector

This sector, in the NACE definition, bears the title "manufacture of carpentry and joinery components and of parquet flooring". The sector produces wooden doors, frames, rafters, wooden façade components, partitioning and other walls, wooden screens, staircases, parquet flooring and glued laminates.

Even the "wood treatment" industry can be considered as belonging to a large extent to the building related sectors. This branch of industry, which was in the past principally geared towards the impregnation of railway sleepers and poles for electricity distribution and telephone connections, has to a large extent switched over to the delivery of protected wood for building and external uses.

Main indicators

Apparent consumption in current prices in 1991 amounted to 12.5 billion ECU.

Production increased by 6.8% in 1991 compared to 1990 to reach 12.2 billion ECU. Production of wooden building components represents about 35% of total production of the wood processing industry and 42% of the second processing of wood, making it the main subsector of the woodworking industry.

The EC-trade balance, which was positive in 1982-86, turned negative in 1987, and has worsened rapidly in the period 1988-91.

This sector employs about 163 000 persons, representing 45% of total employment of the second woodworking process.

Recent trends

In 1991, consumption in constant prices was 36% higher than in 1985, while production increased by 30%. Extra-EC exports, on the other hand, decreased by 17%. These exports started to decline in 1985, contributing to the progressive deterioration of the trade balance, and are expected to continue to decline in the coming years.

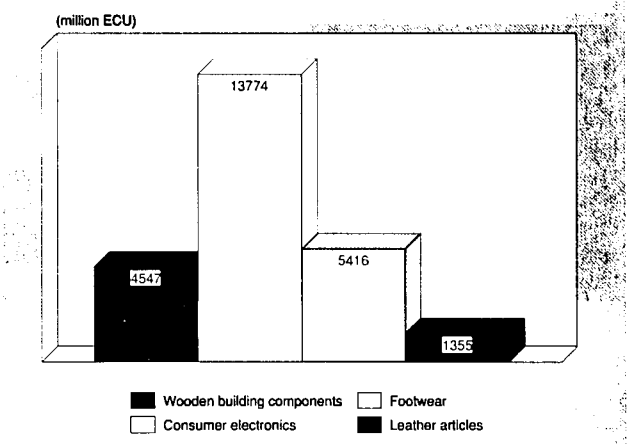
Employment has remained relatively stable since 1982 at about 162 000 employees, with the exception of the years 1985 to 1987 when employment slipped to 150 000 people. Employment is expected to increase in the future.

Foreign trade

The negative trend in the trade balance, which started in 1987, is reflected in the extra-EC exports/extra-EC imports ratio which, after being high in the first half of the 1980's, weakened considerably. In 1991, the exports/imports ratio was 55%, compared to the level of 168% achieved in 1982.

The share of intra-EC trade in total imports decreased compared to the beginning of the 1980's, declining to 50% in 1991.

Figure 1: Wooden building components Value added in comparison with other industries, 1991



Source: Eurostat

Extra-EC imports mainly come from the EFTA countries (46.7%), Yugoslavia (7.6%) and from the OPEC countries (7.5%).

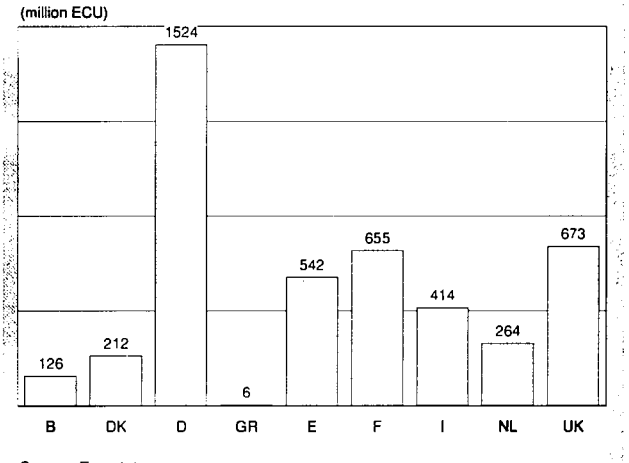
MARKET FORCES

Demand

Demand in the sector depends heavily on trends in the building sector. The recent trend in buyer's preferences, in a market not confronted with saturation, is to use more softwood. During the past decade renovation has expanded significantly, and particularly the demand for wooden building components. This development has made the subsector less dependent on new building construction. In the market for the construction of private housing, the single EC market will not significantly impact the demand for building components, since well-defined regional markets will continue to exist within Europe. This is largely due to the specific climatic conditions and local building traditions and styles, rather than any specific standards laid down by the various local authorities.

Wooden joinery and parquet flooring in private housing has benefited from growing consumer demand in recent years.

Figure 2: Wooden building components Value added by Member State, 1991



Source: Eurostat

Table 1: Wooden building components
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	6 693	7 496	7 734	7 620	8 095	9 004	10 162	11 190	11 587	12 525	13 602
Production	6 837	7 657	7 896	7 721	8 131	8 996	10 101	11 099	11 405	12 179	13 129
Extra-EC exports	355	438	451	377	345	351	375	436	441	422	394
Trade balance	144	161	162	100	36	-9	-61	-91	-182	-345	-473
Employment (thousands)	163	165	161	153	148	155	161	160	163	163	163

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) CEI-Bois estimates
Source: Eurostat

Table 2: Wooden building components
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-0.5	5.3	3.3
Production	-0.8	4.5	2.7
Extra-EC exports	-4.4	-3.2	-3.6
Extra-EC imports	2.6	14.4	10.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Wooden building components
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	355	438	451	377	345	351	375	436	441	422
Extra-EC imports	211	277	289	277	309	360	437	527	624	768
Trade balance	144	161	162	100	36	-9	-61	-91	-182	-345
Ratio exports/imports	2.46	2.72	2.79	3.76	9.52	-40.75	-6.14	-4.79	-2.42	-1.22
Terms of trade index	100.0	102.2	99.1	100.0	112.8	114.0	110.2	108.9	111.2	109.9
Intra-EC trade	317	371	403	403	434	482	568	638	744	823
Share of total imports (%)	59.2	56.6	57.4	58.4	57.4	56.0	55.5	53.7	53.4	50.8

(1) Estimates
Source: Eurostat

The demand for wooden building components is becoming more dependent on characteristics such as thermal and acoustic insulation, than the more traditional properties associated with wood, particularly in the non-residential building sector.

Supply and competition

International competition remains rather limited because of existing differences in climatic conditions and building traditions. Transportation costs are also a limiting factor for international trade, since most products are heavy and voluminous.

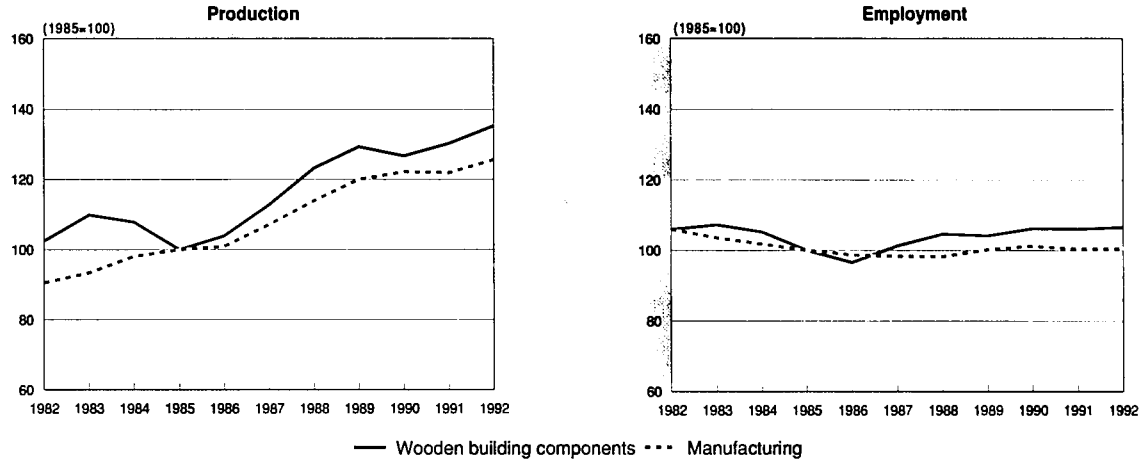
Nevertheless, pressure from foreign competition does exist, mainly due to lower labour costs. Other factors such as exchange rate developments, better availability of raw materials or technological advantages are less important.

The wood treatment industry is also considered to be a sector related to building. Treated wood is used in relatively new market applications, such as in agriculture, vineyards and horticulture, fruit-growing, enclosures, playgrounds and hydraulic engineering,. The significance of wood treatment for the general woodworking industry is especially apparent, since this process has enabled the use of wood to be possible in applications where previously rapid biological attacks have excluded its use. Thus wood is gaining market share from competitive building materials in non-traditional markets.

Products such as fire-resistant wooden doors may, initially, appear unusual. However, the high degree of dimensional stability of wood provides these doors with a competitive advantage over metal or synthetic products, since the latter deform more rapidly at high temperatures.

Producers of wooden window frames experience competition from substitution products made from other raw materials, such as aluminium and PVC. However, wooden frames still have the largest market share in the EC with 40%, well ahead of aluminium and PVC.

Figure 3: Wooden building components
Production and employment indices compared to EC manufacturing



1992 are Cei-Bois estimates
Source: Eurostat

INDUSTRY STRUCTURE

Companies

The ideal enterprise for coping with specific climatic conditions and local building traditions and styles is a small to medium-sized enterprise that optimises its size in accordance with clearly determined geographical limits and technical specialisation.

Strategies

Recent investment has concentrated on modernising plant and increasing capacity (e.g. in Germany, due to the five new Länder). Investment is being predominately undertaken by the European producers themselves, foreign investment is not important.

Producers tend to specialise considerably and the sector is characterised by a lot of acquisitions, particularly in Germany.

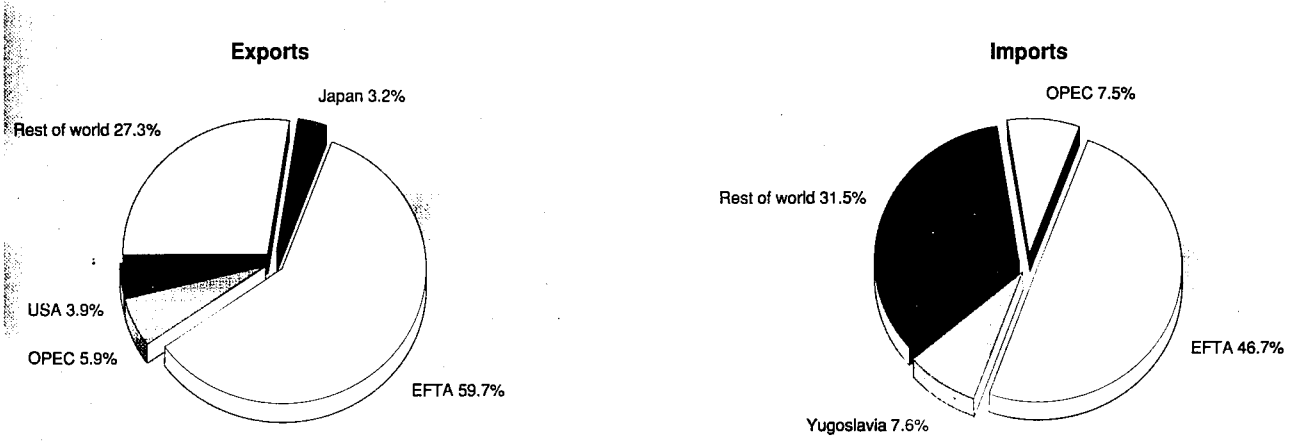
Most manufacturers of wooden building components work on a local or regional scale, because of the differences in climatic conditions and building traditions. However, by conforming to the European construction products directive, many enterprises will be able to expand their potential market to the European Community.

REGULATIONS

Very specific for wooden building components is the Council directive No 89/106 on the relationship of the laws, regulations and administrative provisions of the Member States to construction products, better known as the 'Construction Products Directive'. This directive entered into force in all Member States on June 27, 1991 and deals with the whole family of 'Construction products' instead of individual components. The directive states that a construction product is fit to trade if it can be proven that the product, when used in a construction, satisfies the relevant essential requirements.

There are six essential requirements for which the "Standing Committee on Construction", set up to implement the directive, is still preparing the "interpretative documents".

Figure 4: Wooden building components
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Construction products fulfilling all essential requirements can obtain the CE-mark, which implies that they can be used and traded in all Member States without additional control.

To obtain the CE-mark, the product will have to either comply with a European standard or, in the case of new and innovative products, have technical approval. Standards for wooden construction products are being prepared within five technical committees of CEN, the European Committee for Standardisation. Technical approval will be issued by EOTA, the European Organisation for Technical Approval.

Before being able to implement the Construction Products Directive in practice, some major problems such as the reaction-to-fire performance of construction products still have to be solved and it is hoped that the system will be fully operational by the end of 1992.

OUTLOOK

Consumption in the EC for the period 1992-1995 is expected to grow annually by 5.1% (real growth rates). The average real annual growth rate for production for the same period is estimated to be 4.3%. As a result, extra-EC imports are expected to increase their market share. This may be compounded by the increasing standardisation at the European level which will lead to uniform products, and hence increase extra-EC imports.

Exports are expected to decline by 6.7% in 1992 and less severely in the following years.

In the future, European standardisation and the Single Market should give producers the opportunity to expand within the European market instead of depending on the local market. Activity in the renovation market will ensure the sector is less dependent on the cyclical new construction industry.

Table 4: Wooden building components
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	5.2	5.1
Production	4.3	4.3
Extra-EC exports	-5.0	-4.8

Source: Cei-Bois

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Other wood products
NACE 464, 465, 466

Production and consumption in the industry have improved consistently since 1982 despite increasing competition from the low wage producers of Eastern Europe and the Far East. The industry is characterised by a large number of SMEs with relatively stable employment. There has been significant investment in recent years to automate as much of the production process as possible in order to compete more effectively with imports. However, the trade balance has continued to deteriorate.

INDUSTRY PROFILE

Description of the sector

This chapter covers several of the smaller subsectors of the woodworking industry. The most important is wooden containers (Nace 464) which comprises boxes, crates, pallets, barrels, cable drums, etc.

Nace 465 groups together miscellaneous wood manufactures. The most important products are wooden frames for paintings, photographs, mirrors and similar objects.

Nace 466 includes the manufacture of articles of cork, basketware, wickerwork and other articles of plaiting materials (except case and wicker furniture) and the manufacture of brushes and brooms.

Main indicators

In 1991, the current value of production of these subsectors added up to 9.1 billion ECU, which represents 21.3% of the total production of the woodworking industries (excluding wooden furniture).

The sector is very labour intensive, more than some of the other woodworking sectors. Employment amounted to 127 612 or 29.3% of the total employment in the woodworking industries in 1991, proportionally more than its 25% share of total production of woodworking industries.

Wooden containers and pallets account for 3.1 billion ECU or 34% of the production of the "other wooden products" sector. This compares to a brushes and brooms production of 0.9 billion ECU (10.0% of "other wooden products"). While on average the sector exports some 10% of its output to markets outside the EC, exports of wooden containers remain limited as shown in Table 2.

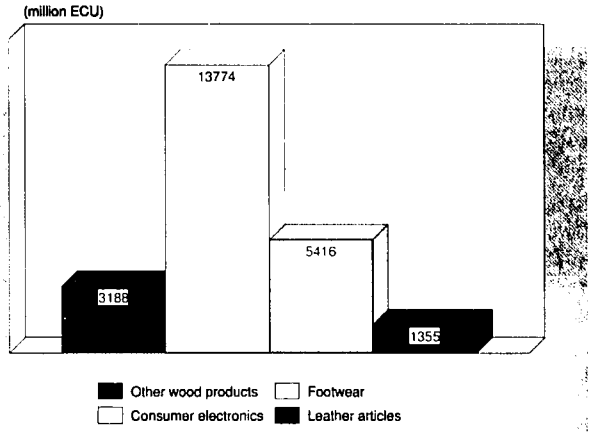
The value added of these subsectors adds up to 3.2 billion ECU, roughly one-third of the consumer electronics industry. The breakdown by Member State is shown in Figure 2.

Recent trends

Apparent consumption grew constantly during the period 1982-91. Until 1986, however, this growth was rather limited. From 1987 until 1989, there was an important increase in the level of consumption, followed by moderate growth in 1990 and 1991.

EC producers were initially slow to react to the upswing in consumption, however, and there was a remarkable rise in extra-EC imports in 1987. EC production responded to strong demand at home with big increases in 1988 and 1989 . Extra-EC imports, however, have been taking a continuously higher share of EC consumption since 1987. Extra EC-exports, on the other hand, were still at the same level in 1991 as in 1985.

Figure 1: Other wood products
Value added in comparison with other industries, 1991



Source: Eurostat

Employment declined steadily from 135 439 in 1982 to 122 589 in 1988. There was an important rise in employment in 1989, followed by a slight decrease in 1990 and 1991.

Because of the slowdown in economic growth and international trade, demand for wooden containers decreased in 1990 and 1991.

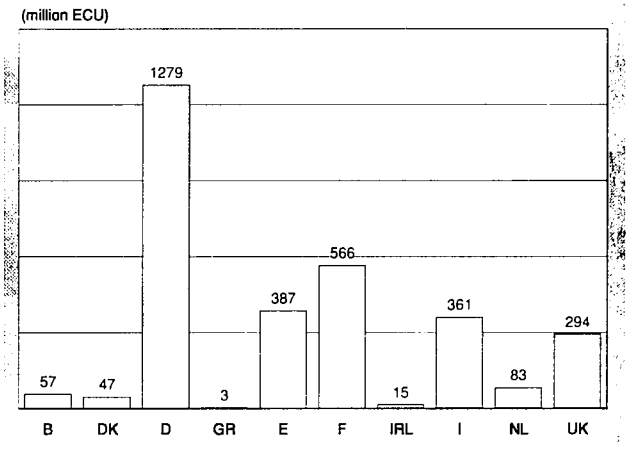
Foreign trade

Although most of the subsectors dealt with in this chapter are exposed to strong competition from extra-EC low wage countries, the import penetration ratio is relatively low at about 13% in 1991 up from 11% in 1982. The share of production that is exported to non-EC markets has averaged a steady 10% throughout the eighties.

External trade in wooden containers and pallets is of limited importance but has nevertheless increased noticeably since 1989. Extra-EC imports now cover 2% of the consumption of wooden containers and pallets. These increased imports mainly consist of cheap pallets made in East European countries, like Poland, Hungary and Czechoslovakia.

The trade balance for wooden containers and pallets, which was still largely positive at the beginning of the eighties, has gradually worsened and showed only a very small surplus in 1991.

Figure 2: Other wood products
Value added by Member State, 1991



Source: Eurostat

Table 1: Other wood products
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	4 826	5 048	5 483	5 754	5 830	6 217	6 948	8 052	8 595	9 113	9 806
Production	4 747	4 980	5 461	5 765	5 853	6 165	6 841	7 916	8 402	8 750	9 293
Extra-EC exports	463	499	599	640	629	629	711	837	815	847	874
Trade balance	-80	-68	-22	11	23	-51	-108	-135	-193	-364	-513
Employment (thousands)	135	132	132	126	123	123	123	129	128	128	127

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Cei-Bois estimates
Source: Eurostat

Table 2: Other wood products
Breakdown by product line, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Wooden containers	3 063	3 065	65
Brushes and brooms	1 178	1 200	203
Articles of cork and plaiting materials	960	914	249
Others	3 912	3 571	331

(1) Estimates are used when country data is not available
Source: Eurostat, Cei-Bois

Table 3: Other wood products
Average real annual growth rates

(%)	1982-85	1985-91	1982-91
Apparent consumption	2.6	4.8	4.0
Production	3.4	3.6	3.6
Extra-EC exports	6.6	0.0	2.2
Extra-EC imports	-1.2	10.0	6.1

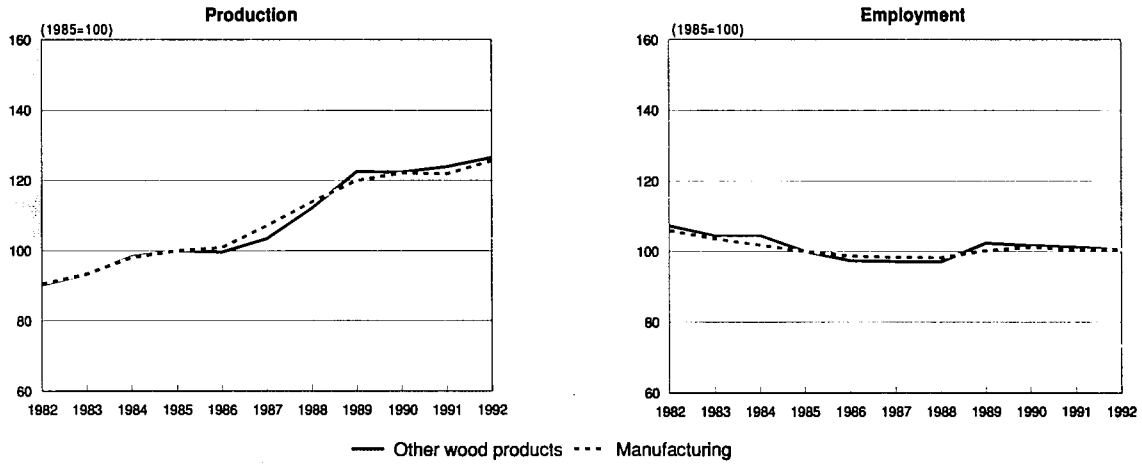
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Other wood products
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	463	499	599	640	629	629	711	837	815	847
Extra-EC imports	542	567	621	628	606	681	818	973	1 008	1 211
Trade balance	-80	-68	-22	11	23	-51	-108	-135	-193	-364
Ratio exports/imports	0.85	0.88	0.96	1.02	1.04	0.92	0.87	0.86	0.81	0.70
Terms of trade index	105.1	106.1	103.6	100.0	113.2	117.3	116.9	119.0	122.4	120.1
Intra-EC trade	688	723	829	888	942	1 031	1 169	1 359	1 483	1 553
Share of total imports (%)	55.8	56.0	57.1	58.5	60.8	60.2	58.8	58.2	59.5	56.2

(1) Estimates
Source: Eurostat

Figure 3: Other wood products
Production and employment indices compared to EC manufacturing



1992 are Cei-Bois estimates
Source: Eurostat

Most trade (62.3%) takes place within the EC. This figure might be overstated, however, as some international movements of pallets are "invisible" since consignments of empty pallets are included in the customs statistics, whereas loaded pallets are not.

Although the EC brushes and brooms industry is experiencing severe competition from China and Eastern Europe, the external trade balance remains positive. Differentiating with regard to product lines, there is a positive trade balance for industrial brushes, paint brushes and rollers, domestic brushes and brooms. The trade balance is negative for toilet brushes and fine hair brushes. Articles of plaiting materials are mainly imported from countries in the Far East, such as South Korea, Taiwan, the Philippines.

MARKET FORCES

Demand

Since the products dealt with in this chapter are very heterogeneous, these products have different types of buyers, i.e. industry or final consumers.

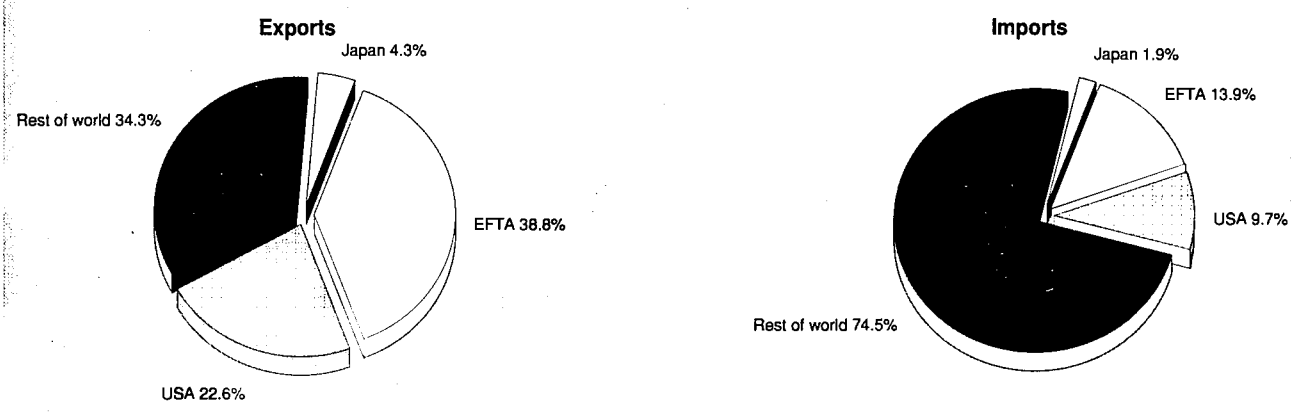
Wooden containers are mainly bought by industry. Here, demand for these products relies on demand for other products which are transported and stored in containers or on pallets. Since most products can be transported either in a wooden container or on pallet, demand for these packaging materials depends largely on the general macroeconomic situation.

Since trade, intra-EC as well as extra-EC, is intensifying, there is a potential stimulus for sustained growth for the sector of transport-related packagings like wooden containers and pallets. For the moment, however, demand for wooden containers is rather weak due to the slowdown in economic growth and international trade.

Wooden containers are used to improve manoeuvrability of goods during their transportation or storage.. This requires light structures that are able to withstand rough handling. Standardisation of pallet dimensions makes them highly suitable for repeated and different uses.

With the exception of industrial brushes, most brushes and brooms are bought by final consumers. Industrial brushes are sold by direct sales contact between the supplier and the in-

Figure 4: Other wood products
Destination of EC exports and origin of EC imports, 1991



Source: Eurostat

Table 5: Other wood products
External trade in brushes and brooms, 1991 (1)

(million ECU)	Brooms	Toilet brushes	Fine hair brushes	Paint brushes/ rollers	Industrial brushes	Domestic brushes	Others
Extra-EC exports	10.1	59.6	20.9	26.1	27.0	26.8	32.2
Extra-EC imports	10.0	73.6	29.3	17.4	9.2	18.7	22.8
Trade balance	0.1	-14.0	-8.4	8.7	17.9	8.0	9.4
Ratio exports/imports	1.0	0.8	0.7	1.5	2.9	1.4	1.4
Intra-EC trade	3.5	72.2	19.5	37.7	40.0	40.2	44.2
Share of total imports (%)	25.8	49.5	40.0	68.4	81.3	68.2	66.0

(1) Estimates: the above product families are defined as following: Brooms: CN 960310; Toilet brushes: CN 960321 & 29; Fine hair brushes: CN 966330; Paint brushes/rollers CN 960340; Industrial brushes: CN 960350; Domestic brushes: CN 96039010 & 96039091; Other brushes 96039099
Source: Eurostat

dustrial client. Personal hygiene products (tooth-brushes, hair-brushes, and make-up brushes) are distributed by specialist chains, pharmacies, and supermarkets. Household brushes are usually offered to individuals by supermarkets; the same applies to paint brushes and rollers. It is worth noting that large distribution centres also import products directly from outside the EC.

Wooden frames for photographs, paintings, mirrors, etc. are also mainly destined for final consumers. These products are distributed by large distribution centres as well as by small specialised businesses, like photographers, art galleries and gift shops.

Demand for bottle corks comes from the wine, champagne and beer producers. Cork is also used for insulation and, recently, for flooring.

Supply and competition

Since 1990 demand for wooden containers has weakened due to the general slowdown in economic growth and international trade, putting pressure on supply to lower profit margins.

For all the subsectors under observation, internal EC competition remains rather limited. Foreign competition from extra-EC countries, however, is fierce in all product lines. The major extra-EC competitors are not the other industrialised countries like USA and Japan, but low wage countries in the Far East and Eastern Europe.

It is clear that lower labour costs are the main competitive advantage of these extra-EC competitors. They also have a lower regulative burden (lower social and environmental costs).

Because of the relatively low degree of complexity of the production process, it is difficult for EC producers to realise technological advantages. Even with the highest possible level of automation, the lower labour costs of the extra-EC competitors is often of overriding importance, especially when combined with dumping practices. The EC brushes and brooms sector has already been involved in anti-dumping procedures regarding Chinese brushes.

Since 1990, there has been a sharp rise in the imports of pallets from Eastern Europe (especially Poland) at extremely low prices that barely cover transportation costs. These imports are a serious threat for the survival of EC pallets producers. European standardisation of pallet dimensions, however, has led to increasing extra-EC imports.

Most of the extra-EC imports of brushes and brooms come from China and Eastern Europe. China has a quasi-monopoly where imports of paint brushes are concerned. Imports of brushes from China and Eastern Europe have disrupted EC production on more than one occasion. Products from these countries are often offered at dumping prices. The EC industry hopes that trade agreements with these countries as well as certain structural changes in their markets will rectify the situation.

Availability of raw materials often plays an important role, too. China has a quasi-monopoly for pig hairs, used in paint brushes. Articles of straw, cork and other plaiting materials are mainly imported from South-East Asia. Eastern Europe has large reserves of wood that is suitable for the production of pallets.

Production process

The raw materials used for the production of wooden containers and pallets are mostly local types of wood. Pallet dimensions have, to a large extent, been standardised. The handles of brushes and brooms are mostly made of wood or plastic. The hairs can be synthetic fibre, animal (pig hair) or vegetable (coconut fibre).

Although the degree of complexity of the production process is relatively low, some automaton is possible. During the second half of the 1980's, the wooden containers sector undertook important investments in automation and rationalisation.

Because of external competition, EC producers of brushes and brooms need to acquire high-performance machinery. The automation of production means acquiring high-performance machines which introduce the fibres, attach them to the frame and adjust the packing material all in one cycle. In this way, toothbrushes and nail brushes, etc. can be produced in very large quantities. With these types of brushes, the packaging and labelling operations are also performed automatically. The manufacture of paint brushes, particularly fine brushes, is less automated, although here too, significant progress has been made.

The workforce still has an important role to play in the case of certain operations (for example, the manufacture of paint brushes). In addition, automation has generated an increasing need for people with technical knowledge of machines and tools.

INDUSTRY STRUCTURE

Companies

Most of the enterprises in these subsectors are SME's. The number of enterprises employing more than 20 people is estimated at 5200 of which 1400 are in the wooden containers sector. Among the subsectors dealt with in this chapter, wooden

containers is the most capital-intensive. The size of the enterprise is also relatively larger.

Strategies

The major strategy for all the enterprises of these subsectors is to rationalise and automate the production process as much as possible in order to be able to face the competition from extra-EC low wage countries.

For the producers of wooden containers, specialisation in custom-made packagings helps to minimise competition from low wage countries which mainly produce standardised products. Because of geographical proximity, EC producers can respond in a more flexible way to the needs of their customers (i.e. special dimensions, just-in-time delivery).

Producers of wooden containers and especially pallets are working out systems for recycling (see also environmental section in overview). This should provide them with a competitive advantage over the producers of plastic and metal pallets.

REGIONAL DISTRIBUTION

The firms in the wooden containers industry are mostly located in the vicinity of available raw materials and/or major transport centres, such as harbours and airports. The brushes and brooms industry is mainly concentrated in Germany (33%), UK (23%), Italy (17.5%) and France (16.5%). Portugal is the most important producer of cork.

OUTLOOK

After a slowdown in 1991 and 1992, production and consumption will grow at a steady pace. It is expected that consumption will grow faster than production. This means that extra-EC imports will increase their market share. Extra-EC exports, on the other hand, will probably diminish.

The risks for the wood product subsectors are increasing imports from low wage countries in the Far East and Eastern Europe and from European standardisation which may lead to increasing extra-EC imports (i.e. pallets). Opportunities for EC producers will come from specialising in custom-made packagings, work out systems for recovery (energy recovery, production of particleboard, repeated use, etc.) and environmental measures (i.e. CO_2 tax) which will affect production of wooden products less than production of substitution goods in other materials (i.e. plastic, metal), which are more energy-consuming.

Table 6: Other wood products
Expected real annual growth rates

(%)	1992-93	1992-95
Apparent consumption	4.2	4.1
Production	2.9	2.9
Extra-EC exports	-1.3	-1.2

Source: Cei-Bois

Written by: Cei-Bois
The industry is represented at the EC level by: European Confederation of Woodworking Industries (Cei-Bois). Address: Rue Royale, 109-111, B-1000 Brussels; tel: (32 2) 217 6365; fax: (32 2) 217 5904.

Pulp, paper, printing and publishing
NACE 47

The EC pulp, paper, printing and publishing sector has undergone notable changes over the past decade. All the branches of the sector are moving towards a more international structure, through concentration. The international slowdown curbed activity growth in the sector in 1990 and in 1991. High interest rates increased the cost of capital investment in the upstream subsectors of the industry such as pulp and paper production. Downstream, the publishing sector experienced lower returns on advertising, while book sales stagnated. The whole industry is increasingly affected by environmental legislation and consumer action. Despite these challenges, the industry is expected to grow by around 3 to 4% in the next few years.

INDUSTRY PROFILE

Description of the sector

The pulp, paper, printing and publishing industry includes the production of pulp, paper and board (NACE 471); the converting of paper and board (NACE 472); printing and allied industries (NACE 473); and publishing (NACE 474).

Pulp, paper and board production covers all manufacturing of paper and board products from virgin pulp or waste paper. Paper and board converting covers all subsequent processing of paper and board products into packaging, stationery and hygienic products. Printing and publishing covers all activities related to the manufacturing and selling of books, magazines, newspapers, brochures and other printed matter.

Main indicators

In 1991, production of the pulp, paper, printing and publishing industry rose by 5.4% in value and by 2.6% in constant prices. The increase in consumption of 2.8% in 1991 in real terms, was slightly stronger than the expansion in production. Consumption decreased in Benelux, Denmark and France. All other countries experienced growing consumption, notably Germany, Italy and Spain.

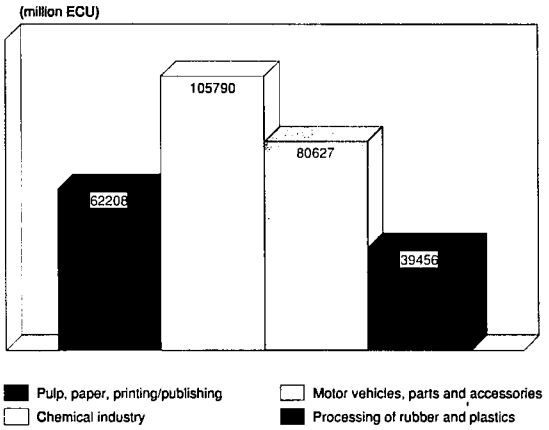
Recent trends in employment in the pulp, paper, printing and publishing industry show diverging developments among the EC member states. In 1991, employment increased in Germany, Greece, Spain and the Netherlands, but decreased in France and Italy. A major reduction of employment took place in the United Kingdom where 18 000 jobs or almost 5% of the sector's workforce were lost. Nevertheless, employment in the EC for the sector as a whole went up by 2.7%.

As shown in Figure 2, Germany, France and the United Kingdom have the largest pulp, paper, printing and publishing industries in the EC.

Recent trends

After averaging growth rates of 4% in real terms between 1982 and 1985, EC production growth in the pulp, paper, printing and publishing industry picked up to more than 6% annually in 1989, before moderating in 1990 and 1991. Real consumption growth followed the same trend as that of production. This slowing trend was particularly evident in the paper converting, and the printing and publishing subsectors while output growth continued to rise at a relatively fast pace in the pulp and paper subsector.

Figure 1: Pulp, paper, printing and publishing
Value added in comparison with other industries, 1991



Source: Eurostat

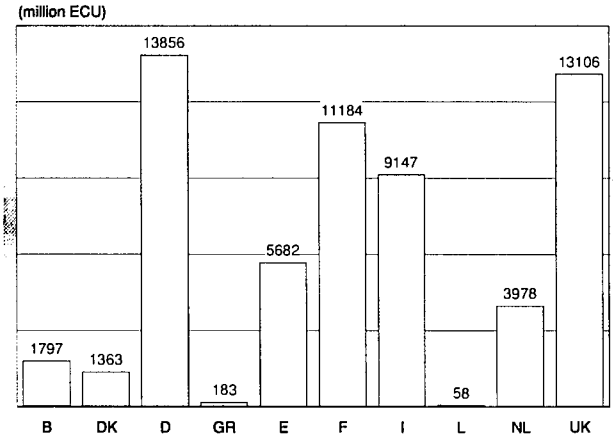
Restructuring throughout the industry led to a 6% reduction (80 000 units) in employment over the 1982-1986 period. However, high level in activity since mid-eighties has more than offset this decrease with annual gains in employment averaging 1.4% between 1985 and 1989 (versus declines of 1.3% for the period 1982-85). Overall, 88 000 jobs were created between 1986 and 1991 in the pulp, paper, printing and publishing sector.

International comparison

Although they are mostly smaller than their competitors in the USA and in Scandinavia., EC manufacturers have built up a large and viable industry in the pulp and paper production and in the converting sectors.

Total EC output in the pulp and paper industry amounted at 48.7 million tonnes in 1991, of which 10.7 million tonnes of pulp and 38 million tonnes of paper. Total EC output was less than half of US output but was 20-25% higher than the Canadian and Japanese. EC output in the paper converting industry is closer to that in the USA: 40 billion ECU against 52 billion ECU. In printing and publishing, total EC sales of

Figure 2: Pulp, paper, printing and publishing
Value added by Member State, 1991



Source: Eurostat

Table 1: Pulp, paper, printing and publishing
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	87 981	93 571	107 257	114 215	117 230	127 704	143 956	161 760	171 549	179 658	189 639
Production	82 743	87 869	100 297	106 875	110 949	120 432	135 201	150 274	160 554	169 222	178 699
Extra-EC exports	4 736	5 272	7 050	7 958	7 136	7 371	8 055	8 956	9 202	9 661	10 288
Trade balance	-5 239	-5 702	-6 960	-6 296	-6 280	-7 272	-8 755	-11 486	-10 995	-10 435	-10 941
Employment (thousands)	1 427	1 407	1 389	1 371	1 348	1 381	1 409	1 451	1 465	1 469	1 479

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) 1992 are estimates
Source: Eurostat

Table 2: Pulp, paper, printing and publishing
Breakdown by major sector, 1991 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Pulp and paper	45 872	33 061	2 518
Paper processing	44 019	44 290	3 173
Printing and publishing	89 767	91 871	3 970

(1) Estimates are used if country data is not available
Source: Eurostat

Table 3: Pulp, paper, printing and publishing
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.9	5.6	5.0
Production	4.0	5.4	4.9
Extra-EC exports	11.5	1.1	4.4
Extra-EC imports	6.4	5.3	5.7

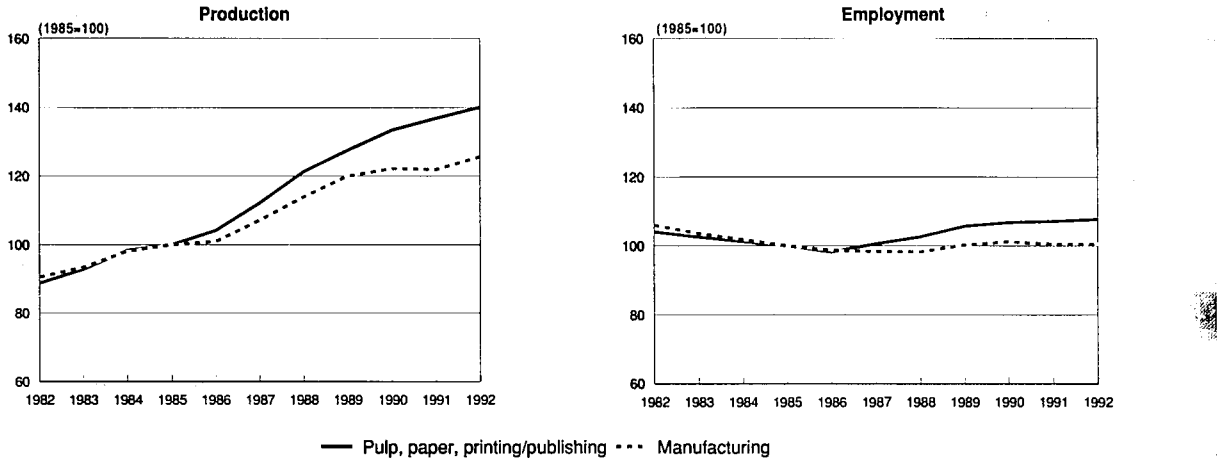
(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 4: Pulp, paper, printing and publishing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	4 736	5 272	7 050	7 958	7 136	7 371	8 055	8 956	9 202	9 661
Extra-EC imports	9 975	10 974	14 011	14 253	13 416	14 643	16 810	20 441	20 198	20 096
Trade balance	-5 239	-5 702	-6 960	-6 296	-6 280	-7 272	-8 755	-11 486	-10 995	-10 435
Ratio exports/imports	0.47	0.48	0.50	0.56	0.53	0.50	0.48	0.44	0.46	0.48
Terms of trade index	97.9	104.2	94.9	100.0	105.3	103.8	101.6	97.1	101.8	110.1
Intra-EC trade	8 990	9 144	10 911	12 213	13 916	15 339	17 216	19 608	20 942	21 368
Share of total imports (%)	45.5	43.8	42.4	44.8	49.5	49.7	49.1	48.7	50.6	51.3

(1) Estimates
Source: Eurostat

Figure 3: Pulp, paper, printing and publishing
Production and employment indices compared to EC manufacturing



1992 are estimates
Source: Eurostat

90 billion ECU are more than two thirds of the roughly 130 billion ECU US sales in this industry. Due to language and cultural diversity, the EC publishes about five times more book titles a year than the USA.

Foreign trade

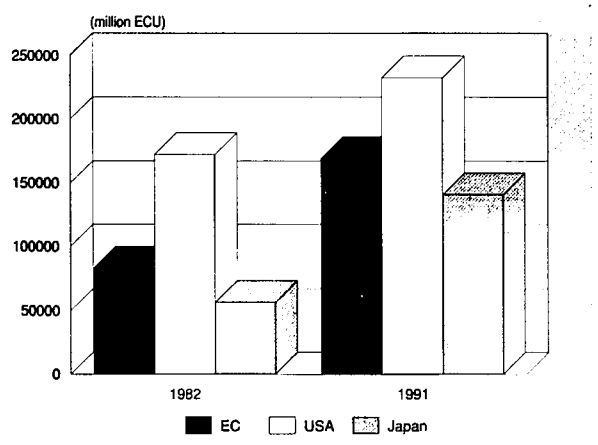
The 10 billion ECU trade deficit for the sector as a whole is due entirely to the 13 billion ECU trade deficit in pulp and paper products. Paper converting shows a slight 0.3 billion ECU trade surplus and printing and publishing activities generated a 4 billion ECU trade surplus.

In 1991, the trade deficit of the EC pulp, paper, printing and publishing industry decreased by 5% or 500 million ECU. The improvement in the trade deficit came primarily from weakening import growth. EC export growth has been steady since 1986. Imports, on the other hand, which were expanding at double digit growth rates in 1988 and 1989, decreased for the second year in a row in 1991.

Most EC exports continued to be oriented to EFTA countries. Since 1986, exports to the USA have decreased by almost 30%. The EFTA countries are an even more important supplier to the EC accounting for nearly 70% of EC imports. These imports are primarily pulp and paper related products from Sweden and Finland. Since 1986, however, the EFTA's share in total imports has decreased slightly, partly as a result of direct investment in production facilities in the EC.

Intra-EC trade has stabilised since 1990 after growing steadily since the early 1980s. High domestic EC trade growth in the paper converting and in the printing and publishing sectors has been offset by decreasing trade volumes in pulp and paper production.

Figure 4: Pulp, paper, printing and publishing
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

MARKET FORCES

Demand

Demand for paper products is strongly related to GDP growth. Stationery and packaging products are principal supplies to the service sector (offices, transport and distribution) and as such they directly reflect performance in these sectors.

In the early 1990s, demand for periodical printed matter has been affected by decreasing advertising revenues. The book sector is suffering from saturation in the markets of Northern Europe. Some expansion could still be generated in southern Europe.

Supply and competition

The booming 1980s led to large investments in the pulp and paper production facilities. With the slowdown in activity in the late eighties, however, these sectors experienced overcapacity in several paper and board grades as well as in market pulp. These very new and advanced paper mills are expected to be fully used when the economic activity picks up in the early to mid-nineties.

As in all oversupplied markets, prices have been put under downward pressure. The pressure on pulp and paper prices has had obvious effects in the paper converting industry, increasing competition among the converters. Clients, in foodstuffs-packaging in particular, were increasingly organised on a pan-European scale in order to strengthen their standing in negotiations with paper converters.

As a result of stagnating book sales, various publishing houses are suffering from overcapacity as well. Average print runs for major book releases have been gradually reduced and a number of glossy magazines have not survived the economic slowdown of 1990-1991. Revenues of daily newspapers were

further eroded by the drain of advertising money to the audio-visual media.

INDUSTRY STRUCTURE

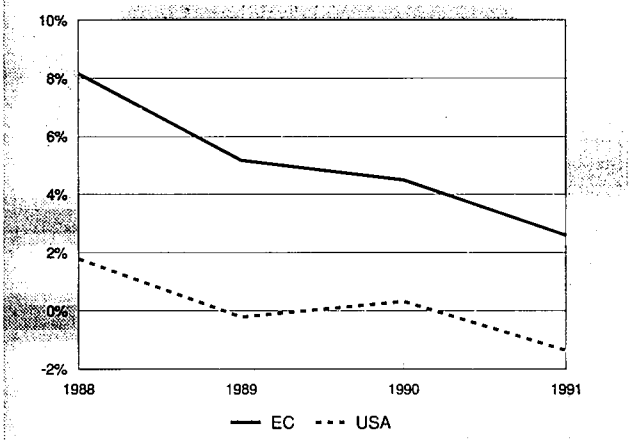
Companies

Several acquisitions by Scandinavian giants such as STORA, SCA and Kymmene have reduced the number of main EC pulp and paper producing and converting companies. These major firms now own 50% to 60% of the EC paper production capacity. Some of the remaining EC companies have merged, such as Arjo Wiggins. Others, such as KNP, might consider merging with EC partners in the near future. The existence of large international companies do not prevent a large number of small and medium sized companies from thriving.

The EC printing and publishing market is dominated by the German Bertelsmann and the French Hachette. Both are world players in their field. Yet, most of the EC industry is fragmented in line with national markets. There has been some degree of concentration, but within national borders.

Regarding the sector as a whole, the EC market is also fragmented: the top 500 companies represent only 34% of total turnover and 29% of total employment. 80% of all companies have less than 10 employees, and 40% of sales are generated by companies employing less than 100 employees.

Figure 5: Pulp, paper, printing and publishing International comparison of production growth at constant prices



Source: Eurostat

Strategies

The strategies of major EC companies in the pulp and paper production and converting sectors are mostly aimed at further integration. Spurred on by their Scandinavian competitors, many of them have diversified throughout the paper production chain. The only area that the EC has hardly touched is forestry, due to the absence of large wooded areas within the Community. This could change somewhat when forestry of fast growing eucalyptus wood in the southern EC countries picks up.

Small and medium-sized EC paper companies tend to carve out niches in highly specialised areas with high added value production. They produce high quality paper and board grades and related products for special applications. Their main focus is to install the latest equipment which facilitates flexible and high quality production. Flexibility is crucial in a market with rapidly fluctuating profit margins on the different paper grades.

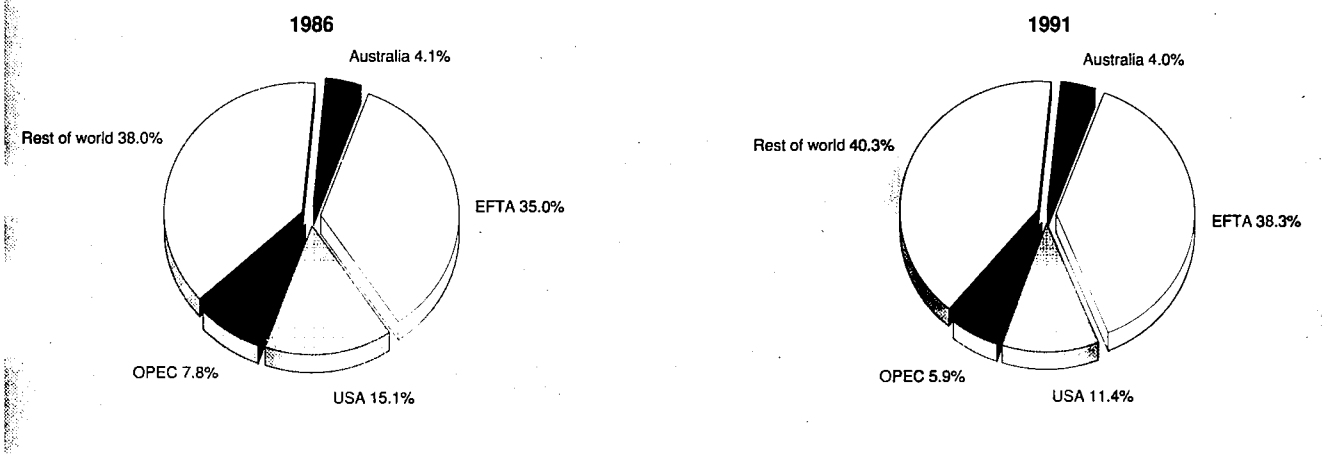
EC printing and publishing companies aim for further concentration and globalisation of activities. Among others, this implies an appropriate response to the new technological challenges of the audio-visual media. Some of the major publishing houses, Bertelsmann and Hachette notably, want to become global multimedia groups in line with their biggest competitor, Time-Warner in the USA. Publishing increasingly includes not only printed matter but also, electronic news services, CD-ROM information and interactive CDI devices.

REGIONAL DISTRIBUTION

EC pulp production is concentrated in the United Kingdom, Belgium and Italy (around 600 000 tonnes per year), Spain and Portugal (around 1.4 million tonnes per year) and Germany and France (about 2 million tonnes per year). The main paper grades such as newsprint and supercalendered paper are largely produced in Germany, France, Italy and the Netherlands. Paper and board converting takes place mostly in the three major EC member states, the United Kingdom, France and Germany. Some foodstuffs packaging related activities are located in agricultural areas.

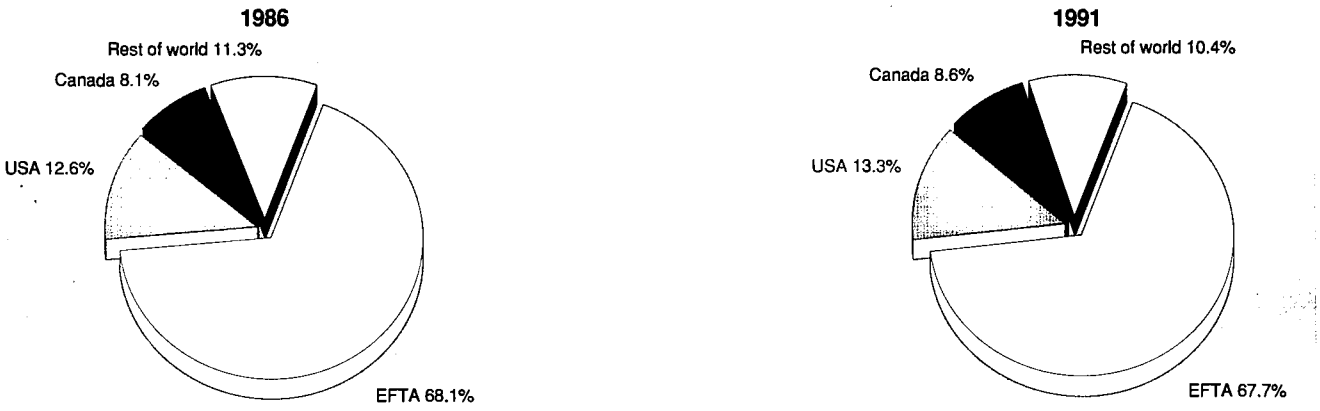
Printing and publishing activities are by nature distributed throughout the Community. Even the ongoing concentration of ownership in the sector has had relatively little effect on

Figure 6: Pulp, paper, printing and publishing Destination of EC exports



Source: Eurostat

Figure 7: Pulp, paper, printing and publishing
Origin of EC imports



Source: Eurostat

concentration of local printing and publishing facilities so far.

Due to the growing predominance of the English language, notably in academic publishing, the UK market is crucial for EC publishers. Many continental publishing houses are thus boosting their presence in the United Kingdom by acquiring local companies or by setting up new UK subsidiaries.

ENVIRONMENT

A number of ecological issues directly affect the business of the paper production and converting industries. Most importantly, the paper production industry faces EC and national legislation on waste paper recycling and on emission controls in the production processes. The paper converting industry faces an EC packaging and packaging waste directive which sets minimum recovery and recycling rates for packaging material. EC manufacturers are gearing up to reorganise production and distribution in such a way that these requirements can be matched.

The publishing and printing industry is not directly affected by this legislation, but it does feel the pressure from public campaigns for greater consumer awareness. As a matter of policy some publishers of magazines and corporate presentations have decided to use 'environmentally friendly' paper to show off an innovative image.

OUTLOOK

The coming years will probably bring moderate improvements to the various segments of the pulp, paper, printing and publishing industry. The overcapacities built up in pulp and paper production will fade out as soon as demand will picks up sufficiently. This cyclical phenomenon is strongly influenced by general economic growth, which is generally expected to pick up by 1993. In order to cope more efficiently with fluctuations in the markets for various paper grades, producers will have to use more flexible production techniques.

Demand for the paper converting industry could benefit from emerging market economies in Eastern Europe, while low costs in production and in distribution in this area could prompt companies to transfer production units from western to eastern countries.

One of the most significant challenges for the coming decade will be the industry's response to new EC and national environmental regulations, as some of them, like the EC packaging legislation could fundamentally alter the market for these products.

Table 5: Pulp, paper, printing and publishing
The 10 leading EC companies, 1990

Company	Country	Turnover (million ECU)	Employment
Bertelsmann	BR Deutschland	6 487	43 509
Hachette	France	4 337	31 210
Arjo Wiggins Appleton	United Kingdom	3 571	11 873
Bührmann Tetterode	Nederland	2 380	12 169
Reed International	United Kingdom	2 226	19 000
Pearson	United Kingdom	2 145	29 410
Koninklijke Nederlandse Papierfabrieken	Nederland	1 918	5 900
Papierwerke Waldhof-Aschaffenburg	BR Deutschland	1 936	11 556
Springer Verlag	BR Deutschland	1 718	12 112
Mondadori Editore	Italia	1 537	5 782
Maxwell Communication	United Kingdom	1 404	14 360

Source: Annual reports

Table 6: Pulp, paper, printing and publishing
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.2	3.6
Production	3.5	4.2
Extra-EC exports	3.7	4.0

Source: ERA

The printing and publishing sector is also showing signs of maturity. The period of high growth is over, and the main strategies focus on consolidation and restructuring. It now appears that new electronic media will not replace but rather complement the written media. Nevertheless, a redistribution of revenues and investments will inevitably favour the audio-visual sector at the expense of the traditional industries.

Written by: European Research Associates

Pulp, paper and board
NACE 471

The performance of the pulp, paper and board industry in 1991 compared positively with other industrial sectors, although it fell short of the high growth rates recorded in the 1980s. Regarding the restructuring process, 1991 was quiet, but it was only an interlude to the expected resumption of wide-scale mergers and acquisitions in the coming years. The three key issues facing the industry were overcapacity, world trade and the environment. Persisting overcapacity in production continued to put a downward pressure on prices in 1991. As a result, new production facilities were not fully used, and plans for major investments were postponed. The emergence of new markets in Eastern Europe and the creation of new trading blocs in North America and Europe continue to modify the picture of world trade. Environmental legislation and public action of pressure groups are becoming the main concern for the sector. The future performance of the paper and pulp industry will depend on its ability to address these concerns.

INDUSTRY PROFILE

Description of the sector

The products of the industry are divided in three categories: pulp, paper and board.

Market pulp is woodpulp for paper making produced for sale in competition with similar pulp from other producers. It excludes pulp for use by the producing mill or other mills which it owns or controls, situated in the same country. However, it includes pulp shipped to affiliated firms in other countries.

Paper and board comprises products as printing and writing paper, sanitary and household paper, wrapping and packaging paper and board, and various sorts of specific quality paper.

The final use of these products is mainly threefold: in communications, for printing, writing and drawing; in the packaging industry, for transportation, storage and presentation of traded goods; and in a variety of special applications, like hygienic paper, nappies and fiduciary paper (money, cheques), or technical use in filters and insulation.

In this monograph, paper and board together will always be referred to as "paper".

Main indicators

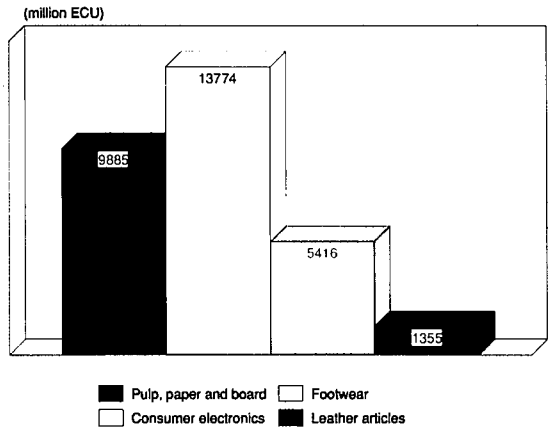
Production in current prices rose by 2.9% in 1991, after nearly 4% in 1990. Germany is the main EC producer, followed by France, the United Kingdom and Italy. The breakdown by major product line shows the importance of waste paper, which accounted in 1991 for about 60% of total production value of the industry, followed by chemical pulp and mechanical pulp with 17% and 11% respectively.

Employment in the sector suffered from the slowdown in production, with a reduction of 2 000 jobs (1%) in 1991. The breakdown by country shows that employment decreased in most EC countries except in Germany and in the Netherlands, where it rose by 1.6% and 3.1% respectively.

Recent trends

After experiencing 7% and 8% growth in 1987 and 1988 respectively, real production in the pulp and paper sector slackened to 4% in 1989 and 1990, before rallying to 5% in 1991. As a result, the industry grew by 5.4% over the 1985-1991 period, against 4.8% over the 1982-1985 period. Between 1982 to 1991 total output in the pulp and paper sector rose faster than EC manufacturing as a whole: 5.2% against 3.4%.

Figure 1: Pulp, paper and board
Value added in comparison with other Industries, 1991



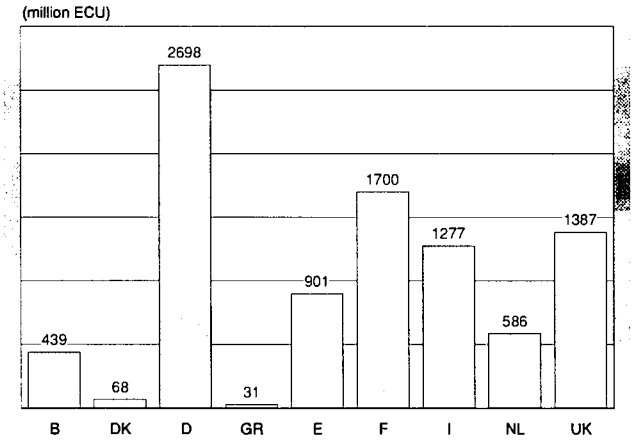
Source: Eurostat

The trend of employment contrasted with that of production. The number of jobs in the pulp and paper sector decreased steadily since the first half of the 1980s (except in 1988 and 1990, as a result of the upward phase of the business cycle), from 208 800 in 1982 to 186 200 in 1991, a level which has more or less since been maintained. This plummeting of employment in the first few years of the 1980s illustrates the deep restructuring process which occurred in the sector.

International comparison

In 1991, total EC pulp production stood at around 10.7 million tonnes, while paper production reached 38 million tonnes. With 48.7 million tonnes in 1991, the EC is the world's second largest producer of pulp and paper, after the USA (130 million tones). Japan and Canada followed, with 40.7 and 39.7 million tonnes respectively. As far as pulp is concerned, the EC is only the fifth largest producer in the world after the USA, Canada, Japan and Sweden. On the other hand, the EC is the second largest producer of paper after the USA, and followed by Japan, Canada, Finland and Sweden.

Figure 2: Pulp, paper and board
Value added by Member State, 1991



Source: Eurostat

Table 1: Pulp, paper and board
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	24 728	25 663	31 430	32 029	32 172	34 565	38 926	44 896	45 671	45 872	47 000
Production	17 774	18 484	22 645	23 468	23 438	24 939	27 853	30 914	32 140	33 061	33 500
Extra-EC exports	1 070	1 150	1 887	2 120	1 871	2 032	2 287	2 526	2 417	2 518	2 450
Trade balance	-6 955	-7 179	-8 785	-8 561	-8 734	-9 626	-11 073	-13 982	-13 530	-12 811	-13 500
Employment (thousands)	208.8	197.3	193.7	188.3	186.2	186.3	186.7	187.4	188.3	186.4	185.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) ERA estimates
Source: Eurostat

Table 2: Pulp, paper and board
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	4.0	5.8	5.2
Production	4.8	5.4	5.2
Extra-EC exports	18.0	3.6	8.2
Extra-EC imports	4.6	6.3	5.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Pulp, paper and board
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 070	1 150	1 887	2 120	1 871	2 032	2 287	2 526	2 417	2 518
Extra-EC imports	8 025	8 329	10 672	10 681	10 605	11 658	13 360	16 508	15 947	15 329
Trade balance	-6 955	-7 179	-8 785	-8 561	-8 734	-9 626	-11 073	-13 982	-13 530	-12 811
Ratio exports/imports	0.13	0.14	0.18	0.20	0.18	0.17	0.17	0.15	0.15	0.16
Terms of trade	96.6	98.7	92.0	100.0	100.0	94.8	93.3	90.2	91.1	96.9
Intra-EC trade	3 871	3 926	4 941	5 306	5 557	6 133	7 062	8 139	8 408	8 220
Share of total imports (%)	30.5	30.2	30.1	31.6	32.8	32.9	32.9	32.8	34.3	34.7

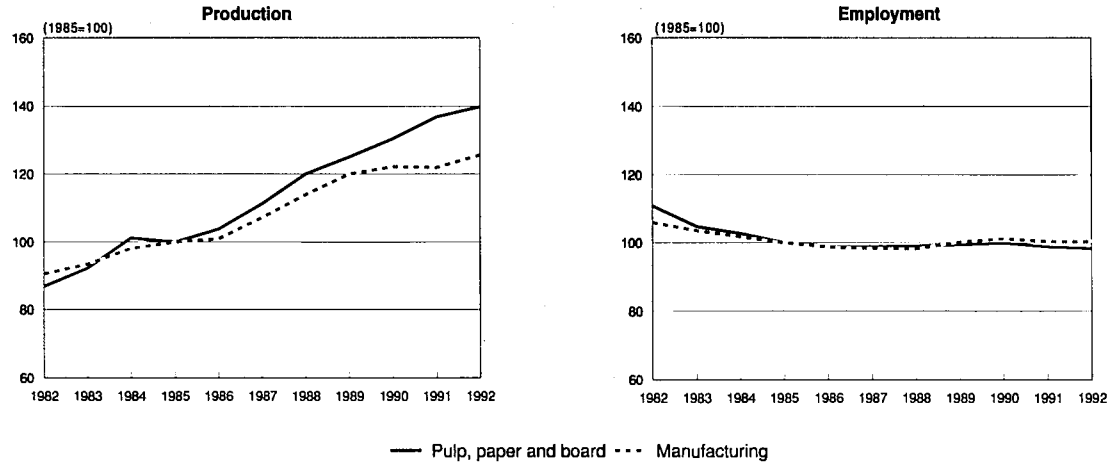
(1) Estimates
Source: Eurostat

Table 4: Pulp, paper and board
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	28.3	32.8	35.4	37.2	44.5	46.9	50.1	49.3	50.9	53.0
Productivity index	76.2	88.2	95.2	100.0	119.7	126.2	134.7	132.6	136.8	142.7
Unit labour costs index (3)	80.4	84.9	92.5	100.0	104.9	110.7	117.4	123.1	129.1	N/A
Total unit costs index (4)	68.8	77.6	97.8	100.0	97.0	103.1	116.2	129.6	133.7	136.6

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Pulp, paper and board
Production and employment indices compared to EC manufacturing



1992 are ERA estimates
Source: Eurostat

Foreign trade

Despite the international economic slowdown, EC exports of pulp and paper bounced back by 4% to 2.5 billion ECU in 1991. Although import volumes rose in 1991, imports fell by 4%, as a result of a drop in imports prices of more than 7%. Intra-EC trade grew rapidly in the second part of the 1980s to reach double the 1982 value in 1991. The ratio of extra-EC imports/EC consumption remained relatively constant.

The EC pulp and paper industry has a widespread range of export markets. The EFTA countries hold the largest individual share of extra-EC exports (28.6% in 1991), followed by the USA (13.1%), whose share has decreased by about one quarter since 1986. As for extra-EC imports, the EFTA countries, in particular Sweden and Finland, account for about three quarters of total imports, a share which has remained stable over the 1986-1991 period. The only significant variation in supplies was the rise of Canada as second largest exporter to the EC.

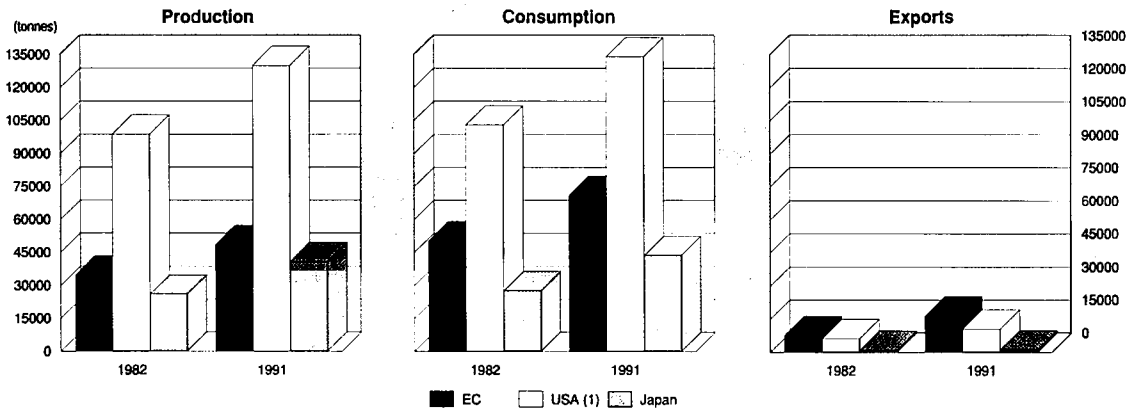
MARKET FORCES

Demand

The principal customers of the paper and board production industry are the paper and board converting industry, the printing industry and final consumers. The market power of these three groups in influencing prices has inevitably grown with the current oversupply on the market. In particular, the market power of the printing industry and final consumers is increasingly demonstrated in the field of environmental issues. Effective campaigns by green pressure groups are forcing the paper and board production industry to adapt to new standards.

Despite the boom in German demand of pulp and paper due to the unification process, demand in Western Europe slackened in 1991, in line with the general slowdown in activity. In the United Kingdom, growth in domestic demand was even negative. The German market continued to be the largest European market, and the fact that no kraft pulp production is allowed in Germany still generates considerable imports of these raw materials. The EC is the largest single importer of

Figure 4: Pulp, paper and board
International comparison of main indicators in volume



(1)1990 figures rather than 1991
Source: CEPI, API, CCPA, PPI

pulp in the world. A short description of the activity for each subsector is given below.

Newsprint

Newsprint is largely made from waste paper and mechanical pulp. Although belonging to the category of uncoated graphic papers, newsprint can be lightly calendered, for instance in order to facilitate the increasing use of colour in newspaper advertising. Newsprint is used in letterpress, flexographic or offset printing. Newsprint consumption is directly related to the revenues of printed advertising. In this respect, depressed spending on advertising in 1991 led to lower demand for newsprint. In Western Europe (EC and EFTA), apparent consumption of newsprint went down by 1.4% in 1991 compared with 1990. Production fell even sharper, by 5%.

Uncoated graphic paper

These grades include directory, heavily filled and supercalendered paper. They are used in rotogravure and offset. A distinction is made between uncoated mechanical and uncoated woodfree graphic paper. Production and consumption of uncoated mechanical slightly decreased as did the trade volume. On the other hand, production in uncoated woodfree in the EC and EFTA increased by 4.4% in 1991, while consumption rose by 3.9% and exports by 5.6%.

Coated graphic paper

A distinction is made between coated mechanical printing paper and coated woodfree printing paper. The coated mechanical grade is made with a mixture of mechanical and chemical pulp and used to print catalogues, magazines and advertising material. The coated woodfree grade is made almost exclusively of chemical pulp and it is used for high-quality 'glossy' printed products. The coated graphic paper grades did well in 1991 with rising production (+3.0%) and consumption (+4.7%). Growth in imports outstripped growth in exports.

Non-graphic grades

Non graphic grades include kraftliner paper, corrugated board materials, packaging paper, folding boxboard and greyboard. Kraftliner is used for the outer lining of corrugated board. This product is essentially produced in France, Spain and Portugal. Most of these non-graphic grades experienced slight increases in production and consumption.

Hygienic and sanitary products

Main final products of this grade are hygienic paper, napkins and industrial wipes. Production and consumption of these grades grew by around 2 to 3% in 1991 but exports fell sharply by 6% (EC and EFTA).

Supply and competition

Within the EC, market pulp production is concentrated in Portugal, Spain, France and Belgium. Newsprint is produced mainly in Germany, France and Italy. Most of the EC kraftliner production is in France and most uncoated graphic paper is produced in Germany, the United Kingdom, Italy and Spain.

Paper and board

Overcapacity is the industry's current biggest problem and it is particularly acute in the printing paper segment. In 1991, some of the most advanced and largest paper mills in Europe were running at only 80-90% of their potential capacity. This is too low for adequate returns on investment in this highly capital intensive industry.

The present situation is directly related to the outstanding growth of the 1980s. Confident with double-digit growth figures and cheap loans in those years, many companies in the EC, Scandinavia and North America decided to build new, larger and more efficient paper mills. These machines are now a source of huge capacities in a market which, although growing, can not absorb all the new supplies. Recent and planned capacity increases have consistently exceeded growth in European market demand.

Table 5: Paper and paperboard
Production, consumption and trade balance by subsector

(thousand tonnes)	1989	1991
Newsprint		
Production	2 771	3 049
Apparent consumption	6 623	6 713
Net exports	-3 852	-3 364
Uncoated graphic papers		
Production	7 104	7 568
Apparent consumption	9 742	10 578
Net exports	-2 638	-3 030
Coated graphic papers		
Production	6 500	6 865
Apparent consumption	7 151	8 223
Net exports	-651	-1 359
Boards		
Production	5 781	6 108
Apparent consumption	6 962	7 305
Net exports	-1 181	-1 197
Sanitary and hygienic		
Production	2 369	2 624
Apparent consumption	2 593	2 895
Net exports	-224	-271

Source: CEPI

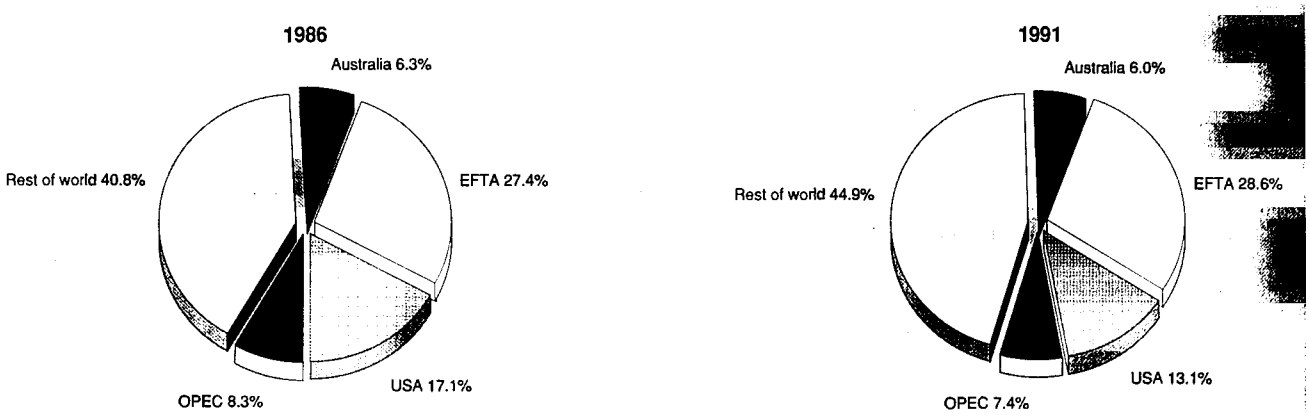
Steeply increased interest rates and a general economic slowdown have now created a bad situation for many of the world's larger, and often heavily indebted, companies. Smaller manufacturers, who have been more cautious in the past, are in a slightly better position.

The gradual abolition of EC frontiers, both in legal as in practical terms, has a further impact on internal EC competition. In this process, access to the German market remains crucial. Although this market is well served by German based, and partly Scandinavian owned production facilities, the country's high labour costs encourage strong competition from efficient French and Dutch producers.

The international competitiveness of the EC paper and board industry is generally good. Its productivity stands out positively against competitors in the USA and Scandinavia. EC industries have invested less in super-capacities and more in flexible production techniques. At the moment this strategy is proving to be vital to overcome rapidly changing market conditions for the various grades of paper products. Otherwise, the competitiveness of EC paper industries is a relative concept since many outside competitors moved into Europe. Some 50-60% of the EC production capacity is foreign owned with Swedish and Finnish companies as the main shareholders.

The EC paper industry is also gradually adapting to Community-wide economies of scale. National EC producers previously concentrated on the manufacturing of all paper and board grades for the national market. This resulted in rather small nationally oriented production facilities, which had a high degree of product diversification. Through a series of mergers and acquisitions, these producers are now seeking economies of scale comparable to those of their main competitors in the world. Many EC manufacturers have focused on niche markets, specialising in higher added value products,

Figure 5: Pulp, paper and board
Destination of EC exports



Source: Eurostat

such as carbonless paper, thermal paper and watermarked paper. Most of them have no integrated links with wood processing plants, and buy pulp on the world market.

The European paper and board industry had a difficult year in 1991 and 1992 will see only slight improvements. However, this hardly affected its international competitiveness since the situation of its main competitors was not much better.

The US paper industry remained badly affected by the persisting economic recession. Much of US paper production is volume oriented which makes it less easy to adapt to changing market conditions.

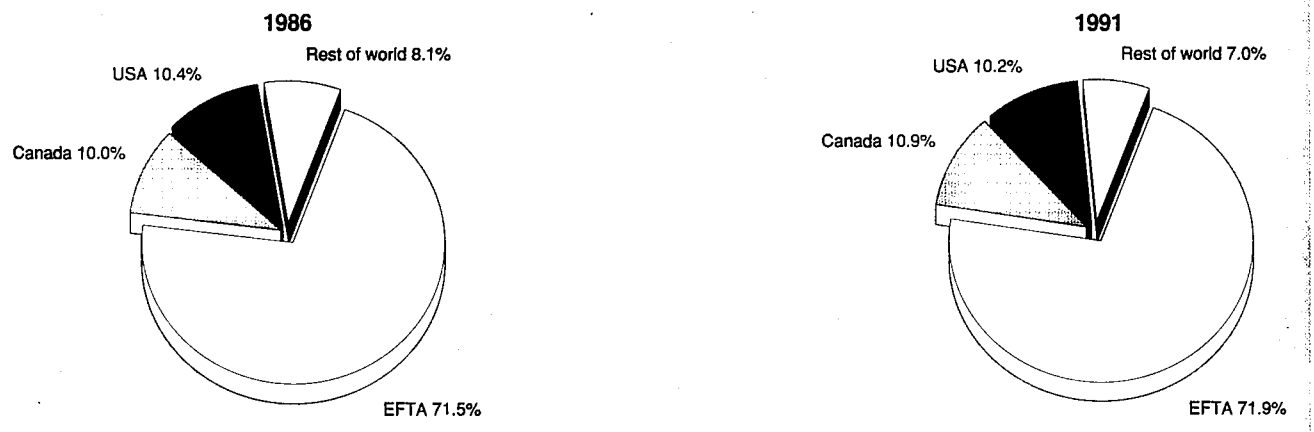
The Canadian pulp and paper industry is hit by legislative developments in its main market, the USA. An increasing number of US states demand by law that newsprint, for example, be made partly from recycled wastepaper instead of virgin fibres. Canada therefore is searching new outlets for its virgin-based pulp product, notably in Europe.

The Finnish pulp and paper industry was drawn into that country's deep economic recession although Finnish machines belong to the world's most advanced state-of-the-art technology. As a result of large investments most companies are heavily indebted. The Finnish industry also suffered from disruption in its former imports of annually 5 million m^3 of wood from the former Soviet Union. Furthermore, Finland has also lost the major Russian export market for their paper products.

As for the Scandinavian countries in general, the EEA treaty between the EC and EFTA which enters into force in 1993 will not change much in the paper industry. Under existing trade agreements, EFTA countries already enjoy a zero tariff for paper imports into the EC.

The Japanese market, although important, is largely self-contained and of limited direct relevance to European producers. The Far Eastern paper market is the fastest growing in the world, notably in the ASEAN countries and South Korea. One of the potential main suppliers in that area will be Indonesia. The Indonesian government policy is actively aiming to become a world leader in paper and pulp production. It is not yet fully clear how European producers are placed to compete on the Asian market.

Figure 6: Pulp, paper and board
Origin of EC imports



Source: Eurostat

Pulp

The prices of various grades of pulp were subject to highly cyclical changes after 1986, the year when steep price rises began. In 1989, the peak year, prices for Northern Bleached Softwood Kraft (NBSK - the prime grade) had risen between 55 and 75%. By 1990 these prices had dropped again by 35%. In 1991 they were slipping further for most grades.

Analysts attribute these large fluctuations mostly to an initially tight market in the latter part of the 1980s and subsequent overshoot in pulp capacity development. In response to a booming demand for paper in most parts of the world, many pulp mills were delivering pulp not only to their regular customers and integrated paper production units but also to many outsiders who increased capacity. Most pulp mills were running at full capacity.

A logical reaction to these developments was to increase pulp producing capacity by larger and more efficient pulp mills, often accompanied by restructuring of the industry at large. Some of these new production capacities have now been established. They are often so big that the advent of one mill (with an average annual capacity of 400 000 tonnes) has an immediate effect on world market prices. In 1991 it became clear that a number of planned new production units were no longer economically justified.

Production process

The pulp, paper and board manufacturing industry is traditionally linked to the forestry and wood processing industry. Due to lower costs of transport and the main raw material (cellulose), dependence on the supplying industries is decreasing. The original vertical integration of forestry, pulp mills and paper manufacturers is gradually replaced by more horizontal integration: big conglomerates in Europe and elsewhere are shaping up to produce every conceivable paper-related product from a variety of raw materials. This increasingly includes recycled paper.

The EC pulp and paper sector is highly innovative, and it modernises its machine park at a fairly rapid rate. Scale advantages and efficiency gains still continue to increase productivity. But despite this trend, the unit labour costs and the total unit costs continue to rise. Labour costs rise slightly because the industry workforce needs continuous training and ever higher technical education. Total unit costs increase even faster because of the high levels of investments needed to stay competitive. The level of indebtedness of many major EC producers is significant.

INDUSTRY STRUCTURE

Companies

The number of paper and pulp companies is still gradually decreasing and their average size is getting bigger. Nevertheless the level of concentration within the EC is still low compared to the situation in Scandinavia and the USA. The five largest companies in the EC are Arjo Wiggins Appleton (UK), Bührmann Tetterode (NL), KNP (NL), Papierwerke Waldhof-Aschaffenburg (D) and Jefferson Smurfit (IRL).

The major events in recent years were the 1990 takeover of the EC's largest firm, Feldmuehle Nobel (D), by the Swedish giant Stora, and the merger of Arjomari (F), Appleton (USA) and Wiggins (UK) in the same year.

The years 1989-1990 were marked by increased acquisitions by Scandinavian and US companies within the EC and some regrouping among EC companies. The US largest paper company, International Paper, bought Zanders (D) Cookson Graphics (UK) and Laurent-Espaly (F). In 1989, the Swedish SCA bought Reedpack (UK). Kymmene of Finland bought Chapelle Darblay (F). The Irish based Jefferson-Smurfit internally restructured its US operations and acquired some smaller mills throughout Europe and the USA. 1991 was a quiet year as far as mergers and acquisitions were concerned.

Strategies

Practically all top European (EC and EFTA) paper manufacturers have been involved in major restructuring activities in the past years. Because of the overcapacity, industries are now less convinced that bigger is better. The financial world is also less keen to finance the mergers and takeovers of already firmly indebted companies. Nevertheless it is more than likely that the relative calm of 1991 is not more than a pause in an ongoing process. However, further restructuring should not necessarily entail expansion of scale. In many market niches the industry needs smaller and more flexible production units which are increasingly closer to their markets.

REGIONAL DISTRIBUTION

Within the EC, market pulp production is concentrated in Portugal, Spain, France and Belgium. Newsprint is produced mainly in Germany, the United Kingdom, France, the Netherlands and Italy. Most of the EC kraftliner production is in France and most uncoated graphic paper is produced in Germany, the United Kingdom, Italy and Spain

ENVIRONMENT

Although the industry was among the first to acknowledge the importance of monitoring the 'eco-balance' in its production processes and actively recycles a large proportion of paper, it has become the target of several hard hitting protest campaigns.

Protest campaigns of international environment organisations focused on four main issues: the bleaching method using chlorine and chlorine compounds necessary to obtain a flawless white colour in quality paper; the quantity of forest wood used in paper production; the degree of recycled paper to be used in the production process; and the high and growing per capita consumption of paper in the Western world.

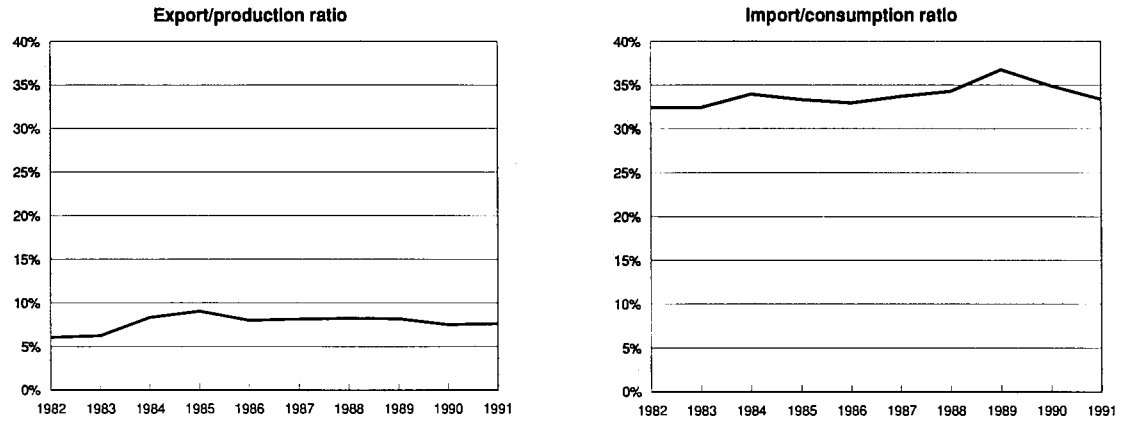
In response to these pressures and a growing consumer awareness, the industry has a strong case to present. Firstly, the pulp and paper industry is one of the few which actually regenerates its raw materials. Sustainable forestry is employed in Europe where at least two trees are planted for every one that is harvested, with the result that forests in Europe are actually increasing. Secondly, the industry has switched largely from the use of pure chlorine gas to the much less harmful chlorine-dioxide as the main active ingredient in the bleaching process. Thirdly, the industry already recycles almost half of the paper consumed in Europe and is still stepping up this activity. There are however other effective methods of waste disposal besides recycling such as energy recovery in state-of-the-art incineration plants.

REGULATIONS

The European Community is presently developing a regulation which will affect the pulp and paper industry. The industry fully supports this pan-European effort of harmonisation, rather than the development of national legislation, because the latter risks to hamper international trade without actually improving the environmental impact of global pulp and paper activities.

A proposal for a packaging waste directive which aims to increase the amount of waste to be recovered places increased responsibility on manufacturers to assist in waste disposal. In Germany legislators have already set very high recovery standards and forbid incineration for packaging waste. The impact of this policy in this crucial market may influence pending EC legislation.

Figure 7: Pulp, paper and board
Trade intensities



Source: Eurostat

One major effect of the German legislation which has already been demonstrated is its important effect on the waste paper market. Waste paper prices have become so low that collection by private enterprises is not attractive. In certain cases prices have even become negative because municipalities no longer knew what to do with their growing stocks. All these direct and indirect market developments will have to be carefully considered in the development of waste management policy, integrated prevention and pollution control, eco-labelling, eco-audits, etc.

OUTLOOK

The keyword for the development of new pulp and paper production lines in the coming years is flexibility. Unstable supply and demand developments among the different paper grades make it crucial that modern facilities produce flexibly the kind and quantity of paper which the market is willing to absorb. The industry will see new restructuring activities in the years to come.

As for the market situation, it is expected that demand will pick up again by early 1993 to alleviate some of the pressure on prices. However, since considerable capacity increases are still planned, the overcapacity will not be easily lifted. To sum up, the current slowdown in growth seems to be cyclical rather than structural. The emergence of market economies in Eastern Europe will have some impact on the EC pulp and paper market, but later rather than sooner. In the short run, it is likely that demand in Eastern Europe will grow particularly in lower grades such as newsprint. In the long run, new production facilities in these countries might serve European consumers.

Table 6: Pulp, paper and board
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	5.0	3.5
Production	3.5	4.0
Extra-EC exports	4.0	4.5

Source: ERA

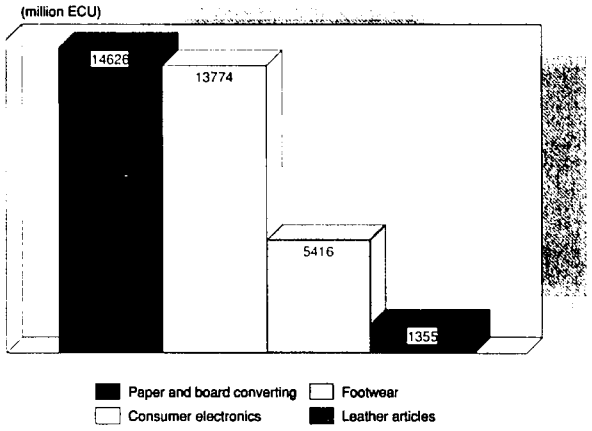
Written by: European Research Associates
The industry is represented at the EC level by: Confederation of European Paper Industries (CEPI). Address: Avenue Louise 306, B-1050 Brussels; tel: (32 2) 627 4911; fax: (32 2) 646 8137.

Paper and board converting

NACE 472

The paper and board converting industry reached a new record high with a total production value of 44.3 billion ECU in 1991. The economic performance of the sector is strongly influenced by the pace of economic activity in general. The effects of decreased consumer spending in 1991 were partly compensated by the opening of new markets in Eastern Europe. The packaging market in particular experienced a revival associated with the reunification of Germany. Over-capacity in the paper production sector, however, resulted in downward pressure on prices which spilled over into the paper converting sector. The converters suffer from high wages and the reduction of working time for their 410 000 employees.

Figure 1: Paper and board converting
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The paper and board converting industry covers all processing of paper and board into final applications in packaging, communications, and other special uses. The industry manufactures a wide variety of products in packaging, often in combination with plastics and metal foils, in stationery and office supplies, wallpaper, labels, hygienic material etc.

The distinction between the paper and board manufacturing and the paper and board converting industry is not easy to make. Increasingly, the major European paper producing manufacturers integrate forward into the production chain. As such they become active in both production and converting markets.

Main indicators

The size of manufactured goods made of paper and board increased steadily in the EC during the 1982-1991 period. The trade balance has always been of small proportion, although positive. In more recent years, a trend towards a reduction of the trade balance has taken place due to rising imports, although the main trade flows (75%) take place within the EC. Employment has been stagnating in 1991 and 1992.

The breakdown by country shows that the largest producer within the EC is Germany, with about 30% of total value added in 1991, followed by the United Kingdom (23%), France (18%) and Italy (10%).

Recent trends

From 1986 onwards, both production and employment in the paper and board converting industry outpaced the growth rate of the manufacturing sector as a whole. Average growth rates during the 1982-1991 period were at 4% for both production and consumption, although consumption grew faster in the 1985-1991 period. Extra-EC exports grew more strongly (9.8% per year) during the 1982-1985 period, before slowing (4.3% per year) in the latter half of the 1980s. Extra-EC imports growth, on the other hand, weak in the first half of the 1980s and grew rapidly (9.3% per year) in the 1985-1991 period. Overall, growth in extra-EC imports has been higher than in extra-EC exports during the 1982-1991 period.

International comparison

The paper and board converting industry is defined as widely diverging in its activities in the EC. It is difficult to make clear comparisons between Scandinavia, North America and Asia. The EC is the second largest producer of paper and board after the USA. In 1991, EC production was about 70% of that of the USA, and about 40% higher than that of Japan.

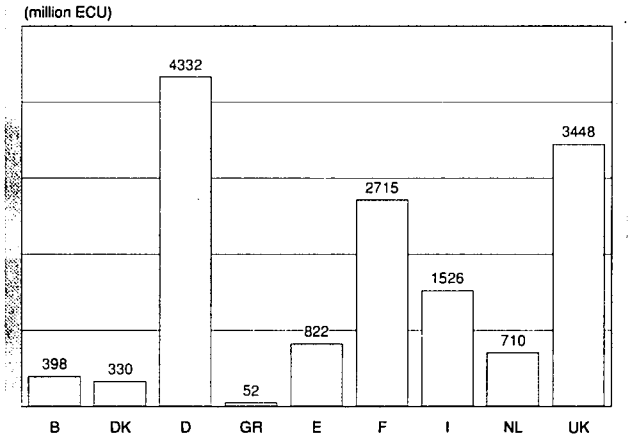
As in Europe, the prosperity of the paper-derived products industry in other regions is closely related to the health of the economy at large. Thus, the persistent recession in the USA has had a negative impact on the sales of packaging products.

Foreign trade

Trade in most goods of the paper converting industry is limited. In packaging products, the volume/weight (i.e. corrugated board/containers) ratio makes transporting over longer distances particularly uneconomical. For other packaging materials, i.e. bags, sacks, folding boxes, this is no longer valid due to container transport systems. For hygienic products, office products, labels, envelopes, the volume/weight ratio is less relevant, and they are exported to distant markets in Asia and South America. Most production is organised as close as possible to the market to keep costs low. Both ratios of exports/production and imports/consumption reach a level of 6 to 7%.

Given the importance of geographical proximity for trade of paper and board, the main trading partners are the EFTA coun-

Figure 2: Paper and board converting
Value added by Member State, 1991



Source: Eurostat

Table 1: Paper and board converting
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (2)
Apparent consumption	23 254	24 492	27 553	30 093	30 520	32 608	36 096	39 526	42 142	44 019	45 428
Production	23 630	25 037	28 190	30 849	31 157	33 078	36 527	40 028	42 541	44 290	45 619
Extra-EC exports	1 428	1 681	2 008	2 247	2 205	2 231	2 519	2 873	3 011	3 173	3 284
Trade balance	376	545	636	756	637	469	432	501	399	271	191
Employment (thousands)	397.1	389.8	386.0	381.7	375.7	383.5	389.6	398.3	402.3	403.6	402.4

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) ERA estimates
Source: Eurostat

Table 2: Paper and board converting
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.6	4.3	4.0
Production	4.0	4.0	4.0
Extra-EC exports	9.8	4.3	6.1
Extra-EC imports	4.2	9.3	7.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Paper and board converting
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	1 428	1 681	2 008	2 247	2 205	2 231	2 519	2 873	3 011	3 173
Extra-EC imports	1 052	1 136	1 372	1 490	1 568	1 762	2 088	2 372	2 612	2 901
Trade balance	376	545	636	756	637	469	432	501	399	271
Ratio exports/imports	1.36	1.48	1.46	1.51	1.41	1.27	1.21	1.21	1.15	1.09
Terms of trade	105.3	106.6	100.6	100.0	101.2	100.4	98.1	94.9	94.6	96.1
Intra-EC trade	3 094	3 576	4 233	4 920	5 228	5 756	6 303	7 248	7 978	8 294
Share of total imports (%)	74.5	75.8	75.4	76.7	76.8	76.4	74.9	75.1	75.1	73.9

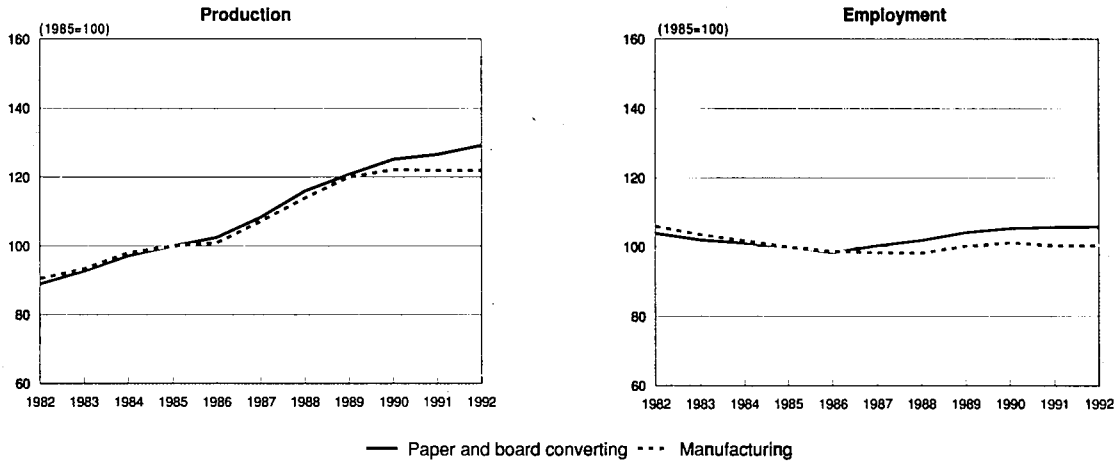
(1) Estimates
Source: Eurostat

Table 4: Paper and board converting
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	27.3	29.4	29.6	30.5	33.7	34.2	34.8	33.4	35.8	36.2
Productivity index	89.6	96.5	97.1	100.0	110.4	112.0	114.2	109.4	117.5	118.8
Unit labour costs index (3)	82.9	88.1	93.3	100.0	103.8	108.2	115.4	120.7	126.7	N/A
Total unit costs index (4)	73.0	79.8	92.9	100.0	100.7	106.1	118.2	129.0	137.1	143.8

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Paper and board converting
Production and employment indices compared to EC manufacturing



Source: Eurostat

tries, which account for a share of about 42% of extra-EC exports and about two thirds of extra-EC imports; the USA take only about 7% of total extra-EC exports and about 15% of total extra-EC imports.

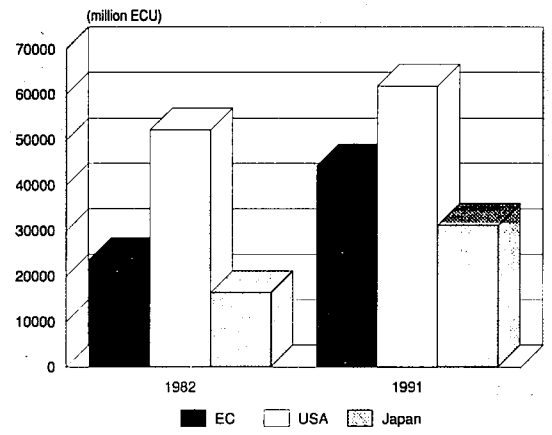
MARKET FORCES

Demand

The 1991 market situation for the different product groups of the industry was as follows.

Packaging products represent most of the industry's production (55 to 60%). It includes corrugated and solid fibre board, folding and rigid board boxes and containers, paper packs and carrier bags and other wrappings of consumable items. Demand for packaging products continued to grow at high levels in the EC. The industry received an extra impulse by the unification of Germany, which already was the most important market. It was a particularly welcome boost since most EC Member States experienced lagging demand. Uncertainty arises out of the different environment legislation in the EC Member States.

Figure 4: Paper and board converting
International comparison of production at current prices



Source: Eurostat, Census of Manufacturers

Household and hygienic paper goods represent the second largest segment of production in the industry. It includes high quality products containing cellulose, cotton tissue and crepe paper, which are used in nursing, baby care and feminine hygiene. Demand for these products has grown exceptionally in the past two decades. Demand for products of slightly less added value, such as travelling, kitchen towels, and toilet paper has grown rapidly as well. It seems that after this period of strong growth, the market for these products has reached certain saturation levels in the EC although consumption per capita of various goods still lies below the US average. Some growth of demand may still be possible in southern EC Member States.

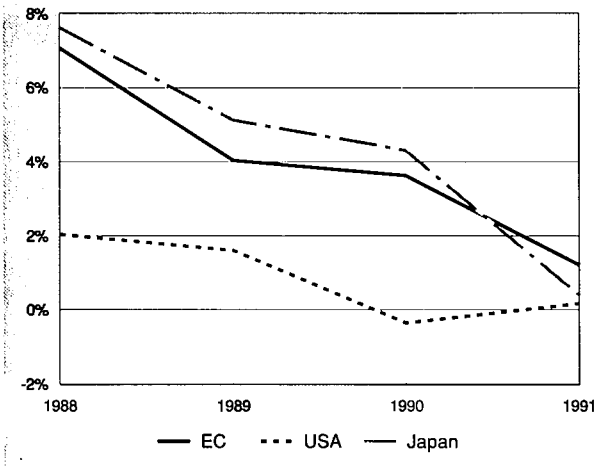
Stationery and office supplies represent the third largest segment of production in this industry. It includes envelopes, labels, printing and copying paper, and products for special applications such as fax paper. Shifts in consumer patterns and the emergence of new technologies has taken away demand from mail-related stationery such as envelopes to electronic transmission-oriented stationery such as fax-paper and computer printing paper. Overall demand for office supplies is still gradually rising. Although some long term effects are expected of a transition to an electronic 'paperless office', most analysts believe that stationery consumption in the EC will still expand.

Supply and competition

Overcapacity and the resulting pressure on prices in the paper and board manufacturing industry had an impact on the market for paper converting goods. But lower costs for the converting industry's raw materials have not led to higher profit margins as labour costs, transport and energy costs increased dramatically. The converting industry's customers have been able to negotiate lower prices for the end products. These customers include increasingly integrated retail trade chains which have considerable market power. Moreover, the industry is faced with steeply rising operating costs as a result of higher costs of labour and the financing of large capital investments.

The principal customers of the packaging industry are distributors, retailers and food processors. These customers are shaping up for the European Single Market and have much to gain with increased scale advantages and integration of international operations. There are indications of heightened

Figure 5: Paper and board converting
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

levels of cooperation among the principal players in this field. In the process they become more powerful negotiating partners for their suppliers in the packaging industry. A similar trend takes place in the hygienic and stationery products sector.

The EC paper converting industry is gradually adapting to EC-wide economies of scale. The pace of restructuring is largely determined by the activities of non-EC manufacturers on the EC market. Major Scandinavian groups such as STORA, SCA, MoDo and Iggesund have been very active acquiring both paper mills and paper converting production units throughout the EC. The advent of the Scandinavians in the EC market had an important positive impact on the productivity of the EC-based industry as a whole. Their introduction of new production techniques and process innovations has been quickly followed by a substantial part of the EC industry. Labour costs and general productivity, now compare positively against Scandinavian and perhaps even better against North American industry.

Production process

In some of its branches the paper and board converting industry is integrated with the paper and board production industry. But as a whole it still remains essentially a separate and moderately fragmented industry of small and medium-sized firms. Originally these two sides of the branch were clearly separated in an upstream side closely related to forestry and bulk paper production and a downstream side related to packaging and other applications, often on a smaller scale. Today, bulk paper producers are integrating forward into the production chain. In competition with their Scandinavian counterparts, the large EC paper manufacturers acquire smaller converting production units. In doing so they gain efficiency, secure market shares and guarantee a steady demand for the raw materials.

These integrating forces led to synergies in new capital investments and a reorganisation of labour. As one notable result, it had a positive effect on labour productivity. The productivity index went up almost 20% from 1985 to 1991.

INDUSTRY STRUCTURE

Companies

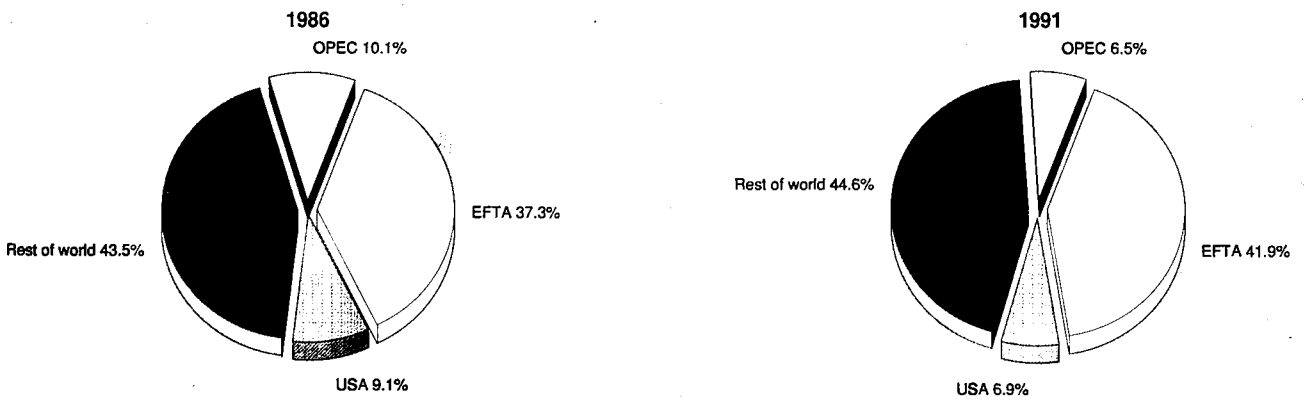
Most of the major EC companies in paper and board converting are the same as those listed in the previous monograph on paper and board production. The same is true for the main competitors in Scandinavia and North America. Forward integration of these companies and a rapid rate of mergers and acquisitions in the years preceding 1992 led to higher concentration levels.

The number of enterprises remained relatively constant at some 4 900, of which many were specialised small and medium-sized companies.

Strategies

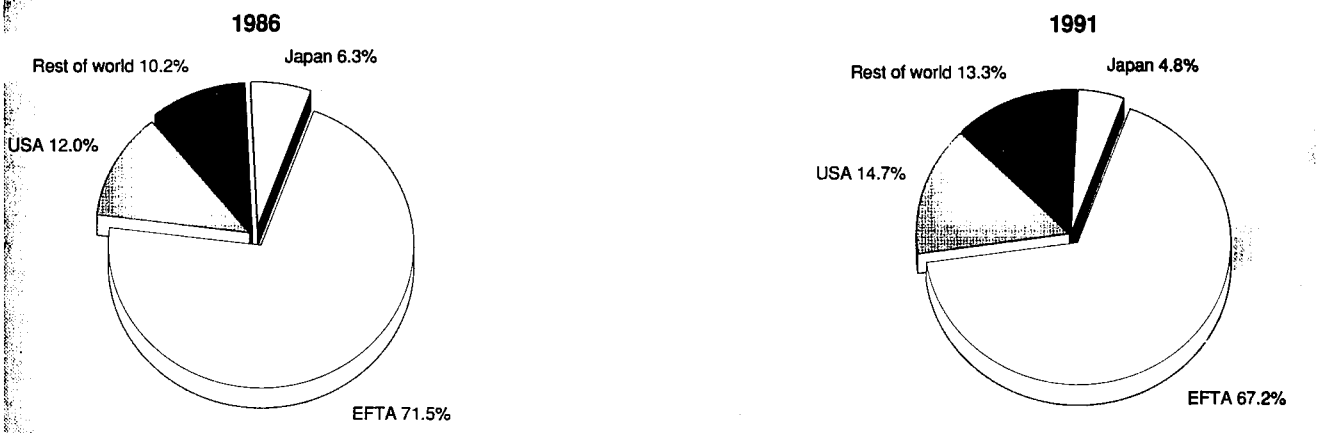
The strategies of the EC paper converting industries are guided by the integrating forces from mergers and acquisitions which thrived in the late 1980s but which have been temporarily slowed down. Continued inward investments of Scandinavian and North American producers within the EC are forcing EC producers either to join them or to cooperate among themselves. The general expectation is that when business picks up again somewhere in 1993 the concentration of the industry will receive a new boost.

Figure 6: Paper and board converting
Destination of EC exports



Source: Eurostat

Figure 7: Paper and board converting
Origin of EC imports



Source: Eurostat

REGIONAL DISTRIBUTION

As the bulk of EC paper production, most EC paper converting is concentrated in the United Kingdom, Germany and France. Some of the specialised packaging industries have settled close to foodstuffs production areas in southern Europe and smaller countries in the North such as Denmark and the Netherlands. The biggest market, both for packaging stationery and hygienic products is Germany. This market has become even more crucial for EC producers after the reunification in 1990.

ENVIRONMENT

Ecological issues in public relation campaigns are starting to become a matter of serious concern for producers of paper related products. A growing number of packagers and retailers switch to environmentally friendly products. Applications in packaging are well suited to contain recycled fibres. Already more than 80% of paper and board packaging, mainly corrugated containers, is made from recycled fibres.

The packaging industry is currently most concerned with legislative developments in several EC member states and the proposal for a packaging directive recently adopted by the European Commission. Early in 1992, Denmark, the Netherlands, Germany and France implemented legislation to set minimum amounts of packaging waste which are to be recovered by manufacturers. The other main element of these new laws are minimum amounts of packaging waste which need to be recycled into the production process.

OUTLOOK

The paper converting industry will face a moderate improvement on 1992 performance in the coming years. Most experts think that the overcapacity in bulk production could diminish by 1993 which would allow some restoration of prices and profits. Equally important will be the resurgence of restructuring activities.

Technical developments are due in the coatings of paper for special applications. New methods for paper coating will increase the use of paper-based packaging and wrappings both in industrial applications as in food transport.

New opportunities could be offered by the opening of new markets in Eastern Europe. Tied closely to the transport and trading of consumable items the demand for packaging products seems set to grow with increasing competition and consumer choice. But the spending power of consumers in Eastern Europe will take several years to grow significantly. The new trading accords with some of the Eastern European states allow increased exports of certain goods to the Community. Since local production of EC-standard packaging material is hardly available, this might also trigger additional demand for the EC packaging industry. Stationery and hygienic products will probably profit less from these market openings.

Table 5: Paper and board converting
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.0	2.5
Production	3.0	3.0
Extra-EC exports	3.5	4.0

Source: ERA

Written by: European Research Associates and CITPA
The industry is represented at the EC level by: International Confederation of Paper and Board Converters in the EC (CITPA). Address: Arndtstrasse 47 D-6000 Frankfurt am Main 1; tel: (49 69) 74 60 70; fax (49 69) 74 77 14.

Printing and publishing
NACE 473, 474

Printing and publishing, with all its historical and cultural importance, is a mature sector of moderate and steady growth which benefits from a reduced susceptibility to movements in the economy by comparison with other media. Nevertheless, the industry is currently undergoing a technological revolution which could bring the whole of paper-based production into question.

INDUSTRY PROFILE

Description of the sector

The printing and publishing sector encompasses all the stages necessary to transform a piece of creative work into a manufactured product available for distribution to the public.

The finished products of the printing and publishing sector are diverse and include books, encyclopaedias, daily and periodical press, maps, and musical scores.

Main indicators

In most EC countries, consumption and production doubled between 1982 and 1991. Since 1991, however, overall EC consumption growth has been checked, reflecting the recession in the United Kingdom, the largest printing and publishing producer in the EC. Growth in consumption in south European countries such as Italy, Spain and Portugal, on the other hand, held steady.

As shown in Figure 2, the United Kingdom, France and Italy together account for 57% of the value added of the sector in Europe, with the United Kingdom dominating with 22%.

Recent trends

The EC trade balance with the rest of the world remains in surplus both in value and volume terms. Following a period of marked volume growth, the balance has stabilised since 1985 as exports performed less well.

Figure 3 shows the remarkable growth of production for the printing and publishing sector during the 1982-1992 period. Also employment in the sector has been rapidly growing after a temporary slump in 1986.

International comparison

With a population slightly higher than that of the United States, Europe publishes five times as many titles, 250 000 a year. From 1982 to 1986, the number of titles published rose in Europe by 10%, while production over the same period fell in the United States and Japan.

The USA remain the world leader in printing and publishing. In 1991 US production was worth 36% more than that of the EC and nearly doubled that of Japan, which had the fastest growth during the 1982-1991 period.

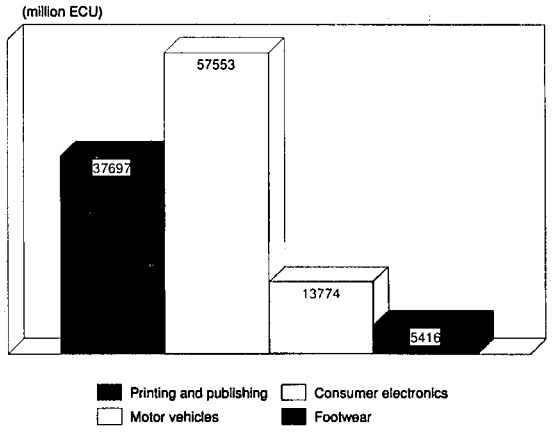
Foreign trade

EFTA is the EC's main partner in the printing and publishing sector both for imports and for exports, surpassing trade with the USA.

In fact, although language considerations do predominate in matters of trade, new markets are developing as economic frontiers expand. Within the EC, the United Kingdom has benefited most from the changes in the structure of trade, closely followed by the Netherlands. The United Kingdom is becoming a crucial centre for European publishers, as well as an important entry point for American printers and publishers wishing to establish themselves in the European market.

Intra-EC trade is growing at the expense of commerce with the rest of the world. Trade intensities are very low in the printing and publishing industry: the export/production ratio is about 4 to 5% and the import/consumption ratio is around 2%.

Figure 1: Printing and publishing
Value added in comparison with other industries, 1991



Source: Eurostat

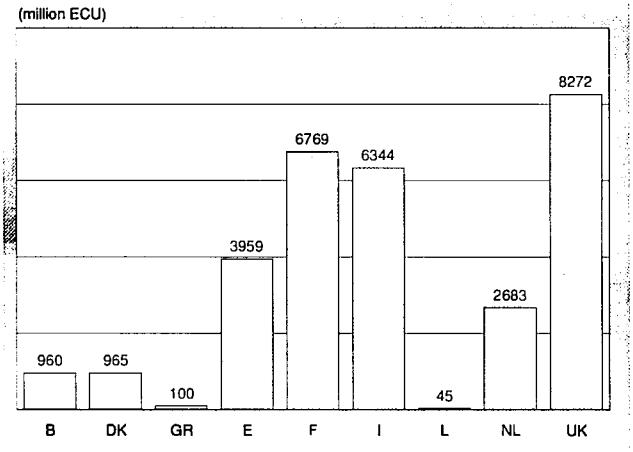
MARKET FORCES

Demand

Developments in the book trade depend on a complex variety of factors, including economic and social aspects such as demographics, education, leisure trends and the number of public libraries.

Books do not follow the rules which generally dictate the economic performance of other products. The book, in fact, is one of those basic products whose evolution takes place over the long term in keeping with demographic circumstances. And every European country has seen a reduction in its birth-rate.

Figure 2: Printing and publishing
Value added by Member State, 1991



Source: Eurostat

Table 1: Printing and publishing
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	40 050	43 181	47 796	51 642	54 608	60 637	69 015	77 338	83 737	89 767	93 447
Production	41 390	44 411	49 462	53 601	56 424	62 521	70 901	79 333	85 873	91 871	95 546
Extra-EC exports	2 238	2 180	2 786	3 148	3 060	3 109	3 248	3 556	3 775	3 970	4 129
Trade balance	1 340	1 230	1 665	1 959	1 816	1 885	1 886	1 995	2 136	2 104	2 099
Employment (thousands)	825.2	820.6	809.4	801.4	786.1	811.1	832.3	865.0	874.9	879.4	885.5

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) Eurostaf estimates
Source: Eurostat

Table 2: Printing and publishing
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	3.6	6.4	5.5
Production	3.8	6.1	5.3
Extra-EC exports	5.0	-0.4	1.4
Extra-EC imports	0.5	3.7	2.6

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Printing and publishing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 238	2 180	2 786	3 148	3 060	3 109	3 248	3 556	3 775	3 970
Extra-EC imports	898	950	1 121	1 189	1 244	1 224	1 362	1 561	1 639	1 866
Trade balance	1 340	1 230	1 665	1 959	1 816	1 885	1 886	1 995	2 136	2 104
Ratio exports/imports	2.49	2.29	2.49	2.65	2.46	2.54	2.38	2.28	2.30	2.13
Terms of trade	107.2	105.3	102.0	100.0	106.4	112.6	113.3	110.3	114.7	101.9
Intra-EC trade	2 025	2 200	2 584	2 881	3 132	3 450	3 850	4 221	4 556	4 853
Share of total imports (%)	69.3	69.8	69.7	70.8	71.5	73.8	73.8	73.0	73.3	72.0

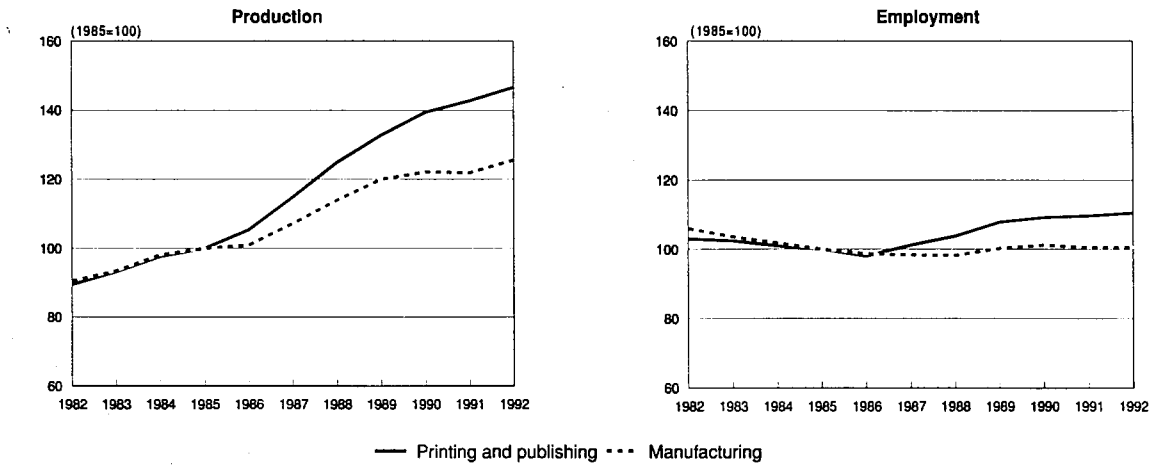
(1) Estimates
Source: Eurostat

Table 4: Printing and publishing
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	26.6	28.1	29.3	30.2	32.8	33.7	35.2	33.7	35.0	35.5
Productivity index	88.2	93.1	97.1	100.0	108.7	111.6	116.7	111.6	116.1	117.8
Unit labour costs index (3)	81.5	86.5	92.8	100.0	104.1	108.2	114.3	120.8	126.5	N/A

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
Source: Eurostat

Figure 3: Printing and publishing
Production and employment indices compared to EC manufacturing



Source: Eurostat

Stagnancy in new school entries intensifies this trend, as a reduction in the number of children has not been offset by a wider provision of education.

The situation appears most favourable in the United Kingdom and France, where a slight rise in population is forecast. Meanwhile, the average birth rate in Europe has stabilised around at 1.9 children per couple; the corresponding figure for the rest of the world is 3.6.

Analysis of consumption trends for books reveals a marked difference between the South and the North, with Southern Europe characterised by relatively weak reading habits.

Books represent 27.5% of leisure spending in Italy, compared with 18.7% in 1981, but only 46% of the population can be described as "readers", among whom 70% read less than five books a year. In Spain, 63% of the population does not read for leisure.

There exists a strong correlation between the level of education attained and the tendency to read. 93% of graduate Italians read regularly, compared to a figure of 26% for those less qualified.

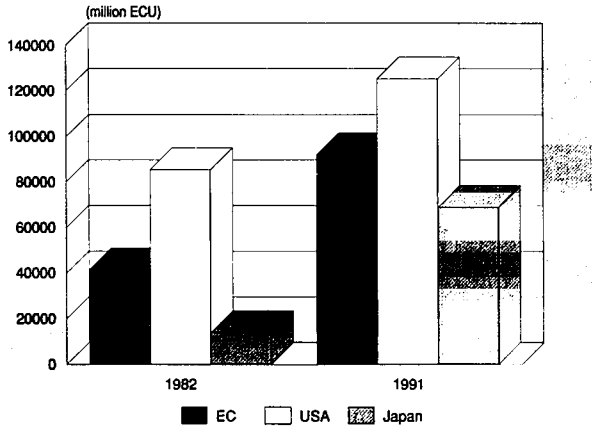
While reading ranks behind television and radio, nearly 50% of Britons read one book a month. Despite such a high consumption rate, the level of buying is very low: of the 56% of regular readers, only 60% actually purchase their books. This situation is due to the importance of public libraries - seven times more numerous in the United Kingdom than, for example, in France.

Overall, Europe is a mosaic of contrasts. In addition to major cultural differences, we can highlight:

- the ageing of the readership in Northern Europe linked to demographic factors, as well as regular consumption of books due to improvements in living standards and the cultural importance of reading in these countries;
- increased importance given to reading in the cultural habits of Southern Europe due to improved education. This now means that the most committed readership is among the young.

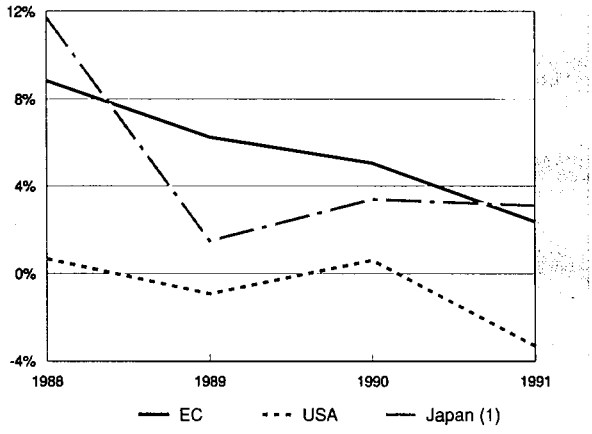
Despite national disparities throughout Europe, it would appear that two sectors of editorial activity are emerging to cater to

Figure 4; Printing and publishing
International comparison of production at current prices



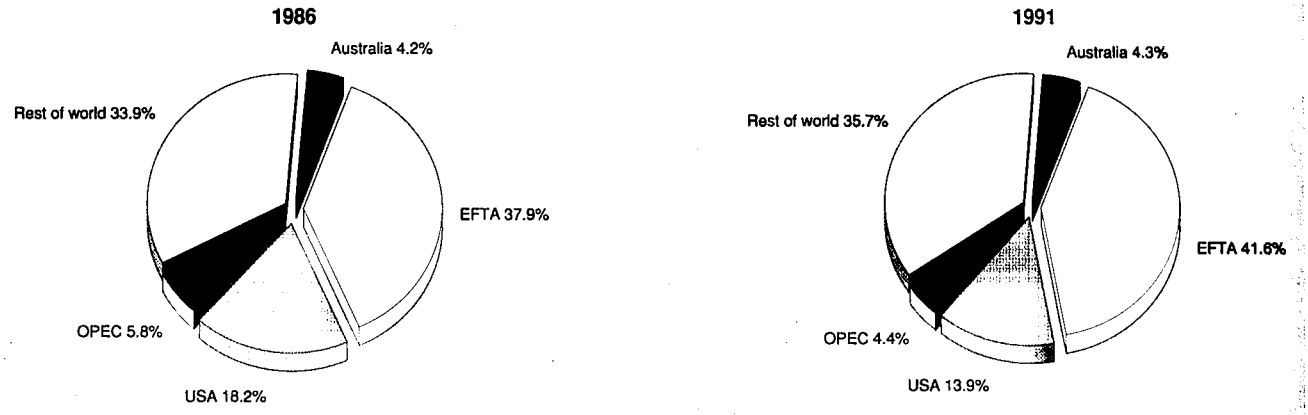
Source: Eurostat, Census of Manufacturers

Figure 5: Printing and publishing
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Printing and publishing
Destination of EC exports



Source: Eurostat

the interests of the main groups and larger small and medium-sized businesses - youth and educational publishing.

For a long time, children have been considered prime consumers; seen as the readers of tomorrow, they have spearheaded the youth sector as a major arena for socio-cultural activity. Educational success is a key factor for professional development and one of the main sources of parental concern. Encyclopaedias and dictionaries, as part of the educational publishing sector, also represent a rapidly-expanding market.

Supply and competition

Two separate phenomena have given rise to talk of a "publishing crisis" in Europe. On the one hand, stagnant sales have held down the number of titles published. On the other, the titles that have been published testify to editorial dynamism and healthy competition.

The apparent contradiction between these two phenomena has led to what some see as a crisis of over-production, resulting in a reduction in the size of average print runs. Stagnation or even reduction in the number of copies published emerges as a widespread phenomenon.

In Germany, the average print run for a contemporary novel never exceeds above 5 000 copies. Those countries with the most vigorous publishing sector are the ones most hurt by cutbacks in average print runs.

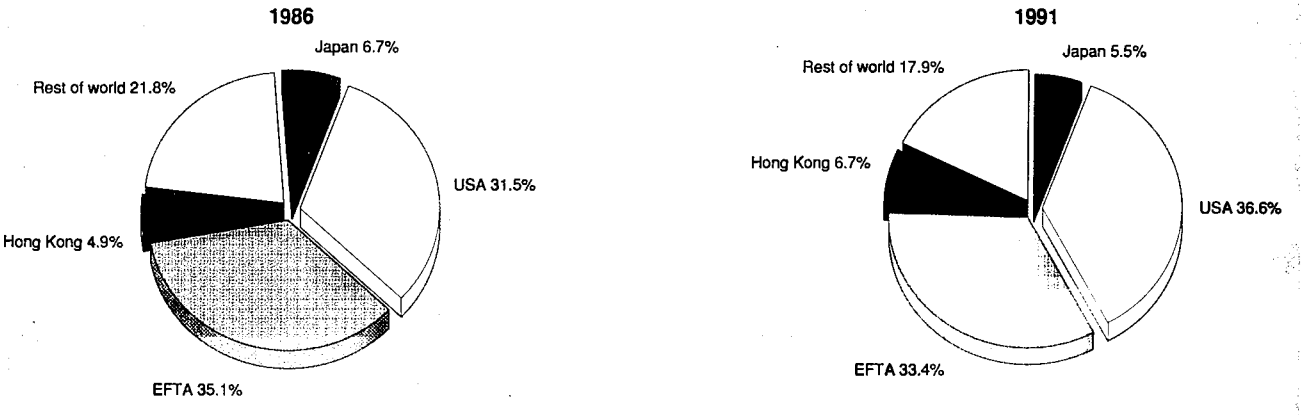
The countries where production has grown most are the United Kingdom (with 68% growth between 1976 to 1986) and Spain, with a growth rate of 50% over the same period.

The number of titles published gives some indication of the expansion of the market; the percentage of new titles gives a further indication of market health.

Accordingly, Germany exhibits a high number of published titles, but a low ratio of new titles (27% of the total in 1989). France and Italy come in the middle, with the ratio of new titles to overall published output roughly balanced. Finally, the Netherlands, Spain and the United Kingdom exhibit strong market vitality, with new titles accounting for some two-thirds of total published output.

Commercially speaking, new titles are a high-risk area for publishers, whereas reprints reduce uncertainty and hold down fixed costs on a larger number of units over a longer period. The strategy of differentiation practised by the major publishing groups can be seen, to some extent, as "competition by attrition", with each publishing house attempting to secure maximum shelf space in retail bookseller outlets and, by definition, crowding out its competitors.

Figure 7: Printing and publishing
Origin of EC imports



Source: Eurostat

The reduction in average print runs and price rises are related. In practice, the average production cost of a book falls in relation to the number of copies published. Lower print runs therefore push up average unit costs.

Book prices do not obey the laws of supply and demand. In fact, eleven EC countries have adopted different forms of single-price arrangements. Only in Portugal is there a system of free pricing for books. On the other hand, books benefit in general from lower value-added tax rates. These range from 0% in Italy, Portugal, the United Kingdom and Ireland to 22% in Denmark.

Book publishing has been affected by developments in audio-visual media, but the press has been affected even more. Advertising revenue, the principal source of finance for the press, has fallen dramatically over the last ten years, with advertising spending in the press dropping from 77% in 1980 to 41.6% in 1990. Over the same period the corresponding figures for TV advertising revenues rose from 15.8% to 25.1%. Nevertheless, in spite of forecasts that dailies, weeklies and periodicals would disappear as a result of the rise of audio-visual media, the principal newspapers have maintained their profit level over the last ten years.

The market for the press in southern European countries is relatively underdeveloped, with fewer than 118 000 copies per thousand inhabitants compared to 129 000 in France.

In addition, the press is highly competitive. In European countries on average, ten daily titles together account for more than 50% of national circulation. This situation is most pronounced in the United Kingdom, where that percentage is reached by the combined circulation of only four titles.

The 1990s will be witness to a major upheaval in printing and publishing as the very notion of paper -based media is progressively challenged. A CD-ROM (Compact Disc -Read Only Memory) is capable of storing up to 550 million characters - the equivalent of about 25 000 printed pages - and has become a vital storage medium for activities such as archiving, data banks and directories.

Meanwhile, the CD-I (Compact Disc- Interactive) has a storage capacity capable of storing and reproducing sound and images as well as text. The CD-I also permits interactive audio-visual applications via a simple remote control device. Units are already on sale in the USA, and the launch of CD-I on the UK market was planned for June 1992.

Given this enormous text and image data storage capacity and know-how, CD-I publishers will play a major role in these markets: when it comes to targeting the public at large, the industry will be critically dependent on publishers.

Production process

The printing and publishing sector is characterised by strong value added and a high dependence on skilled personnel. In Germany, where manpower is particularly expensive, printing labour costs can represent 36% of total costs in Germany.

The main stages in the manufacture of a book are: editing the work following acceptance of the author's manuscript; a technical stage where typesetting and pagination allow a calculation of the costs of production and the raw materials needed; return of the composed text to the publisher in proof form; initial correction; layout and illustrations with preparation of a "dummy" copy for the printer; checking printer's final proofs; printing a predetermined number of copies; distribution of the requisite number of copies to points of sale; and acceptance of returns or unsold copies at the publisher's expense.

In the course of the last few years, computer-assisted publication (CAP) and desk-top publishing (DTP) have generated professional interest. Computerisation of design and manufacture has allowed considerable gains in time and cost, but CAP will add to salary costs in the short term, since the process requires new skills from the workforce. CAP seems to be better adapted to limited print runs and, as a result, is more cost-advantageous to smaller publishers than to the major groups.

In hardware terms, computerisation opens up the possibility of creating new forms of published product such as CD-ROM and CD-I. For example, a 9-volume dictionary weighing 50 kg can now be captured on a 6 cm disc weighing a few grams and the entirety of its information accessed in a matter of seconds.

In the printing sector, most firms now use electronic systems for composition and image processing. Photo composition has now replaced hot metal as the main technology. Micro-publishing (desk-top publishing) has also brought about considerable changes in the sector by facilitating PC-driven integrated text and image processing.

These technological innovations imply improved qualifications for staff and increases in productivity. Output per employee has thus risen from ECU 59,000 in 1980 to ECU 73,000 ECU in 1989 (at constant 1985 ECU values).

A special feature of publishing is the cost burden of "returns", i.e., unsold copies. This burden is all the more difficult to bear in a period of recession. Books which are not sold are returned and destroyed/recycled.

Part of the problem is that available sales space tends to remain constant, whereas the number of titles on the market continues to grow. Inevitably, this disparity leads to a reduction of the time a book is on display, and its overall life-span. Volume and speed of returns has affected some publishers disproportionately, with several experiencing rates of return of over 60%.

Both the printing and the publishing industries require an increasing level of capitalisation. The best-known example is in dictionaries and encyclopaedias, where long production and commercialisation lead times presuppose financial resources to absorb heavy cost burdens both during the period of investment and to cover the costs of promotion and publicity to launch the title on the market.

INDUSTRY STRUCTURE

Companies

Europe's publishing sector is highly fragmented. Most groups have activities beyond merely publishing, covering a wider range of economic activities such as printing, press and publishing, bringing together a range of activities of creation and manufacture of paper-based media. Fewer than 10% of all printers operate independently of a publisher.

The main groups such as Bertelsmann (D) and Hachette (F) range even farther afield, and are involved in multi-media activity.

The trend towards concentration by acquisition and merger is not equally marked in every country, but it is growing everywhere.

In Italy, the three main groups are Mondadori (30% of the market), Rizzoli (12%) and Fabbri (10.5%).

In the United Kingdom, the two publishing giants are Pearson and Reed which, between them, have 31% of the domestic market.

In the Netherlands, where 500 publishers serve a population of 15 million, three houses dominate: Elsevier, Wolters-Kluwer and VNU, which together control two thirds of the nation's publishing activities.

In Spain, five groups - Planeta, Anaya, Plaza y Janes, Circulo Lectores and Salvat - represented 38% of the market in 1983.

In France, five main groups control three-quarters of the market. La Cite and Hachette hold two-thirds of the national market between them - a situation without parallel elsewhere in Europe. That said, French publishing as a whole is characterised by modest levels of globalisation and poor sales of French language books on international markets (as compared with the performance of Anglo-Saxon publishers).

Strategies

The two main aspects of strategy are concentration and globalisation.

Publishing groups are developing both vertical (publishing and distribution) and editorial (diversification) strategies in these new areas as well as in traditionally profitable areas, the net result being to favour economies of scale. However, small publishing houses have a capacity for creativity and flexibility which allows them to stay in the market.

Publishers, in the strict sense of the term, tend on the whole to be medium-size in Europe, with the exception of the major Dutch groups Elsevier and Wolters-Kluwer.

Mixed books/press houses are becoming more numerous, as a result of growing synergy between the two activities: newspapers and magazines remain the most reliable media for book promotion. Thus, Mondadori acquired control of L'Espresso, a famous Italian weekly magazine, in 1989.

The most prestigious names belong to the multi-media groups: Bertelsmann, (D), Time-Warner (USA), Paramount (USA), News Corporation (AUS) and Hachette (F). These groups have a presence in all of the main mass media markets - books, cinema, television, press - and all have extensive international connections.

Globalisation strategies are pursued in general by way of subsidiaries or by acquisitions. In practice, publishing groups -acknowledging their limited knowledge of international markets and the cultural differences implicit in language and business practices - are more likely to expand by economic rather than industrial or commercial means.

Bertelsmann and Hachette are the most international of the major global groups. Between now and the mid-1990s, however, they will in all probability be joined by groups like Pearson and Reed, which have made no secret of their intention to diversify away from their pronounced Anglo-Saxon orientation.

Meanwhile, the Single European market is obliging publishers to consolidate their position in Europe: what is at stake is not so much Europe itself, but the principal European languages which predominate on world markets: English, Spanish and, to a lesser extent, French.

Expansion both in Europe and throughout the world is nevertheless limited by the national character of information. None of the multi-media groups has a major position across Europe in the three main media - press, TV and radio.

REGIONAL DISTRIBUTION

The United Kingdom is a key market for European publishers, largely due to the growing importance of the English language and the influence of the major UK publishing houses. The United Kingdom acts as a springboard for American publishers and printers wishing to access the European market.

While UK publishers have invested only modestly in Europe, continental Europeans have boosted their presence in the United Kingdom through a series of acquisitions and establishment of new subsidiaries.

London is at the cross-roads of a number of trade zones all of which target Anglo-Saxon markets. French and Hispanic language zones remain natural areas for France, Belgium and Spain, which, by and large, have successfully retained their special trade relationships with those respective language areas.

ENVIRONMENT

Paper consumption in developed countries is of the order of 120 kg a year per inhabitant. Paper and pulp is the second main consumer of forest products in the world, after the lumber industry. Demand in the OECD countries for wood pulp, paper and cardboard is projected to grow substantially in volume, from 150 million tonnes today to some 200 million tonnes by 2010.

The use of recycled paper is increasing. Furthermore, contrary to popular belief, paper production is rarely harmful for woods because they need to be cleared regularly.

REGULATIONS

As a cultural product, books ought to remain affordable to consumers. For this reason, most European countries apply conservative measures on pricing, Portugal being a notable exception. These measures would appear to be crucial to the continued existence and development of the distribution networks needed to keep books available to the public and, by extension, for the survival of literary creativity in all its diversity.

In the United Kingdom, the Net Book Agreement governs the fixing of book prices. It is for the publisher to decide whether his books should be sold at a free or an imposed price. In practice, only textbooks tend to be sold at free market prices.

In Germany, publishers themselves operate the rules on price fixing. In Germany, bookshops are bound by a collective contract with 1 700 affiliated publishers to respect the fixed cover price. A similar arrangement operates in Italy. In France and Spain, legal provisions exist to enforce the obligation to sell at the published cover price.

One way out of the problem is to purchase and sell rights on a pan-European level; this, of course, would entail larger investment on the part of publishers.

It will be difficult, especially in the case of more internationally-oriented publications such as English-language encyclopaedias and technical and scientific literature, to maintain an imposed price which differs according to the country concerned. The logic of the Single Market calls for the application of a European price, possibly corresponding to the published price in the country with the lowest applicable value-added tax.

OUTLOOK

The publishing sector is best described as a mature sector posting regular if moderate year-on-year growth. Because of its peculiar mix of historical and cultural factors, the publishing market is relatively immune to economic swings.

The cultural habits of consumers are the key to future development in the sector. Its evolution depends on socio-economic factors such as demographic trends, education, industrialisation, political trends (as in Spain, Greece and Portugal) and, not least, tradition.

New technologies now seem to be complementing rather than substituting for the written word: in fact, those countries which have emerged as the prime consumers of images are also those which remain most attached to the written word.

The most promising subsectors of the publishing industry are those connected with knowledge, teaching and professional

Table 5: Printing and publishing
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.5	3.4
Production	3.4	3.3
Extra-EC exports	4.6	4.0

Source: DRI Europe

training - such as dictionaries, encyclopaedias, textbooks, practical guides and books aimed at the youth market.

The application of new technologies in publishing - either as production aids or as new media per se - is still at an embryonic stage. New products derived from books or developed from synergy between different media - sound, images, text and data - can be expected to multiply on and stimulate global markets.

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The industry is represented at the EC level by: International Confederation for Printing and Allied Industries (INTERGRAF). Address: Square Marie Louise 18, Bte 25-27, B-1040 Brussels; tel: (32 2) 230 8646; fax: (32 2) 231 1464; and,
Communauté des Associations d'Editeurs de Journaux de la CEE (CAEJ). Address: Boulevard Paepsem 22, Bte 7, B-1070 Brussels; tel: (32 2) 522 9660; fax: (32 2) 522 6004.

Printing
NACE 473

Comprising more than 60 000 firms and employing some 670 000 people, the Community's graphic industry handles a turnover of over 50 billion ECU. The industry consists mainly of small enterprises, as 85% of them employ fewer than 20 persons.
The graphic industry is a modern, high-technology industry which, by keeping up with the latest manufacturing processes and investing heavily in new machinery over the last few years, has placed itself at the forefront of technical progress. Image processing in modern printing is now carried out by computer or computer assisted equipment. This technology does of course require highly skilled workers.

INDUSTRY PROFILE

Description of the sector

Printing firms produce a wide variety of products ranging from simple visiting cards printed in one colour to bulky, four-colour direct mail catalogues. The smaller firms work mainly with local clients for whom they produce personal or commercial printed matter whereas bigger firms often deal with a more widespread clientèle and supply for example printed advertising material, books or continuous stationery. Some large firms run both a printing and a publishing house which specialise in newspapers and magazines.

Those larger firms which have gravure printing, print and/or publish magazines, catalogues and long-run advertising material very often for the international market. Of course, this variety of markets goes together with a great variety of results; the economic health and vitality of the markets can vary substantially because of the impact of economic, cultural and social factors on them.

Recent trends

Despite the economic growth of the last few years and the positive effect on employment and production, the graphic industry in Europe is now developing differently from country to country. Germany, for example, is benefiting from its present economic growth, partly because of the increase in demand from the new East-German Länder, whereas the United Kingdom and other EC countries are suffering from a slowdown in economic growth. Countries close to Germany have also benefited from its unification as they have won contracts which German firms have been too busy to accept. On the whole, though, in 1990 the growth of the graphic industry exceeded that of the Community's economy by about 1%. In 1991 extra-EC exports reached nearly 1.5 billion ECU, whereas extra-EC imports were 0.7 billion ECU.

Foreign trade

No detailed figures can be given on the trade in graphic products or the structure of that trade because the external trade statistics do not distinguish between the trade of printing firms and that of publishing houses.

The production of graphic products in EC Member States is mainly determined by the internal demand. The export rate, that is the percentage of the industry's turnover achieved by exports, is in general below 10%. This relatively low rate is due to several characteristics of the industry, such as the need for frequent contacts with the client, the great need for communication during the work, linguistic barriers or the relatively high costs of transport. Exports concern mainly large runs or special contracts, such as catalogues or other printed advertising, books or newspapers. Exports are in general made by a small number of large firms working in gravure or web-offset.

Most of the external trade with non-EC countries is made with other Western European countries. The amount of printed work done by EC printers for outside clients has indeed increased considerably in recent years. Trade with Eastern countries remains low but is expected to develop substantially in the near future. Exports to non-EC countries are about twice as important as imports.

MARKET FORCES

Demand

In the graphic industry there is a direct link between demand and production because this sector supplies mainly to order. Printing firms are rarely able to manufacture for stock as other industrial sectors can.

Demand for printed products is influenced by a number of demographic and economic factors such as population growth, composition of households, training and education as well as economic growth. The graphic industry, just like the publishing sector, is above all a supplier of products which disseminate information and knowledge and cater for leisure activities. Despite the low growth of population, the number of households and managerial jobs continues to grow as does the proportion of income available for education and information. All this continues to stimulate the demand for newspapers, magazines, periodicals and books. Consequently, the number

Table 1: Printing
Turnover

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	1 381	1 479	1 675	1 853	2 059	2 150	2 323	2 522	2 728	2 866
Danmark (1)	1 221	1 354	1 552	1 747	1 975	2 096	2 200	2 224	2 355	N/A
BR Deutschland	10 160	10 952	12 254	12 898	14 141	15 957	17 820	19 651	21 909	24 007
España	2 750	2 483	2 923	3 174	4 147	4 550	5 160	6 173	7 423	8 264
France (2)	4 002	4 354	4 611	5 079	5 559	6 197	13 681	14 875	15 829	15 883
Italia (3)	6 043	6 667	7 384	7 459	7 764	8 882	9 775	10 590	12 427	14 495
Nederland (2)	1 895	2 014	2 172	2 341	2 614	3 109	3 336	3 605	3 936	4 111
Portugal	N/A	N/A	253	273	N/A	N/A	N/A	N/A	N/A	N/A
United Kingdom	N/A	N/A	N/A	N/A	N/A	N/A	4 184	4 562	4 533	N/A

(1) Enterprises with 6 or more employees
(2) Enterprises with 10 or more employees
(3) Including Nace 474
Source: INTERGRAF, Eurostat estimates

Table 2: Printing
Employment

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgique/België	26 947	26 884	26 956	26 918	26 850	27 064	28 351	29 362	29 358	29 983
Danmark (1)	24 049	23 739	24 269	25 114	26 439	27 032	25 852	25 246	27 218	26 810
BR Deutschland	216 115	208 820	210 185	211 399	214 654	220 211	222 495	227 222	234 429	244 890
España	93 063	90 019	83 655	76 500	78 000	78 100	82 000	85 000	85 000	N/A
France (2)	87 434	79 636	79 981	77 982	77 536	133 968	136 601	140 262	139 971	140 382
Italia (3)	66 829	63 020	60 625	60 383	63 402	65 778	66 435	66 435	65 240	63 712
Nederland	51 284	48 939	46 970	47 774	49 144	54 517	53 191	53 686	55 653	57 454
Portugal	19 340	19 219	18 634	17 878	17 249	17 424	18 140	18 416	18 650	18 802
United Kingdom	94 134	N/A	84 302	83 800	84 600	82 600	N/A	N/A	N/A	N/A

(1) Enterprises with 6 or more employees
(2) Enterprises with 10 or more employees
(3) Enterprises with 20 or more employees
Source: INTERGRAF, Eurostat estimates

of books printed has never been so high. New technologies have opened up new and ever growing markets, such as for computer manuals and educational material. On the other hand, private demand represents only a small part of the graphic market.

The advertising expenditures of the economy as a whole is one of the most important factors influencing demand and production in the graphic industry. Almost two thirds of the industry's turnover depend directly or indirectly on advertising. Any political decision affecting advertising, in general or in particular also affects the graphic industry and consequently can jeopardise employment. The printing of catalogues, advertising brochures, pamphlets and company reports is ever increasing as are advertising inserts in newspapers.

Commercial printing has now become an important part of graphic production. Individuals, municipalities, industry, commerce and insurance companies are now big clients for printed products of all kinds, including stationery, visiting cards etc.

These products, printed on separate sheets remain one of the main activities of the small printer who is often limited to local custom. Larger printers will deal with continuous forms and a more widespread clientèle. The demand for continuous business forms is constantly increasing , mainly due to the growth in electronic data processing used for example in electricity bills and insurance certificates. The continuous forms market is expanding substantially in some countries, partly because of increasing electronic treatment of information, whilst the market is suffering from a harsh crisis in other countries, such as Italy.

Labels, packaging products, wall calendars, illustrations and postcards form yet another sector of the graphic industry. These products are often printed by specialised firms.

The upward trend in overall demand has been stimulated by the development of new and existing products. At the same time, printers are now trying to cater for special requests. Quality standards are rising visibly, particularly in creativity and design by electronic means and improved equipment for colour printing. Multicoloured pictorial information is increasing for advertisements, magazines and company reports, and newspapers are also now making use of colour.

Progress in technology has also led to a number of electronic data processing functions being carried out at the client's office, for example, articles are often now drafted on the client's computer. The printer then has to transfer the information - off-line and on-line - to and from the client.

Information needs are satisfied by an increasing variety of electronic means and communication devices. Nevertheless, the permanence and high degree of information stored in the printed product have enabled it to retain its position as a simple, easy, accessible and efficient means of communication. A number of printed products are complemented by electronic media and vice versa (for example, specialised magazines). The necessity to process and exchange information efficiently will continue to increase.

Supply and competition

The publisher remains one of the printer's main clients, as he accounts for about 40 to 50% of production. The printing of newspapers is almost exclusively carried out for publishing firms. Furthermore, in this area, publishing houses and printing houses often form a legal entity and belong to one owner. The printing of newspapers accounts for roughly one-fifth of the total printing production.

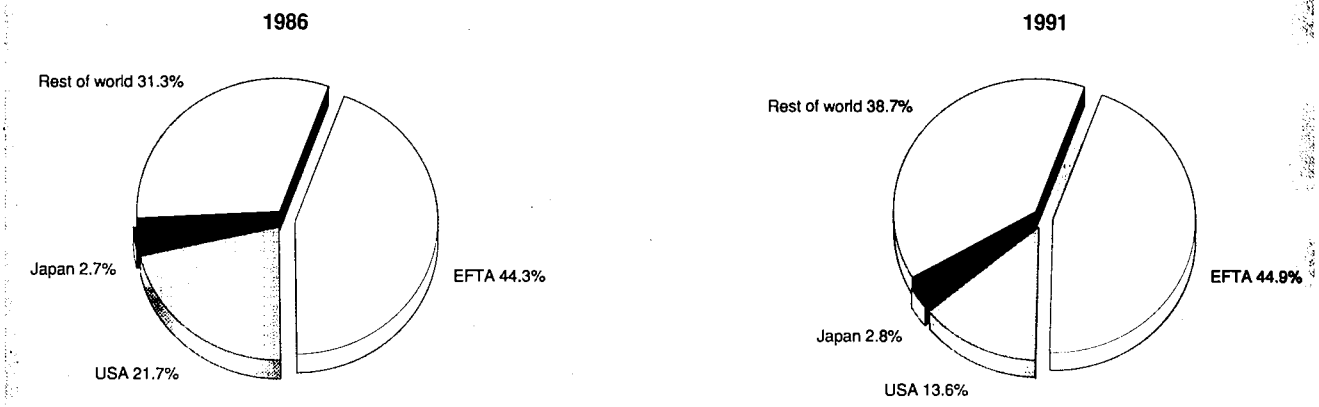
Publishing houses are also important clients of the magazine printer. In countries such as Germany, widely circulated magazines are invariably published by printing houses which are owned by publishing houses. In other countries like the United Kingdom and France such a situation is rare: printing and publishing represent two distinct and different activities. These

Table 3: Printing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	531.0	600.6	730.1	866.4	930.2	1 008.4	1 100.0	1 191.7	1 412.9	1 492.9
Extra-EC imports	261.9	288.3	361.8	390.9	505.4	466.8	495.4	574.0	613.9	724.2
Trade balance	269.2	312.3	368.3	475.5	424.8	541.5	604.7	617.7	799.0	768.7
Ratio exports/imports	2.03	2.08	2.02	2.22	1.84	2.16	2.22	2.08	2.30	2.06
Intra-EC imports	848.7	915.2	1 075.8	1 213.0	1 535.6	1 667.4	1 875.4	2 137.2	2 312.7	2 494.0
Share of total imports (%)	76.4	76.0	74.8	75.6	75.2	78.1	79.1	78.8	79.0	77.5

Source: Eurostat

Figure 1: Printing
Destination of EC exports



Source: Eurostat

publishing houses are dealing increasingly on the international markets. Other types of publications, such as specialised magazines, religious, scientific or professional are printed for independent publishers or for publishing houses linked to printing houses. The production of periodicals accounts for about one-fifth of the total print production. Book printing follows a similar pattern to that of periodicals. Book publishers - independent or linked to printing houses - are not the only ones to order the printing of books, paperbacks or hardbacks; industry, public authorities and other organisations are also ready clients. Book printing accounts for about one-tenth of the total printing production.

The market for printed advertising material consists of a wide range of goods, such as direct mail catalogues, prospectuses, advertising inserts, posters or leaflets. The structure of this market is as diversified as its products as a large proportion of the clients are made up of direct mail companies, commerce and industry. Political parties and other organisations are also big consumers of printed advertising material. This sector has grown considerably over the last few years, stimulated mainly by the development of new forms of advertising, such as direct mail. The production of printed advertising material accounts for a quarter of the total printing production.

Printed matter for individuals and professionals is often taken on by the small printing firms. These cater for the municipalities, various organisations, industry, commerce and local individuals to whom they supply visiting cards, business forms, headed paper, invoices, transport tickets and cheques.

These small firms often print in single sheets, whereas the larger or more specialised firms deal with continuous printing and produce different types of continuous forms, completed on computer by the clients themselves. The production of this printed matter accounts for about one-fifth of the total printing production.

The tenth of the printing production which has not been attributed to any of the above categories accounts for various products such as calendars, fine-art prints, postcards and greetings cards, cartographic products etc. Alongside these printed products the sector also produces rubber or polymer stamps, reprographic products such as photocopies, overhead foils and microfilms.

Alongside these printing firms can be found suppliers of services who often take the place of printers when these cannot cater for exact needs. This is why composition and word-processing are sometimes carried out by trade typesetters; the same applies to reproduction (image processing) and to finishing. Services such as the design of printed matter and the production of layouts and dummies are also offered to the client. In the future, firms who will offer new services through desk-top-publishing processes will complete the existing structure of the graphic industry.

Production process

Printing has traditionally been a high wage industry, reflecting the above-average levels of skill required from its labour force. Printers have also often been among the first to benefit from improved working conditions - shorter hours, longer holidays and other advantages. In half the Community countries the working week is 37.5 hours or less. In most others it is not more than 40. Only Portugal still has a basic week of 44 hours.

At the same time, wage costs have a considerable impact on total production costs and have even increased in the last few years. Furthermore, important investment costs need to be made to ensure that the necessary qualified personnel is available. Despite all this and the swift technological developments in recent years, which have enabled new markets to be won, employment has remained relatively stable in the graphic industry.

Current developments in the industry indicate a close link between the printing sector and the development in communication and information technology. Innovations in equipment and graphic machinery have put the industry in the forefront of technological progress, an industry where equipment has a major impact on the type, the quantity and the flexibility of the work carried out as well as on the professional skills and the organisation of the work in general. Many aspects of the print production process are now commonly automated, measured and controlled by computers. In the last few years, there has been a substantial increase in investment in new printing machinery in several Community countries.

There have been particularly fast changes in the sectors of pre-press and reproduction. Even small printing and reproduction firms now use totally electronic pre-press systems with word and image processors. Photocomposition is the dominating technology and is progressively taking over the old system of hot-metal composition. The latter is still used, however, in certain specialised jobs.

Desk-top-publishing has also brought about a number of changes. Generally speaking, desk-top-publishing allows combined processing of both text and image. This new development means that a number of customers are now able to do their own keying work which in turn has led to ever greater demands

in photosetting especially in capturing, processing and converting the very varied information found in printed matter. A number of customers have tried to accomplish these operations themselves but have had to face the fact that such systems require the experience of a professional typesetter and that the cost is often underestimated.

Upstream of the printing process, reproduction has also undergone a number of important changes due to the rapid developments in micro-electronics. Photomechanical reproduction by camera which was once quite common has already been widely replaced by electronic image processing. Such systems process and convert image-data through electronic whole-page transmission; after the lay-out of the page with the text, the illustrations are mounted electronically. These very expensive systems are installed in the large printing firms and in reproduction firms dealing with colour magazine and catalogue printing. Other less expensive systems, such as powerful personal computers are now being used for colour separation. In this area, technological progress is comparable to that found in composition. In fact, there are now very definite signs that the two areas of composition and reproduction will eventually merge.

Equipment and production techniques now used in printing and in finishing have also been influenced by the arrival of the micro-processor. The latter is being increasingly used to control such functions as tension of the paper web, ink flow, machine control, labelling and despatching. To a great extent these two areas also show signs of merging. Certain printed products, such as books, are already being produced by what is known as on-line finishing, in other words the printing and binding are carried out on the same production line.

The use of electronics in information and communication now play a significant role in printing as a whole. The effect is quite obvious in the transmission of information from client to printer as this is now, more often than not, carried out through electronic media. The transmission of information within a printing house - for example, in newspaper printing, from the editing department to the printing floor or in the case of magazine printing, from one printing department to another - is becoming quite common.

On the other hand, publishing firms have tried to evaluate the impact of this new technology in communication on printed products and are looking into ways of becoming more involved in these areas. Publishers and printer-publishers have often invested in such areas as data-processing units, data banks, videotext and even local radio stations, whereas the printers tend to remain faithful to purely technical operations.

Taking into consideration that most equipment manufacturers now offer similar techniques and know-how in all European countries, if not world-wide, the technological progress of the graphic industry can be considered to be similar in all the EC countries.

INDUSTRY STRUCTURE

The graphic industry in the EC is made up of small and medium-sized companies. A typical printing firm employs fewer than 20 employees, as some 85% of all the firms belong to this category. The remaining 15% are nearly all firms employing between 20 and 500 workers. Only a very small number of printing firms employ over 500 workers; in Germany this category stands for 0.3% of all the firms and this percentage is even lower in a number of other countries.

ENVIRONMENT

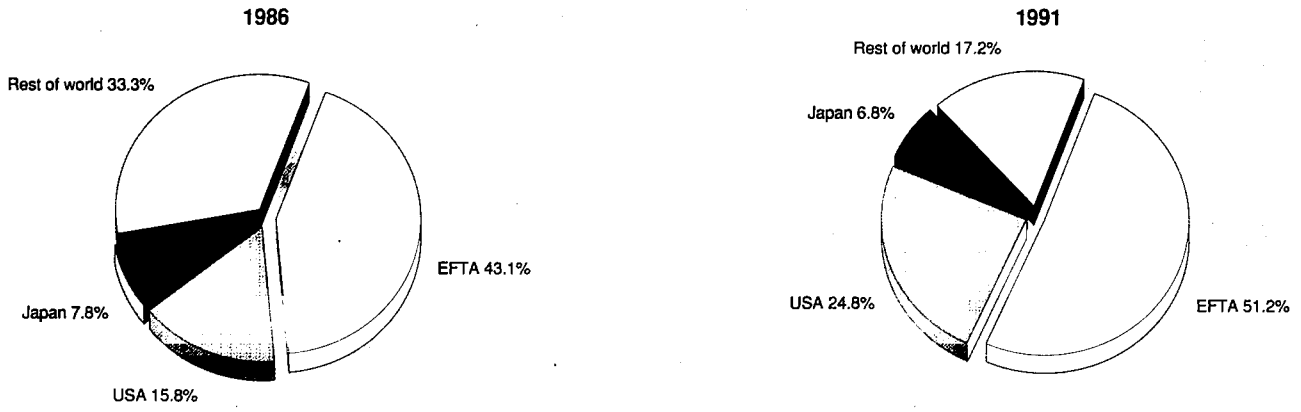
The European graphic industry is an industrial branch which has only a marginal impact on the environment. Nevertheless, the industry is devoting increased resources to meeting the stricter environmental requirements. For example, it has invested large amounts of money to limit emissions caused by web-offset printing, to improve the quality of water and to encourage the recycling of waste.

In some EC countries the graphic industries federations collaborate closely with government departments to agree on the best measures for environmental protection. At international level, the international association for the graphic industry, INTERGRAF, is co-operating with the EC Commission to define appropriate directives in this area. To maintain fair competition, the Single Market requires the harmonisation of laws and directives in all EC Member States, and this also in the field of the environment.

REGULATIONS

The European graphic industry is following very closely the debates concerning the EC draft directive on tobacco advertising. Present terms could well lead to a total ban on advertising of tobacco products. Besides the total ban on featuring the brands of tobacco products in ads, the EC Commission is considering the following measures: limitation of direct advertising; restriction of the advertising activities of mail order houses and retailers of consumer goods; limitation of advertising for medicines not requiring a prescription.

Figure 2: Printing
Origin of EC imports



Source: Eurostat

Besides the economic considerations against the advertising ban, there is also the legal consideration. It is Intergraf view that products manufactured legally should be allowed to be advertised legally.

OUTLOOK

The future outlook is for a continuing high rate of change affecting all parts of the printing industry. This change will not be conditioned by technological progress only, although this will surely bring further automation both on presses and in print-finishing lines.

Thanks to advanced technology, customers will increasingly require on-demand printing, i.e. the printing of very small runs of specialised works, instead of speculating on future sales and keeping expensive published works in stock. Customer demand will also affect the way printing companies are managed with an increased requirement for certification according to the Total Quality Management Concept.

In the longer term, environmental concern will lead to the use of new materials, certainly in the printing process (ink formulations, for instance) and perhaps also in end-products.

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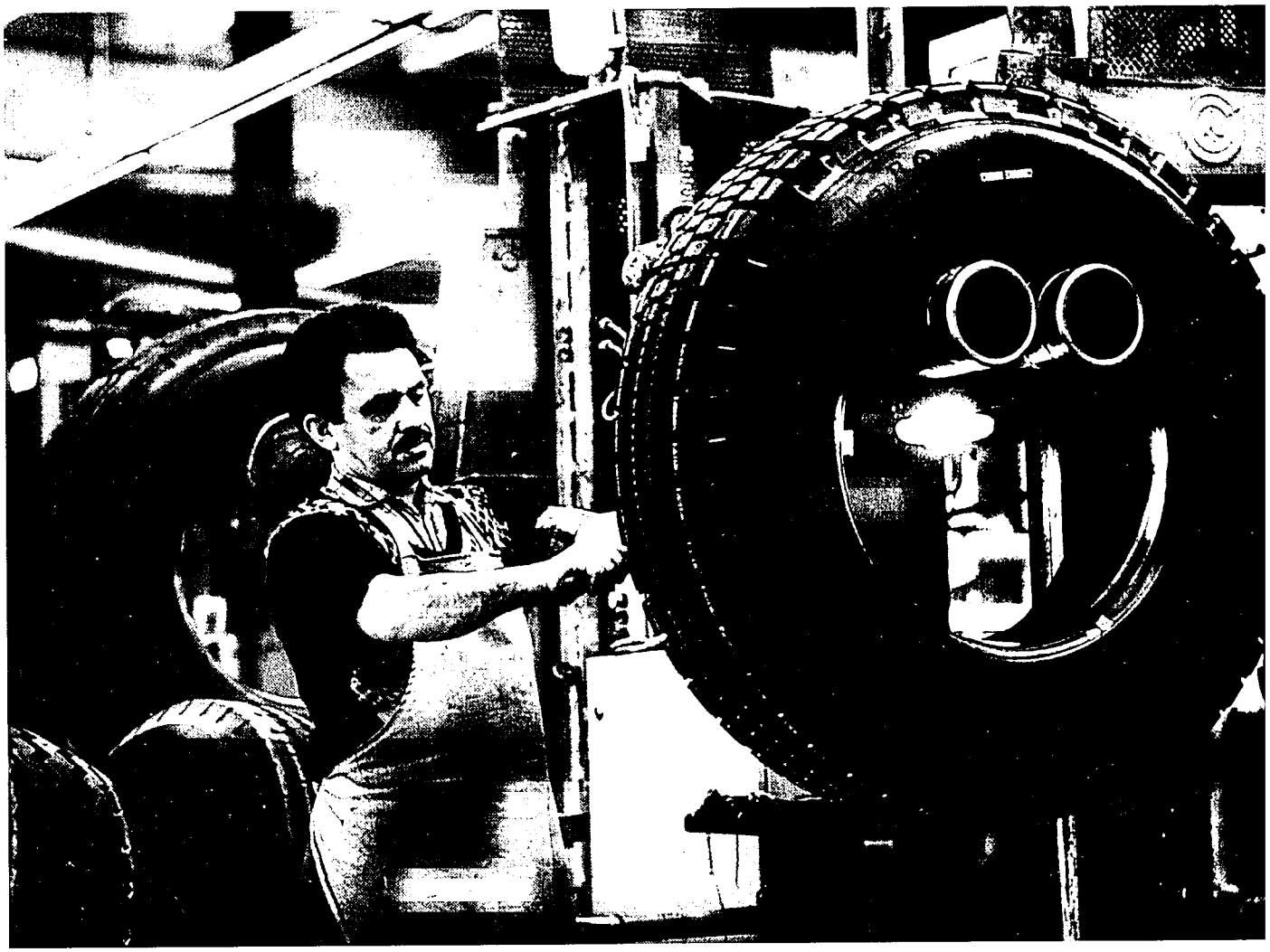


Rubber products
NACE 481, 482

The rubber products industry consists of two main subsectors: the manufacture of tyres and the manufacture of industrial rubber products. In the world tyre market the EC is now neck and neck with the USA. After slow but positive production growth in the 1980s, the industry is now experiencing a period of stagnation but there are good prospects for recovery in the years to come.

INDUSTRY PROFILE

Description of the sector

The rubber industry comprises two main subsectors, the tyre and inner tube industry and the production of industrial rubber products (which includes some products for consumers).

The tyre and inner tube industry includes the manufacture of tyres and tubes for passenger cars, trucks and buses, agricultural vehicles, earth moving and mining machinery, bicycles and motor bikes, and other applications.

Industrial rubber products are pipes, hoses, sealings, belts, profiles, foam, soles, glue, etc. which are manufactured for such end markets as vehicles, machinery, electrical engineering, construction, the chemical industry, the food and drink industry, the medical sector and sporting goods.

The rubber industry is to some extent connected with the plastic processing industry (NACE 483): both process polymeric material based on hydrocarbons. The bigger enterprises in the sector of industrial rubber products are often active in the plastic processing branch too. The processing machinery for both branches is similar; the rubber industry uses mixing equipment in addition because the raw material is mixed by the manufacturers themselves.

Main indicators

Both demand and production of rubber products stagnated from 1989 onwards. In line with the weakness in demand and production growth, employment did not show any improvement. Due to rationalisation efforts of the industry, employment in the rubber products sector remains at around its 1986 level.

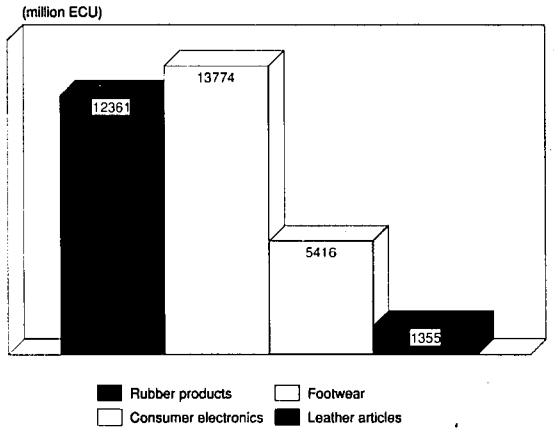
Growth was sluggish in 1992 due to low growth rates in its end markets especially in the car manufacturing sector, which accounts for more than two thirds of the demand for rubber products.

Germany is by far the largest producer of rubber products in the EC, accounting for about a third of total value added in 1991. France is the next largest producer, with about one fifth of total value added, followed by the United Kingdom and Italy, both of which account for about 15% of total value added.

International comparison

The US tyre market remains the biggest in the world but EC-based tyre producers are now the world leaders. The same situation also holds for industrial rubber products. Figure 4 shows that the EC had the biggest increase in production volume in the 1982-1990 period, followed by Japan. Production growth in the US tyre industry has been stagnating since 1988.

Figure 1: Rubber products
Value added in comparison with other industries, 1991



Source: Eurostat

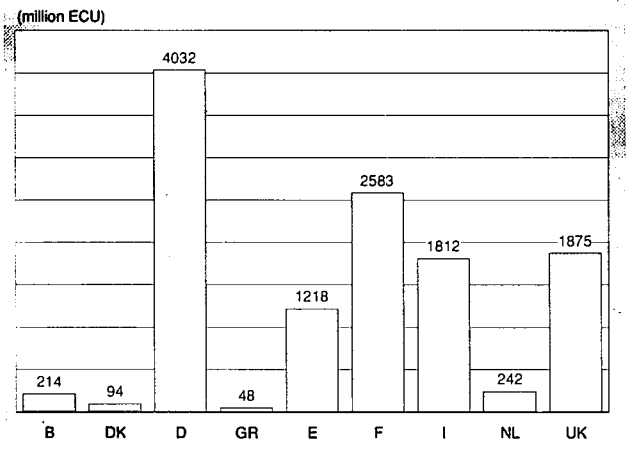
Foreign trade

In 1984 and 1985 there was a remarkable upswing in extra-EC exports. Extra-EC imports, however, steadily increased every year from 1982 to 1991 by more than 8% on average with the result that the trade balance decreased. Throughout the eighties, the share of intra-EC trade in total imports stayed constant.

Among the export markets of EC rubber products, the EFTA countries account for roughly one third of total extra-EC exports, followed by the USA and the OPEC countries. Japan's share is negligible and even decreased in the 1986-1991 period.

As for extra-EC imports, Japan is an important supplier of rubber products, and its importance is increasing. The share of the EFTA countries decreased between 1986 and 1991 and was only marginally bigger than Japan's in 1991. The importance of Malaysia as a world rubber producer is confirmed by the fact that this country more than doubled its share of total extra-EC imports during the 1986-1991 period.

Figure 2: Rubber products
Value added by Member State, 1991



Source: Eurostat

Table 1: Rubber products
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	16279	17355	18769	20227	21364	22123	24079	25584	25919	26324	26500
Production	17697	18851	20627	22182	22974	23560	25354	26898	26914	27097	27300
Extra-EC exports	2452	2649	3201	3468	3217	3237	3465	3791	3516	3510	3500
Trade balance	1418	1496	1858	1954	1610	1437	1275	1313	995	774	500
Employment (thousands)	400.9	390.6	376.1	365.8	360.9	358.5	358.9	359.8	359.2	361.7	360.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) ifo Institute estimates
Source: Eurostat

Table 2: Rubber products
Average real annual growth rates (1)

(%)	1982-86	1986-91	1982-91
Apparent consumption	2.7	2.0	2.3
Production	2.4	1.1	1.7
Extra-EC exports	2.7	0.4	1.4
Extra-EC imports	6.9	9.3	8.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Rubber products
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	2 452	2 649	3 201	3 468	3 217	3 237	3 465	3 791	3 516	3 510
Extra-EC imports	1 034	1 153	1 343	1 514	1 607	1 800	2 191	2 478	2 521	2 736
Trade balance	1 418	1 496	1 858	1 954	1 610	1 437	1 275	1 313	995	774
Ratio exports/imports	2.37	2.30	2.38	2.29	2.00	1.80	1.58	1.53	1.39	1.28
Terms of trade	99.7	98.9	99.1	100.0	98.8	98.3	97.7	98.8	99.3	97.2
Intra-EC trade	3 648	3 852	4 196	4 711	5 159	5 575	6 245	6 801	7 191	7 586
Share of total imports (%)	77.8	76.9	75.7	75.6	76.2	75.5	74.0	73.3	74.0	73.5

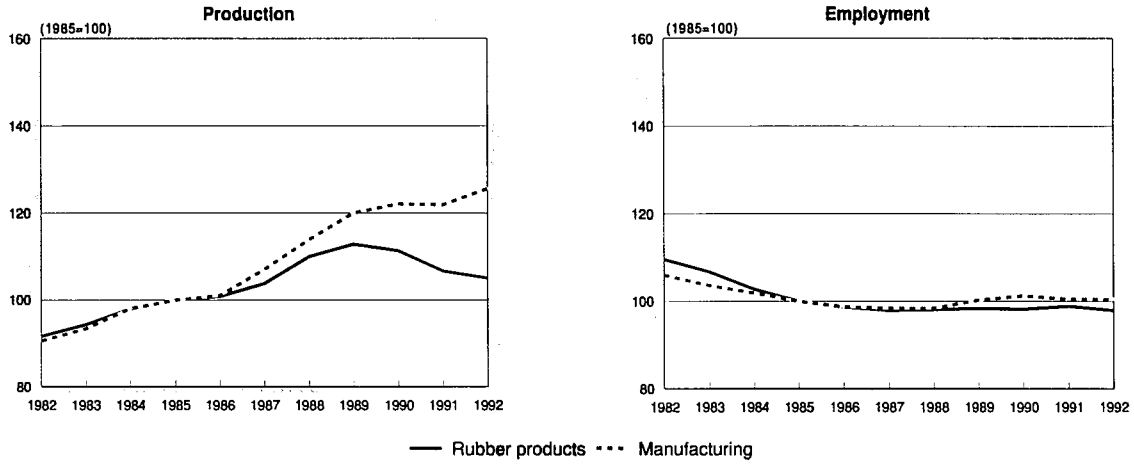
(1) Estimates
Source: Eurostat

Table 4: Rubber products
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	22.7	23.9	24.4	26.3	28.1	29.8	31.0	31.2	31.2	29.7
Productivity index	86.3	90.6	92.8	100.0	106.5	113.3	117.7	118.5	118.5	112.9
Unit labour costs (thousand ECU) (3)	16.3	17.3	18.3	20.1	20.7	21.9	23.1	24.0	25.1	N/A
Unit labour costs index	80.9	86.0	91.2	100.0	103.1	109.1	114.8	119.5	124.9	N/A

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
Source: Eurostat

Figure 3: Rubber products
Production and employment indices compared to EC manufacturing



1992 are Ifo estimates
Source: Eurostat

MARKET FORCES

Demand

The tyre market for original equipment (OE) is a highly competitive market with a limited number of customers who exert a strong market pressure on the suppliers. The replacement market is entirely different with a huge number of customers. Most of them are individual car owners, some are commercial organisations like rent-a-car firms or transport enterprises.

The ratio between OE tyres and replacement tyres depends on the development of car production and on the total fleet of vehicles. In periods of overall economic growth, for example, high car sales may boost the share of original equipment up to about one half of the total tyre sales; during periods of recession or stagnation, the ratio is about 40:60.

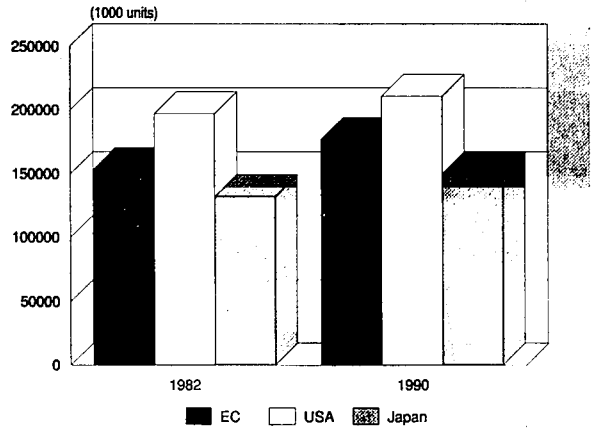
Industrial products account for almost 40% of the volume of total EC production of rubber products, while tyres account for about 60%. Sales values are about the same for both sectors due to a higher specific value of industrial products.

Taking tyres, tubes, and industrial products for motor vehicles altogether, the automotive sector covers about 70% of the rubber products market. Although tyre replacement demand is not as closely connected with income developments as the demand for new cars, in periods of recession there is a tendency to reduce the driven distance per vehicle, privately and commercially.

The rubber industry participated in the booming car market in the late 1980s. The boom continued in Germany in 1990 and 1991 as a result of German reunification, with positive side-effects also on the French and Italian car production. The weakness in the car market in 1992, however, had a negative impact on that part of the rubber industry which supplies the outfitting of new cars.

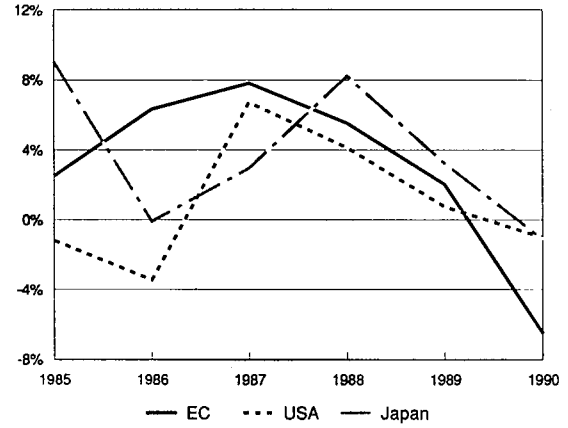
Substitution processes have taken place in some areas of industrial rubber products in the last decade. Rubber has been substituted by plastics especially in the profile, hoses, pipes, and sealings sector or in the production of toys or soles. Presently, the situation has in some cases reversed and re-substitution has taken place. The plastic tyre which was introduced some years ago did not achieve a breakthrough. Its

Figure 4: Tyres
International comparison of production in volume



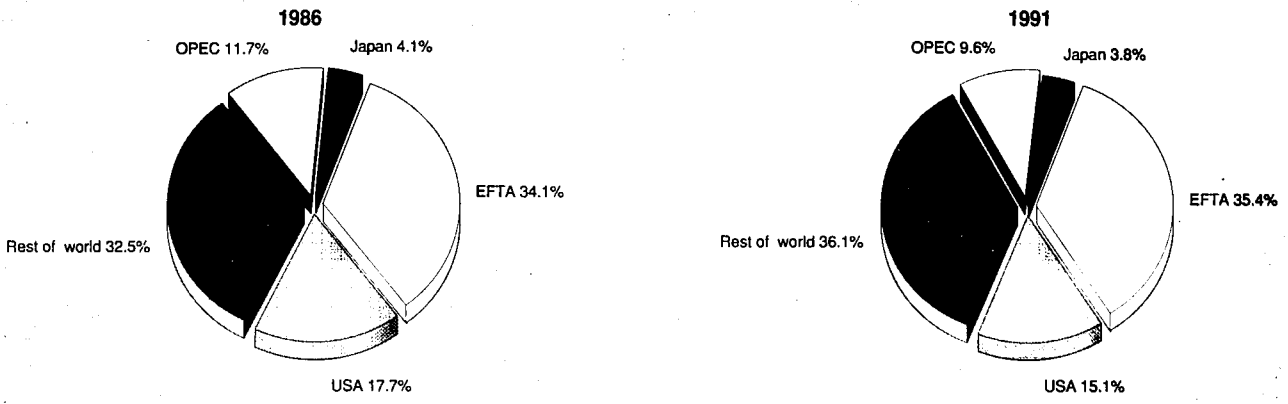
EC is Belgium, Germany (including former East Germany), France, Italy, The Netherlands and the United Kingdom only
Source: International Rubber Study Group

Figure 5: Tyres
International comparison of production growth at constant prices



EC is Belgium, Germany (including former East Germany), France, Italy, The Netherlands and the United Kingdom only
Source: International Rubber Study Group

Figure 6: Rubber products
Destination of EC exports



Source: Eurostat

application is, according to experts, limited to very specific purposes. Rubber has replaced metal in some hoses and window frames in cars.

To counterbalance substitution attempts, intensive research and development activity was undertaken partly on raw material and partly on rubber products. Composites consisting of rubber and metal, rubber and glass, rubber and plastic, were developed and produced. One of the most well known inventions was the new tyre developed by Continental in the 1980s. But its introduction on a wider scale is still forthcoming.

Supply and competition

Tyres form a highly competitive market. Production capacity often exceeds demand and there is a constant pressure on prices. This is particularly true for OE tyres. Car manufacturers accept the cheapest offer under certain quality and specification conditions to reduce their own costs. Worldwide procurement of tyres is possible and acts as a permanent market discipline for the suppliers. The price-setting margins are restricted and the tyre industry complains all over the world of low prices and low profits. The replacement market does not face such stiff competition, but wholesalers and retailers also take advantage of the competitive situation as long as the demand by car owners is not restricted to specific brands.

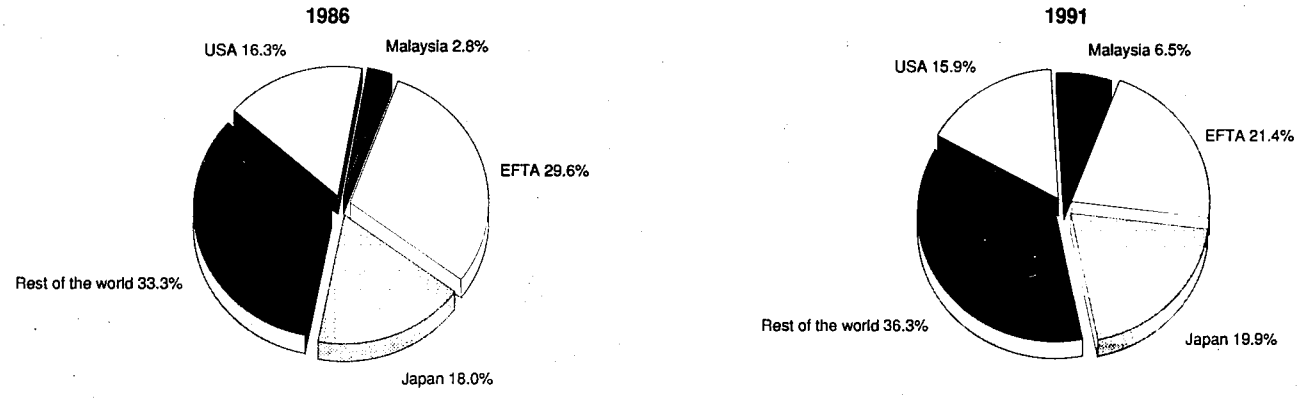
The industrial rubber sector is a much more specialised branch with less opportunity to take advantage of economies of scale than the tyre sector. Even the supply of parts to the automobile sector involves a high degree of specialisation and differentiation. The consequence is that competition between suppliers is less strong than in the tyre sector and the globalisation of procurement is limited because of the necessary consultations between customer and supplier.

Production process

The rubber industry processes natural and synthetic rubber. For tyres the production input is shared about half and half in volume terms; for technical rubber products production, much more synthetic rubber is used, depending on the specifications of the product. An important raw material for tyres is carbon black, besides other textile and metal components.

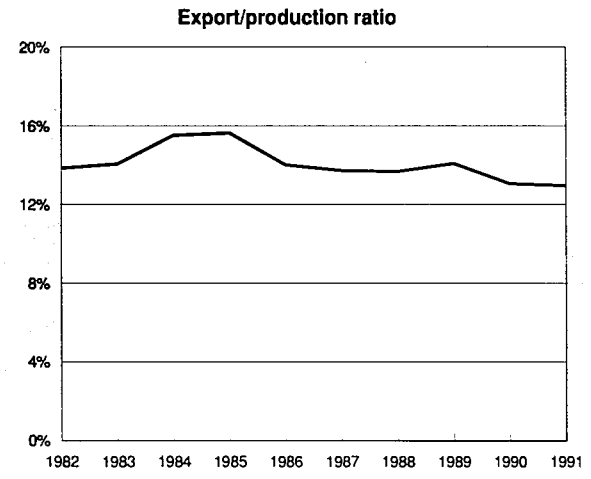
Natural rubber is imported mainly from Southeast Asia, while synthetic rubber is supplied by the chemical industry. The unfavourable price and profit situation in the market for OE tyres leads to constant efforts to bring down costs, especially

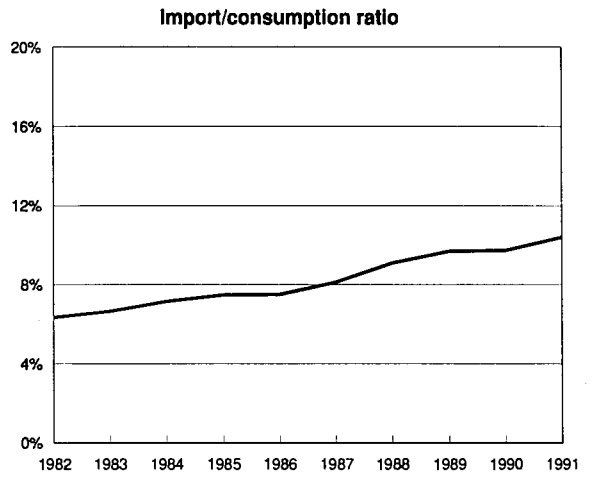
Figure 7: Rubber products
Origin of EC imports



Source: Eurostat

Figure 8: Rubber products
Trade intensities





Source: Eurostat

labour costs, by automation. If these technical developments achieve a breakthrough, and the labour employed gets more and more only controlling and supervising tasks, then a major change in productivity would follow.

INDUSTRY STRUCTURE

Companies

The largest tyre manufacturers normally produce industrial rubber products as well. In addition, there are many small and medium-sized enterprises which produce technical products or products for end consumers only. Small and medium-sized enterprises dominate the rubber and plastic products industry (there are no separate figures available). As far as rubber is concerned, all tyre producers have more than 100 employees, but there are many producers of industrial rubber products or consumer products which employ between 20 and 100 persons. The three largest European tyre manufacturers are Michelin (F), Pirelli (I), and Continental (D). European tyre manufacturers account for 36-40% of the world market.

Strategies

There are at least three ways to react to the challenges resulting from intense competition: first, higher investment in cost-reducing processes; second, increased research and development activity; third, mergers and acquisitions and/or alliances.

Investment activity in the EC showed an upward trend until 1990. Due to reduced expectations, investment decreased in 1991 and it was expected to do so in 1992 as well. The main aim for investment activity is an increase in productivity and reduction in costs (especially labour costs). When the tyre business was booming, expansion was an additional objective. Innovation activities aimed at new products or at new processes, and production methods are other strategies for keeping up with the competitors and are partly in line with diversification. Among the active tyre producers worldwide none is restricted to making tyres.

As the car market became increasingly international, tyre manufacturers have had no choice but to adopt a worldwide strategy. The concept of dominant position at both national and EC level has disappeared. Several structural changes have taken place in the recent past that have reshaped the structure of the world tyre industry, aimed at increasing the size of the largest groups: Bridgestone (J) took over Firestone (USA), Michelin took over Uniroyal-Goodrich (USA), Pirelli acquired Metzeler (D), Continental took over Semperit (A), General Tyre (USA), and Uniroyal-Englebert (USA). Fulda (D) was acquired by Goodyear (USA) and Dunlop (UK) by Sumitomo (J). On the fate of the East German Pneumant, no decision has been taken so far. The latest attempt by Pirelli to take over Continental in 1991 failed. It remains to be seen whether in the long run these two firms will establish some sort of alliance to compete on the world market with the three largest firms: Bridgestone, Michelin and Goodyear.

The industrial rubber industry supplies a large number of sectors, and some rubber producers are now tailoring their production to the needs of the main local client industries. The Italian industry, for example, tends to specialise in sole components for footwear, while the German rubber industry tends to specialise in conveyor belts for the mining industry.

ENVIRONMENT

The main environmental issue for the rubber industry is the recycling, incineration or disposal of scrap tyres and rubber products. Retreading used tyres is a widespread recycling method which has many positive aspects from the ecological point of view. But this does not solve the problem of disposal: at the end every tyre and rubber article has to be incinerated (for example in cement mills) or disposed at dumps. There were attempts to make a chemical recycling by pyrolysis in order to get hydrocarbons but it turned out to be to expensive and generating itself air pollution.

The EC (particularly Germany) is in a leading position worldwide as far as research on and development of ecological techniques are concerned. In the long run this could lead to export opportunities either in the form of machinery or plants or in the form of licences for ecological incineration of tyres.

OUTLOOK

Growth in the automobile industry will be sluggish in the near future but in the medium term prospects for stronger growth are good. In the truck tyre sector the growing traffic as a consequence of the realisation of the single EC market will lead to increasing demand for tyres too. The replacement tyre market acts as the stabilising element; there is always some growth as long as the number of registered cars is in-

Table 5: Rubber products
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	2.0	2.4
Production	1.0	1.9
Extra-EC exports	1.0	2.3

Source: ifo Institute

creasing. Other industrial rubber products will grow more or less in line with general industrial growth.

The year 1993 is likely to bring some recovery in consumption which will continue in the following years until 1996. For production and extra-EC exports, only the years after 1993 will see growth. One of the underlying assumptions is no significant increase of demand from eastern Europe.

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Plastics processing
NACE 483

The recession in Europe and the rest of the world has had a negative effect on the EC plastics processing industry during 1991. In 1992 the manufacturing output of plastics goods in the EC is expected to grow at the same rate as GDP (2%), while the extra-EC trade balance should rise in 1992, compared to the weak 1991, by 6% approximately. The main challenge for the plastics processing industry, as for other sectors, will be to help solve the problems of managing waste.

INDUSTRY PROFILE

Description of the sector

Consumption of plastics material in the EC plastics processing industry is approximately 26 million tonnes. The main branches of the industry are plastic films (6.2 million tonnes), polyvinylchloride (3.5 million tonnes), polyurethanes (1.6 million tonnes), fibre reinforced plastics/composites (900 000 tonnes), and expanded polystyrenes (535 000 tonnes). The industry employs around 800 000 persons. Its main business is to convert plastic resins and compounds into products. The sector operates a range of different technologies, such as injection moulding, compression extrusion, blow moulding extrusion, hand lay-up of fibre reinforced plastics and coating. They also carry out ancillary operations such as decoration by printing, hot stamping and a variety of subassembly operations.

Plastics converters may produce finished articles which are used by other industries like food and hygiene packaging, or building articles, or distributed to consumers. They may also be custom processors who produce components on a subcontract basis for other manufacturers or they may be in-house operations integrated into the manufacturing process. The major markets for plastics are building, packaging, electrical and electronics, automotive, furniture, and agriculture.

Production of plastic films, largest subsector of the plastics processing industry, reached 6.2 million tonnes in 1992 in western Europe. Plastic films are mostly based on polyethylenes but also on polypropylene, PVC, PET or coextruded resins (polyamides, ethylene-vinyl acetate, etc.).

In 1990, the production of polyurethanes in western Europe reached 1.6 million tonnes, of which rigid foams accounted for 450 000 tonnes. The key end markets for polyurethane are furniture, transport and construction which together account for two-thirds of polyurethane consumption.

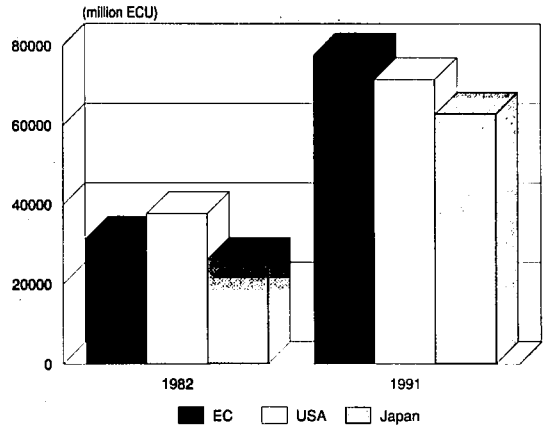
The main constituents of fibre reinforced plastics/composites (FRP/C) are reinforcing fibres dispersed or imbedded in a continuous matrix (polymer). Glass fibres represent over 98% of the total tonnage of reinforcing fibres used. The remaining 2% is shared between carbon and aramid fibres. The total EC glass reinforced plastics (GRP) production in 1990 reached about 990 000 tonnes, three quarters of which were obtained by thermoset matrix and a quarter by thermoplastic matrix.

Expanded polystyrene represented an output of 535 000 tonnes in 1991 in western Europe. In addition, a large part of the plastics converting industry is also devoted to the manufacture of bottles, drums, pipes (875 000 tonnes), profiles, window frames (400 000 tonnes) and calandered products (wall and floor coverings).

Main indicators

Both consumption and production strongly increased during the 1982-1991 period, respectively by 7.5% and 7.1% per year. Extra-EC imports grew at a spectacular annual rate of 13.4% during the second half of the 1980s, that is three times more than extra-EC exports. The trade balance remained stable during the 1982-1991 period, at a level of around 2 to 2.5 million ECU. During the same period, employment in the plastics processing industry grew by 36%.

Figure 1: Plastics processing
Value added in comparison with other industries, 1991



Source: Eurostat

International comparison

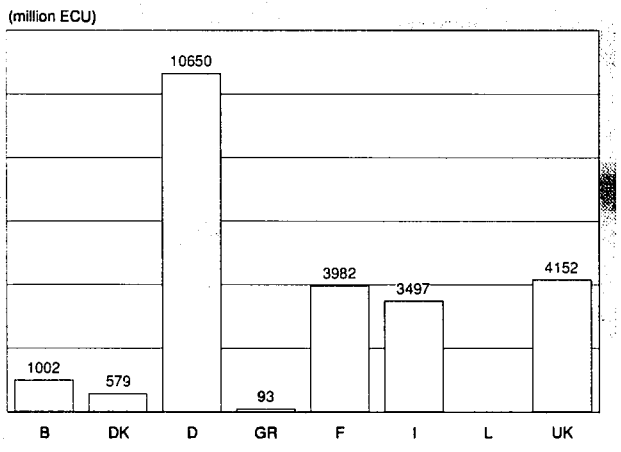
The USA, EC and Japan remain by far the largest producers and consumers of plastic materials. In absolute terms, this was expressed in 1991 in the following production and consumption: USA (28.5 and 27.4 million tonnes); EC (28.5 and 24.9); and Japan (12.8 and 11.6). Germany accounts for about 40% of total EC production and consumption.

Foreign trade

The value of the plastic products exported from the EC increased less rapidly than what was imported. From 1982 to 1991 the value of exports has been multiplied by 2.1 and the value of imports by 3.3.

During the 1985-1991 period there has been a decrease in trade between the EC and the USA, as well as a reduction of imports from EFTA countries. This was balanced by an

Figure 2: Plastics processing
Value added by Member State, 1991



Source: Eurostat

Table 1: Plastics processing
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	29 709	33 166	39 024	41 783	45 705	50 807	57 611	66 323	70 824	76 004	79 004
Production	31 483	35 111	41 284	44 409	48 201	53 166	59 758	68 614	72 983	77 711	81 596
Extra-EC exports	3 434	3 811	4 600	5 203	5 189	5 378	5 981	6 786	6 981	7 229	7 662
Trade balance	1 775	1 945	2 259	2 626	2 496	2 358	2 147	2 291	2 159	1 707	1 792
Employment (thousands)	577.5	577.2	597.9	601.2	632.0	662.4	690.4	736.2	771.2	790.1	820.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) EuPC estimates
Source: Eurostat

Table 2: Plastics processing
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	7.0	7.5	7.5
Production	7.2	6.8	7.1
Extra-EC exports	7.6	4.2	4.8
Extra-EC imports	5.6	13.4	10.2

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Plastics processing
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	3 434	3 811	4 600	5 203	5 189	5 378	5 981	6 786	6 981	7 229
Extra-EC imports	1 659	1 866	2 341	2 577	2 693	3 019	3 834	4 494	4 823	5 523
Trade balance	1 775	1 945	2 259	2 626	2 496	2 358	2 147	2 291	2 159	1 707
Ratio exports/imports	2.07	2.04	1.96	2.02	1.93	1.78	1.56	1.51	1.45	1.31
Terms of trade index	108.5	106.4	102.9	100.0	103.6	105.6	105.6	103.9	106.2	107.4
Intra-EC trade	6 044	6 798	7 974	9 136	10 106	11 248	12 703	14 668	16 373	17 445
Share of total imports (%)	78.0	78.1	76.9	77.5	78.4	78.2	76.7	76.5	77.2	75.9

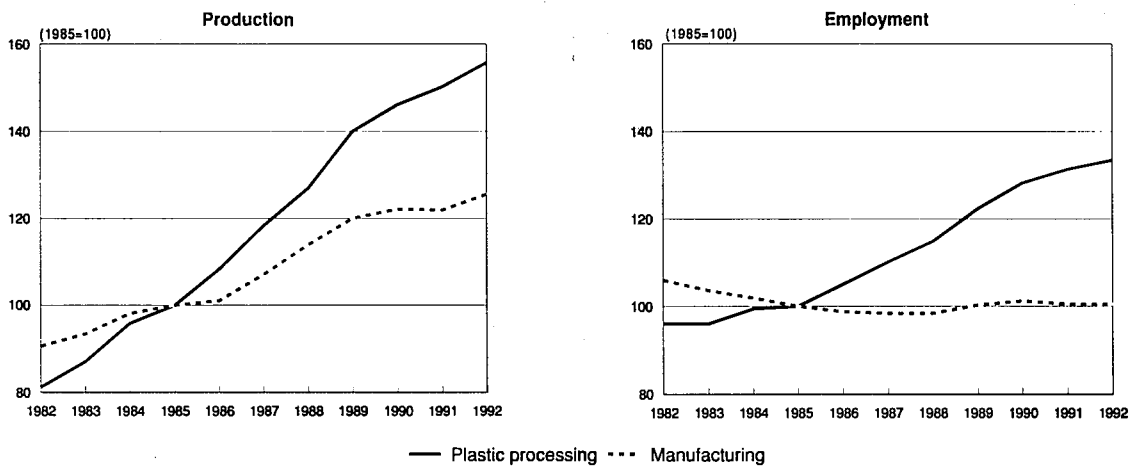
(1) Estimates
Source: Eurostat

Table 4: Plastics processing
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	27.2	28.7	29.4	30.8	32.9	34.5	33.9	34.0	34.1	34.3
Productivity index	88.5	93.2	95.5	100.0	106.9	112.1	110.3	110.6	111.0	111.4
Unit labour costs index (3)	81.6	86.6	93.2	100.0	104.9	109.3	115.1	121.6	128.5	N/A
Total unit costs index (4)	72.8	82.9	93.9	100.0	100.7	106.4	118.0	126.2	130.1	140.0

(1) Estimates are used if country data is not available, especially from 1989 onwards
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Plastics processing
Production and employment indices compared to EC manufacturing



1992 are estimates
Source: Eurostat

increase of the imports from China, which is becoming an important supplier of the EC.

Trade with extra-EC countries grew more slowly than the production. On the contrary intra-EC trade increased faster than production.

MARKET FORCES

Demand

Products made by plastics processors range from such mass-produced items as small injection mouldings and continuously produced low density polyethylene packaging film to such specialised ones as composites used in space-shuttle components. In short, virtually every product manufacturer uses, or can use, plastic components.

There is an extensive and diversified demand for plastics goods. Consumer goods and technical applications are characterised by continuous developments.

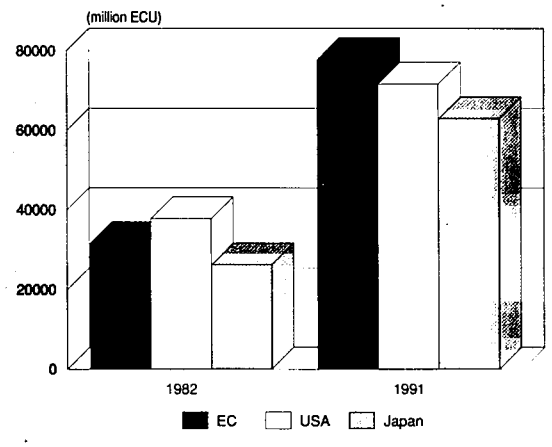
Demand for plastics can be subdivided in six important markets: building (window frames, insulation, etc.); packaging (food, beverages, etc.); electrical/electronics (offices, telecommunications, etc.); automotive; other transports (railways, shipping, aircraft, etc.); and other markets (agriculture, leisure, toys, household, garden, etc.). The first five sectors deliver to other industries, while the last one directly to consumers via distribution outlets such as department stores.

Many industries use components made of various types of polymers. The energy crisis increased the need for low weight materials. For example in the automotive industry plastics have been replacing more and more metal parts. Another example is given by the packaging sector, where plastics have been replacing glass for bottles (soft drinks, mineral water, milk, etc.) and jars (yoghurts, etc.). The man-made properties of more than 5 000 polymers, blends, alloys and combinations enhanced the design and manufacturing of goods (compact discs, televisions, medical instruments) which would not be possible without various types of plastics.

Plastic films

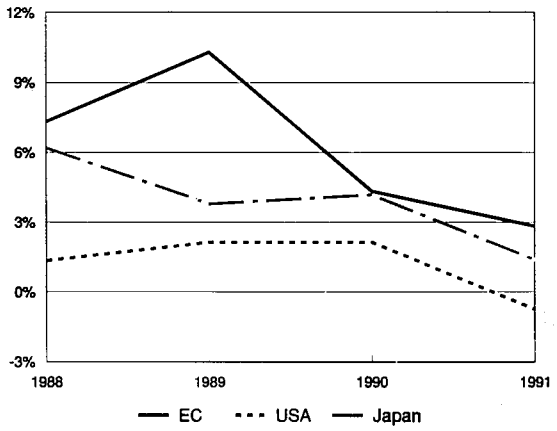
The major end uses of plastic films are printed films for automatic packaging, shrink and stretch films for overpack-

Figure 4: Plastics processing
International comparison of production at current prices



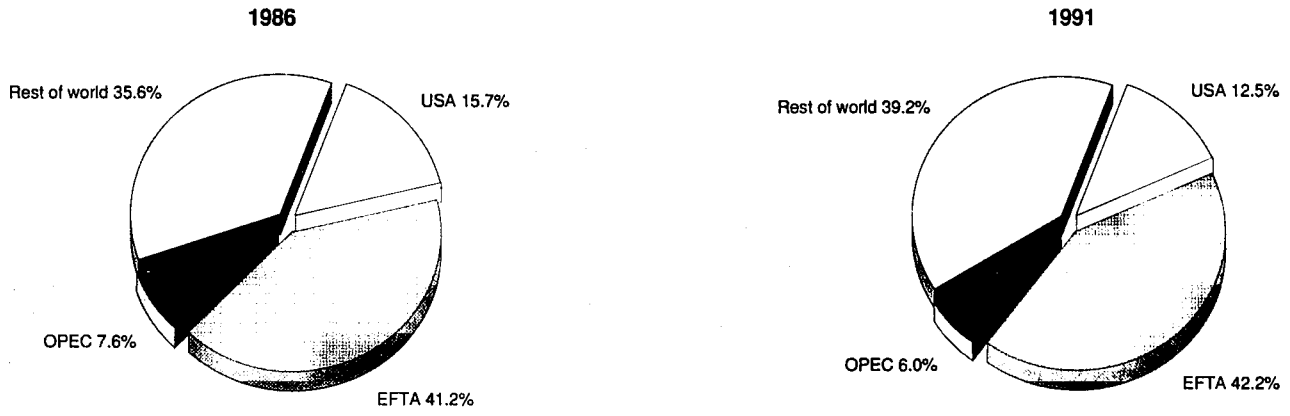
Source: Eurostat, Census of Manufacturers

Figure 5: Plastics processing
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Figure 6: Plastics processing
Destination of EC exports



Source: Eurostat

aging (i.e. pallet hoods and covers or collation films), film for agriculture and horticulture (greenhouses, silage, mulching), films for construction and for shoppers, carrier bags, refuse bags and heavy duty sacks. Almost three-quarters of these films are printed, generally by flexography. Thus printing is an activity almost as important as extruding in this sector of the plastics converting industry.

Polyurethanes

Rigid polyurethane foams show the most potential for growth relative to the more mature flexible market. The key end markets for rigid foams are domestic appliances, mostly refrigerators, which take 90-100 000 tonnes, and the construction industry which takes 250-270 000 tonnes of rigid polyurethane panels. Insulating panels for refrigerated trucks and containers is also an important end market.

FRP/C

The FRP/C industry is a very young and fast growing branch of industry. During its early years in the 1950s the only technologies known were manual hand lay-up and spray lay-up. The first mechanisation appeared only in the 1960s, while pultrusion and winding were introduced only in the 1970s. Even nowadays new techniques are introduced.

In 1990, the breakdown of total EC production of thermoset GRP by manufacturing technique shows that manual techniques still account for about 35%, followed by automated techniques like sheet moulding compound (SMC) and bulk moulding compound (BMC) with about 34% and continuous lamination (about 11%). The percentage of manual techniques used varies greatly among Member States, accounting for more than 80% of production in Greece, Ireland, Portugal and Denmark and for less than 40% in Belgium/Luxembourg, Italy, Spain, France and Germany.

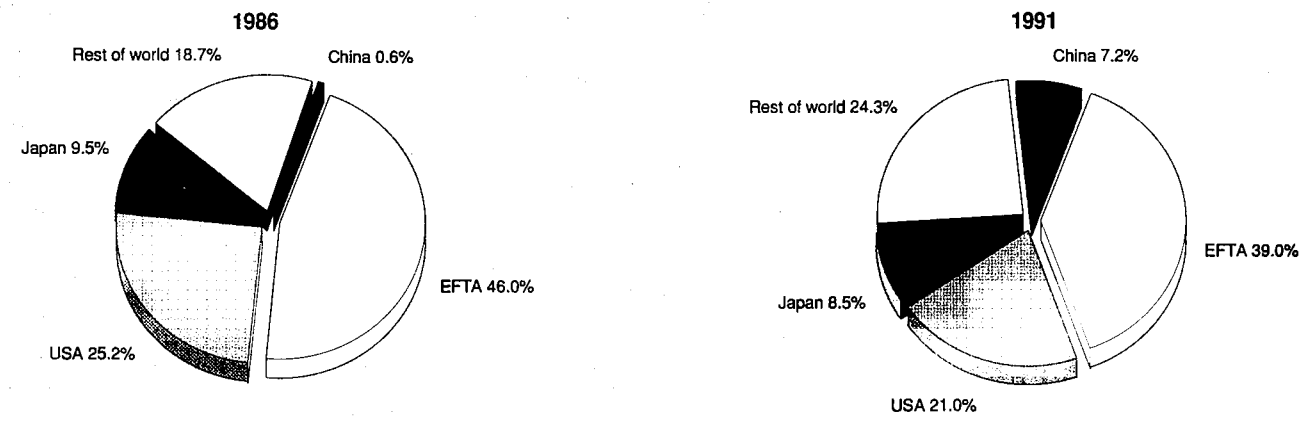
Supply and competition

The existing capacity of polymer production, mostly in the hands if the main petrochemical groups, is in general in accordance with the demand for raw materials by processors.

The plastics processing industry is mainly composed of small and medium sized companies. On one hand for the procurement of raw material, the medium-sized plastics processor has to deal with strong polymer producing companies, and on the other hand he has to sell his plastic products through large scale industries like carmakers, manufacturers of electrical and electronic equipment and department store chains.

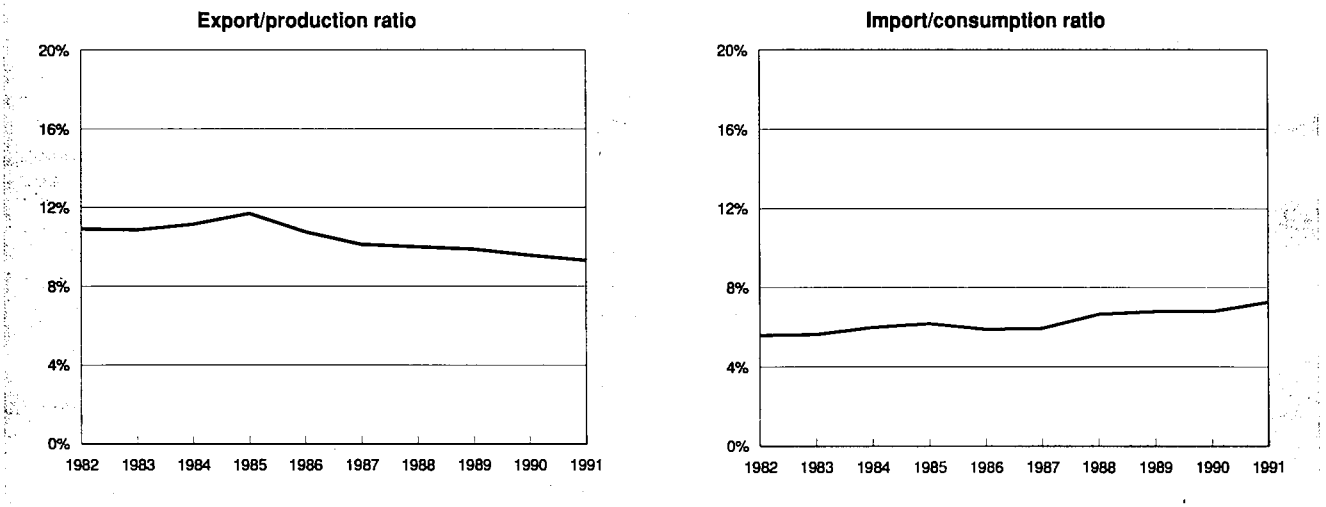
The highly advanced technology in the European processing companies enables them to export about 9.5% of their total production in spite of the high transport costs for plastics

Figure 7: Plastics processing
Origin of EC imports



Source: Eurostat

Figure 8: Plastics processing
Trade intensities



Source: Eurostat

products. The same happens to the imported goods where extra EC imports account only for about 7.3% of total EC consumption. Another reason for this is that plastics processors are often working as subcontractors to other industries and therefore need to be in the "just-in-time" distance. Nevertheless, competition from Far East Asian countries, is becoming in some cases a threat.

Production process

The plastics processing industry utilises a variety of production methods and plastic materials. For every production method, a skilled labour force and important investments in numerically controlled machines are necessary. Professional training is therefore very important for the plastics processors in the EC.

Plastics are increasingly needed because they offer a complete freedom of design, because they are tough, safe, and low in energy content. Plastics lead to many new applications in consumer products as well as in hi-tech applications.

INDUSTRY STRUCTURE

Companies

There are approximately 20 000 plastics processing firms in the EC. The sector experienced a consistent growth during recent years. This was not only achieved by an extension of the sales of the existing companies, but mainly of new companies joining the sector.

Table 5: Plastics processing
Destination of output, 1990

(million ECU)	Value	(%)
Exports	6 981	8.7
Building	13 283	16.6
Packaging	21 603	27.0
Electrical/Electronic	3 503	4.4
Automotive	4 452	5.6
Other transports	1 531	1.9
Other markets	28 610	35.8
Total	79 963	100.0

Source: EuPC

In spite of being a sector of small and medium sized companies, the plastics processing industry in Europe has also larger companies such as: Plastic Omnium (F), Wavin (NL), Alphacan (F), Rehau (D), CMB Packaging (F), BPI (UK), Schöller (D), Autobar (UK), Allibert (F), Klockner (D), Peguform (D), Freudenberg (D), and subsidiaries of Hoechst (D) and Solvay (B).

The biggest companies in the field are establishing links within the EC and eastern Europe and are looking for partners.

ENVIRONMENT

The plastics industry is prepared to accept its fair share of responsibility for the environmental impact of plastics but other essential partners in this work are: supply and user industries, retailers, consumers, governments and the waste disposal authorities. Recognition must be accorded to the environmental benefits they can impart from their initial conception through their service life, for example by saving energy and to their ultimate manifestation as waste, ensuring that their full potential for reuse is exploited. There is no single solution to the problems of plastics waste management and material recycling or chemical recycling, incineration and landfill all have their part to play to different extents and according to particular local circumstances. The preferred hierarchy of solutions should be in the following order: 1) Resource efficiency and waste avoidance; 2) Material recycling/product re-use; 3) Energy recovery/recycling; 4) Thermo-conversion; 5) Landfill.Industry itself can assist to help eliminate litter by avoiding overpacking. However, public discipline has a major part to play and public agencies should help improve public education in this field. Degradable plastics are for many reasons not a solution to litter problems, or indeed to plastics waste management questions in general.

OUTLOOK

Due to environmental concern, the industry can foresee the development of products made of recycled plastics. It can also expect concentrations in different fields such as subcontracting for cars and consumer electronics. This young industry is working at heightening public awareness of its many initiatives to contribute to a cleaner environment. The best growth opportunities may come from newly accessible markets

Table 6: Plastics processing
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	7.0	7.5
Production	5.0	6.0
Extra-EC exports	5.0	6.0

Source: EuPC

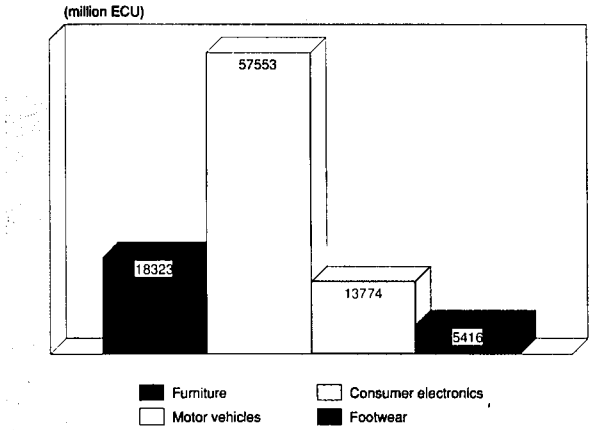
developing in Eastern Europe and new leisure and health care applications.

Written by: EuPC
The industry is represented at the EC level by: European Plastic Converters (EuPC). Address: Avenue de Cortenbergh 66, B-1040 Brussels; tel: (32 2) 732 4124; fax: (32 2) 732 4218.

Furniture
NACE 316.6, 467

Competition in the EC furniture industry is fragmented; the sector is composed of small or medium-sized enterprises. Concentration, however, is increasing, both in manufacturing and distribution and particularly in northern Europe. Four countries, Italy, Germany, Belgium and Denmark, have highly competitive furniture industries.
Demand for furniture is cyclical and highly elastic. It is dependent on a series of indicators over which the industry itself has no control, including consumer confidence in the economy as a whole. The industry is very vulnerable to shifts in the economic climate.

Figure 1: Furniture
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The products of the furniture industry are highly diversified and are classified according to the main composing material. Non-metal furniture, for example, accounts for 78% of production. Products are differentiated between dining/living room, bedroom/bedding, kitchen and office furniture.

Office and shop furniture accounts for approximately 15% of production. Two main product groups can be distinguished in the production of office furniture: seating and other types of office furniture (desks, tables, cupboards and cabinets). Production of seating amounts to about one fourth of total production of office furniture.

Main indicators

After a decrease in the early 1980s in all parts of the sector except office furniture, production levels for the industry as a whole have grown steadily, although growth rates have been slowing more recently. Production growth of 13% (in nominal terms), in 1988 was down to 6.6% in 1991. Consumption growth has outpaced production growth by a small percentage due to weakening export growth in the latter half of the eighties. The slowdown in export growth has also contributed to the deterioration of the EC trade balance since 1989, although rising import growth is a more significant factor. Employment in the EC furniture industry is at its highest level since 1982.

The largest share of the furniture industry is devoted to the manufacture of household furniture, specifically dining and lounge furniture. Office and shop furniture makes up approximately 50% of the metal furniture sector in some countries, including the Netherlands. Total production of office furniture in the EC reached about 6 960 million ECU in 1991. The largest producers were Germany (37%) and Italy (19%).

The countries with the highest value added are Germany and Italy, followed by the United Kingdom and France. Together these four countries account for over 80% of total value added.

Recent trends

Compared with overall EC manufacturing, the furniture industry experienced above average growth from 1985 to 1991, in contrast to the early eighties when furniture production growth lagged behind that of total manufacturing. In particular, office furniture has profited from the general economic upturn since 1982, showing the largest growth rates in the industry.

Before 1986, employment in the furniture industry declined, although at a lesser rate than for total manufacturing. In the late 1980s, however, and in line with production growth, employment in the furniture industry grew faster than overall EC industry employment such that by 1991, employment had regained its 1982 level.

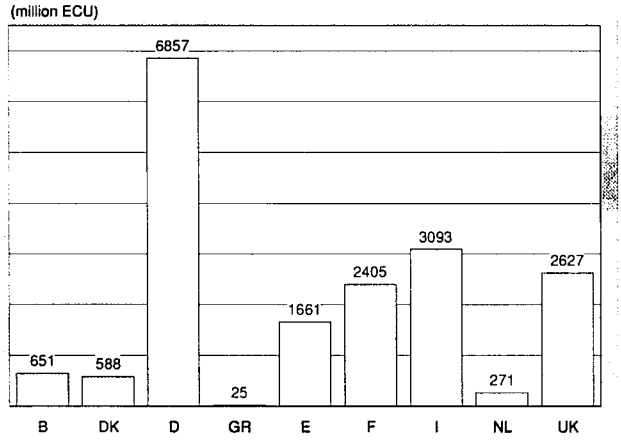
Exports at constant prices for the furniture industry grew at a faster rate than overall EC exports before 1985. This pattern for exports was influenced to a large extent by increased exports to the USA. Since 1986, EC export growth has varied considerably, with virtually no growth in 1986 and 1987, a strong performance in 1989, and a weaker performance thereafter.

Furniture consumption showed no real growth until 1986, after which it began to grow at 6% per year on average, spurring production. Office furniture showed the highest growth rates. Growth rates for the different types of household furniture vary by country. In the United Kingdom consumption of bedroom furniture has the highest growth rate, whereas in Germany, kitchen furniture is the fastest growing subsector.

International comparison

The US furniture sector has expanded more rapidly than that of the EC since 1982, although both regions have grown more

Figure 2: Furniture
Value added by Member State, 1991



Nace 467 only for NL
Source: Eurostat

Table 1: Furniture
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	24 030	25 649	26 990	27 579	29 203	32 318	35 959	40 776	43 878	47 301	49 802
Production	25 599	27 394	29 121	30 247	31 684	34 592	39 102	43 183	46 194	49 223	52 176
Extra-EC exports	2 742	3 039	3 745	4 388	4 131	4 188	4 347	4 951	5 024	5 036	5 188
Trade balance	1 569	1 745	2 131	2 668	2 481	2 274	3 143	2 407	2 316	1 922	2 374
Employment (thousands)	611.0	598.6	585.5	563.3	556.3	563.0	581.7	599.3	607.7	610.4	623.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Furniture
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	0.2	5.2	3.8
Production	0.7	4.4	3.1
Extra-EC exports	10.2	-0.5	3.0
Extra-EC imports	9.5	7.4	8.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Furniture
Breakdown by product line, 1990 (1)

(million ECU)	Apparent consumption	Production	Extra-EC exports
Wooden furniture:	34 522	36 022	3 581
Dining/lounge	N/A	15812	N/A
Bedroom/bedding	N/A	9369	N/A
Kitchen/bathroom	N/A	6646	N/A
Office/shop	5 564	5 792	404
Metal furniture	9 765	10 172	1 443

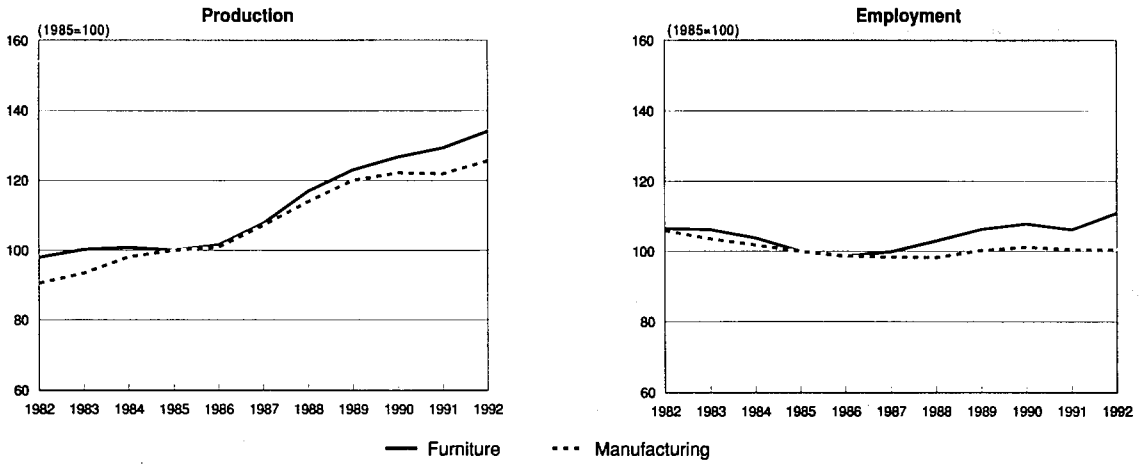
(1) Estimates based on Belgium, Germany, France, Italy, the Netherlands and the United Kingdom; Italian figures include metal furniture, therefore the sum of wooden furniture is greater than the total
Source: Economist Intelligence Unit, Eurostat, Prometeia, BIPE, Central Statistical Office UK, Market Assessment UK, Verband der deutschen Mobelindustrie

Table 4: Furniture
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Extra-EC exports	2 742	3 039	3 745	4 388	4 131	4 188	4 347	4 951	5 024	5 036
Extra-EC imports	1 173	1 294	1 614	1 720	1 650	1 914	2 204	2 544	2 708	3 114
Trade balance	1 569	1 745	2 131	2 668	2 481	2 274	2 143	2 407	2 316	1 922
Ratio exports/imports	2.34	2.35	2.32	2.55	2.50	2.19	1.97	1.95	1.86	1.62
Terms of trade	95.0	96.9	97.4	100.0	101.1	100.5	101.8	102.6	103.7	100.5
Intra-EC trade	3 508	3 751	3 972	4 384	5 212	5 871	6 690	7 782	8 733	9 403
Share of total imports (%)	74.9	74.4	71.1	71.8	76.0	75.4	75.2	75.4	76.3	75.1S

Source: Eurostat

Figure 3: Furniture
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

than the furniture industry in Japan. In addition, strong demand growth in the USA before 1989, stimulated export growth in the EC. The EC's continuously positive trade balance suggests its strong competitive position relative to Japan as well as the USA, both of which have trade deficits in the furniture sector due to higher consumption demand than domestic production.

Foreign trade

Extra-EC imports grew considerably faster than extra-EC exports at the end of the 1980s and the beginning of the 1990s. This is reflected in the development of the trade balance and the ratio of exports to imports, which both increased until 1985 and then fell steadily. Intra-EC trade is important, averaging a steady 75% of total imports. Metal furniture accounts for approximately 30% of total imports and 20% of extra-EC exports.

The EFTA countries are is the primary market for exports, as well as the primary source of imports. Eastern Europe is also a major supplier.

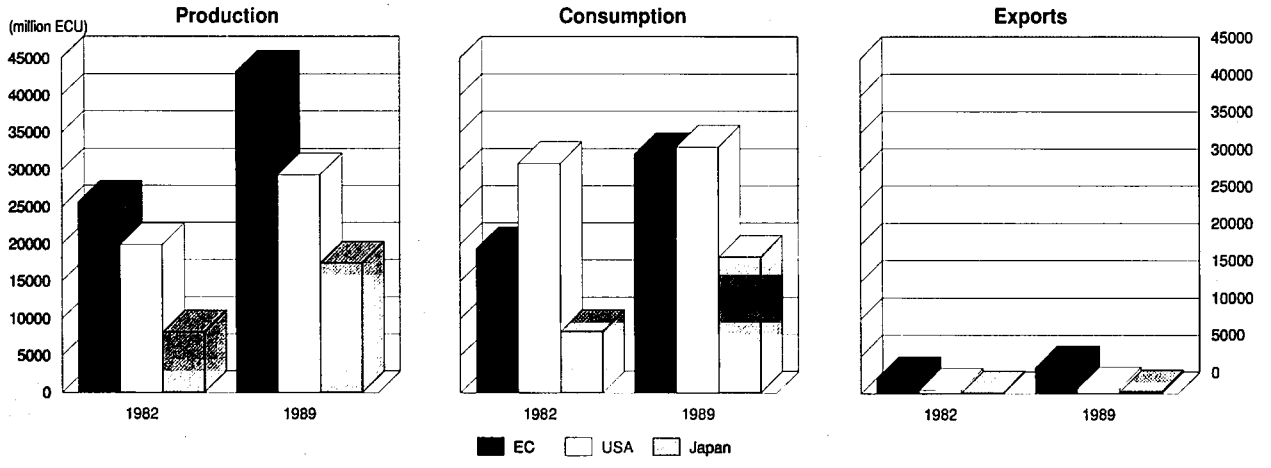
In general trade has grown more rapidly than production, although extra-EC export growth stagnated in 1990 and 1991. Extra-EC exports are a small percent of production compared to intra-EC demand, so this situation did not have a large effect on the overall performance of one industry. Net exporters within the EC are Germany, Italy, Belgium and Denmark, while France and the United Kingdom are net importers.

MARKET FORCES

Demand

Demand for household furniture is primarily connected with growth in the number of new households. Furniture sales are also closely related to trends in overall consumer expenditure and in the housing market. Consumption is also related to consumer confidence in the economy in general. Demand is highly cyclical; purchases tend to be postponed during recession and periods of high real interest rates, making the furniture sector highly vulnerable to changes in the economic situation.

Figure 4: Furniture
International comparison of main indicators at current prices



Source: Eurostat; OECD, Industrial statistics, and Foreign trade by commodities

Other factors which determine demand are changes in life styles, cultural aspects, the furniture renewal rate and the intensity of advertising and marketing, which tends to be very low in the industry.

Supply and competition

The furniture industry is fragmented and is dominated by a number of small independent firms. In recent years, however, large groups have acquired some of the smaller firms, especially in northern Europe. Increased concentration is not yet a factor in Greece, Spain and Portugal, where the manufacturing process is still predominantly artisanal. Germany also tends towards small firms; the average firm has 125 employees and only nine German enterprises have over 1 000 employees.

Retail firms are much more highly concentrated than manufacturing firms, giving the retail sector a firm position vis-a-vis the industry. Internationalisation is expected to increase, although currently only one furniture company in Western Europe, IKEA, in considered to be an international firm. Large trading companies are usually department stores, mail order companies and companies divided into branches. The increased market power of retailers has put prices, and therefore profit levels, under pressure. Larger firms will have a competitive advantage in the future, especially with the advent of the Single European Market.

Four EC countries have highly competitive furniture sectors: Italy, Germany, Belgium and Denmark, all countries with an export surplus. Their position is largely explained by individual local factors, including the level of demand, production factors, distribution networks, etc. For example, the Italian retail system forces manufacturers to be flexible, and results in originally designed furniture to fit specific demand. This necessary domestic innovation strengthens Italian companies on the international level.

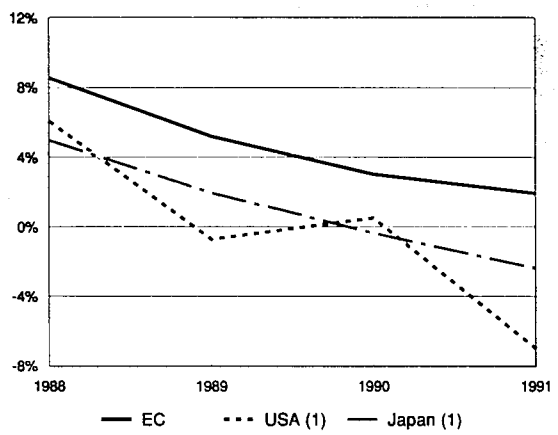
Competition from the United States and Japan in this area is negligible, and imports from East Asia (ASEAN), although increasing, are still only about 3% of total imports. The cost of transportation of the industry's products hampers international trade, although solid wood furniture, furniture in ready-to-assemble form and furniture components have strong international demand.

Eastern Europe has always been an important supplier for the West European market. Due to the economic crisis in these countries, production and supply have been reduced strongly, creating some supply problems in Germany which depends heavily on imports from Romania. Currently only Poland and Hungary are capable of producing goods for exported. Imports from Eastern Europe will continue to decline, although most of what is produced in these countries will be exported due to lack of domestic demand.

Production process

The production of furniture has for a long time been a process artisanal in character; industrial manufacturing of furniture is relatively recent and the production process is still labour intensive. Labour productivity and unit labour costs are therefore of particular importance to this industry. Both have risen

Figure 5: Furniture
international comparison of production growth at constant prices



(1) 1991 for Japan and US are estimates
Source: Eurostat, Department of Commerce, Bureau of Economics Analysis, USA,Statistics Bureau, Japan, OECD, Indicators of Industrial activity

in the past decade, with the unit labour costs increasing slightly faster.

For several subsectors of the furniture industry, raw material input costs can also be very high. In the metal furniture industry in the Netherlands, for instance, these costs amount to 47% of turnover (51% of total costs).

In spite of the labour intensive nature of the furniture industry, technology has been moving the production process towards increasingly automated manufacturing in response to increased national and international competition. Major productivity improvements have been in the production and assembly of rectilinear furniture from coated panel boards.

INDUSTRY STRUCTURE

Companies

The furniture sector is comprised of around 65 000 firms, most of them medium sized. For technical and market-related reasons, a high degree of specialisation is required. However, forces like the Single European Market and the ongoing power of furniture retailers in setting prices are forcing the furniture industry to make strategic choices which include increased concentration.

The number of firms varies regionally. In Spain, where the production process is largely artisanal, the number of manufacturers is around 12 000, whereas in Germany the number is around 1 500.

Strategies

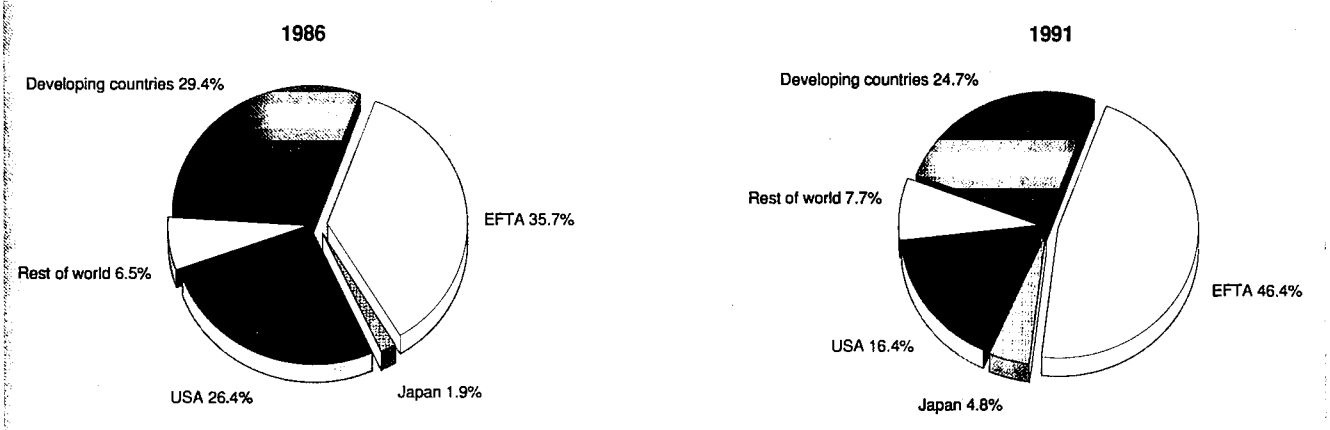
Strategies in the furniture industry will come from the need to face the increased concentration of the distribution sector

Table 5: Furniture
international comparison of home investment at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989
EC (1)	283.7	704.4	709.4	798.8	941.6	919.0	1 203.9	1 354.0
USA	428.7	460.6	697.1	733.9	571.0	552.9	552.2	649.9
Japan	131.4	137.2	165.7	149.5	206.1	222.1	297.1	480.5

(1) Excluding Greece; 1989: NEI estimate
Source: Eurostat, OECD, Industrial structure statistics

Figure 6: Furniture
Destination of EC exports (1)



(1) Excluding metal furniture (Nace 316.6)
Source: Eurostat

and the associated increase in the market power of retailers, franchises, and cooperatives. It is much more difficult to establish cooperatives in the production sector itself and thus is more competition among manufacturers than retailers.

Cooperation is particularly strong in Denmark, Scandinavia and Germany, whereas franchising is more frequent in the United Kingdom. If this tendency continues, European firms' international competitive positions could be threatened. Domestic competition strengthens a firm's efficiency and ability to read changes in market demand, as can be seen from the fact that the four countries with the most competitive industries also are the highest exporting countries in the EC.

REGIONAL DISTRIBUTION

In every country of the EC the furniture industry is present, but in varying degrees of competitiveness and concentration. As previously mentioned, the northern countries and Italy have a fairly developed manufacturing industry, whereas in Portugal, Spain and Greece, the sector is quite artisanal nature.

In general, large-scale enterprises are not numerous, although they do exist in nearly every country.

ENVIRONMENT

Environmental issues for the furniture industry fall into two categories: process problems and the use of specific materials in the products.

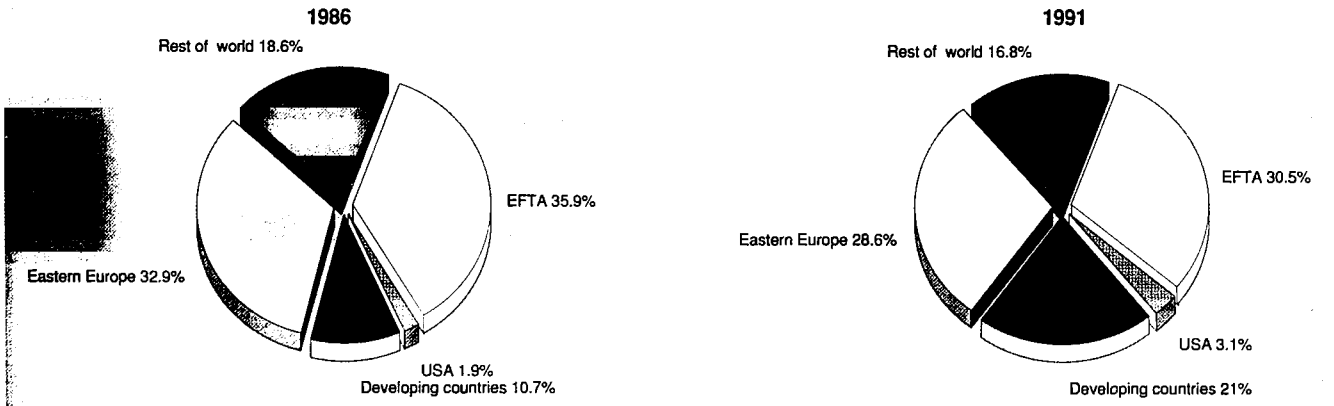
Emissions from finishing materials like stains, glazes and lacquers may cause problems and result in government intervention. The use of plastics in the upholstered furniture industry may be under pressure as well due to the increased concern about certain materials like polyurethane and PVC.

REGULATIONS

Safety of products and protection of design are the two main elements which are affected by legislation.

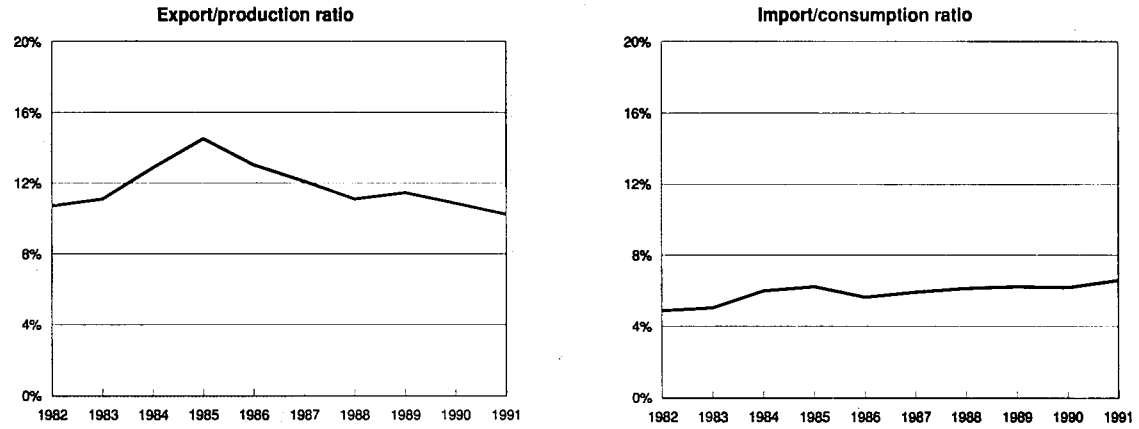
Fire safety is an area of high concern. The EC Commission is drafting a proposal for a directive on the fire safety of

Figure 7: Furniture
Origin of EC imports (1)



(1) Excluding metal furniture (Nace 3166)
Source: Eurostat

Figure 8: Furniture
Trade intensities



Source: Eurostat

upholstered furniture. For instance, it should not be possible for furniture to be set on fire by a burning match or cigarette.

Design protection is one of the key elements of the success of the European furniture industry, and adequate protection of design and models is essential to the industry.

OUTLOOK

The outlook for the furniture market is generally favourable. Due to the growing number of households, as well as the gradual recovery from the general economic slowdown at the start of the 1990s, real growth rates are expected to be 3% to 4% per year in the medium-term. Additional factors supporting growth are high replacement demand and more inherited capital. Prospects for office furniture are particularly promising because of the growth of the service sector and the gradual recovery of investment in the EC.

Counter forces are the saturated market, which will spur competition among the producers, and possibly high interest rates. Output could grow along with demand, but the prospects for exports are less encouraging.

In summary, the furniture industry faces a number of challenges in the future: the growing power of the retailers (e.g. IKEA); the search for Europe-wide brand products; the increased concentration of the industry; the reorganisation of production (automation, logistics, sub-contracting).

Table 6: Timber and wooden furniture (1)
Breakdown by size of enterprise, 1988

(employees)	Number of enterprises	% of enterprises	% of employment	% of turnover
Less than 20	227 532	94.2	46.0	24.6
20-99	12 599	5.2	28.5	30.1
More than 99	1 532	0.6	25.5	36.0

(1) Nace 46
Source: Eurostat

Table 7: Furniture
Labour productivity and unit costs

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	24.6	25.3	25.4	26.0	26.9	27.9	29.3	28.9	29.6	30.0
Productivity index	94.6	97.3	97.7	100.0	103.5	107.3	112.7	111.2	113.8	115.4
Unit labour costs index (3)	83.1	88.6	94.8	100.0	104.7	108.9	115.9	122.2	128.7	N/A
Total unit costs index (4)	74.7	83.7	92.5	100.0	105.5	114.8	125.4	134.4	141.7	150.8

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Table 8: Furniture
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	3.5
Production	3.0	3.5
Extra-EC exports	1.0	1.0

Source: NEI

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: Union Européenne de l'Ameublement / European Furniture Manufacturers Association (UEA). Address: rue de l'Association 15, B-1000 Brussels; tel: (32 2) 218 1889; fax: (32 2) 219 2701; and
Fédération Européenne du Mobilier de Bureau (FEMB). Address: Bredewater 20, PO Box 190, 2700 AD NL-Zoetermeer; tel: (31 79) 53 12 62/63; fax: (31 79) 53 13 65.

Jewellery
NACE 491

The jewellery sector had a difficult year in 1991, with production and consumption in real and in nominal terms declining, although prices for precious metals and diamonds remained stable. The value of diamond sales declined in 1990, although the number of pieces purchased increased slightly, implying increased purchases of lower valued pieces. The outlook for 1993 is more promising, as it is expected that general economic growth will increase after the slowdown at the beginning of the 1990s.

INDUSTRY PROFILE

Description of the sector

The jewellery sector is divided into six subgroups:

- precious metal or precious plated ware;
- goldsmiths' and silversmiths' wares;
- fancy (or "costume") jewellery;
- diamond cutting;
- precious and semi-precious stones;
- coins and medals.

The difference between precious and fancy jewellery is sometimes difficult to determine. An article made of base metal and coated with precious metal set with imitation stones would be regarded as costume jewellery, but high-quality plated metals may also be set with natural stones, and the designation of costume versus precious jewellery is unclear. The industry includes articles made of precious metals (particularly silver) that are not worn on the person.

At the retail level, it is customary for the industry to have close ties with the clocks and watches industry as well as with antiques not necessarily made of precious metals.

It should be noted that Eurostat data on production and employment used in the monograph show the relative volume of the industry in each country and trends in production and employment. However, the absolute figures are underestimated, as units employing less than 20 people are not taken into account by official statistics, and because of high taxation of jewellery in most EC countries. Small firms can account for more than 40% of production for a country.

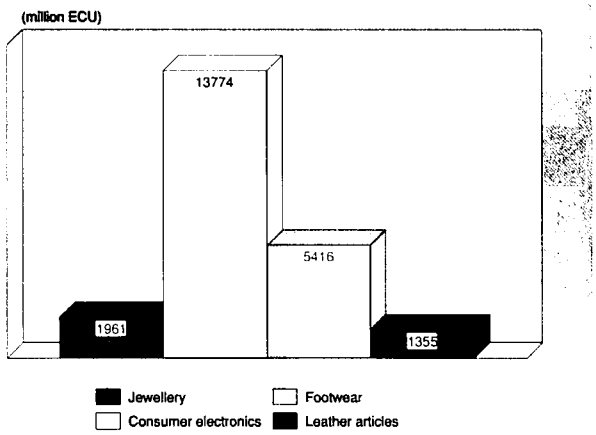
Main indicators

Production in current prices and in real terms grew slowly in 1990 and declined in 1991. For the largest EC producer, Italy, jewellery production declined in real terms by 7% in 1991, and for the EC as a whole, by 6.6%.

Although the growth of gold jewellery fabrication also slowed down in 1990, output from East Asia declined as well, and for the first time in three years the EC's output was higher than that of East Asia. Despite the relatively stable prices of gold, silver and diamonds in 1991, the jewellery industry was vulnerable to the effects of the recession in the USA, and the slow economic growth in the EC and Japan.

Gold production in Italy reached the level of 415 tonnes in 1991 compared to 381 tonnes in 1990 (9% growth), while total gold fabrication in Germany, France and Spain increased 15% during that time. The largest producing countries are Italy, Germany, France and Belgium. Italy alone produced 70% of EC total gold production in 1990.

Figure 1: Jewellery
Value added in comparison to other industries, 1991



Source: Eurostat

Gold and silver traded at low price levels in 1991 compared with the early 1980s. The price of gold went down from 392 USD per ounce to 355 USD in August, 1991. Traditionally, instability raises gold and silver prices, but neither the Gulf War nor the attempted Soviet coup affected the price. Silver prices declined at first, but later rose to the early 1991 price of 4.10 USD per ounce. Diamond prices, which are strongly influenced by the De Beers Central Selling Organisation, remained fairly stable during 1991.

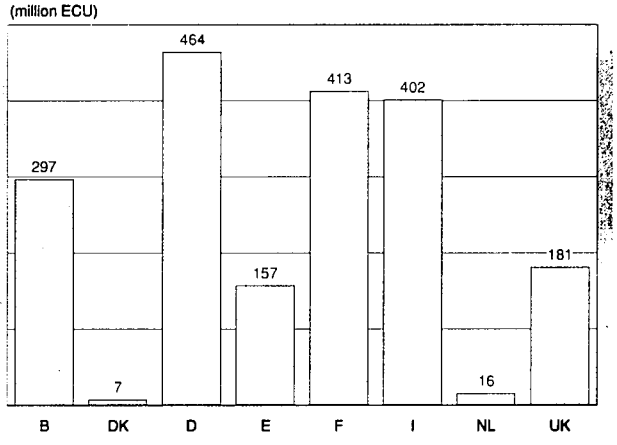
In evaluating apparent consumption, care must be taken in analysing the figures for the following reasons:

- the interval between production and sale is often long and stock levels fluctuate significantly;
- production figures are underestimated by the exclusion of firms with less than 20 employees. Apparent consumption is derived by subtracting exports and adding imports to production, so apparent consumption figures are highly dependant on production figures.

Therefore consumption is likely to be underestimated by a large amount.

Import and export figures, however, will cover most trade because of the high value of the products involved, above the minimum for statistical declaration.

Figure 2: Jewellery
Value added by Member State, 1991



Source: Eurostat

Table 1: Jewellery
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Production (3)	3 727	3 547	3 906	4 797	4 321	5 203	5 562	6 138	6 355	6 109	6 475
Extra-EC exports	7 334	7 566	9 655	9 397	8 740	8 757	10 054	11 855	10 716	10 733	11 270
Trade balance	2 723	2 701	2 937	3 560	2 791	4 368	4 039	4 599	4 018	4 295	4 510
Employment (thousands)	58.9	58.4	57.1	56.3	55.6	55.6	57.6	60.8	61.7	61.5	62.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. For trade, only 1991 is estimated
(2) NEI estimates
(3) Production refers only to companies employing more than 20 people, thus, is a lower estimate of the sector
Source: Eurostat

Table 2: Jewellery
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Production	4.3	2.7	3.3
Extra-EC exports	2.3	7.8	5.9
Extra-EC imports	16.0	6.6	9.7

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Jewellery
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	7 334	7 566	9 655	9 397	8 740	8 757	10 054	11 855	10 716	10 733.4
Extra-EC imports	4 611	4 866	6 717	5 837	5 949	4 389	6 015	7 256	6 698	6 438.4
Trade balance	2 723	2 701	2 937	3 560	2 791	4 368	4 039	4 599	4 018	4 295.1
Ratio exports/imports	1.59	1.56	1.44	1.61	1.47	2.00	1.67	1.63	1.60	1.70
Terms of trade index	67.8	55.7	71.5	100.0	95.3	110.4	78.0	91.8	87.5	97.2
Intra-EC trade	1 547	2 339	1 752	1 867	1 635	3 419	3 288	4 075	4 071	3 972.6
Share of total imports (%)	17.8	24.7	16.0	19.2	16.8	34.6	27.3	28.9	30.4	31.2

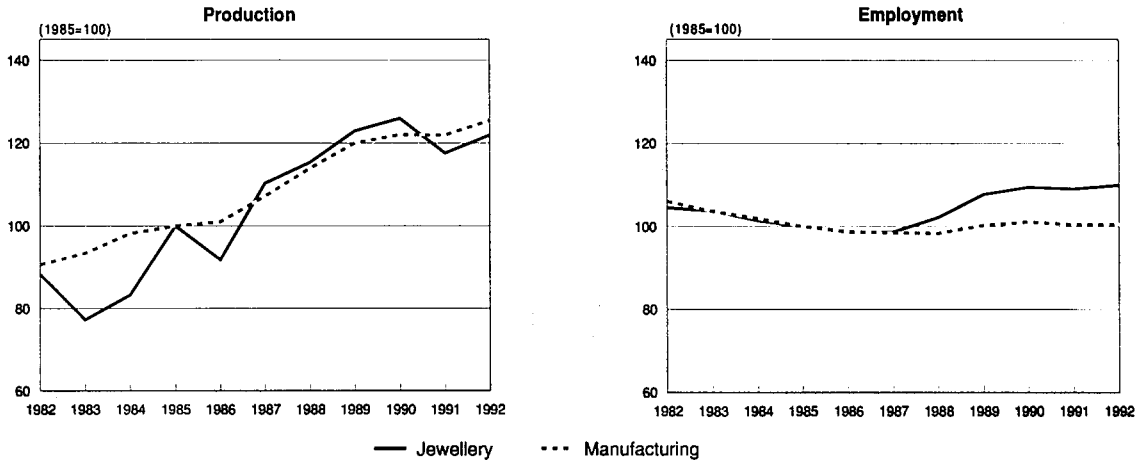
(1) Estimated
Source: Eurostat

Table 4: Jewellery
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	31.4	24.1	23.9	24.8	26.8	39.8	36.0	33.0	34.0	31.9
Productivity index	126.5	97.2	96.0	100.0	107.9	160.0	144.7	132.7	136.9	128.3
Unit labour costs index (3)	82.6	88.0	92.6	100.0	107.1	110.3	114.7	117.4	123.3	N/A
Total unit costs index (4)	58.8	64.7	78.6	100.0	85.8	89.8	102.1	110.2	112.8	110.2

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Jewellery
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

As a result, apparent consumption for even the largest producing countries, such as Italy, could be negative. This is readily understood when one considers that the enterprises included in the production figures employed in 1988 some 12 000 people, whereas it is estimated that total industry employment in Italy is actually around 40 000.

An indication of the market can be found when looking at retail figures. Euromonitor estimates for 1988 showed a market of 8.1 ECU billion (9.6 billion USD) for precious jewellery and of 1.3 billion ECU (1.6 billion USD) for costume jewellery. Using the retail sector margins, the comparable consumption figure calculated equals 5 billion ECU, three times apparent consumption.

France and the United Kingdom are traditionally the major markets for costume jewellery in the EC. Germany has recently witnessed an upsurge in demand for costume jewellery which places the German market alongside the United Kingdom and French markets in importance. German consumers, more than other Europeans, had a bias for real jewellery during the 1960s and 1970s. Costume jewellery became more fashionable at the end of the 1970s, but demand decreased in 1991.

Imports are a small percent of consumption in the EC. Italy is a large importer of raw materials and semi-finished products, which are exported after further production. EC export growth was negligible in 1991, reflecting the less favourable economic situation world-wide. Costume jewellery exports have been declining since 1989.

Employment figures show very little change in the numbers employed between 1985 and 1991, but accurate figures are difficult to obtain due to the large number of very small firms in the industry, and of self-employed workers.

Recent trends

The demand for gold for the purpose of jewellery fabrication rose markedly, from 54% of total gold production in 1980 to 87% in 1990, which had a not able effect on the price of gold. The market for costume jewellery in particular expanded during the 1980s. On the basis of estimates at the retail level for the EC (Euromonitor) and for Japan (Japan External Trade Organisation) and at the industry level for the United States (Department of Commerce) the total value of the market for jewellery in the late 1980s was roughly divided into 80% precious jewellery and 20% costume jewellery.

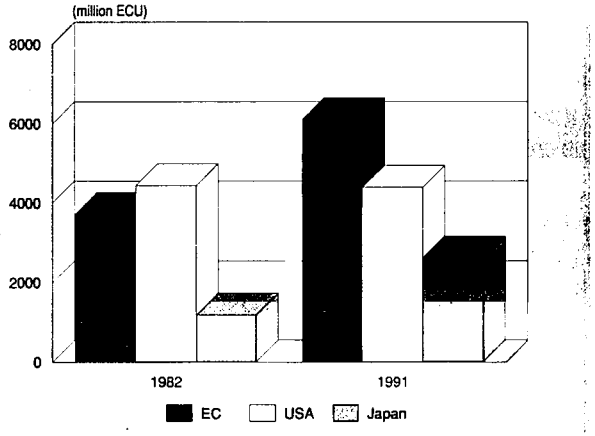
The substantial fall in industry employment in the early 1980s was caused by the slump in economic activity and by increasingly capital-intensive production methods. These methods have allowed for greater production without a dramatic increase of the labour force.

International comparison

According to the World Gold Council, in 1988 around 38% of Italian adults bought at least one article of gold jewellery, compared to 34% in the United Kingdom, 18% in Germany, 14% in France and 15% in other EC countries. In Japan, a comparable figure was 33% of all female adults. In the 1980s these figures showed a rise in almost all countries, but the growth has been especially strong in Japan, where in 1986 this figure stood at 21%. In the USA, sales are under pressure, due to a 10% luxury excise tax applied on the portion of retail sales over 10 000 USD, effective on January 1, 1991, which especially affects high end products.

US demand shrunk in 1991, resulting in difficulties for some retail chains. Total turnover in 1991 has been estimated be-

Figure 4: Jewellery
International comparison of production at current prices



Japanese production presented for 1982 and 1989
Source: Eurostat, US Dept of Commerce, US Industrial Outlook 1992, OECD, Industrial Structure Statistics, Japan External Trade Organisation, Your Market In Japan, 1990

tween 15 billion to 18 billion USD in retail prices. At the industry level, the market for precious jewellery in 1991 was estimated at 6.2 billion USD and for costume jewellery at 1.7 billion USD, continuing the decline of 1990.

In Japan, demand shrunk 2% in 1990. Japan is still considered a growth market, however. The total market in Japan has been estimated at 2,500 billion Yen at the retail level (13.7 billion ECU). Japan itself is facing competition from East Asian countries in the costume jewellery market. Japanese manufacturers are increasingly using the workforce in those areas; bullion and diamond materials are being shipped to East Asia, from which finished or semi-finished products in turn are imported.

According to De Beers, world retail sales of diamonds reached 32 billion USD in 1990.

Foreign trade

The most significant general feature of the trade figures is the volatility of the figures over the years. It should be noted that all values are in ECU. As most international trade takes place in dollars, the ECU values are influenced by fluctuations in the dollar rate. The appreciation of the yen during the 1980s had an overwhelming impact on EC exports to Japan; by 1990, exports to Japan in ECU value were well over nine and a half times the 1980 figure in ECU.

In 1991, extra-EC exports considerably exceeded extra-EC imports. The trade surplus amounted to 4.3 billion ECU, which was an increase from 1990. Much of this, however, was due to falling imports. The breakdown of EC imports by country of destination emphasises the importance of Italy as a producer of jewellery. For Italy itself, exports are very important, accounting for 70% of production. Italian exports mainly involve high priced products.

The trade deficit for costume jewellery amounted to 252 million ECU in 1991, with exports to countries outside the EC of 218 million ECU and imports of 470 million ECU. The largest exporter and importer of costume jewellery is France.

Exports from Thailand have been accelerating over the past ten years, placing it in the position of second largest exporter of jewellery in the world after Italy, with the potential to become the largest. Exports of polished diamonds look particularly promising for Thailand.

For intra-EC trade, the Single European Market will mean that national tariff and quota restrictions will disappear, restrictions mainly found in trade with Spain, Portugal and Greece. EC import tariffs for jewellery range from 3% of CIF value for types of precious jewellery to 8.5% for costume jewellery. For countries falling under the GSP or the Lomé convention there are no tariffs.

In 1991, France and the United Kingdom were the most important consumers of EC exports in Europe. The European export market decreased 2.5% in 1991, continuing the development of 1990.

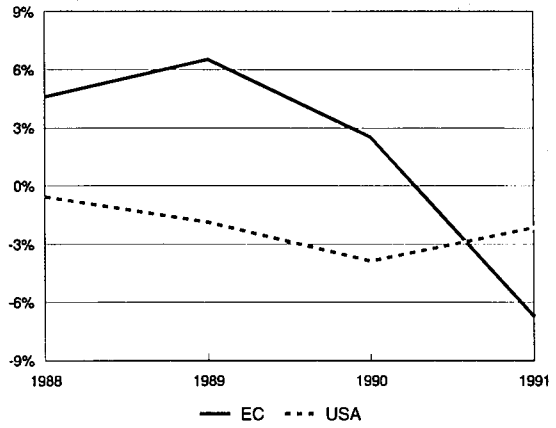
France is the most important intra-EC importer of costume jewellery, followed by Germany, the United Kingdom and Belgium. In 1991, the European export market declined 6.5%. Extra EC exports decreased by 7.5%.

MARKET FORCES

Demand

In 1991, demand for heavier, bulky items increased; ethnic jewellery also grew in popularity, particularly gold mixed with coloured enamel. In the EC, polished gold remains the most popular choice for general jewellery, although textured gold is gaining popularity for more 'avant garde' designs. Earrings are the most frequently bought item.

Figure 5: Jewellery
International comparison of production at constant prices



Source: Eurostat, Census of Manufacturers

Diamond rings continued to dominate the retail sales of diamond jewellery throughout the world. Especially in those countries where diamond engagement rings are traditional, this domination is pronounced. For instance, in the United Kingdom, where 70% of brides receive a diamond engagement ring, rings account for 83% of the total value of the market. In the USA, however, despite the strong tradition of diamond engagement rings, rings accounts for only 61% of total value. This is a result of the increasing popularity of men's diamond jewellery and of high priced diamond bracelets. In Germany and Spain, where engagement rings are not a tradition, rings account for only 52% and 41% of total value, respectively. In Germany, high-value necklaces form a very important category. In Spain, earrings are particularly popular. Sales promotion by the De Beers Corporation in Japan has been very effective, firmly establishing the position of diamond jewellery in the engagement ring market. In Japan, 77% of brides receive a diamond engagement ring. As a result, rings account for approximately 76% of total value in that country.

Purchasing of jewellery is highly seasonal, with one-third of diamond jewellery being bought in December. The rising demand for precious jewellery is a result of growth in the standard of living and personal disposable incomes. National differences can also be quite large. These are influenced by the amount of disposable income people are prepared to pay for luxury items. For instance, Dutch consumers' spending on precious jewellery is relatively low, whereas Italian consumers' spending is high.

The majority of purchasers are women, but the percentage of men buying jewellery is rising. Much of this is for gifts, but there is also an increasing portion of men wearing jewellery. Younger groups in the population are the leading purchasers.

The following factors are likely to stimulate demand for more costly jewellery:

- the ageing population. The percentage of people between 30 and 40 years old will rise in the 1990s. These are the people who buy costly jewellery; younger people tend to buy less expensive fashion accessories;
- the demand for unusual and natural materials;
- the current ornate and luxurious fashion trends.

Among the discernible trends are:

- Far Eastern, Indian and African styles;
- folkloric, heraldic and Art Deco themes;

Table 5: Jewellery
Diamond jewellery - retail sales in value and pieces

		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
EC (1)	million ECU	2 917	3 055	3 387	3 542	3 989	4 443	5 232	6 340	6 058	N/A
	1000 pieces	6 537	7 066	7 137	7 528	8 140	9 123	10 345	11 108	11 258	N/A
Belgique/België	million ECU	N/A	118	118	118	130	134	151	174	130	N/A
	1000 pieces	N/A	250	250	250	260	268	292	321	245	N/A
Danmark	million ECU	20	27	30	22	35	37	40	44	34	N/A
	1000 pieces	77	93	86	79	72	73	76	79	69	N/A
BR Deutschland	million ECU	654	759	749	735	790	1 029	1 180	1 317	1 389	1 402
	1000 pieces	1 707	1 756	1 656	1 714	2 039	2 640	3 036	3 127	3 346	3 011
España	million ECU	307	334	389	435	547	607	749	816	707	728
	1000 pieces	696	795	827	857	919	950	1 087	1 103	1 100	1 100
France	million ECU	579	533	485	488	542	499	564	757	744	720
	1000 pieces	865	830	759	759	721	714	832	1 063	1 069	1 154
Italia	million ECU	973	834	1 065	1 139	1 347	1 489	1 676	2 283	2 187	2 252
	1000 pieces	1 850	1 898	1 974	2 239	2 390	2 377	2 543	2 871	3 081	3 173
Nederland	million ECU	56	63	68	73	81	84	130	142	121	N/A
	1000 pieces	189	191	194	196	233	276	325	356	338	N/A
United Kingdom	million ECU	328	367	483	532	517	564	742	807	748	670
	1000 pieces	1 153	1 253	1 391	1 434	1 506	1 825	2 154	2 188	2 010	1 709
USA	million ECU	5 137	5 838	6 731	7 613	8 248	9 558	9 775	10 693	8 939	N/A
	1000 pieces	14 575	15 241	16 054	17 407	18 155	19 843	18 863	17 989	16 993	N/A
Japan	million ECU	4 144	4 863	5 773	5 861	7 168	7 810	10 143	10 622	9 183	N/A
	1000 pieces	4 449	4 630	5 257	5 591	5 953	6 795	7 900	8 295	7 631	N/A

(1) Excluding Greece, Ireland, Luxembourg and Portugal; 1982 excluding Belgium
Source: De Beers

- increased use of natural raw materials;
- floral and animal motifs.

The last two trends emerge out of a general concern for ecology and nature.

Supply and competition

There is little branding in the precious jewellery sector, which makes analysing competition at an industry level irrelevant. It is more significant to determine competition at the retail level. Manufacturing for costume as well as precious jewellery is highly fragmented, with many small, artisanal companies. At the retail level there is also fragmentation, but in the 1980s some retail chains gained importance: including Ratners (parent company of Ratners and H. Samuel) in the United Kingdom, Magic Moment and Gold Market in Italy.

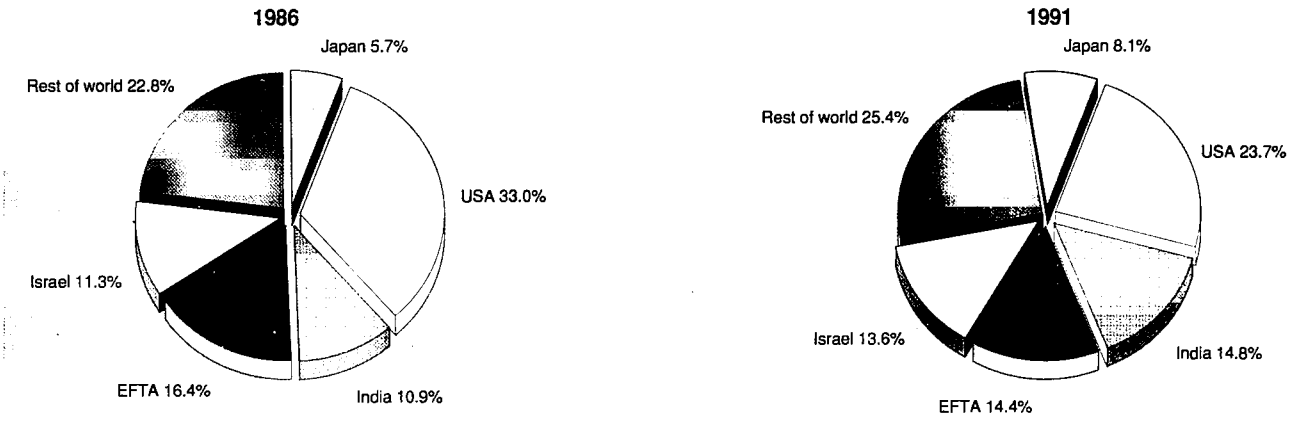
Precious jewellery is sold mainly through specialist jewellers, whereas costume jewellery is sold through a variety of outlets: department stores, chemists, clothing shops and jewellers.

Competition in the costume jewellery industry is coming mainly from East Asian countries, especially Hong Kong, South Korea, Taiwan and Thailand. Usually these countries operate at the less expensive end of the market, but product quality is improving. Competition from East Asia takes place mainly through price.

Production process

Most of the enterprises in the precious jewellery industry are artisanal in character. Therefore it is difficult for the industry to keep up with fast growing demand, as was the case in the 1980s. In comparison with costume jewellery, however, the

Figure 6: Jewellery
Destination of EC exports



Source: Eurostat

Table 6: Jewellery
Gold fabrication in carat jewellery - production (including scrap)

(tonnes)	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC (1)	321.6	262.4	310.8	353.4	341.1	332.7	391.1	495.7	553.6
EC (excluding scrap)	295.6	235.9	285.7	329.2	323.1	315.2	374.4	477.8	N/A
Belgique/België	2.1	2.0	1.9	1.9	1.7	1.6	1.8	2.0	2.2
Danmark	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.8	0.9
BR Deutschland	32.5	33.0	33.0	34.1	35.0	39.2	45.1	51.9	58.6
Hellas	6.7	7.9	9.1	10.5	9.0	8.2	8.3	8.6	10.0
España	15.8	13.4	12.6	15.7	15.6	17.0	24.0	30.0	34.0
France	18.8	17.4	16.7	17.6	19.9	20.4	22.3	25.1	30.2
Ireland and United Kingdom	13.2	12.0	13.5	15.5	16.6	18.4	21.1	25.7	27.8
Italia	228.0	172.0	220.0	253.0	238.0	222.0	262.0	345.0	381.0
Nederland	0.8	0.8	0.8	0.8	0.9	1.0	1.1	1.3	1.5
Portugal	3.0	3.2	2.4	3.5	3.5	4.0	4.5	5.3	7.4
Rest of Europe	29.1	28.9	31.2	35.7	37.4	37.0	45.3	54.9	64.0
North America	81.8	90.2	94.5	99.8	103.2	104.1	110.7	119.2	135.7
of which, USA	71.6	79.8	83.9	89.0	92.9	94.4	100.6	108.8	126.6
Latin America	30.6	21.4	18.5	22.2	33.2	23.3	23.0	28.6	40.9
Middle East	168.5	155.8	208.7	213.9	206.2	195.8	210.0	257.3	317.5
Indian Subcontinent	126.5	121.3	170.5	199.9	175.9	190.2	221.5	258.5	277.1
Far East	138.0	122.8	215.7	201.3	198.0	253.0	442.5	565.2	549.4
of which, Japan	42.9	43.4	50.2	60.7	80.7	84.0	95.0	112.5	102.3
Africa	18.7	17.8	18.3	17.8	21.0	22.4	32.0	33.8	42.8
Australasia	5.3	4.7	2.6	3.2	4.4	4.2	4.0	5.1	4.7
Total	940.0	847.3	1 097.6	1 179.3	1 154.4	1 197.1	1 514.5	1 873.8	1 985.6

(1) Excluding Luxembourg
Source: Gold 1991, Consolidated Gold Fields

precious jewellery industry has the advantage of not being under the influence of fashion trends: designs last much longer.

The manufacture of costume jewellery includes a broad variety of products: brooches, ear-rings, necklaces, bracelets, rings, hair ornaments, hat ornaments, shoe ornaments, cuff-links, tie-clips, etc. To maintain market position, manufacturers of fashion jewellery are urged to produce up-to-date designs. In theory, new collections are introduced 2 to 4 times per year, but in practice new ranges appear much more frequently. This makes short distribution lines necessary, giving local EC producers an advantage over overseas manufacturers. Much costume jewellery is shipped by air because of the need for quick delivery.

Costume jewellery is very sensitive to fashion trends, which make high mark-ups necessary to compensate for the risk of goods becoming unsaleable.

INDUSTRY STRUCTURE

Companies

Jewellery manufacture, for both precious and costume jewellery, is highly fragmented. For example, Italy's industry has 6,500 businesses, employing 40,000 people (estimated). The largest are all privately, generally family, owned and managed.

Primary precious jewellery firms include Lyon Alemand Louyet (France), Engelhard (France), Trattamente Ceneri Auroargentari (Italy), Uno a Erre Italia (Italy), Rosy Blue (Belgium), Lens Diamond (Belgium), Franz Golz (Germany) and Guthmann & Wittenauer.

Among the costume jewellery companies with the highest sales are Bijoux GL (France), Moranduzzo Dario (Italy), Modern Creation Muenchen Reisegepack (Germany), and Rudolf Zenner (Germany), among others.

Strategies

The use of brands is rare in the jewellery industry. The few existing brands tend to be active in the costume jewellery sector, mainly originating from enterprises with well known brand names in other industries such as cosmetics or clothing (Kenzo, Moschino, Fiorucci) which branch out into jewellery. Distribution, therefore, plays an important role in competition and strategy.

Precious jewellery is mainly sold through speciality jewellers, but there are a growing number of multiple and non-specialist outlets. However, once demand picks up, independent jewellers should fare better. For costume jewellery sales outlets are much more diverse, with special emphasis on the tax and duty free shops. With the Single European Market, this type of outlet will disappear for intra-EC travel, but the European Commission has given the duty free stores until the year 2000.

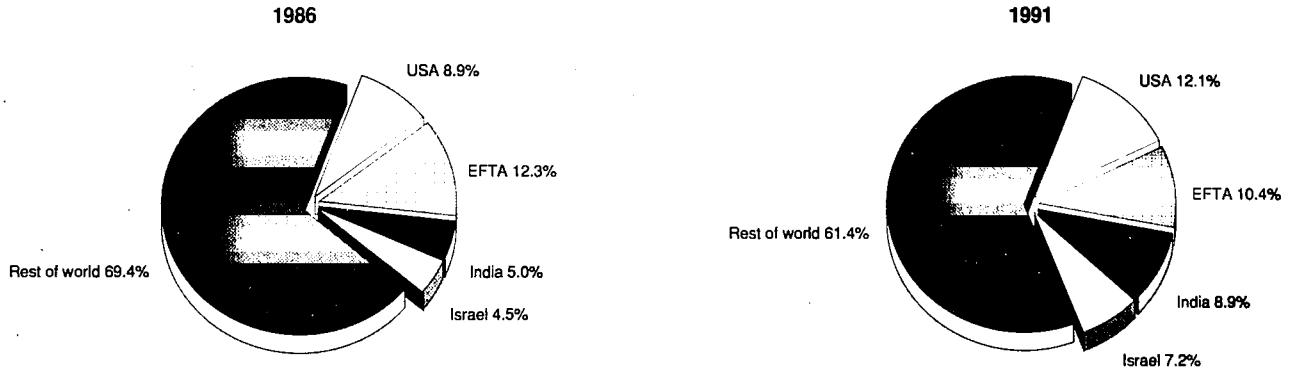
Most of the enterprises of the industry are too small to follow rigid strategies apart from following the market. As competition with foreign industries increases, however, more emphasis could be placed on quality.

REGIONAL DISTRIBUTION

The industry has a great need for specialists and therefore remains concentrated in places where the infrastructure has been built over many years. By further specialised aggregation, some locations lend themselves to higher-quality jewellery, some to quantity production, and some to production of larger silver articles.

The main manufacturing centres in Italy are Arezzo, Vicenza and Piedmont. In Germany about 75% of the trade is based in Pforzheim, with Idar-Oberstein being an important centre of the gemstone industry. Other centres are Schwabisch Gmund, Hanau and Kaufbeuren. In France, Paris and Lyon account for a major part of the industry, as does St. Amand.

Figure 7: Jewellery
Origin of EC imports



Source: Eurostat

In the United Kingdom the main centres are London, Hatton Garden, Birmingham and Sheffield (the centre for cutlery and a large portion of the table-silver industry). In Belgium, Antwerp is the centre of the jewellery industry. Belgium ranks among the major diamond cutting centres in the world, along with India, Israel and the United States.

REGULATIONS

Regulations in this industry refer only to the precious jewellery, as there are generally no specific standards or restrictions for fancy jewellery.

Currently, four systems of grading are in use for polished diamonds, associated with the Gemological Institute of America (GIA), the International Diamond Council (IDC), the Scandinavian Diamond Nomenclature Committee (ScanDN) and the International Confederation for Jewellery, Silverware, Diamonds, Pearls and Stones (CIBJO). Proposals have been made to arrive at one international standard. Although all organisations are confident of reaching a successful solution, an agreement has still not been reached.

On October 8, 1990 the European Commission accepted the Green Paper on standardisation (published January 28, 1991). Early in 1992, the Commission gave a communiqué summarising the reactions on the Green Paper. All this has to lead to directives in the spirit of the "new approach" (the Commission only providing general guidelines and prescriptions for a product).

OUTLOOK

Demographic changes will affect the market. The proportion of persons 45 to 65 years old in the population is forecasted to grow 4% by 1995, which should stimulate demand for higher priced items. The proportion of people aged 15 to 24 years is forecasted to fall 12%, which will lead to more competition in the lower-price end of the market.

Forecasts for the jewellery sector depend heavily on the price of gold. Along with the expected moderate economic growth, the gold price may move upwards. But several scenarios are possible here, including a further decline in price should the mining industry not decrease production. After the active years of 1988 and 1989 and the successive slowdown in 1990 and 1991, growth is expected to be 3% to 4% for the jewellery industry.

Table 7: Jewellery
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	4.0
Production	3.0	4.0
Extra-EC exports	2.0	5.0

Source: NEI

The costume jewellery industry is very sensitive to developments in the world economy. As the prospects for general economic developments are for slow growth, the outlook for the costume jewellery industry is also moderate.

Furthermore, competition is expected to intensify as a result of the advent of the Single European Market and of production in East Asia. Another threat to domestic EC manufacturers is the assembly of imported pieces into products by importers. Subcontracting to manufacturers in the Far East is also growing. These developments put pressure on prices.

One possible response of manufacturers is the development of brand names. At the moment, brands are mostly absent in the sector, which increases vulnerability to imports. Developing brands could offer significant opportunities, although more for distributors than producers, due to the higher level of concentration among distributors. Brands could also differentiate between East Asian and European manufacture on the basis of quality; East Asian imports compete on a price basis, and with the demographic changes expected in the near future, price will be less important than quality.

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: International Confederation of Jewellery, Silverware, Diamonds, Pearls and Stones (CIBJO). Address: 78A Luke Street, London EC2A 4PY, United Kingdom; tel: (44 71) 613 44 45; fax: (44 71) 613 44 50; and,
Union Européenne des Fabricants de Bijouterie Fantaisie (UNEBIF). Address: Via Desenzano 8, I-20146 Milano; tel: (39 2) 404 3275/3277; fax (39 2) 487 014 19.

Musical instruments
NACE 492

There has been an increasing demand for musical instruments in the 1980s as a result of changing lifestyles and the development of musical culture among the general public. Asian imports account for a large portion of the supply of electronic instruments; Japan is particularly strong in the supply of up-market, sophisticated instruments. Current trends in EC production are likely to continue into the 1990s with the emphasis on traditional, high-quality instruments, the gradual development of electronic instruments, and increasing activity in the restoration of old instruments due to the growing share of 30 to 40 year old people in the EC and the accompanying changing lifestyles.

INDUSTRY PROFILE

Description of the sector

The products of the musical instrument industry are highly diversified and can be summarised in the following groups:

- pianos (upright and grand pianos);
- organs;
- woodwind instruments (saxophones, oboes, flutes and clarinets);
- brass wind instruments (trumpets, trombones);
- string instruments (violins, cellos, violas and bases);
- fretted instruments (non-electric guitars, mandolins, banjos);
- percussion instruments (drums, cymbals);
- electric pianos, electric keyboards, portable keyboards;
- synthesisers;
- other instruments (accordions, rhythm machines, mouth organs, harpsichords, pipe organs);
- accessories and parts (bows, strings, bridges, components for electronic music).

Musical instruments include both traditional instruments (early or modern), and electronic instruments.

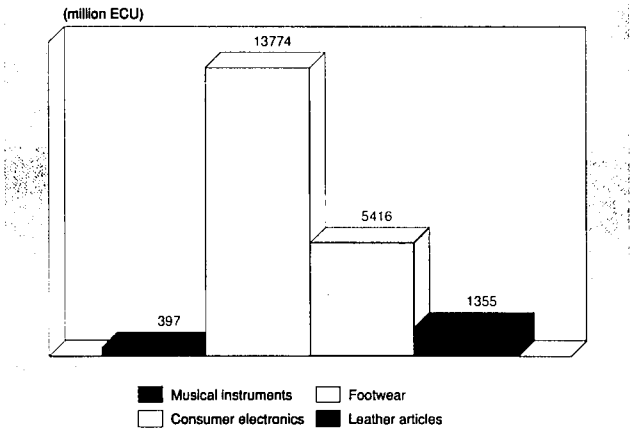
Demand for pianos keyboards and related instruments accounts for two-thirds of the market.

Main indicators

Consumption of musical instruments increased in 1991, after a decrease in 1990, and production reflected the improved demand with a similar growth. The EC is a net importer of musical instruments. In 1991, the balance of imports over exports deteriorated slightly as EC exports grew slowly compared to EC imports. These indicators do not reflect perfectly the market for musical instruments, as resale and rental, which are significant in all European countries, must also be taken into account.

Employment fell in 1990 and 1991, compared to growth in 1989. Many countries, however, only report employment for firms with 20 employees or more. In Germany alone, 30% of the working force is employed in firms with less than 20 employees. When taking into account that labour force reduction is more difficult in small companies than in large ones the decline in employment in recent years is likely to be insignificant.

Figure 1: Musical Instruments
Value added in comparison with other Industries, 1991



Source: Eurostat

Production of musical instruments varies on a regional basis. The bulk of European production comes from Germany and Italy, which together account for 78% of EC production. Germany (West), however, suffered a decrease in production at constant prices from 1980 onwards with only a temporary recovery in 1989. Italy's production grew until 1991, with a setback only in 1990.

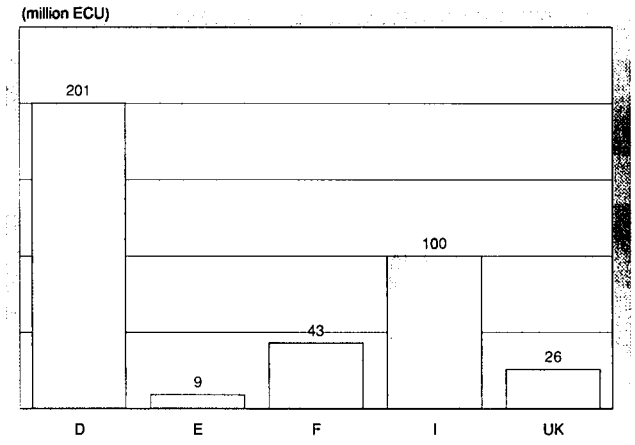
According to some market reports of Germany and the United Kingdom, there is a trend towards the use of more traditional, acoustic instruments. A renewed interest in jazz in some countries is creating more demand for pianos and wind instruments. The largest growth of the market, however, is still to be found in new electronic products.

Recent trends

EC production at current prices grew 37% between 1985 and 1991. In constant prices however, total production recovered slowly from the decline in the early 1980s, with a slight relapse in 1990. In 1991 there was a substantial rise in production.

The growth rate of value added has lagged behind production growth. Investments by EC producers picked up in 1988 and again in 1989 according to German figures. Investment in the USA also grew in 1988, but fell back in 1989.

Figure 2: Musical instruments
Value added by Member State, 1991



Source: Eurostat

Table 1: Musical instruments
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	748	797	877	871	958	1 106	1 177	1 235	1 222	1 335	1 441
Production	575	623	700	700	728	773	791	842	853	961	1 041
Extra-EC exports	172	199	222	255	234	231	231	269	282	288	303
Trade balance	-172	-174	-177	-171	-230	-333	-386	-393	-368	-373	-392
Employment (thousand)	18.1	17.4	16.8	16.0	14.7	14.5	13.7	14.2	14.1	13.8	14.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 is estimated
(2) NEI estimates
Source: Eurostat

Table 2: Musical instruments
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-4.6	5.5	2.0
Production	0.1	2.4	1.7
Extra-EC exports	9.8	4.8	6.5
Extra-EC imports	-5.2	9.4	4.3

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Musical instruments
External trade at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 (1)
Extra-EC exports	172.3	198.9	222.1	255.4	234.2	231.3	231.0	269.2	281.7	288.3
Extra-EC imports	344.6	372.7	399.4	426.6	464.3	564.1	617.2	662.1	650.1	661.5
Trade balance	-172.3	-173.9	-177.3	-171.2	-230.1	-332.7	-386.2	-392.9	-368.4	-373.1
Ratio exports/imports	0.50	0.53	0.56	0.60	0.50	0.41	0.37	0.41	0.43	0.44
Terms of trade index	129.7	116.9	106.4	100.0	103.1	102.7	98.6	97.4	100.8	94.0
Intra-EC trade	227.3	209.8	203.1	201.1	209.6	223.2	232.6	255.8	294.1	309.2
Share of total imports (%)	39.7	36.0	33.7	32.0	31.1	28.3	27.3	27.9	31.1	31.8

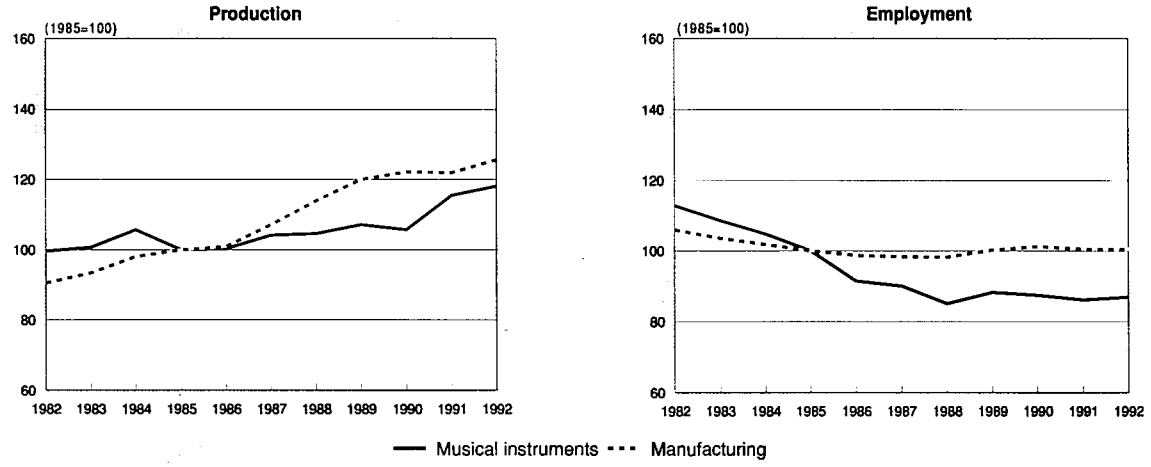
(1) Estimated
Source: Eurostat

Table 4: Musical instruments
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	24.6	24.5	25.1	24.7	26.6	27.3	27.7	27.2	27.2	28.7
Productivity index	99.4	99.3	101.6	100.0	107.4	110.4	112.0	109.9	110.0	115.9
Unit labour costs index (3)	85.5	89.9	94.9	100.0	110.3	113.8	121.8	123.7	128.8	N/A
Total unit costs index (4)	69.2	83.1	103.6	100.0	115.3	128.3	143.3	148.4	149.4	174.5

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Musical instruments
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

In the 1980s many firms, both cottage industries and larger concerns, went out of business as a result of commercial and financial difficulties. The number of people working in the industry fell from 19,300 in 1980 to 13,800 in 1991, with a temporary increase in 1989. The evolution varies from country to country. Employment is mainly concentrated in Germany (48 % of the total), Italy (18%), the United Kingdom (13%) and France (11%). The greatest job losses since 1980 have occurred in Italy, the United Kingdom and Spain. Although Germany and France have also experienced declining employment, the decreases were smaller and steadier. Since German figures refer only to firms with 20 employees or more, this fall is likely to be lower when the small firms also are taken into account.

International comparison

With production at 962 million ECU, the EC was the largest world producer in 1991 for the sixth consecutive year. Japan suffered from a decrease in production after high growth in 1990 while USA production declined for third year in a row.

Foreign trade

The EC faces stiff competition for high value, modern products, especially from the East Asian countries of Japan, South Korea, China and Taiwan. In the field of traditional instruments, competition is also present from other Europe countries including those in Eastern Europe, Austria and Finland. Increasing labour costs had a negative impact on EC competitiveness at the end of the 1980s and at the beginning of the 1990s. Asian countries have succeeded in gaining a firm foothold in the EC market by selling good quality products at lower prices.

Throughout the 1980s, imports grew steadily mostly in electronic instruments, pianos, wind instruments, and accessories and parts. EC producers are faced with an absolute decline in market share; the share of the EC market being supplied by non-EC producers has grown from 40% in 1980 to 50% in 1991.

In 1991, exports of musical instrument accounted for 30% of total production: the same ratio as in 1980. The EC balance of trade figures showed a deficit throughout the 1980s. Exports consist mainly of string instruments, accordions, organs, and accessories and parts. In 1991 extra-EC exports continued to grow after the recovery in 1989. Intra-EC trade has grown faster than extra-EC trade since 1988, a reversal of the trend in the 1980s.

MARKET FORCES

Demand

The EC has a large market, estimated at 1 335 million ECU in 1991. However, the consumption of musical instruments in the EC remains low compared to the United States, due to the fact that the market is made up of individual national markets with specific characteristics. There is, however, a trend towards greater uniformity in the electronic instruments sector.

Several basic factors are likely to have a favourable effect on the musical instrument market all of which are linked primarily to demographic developments.

The decreasing number of 5 to 20 year old people in the total population will, in the long term, lower total demand for musical instruments and, in the short term, lower growth of demand for easy electronic instruments like portable keyboards. The increasing number of 30 to 40 year old people means more purchasing power and more interest in acoustic instruments in the future.

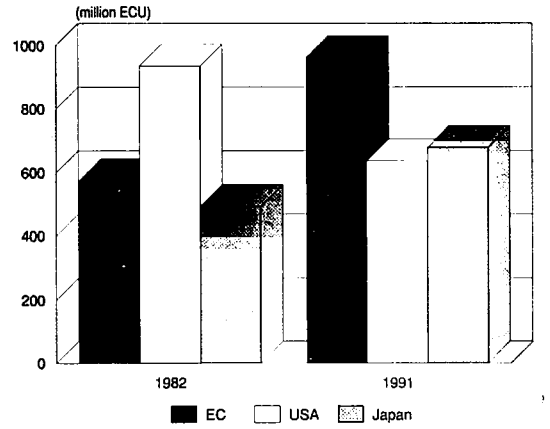
The rise in purchasing power and changing life styles, have also revived interest in music-making.

Table 5: Musical instruments
Breakdown by major product line, 1988

(thousands)	Production
Pianos:	
-EC	25
-Asia	572
-North America	215
Musical instruments, string:	
-EC	96
-Asia	1 867
-North America	83
Musical instruments, wind:	
-EC	3 025
-Asia	274
-North America	5 138

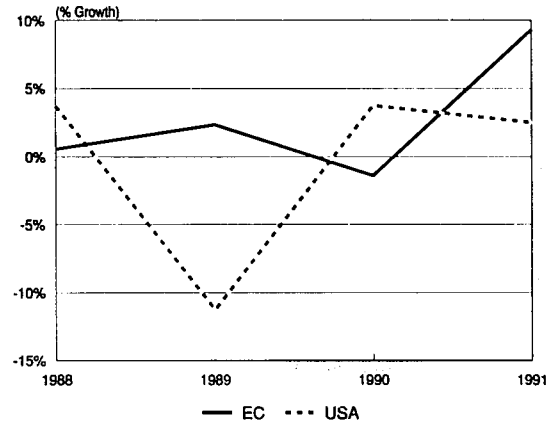
Source: UNIDO

Figure 4: Musical instruments
International comparison of production at current prices



Source: Eurostat, US Dept. of Commerce, US Industrial Outlook 1992; UN, Trade Statistics Yearbook; Census of Manufacturers

Figure 5: Musical instruments
International comparison of production growth at constant prices



Source: Eurostat, Census of Manufacturers

Supply and competition

Despite its large home market, the EC musical instrument industry is losing its competitive position. Import penetration continued after a temporary standstill in 1990. During the second half of the 1980s the yen depreciated, making Japanese products relatively cheaper in the EC, whereas EC exports to Japan grew more expensive. In 1990 the yen appreciated, which is reflected in weaker imports, but in 1991 the Japanese currency again fell in value against the ECU.

The development of electronic music instruments has lead to a wider range of products. These electronic instruments have an advantage over traditional music instruments in that they offer new ways of making music, in an easier and more accessible way for non-professional musicians makers. However, a part of the market for traditional instruments has been lost, mostly in the segment of musical instruments which were designed to be played at home. In the professional market the trend in live music towards more sophisticated shows and video clips has lead to a demand for easy compatibility of instruments.

Production process

European firms concentrate on products in the top of the market range. High quality production implies smaller production runs and instruments made-to-order, consistent with an industry which is geared to an experienced clientele rather than the general public. The EC industry, with its specific national features, also plays an important role in transmitting European musical culture through the instruments it manufactures: pianos and violins in Germany, woodwind instruments in France; guitars in Spain; and some piano and brass instrument manufacturing in Britain.

INDUSTRY STRUCTURE

Companies

The EC musical instrument industry suffers from two major structural handicaps. Firstly, the industry is fragmented, with many small and medium-sized firms. Secondly, the EC lacks multinational firms similar to those of the United States and Japan. That situation has led to restructuring and mergers in all EC countries.

An important development, which will raise the competitive pressure in the high quality market, has been the decision of Yamaha, the world leader in musical instruments, to set up localised production plants in the EC. Yamaha recently took control of Kemble (UK) piano company and brought the Premier (UK) drum company. Premier percussion ranked 16th in sales in 1990 and had some 220 employees. Yamaha also acquired an interest in Schimmel (D). This should strengthen its presence in the EC, and allow Yamaha to offer better service and to respond more quickly to local preferences.

The South-Korean company Samick has plans for a piano assembly plant in Germany. Samick is the second largest piano maker in the world and has the worlds largest guitar manufacturing facility. Daewoo also has some interest in a German manufacturer.

The shift in markets and the development of new markets have encouraged a number of companies, mostly Japanese and South Korean with core activity outside the market for musical instruments, to enter the market. An increasing use of computers in synthesisers and Public Address (PA) systems facilitated the entry of computer manufacturers.

The development of new electronic instruments has mostly hit the lower quality market, while EC companies still have a name for high quality products. Steinway pianos, Selmer saxophones, Buffet-Crampon clarinets and Hohner accordions and mouth organs continue to be regarded as the best available.

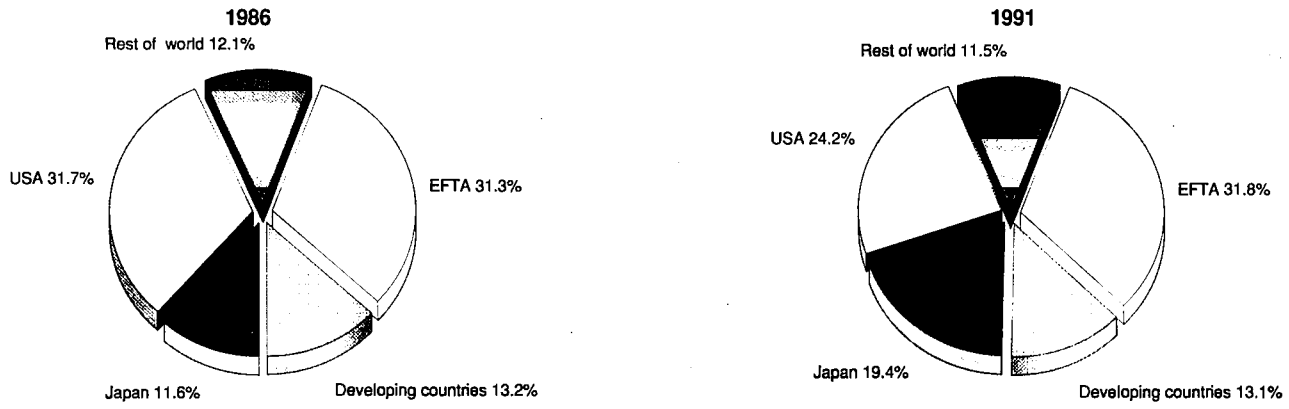
There are only a few large companies in the EC musical instrument industry. They include: Hohner, Steinway and Sons, Schimmel, Schreiber and Vogtländische Musikinstrumente (D); Bontempi and Roland Europe (I); Selmer, Buffet-Crampon (F); Boosy & Hawkes (UK).

Strategies

Owing to large investments during the early 1980s in the Italian industry, productivity improved considerably, causing a significant drop in employment. Production value in constant prices increased rapidly during the same period, while productivity figures for Germany and the United Kingdom have deteriorated since 1987. The overall trend for the EC has been a relatively steady rise in productivity.

Several structural factors influence the industry's operations. First, high labour costs are a major handicap for an industry that has to compete with foreign companies which are sometimes larger and use more efficient and more flexible production methods, in particular Japan, Korea, Taiwan and other East Asian countries. However, within the EC the value added per employee increased in real terms from approximately 24

Figure 6: Musical instruments
Destination of EC exports



Source: Eurostat

100 ECU in 1982 to 28 700 ECU in 1991 as a result of increasing production and a decreasing work force.

Two other factors, the small size of the European firms and a tendency toward national specialisation, result in independence and individualised production among EC manufacturers. Therefore, investments in production and marketing are low for the sector as a whole, except for one or two larger companies which have achieved reasonable profitability levels. The case of electronic musical instruments is an illustration: investments in the EC grew initially but are still not sufficient to match the sums laid out by Japanese, Korean and American firms.

Poor financial resources and predominantly artisanal production have restricted the introduction of automation in the EC in contrast to the persistent streamlining efforts made in Japan, South Korea and the United States. These countries have achieved large production runs by using computer-aided design and micro-computer and software developments to produce musical instruments at lower costs. In addition, American and Japanese firms have introduced greater manufacturing flexibility by subcontracting the manufacture of electronic components. This has given them a further advantage over their European counterparts, who cannot achieve this level of flexibility. The limited financing and automation capacity of the European firms shows up in the investment figures. Although the ratio of investment to value added rose from 6.2% in 1982 to 9.5% in 1988, it has always been one or more percentage points lower than the overall, economy-wide ratio.

Despite the EC's disadvantages compared to its international competitors, it has a few dynamic firms with good technical and human potential which are beginning to pay off, especially in the concentration on top-of-the-line products.

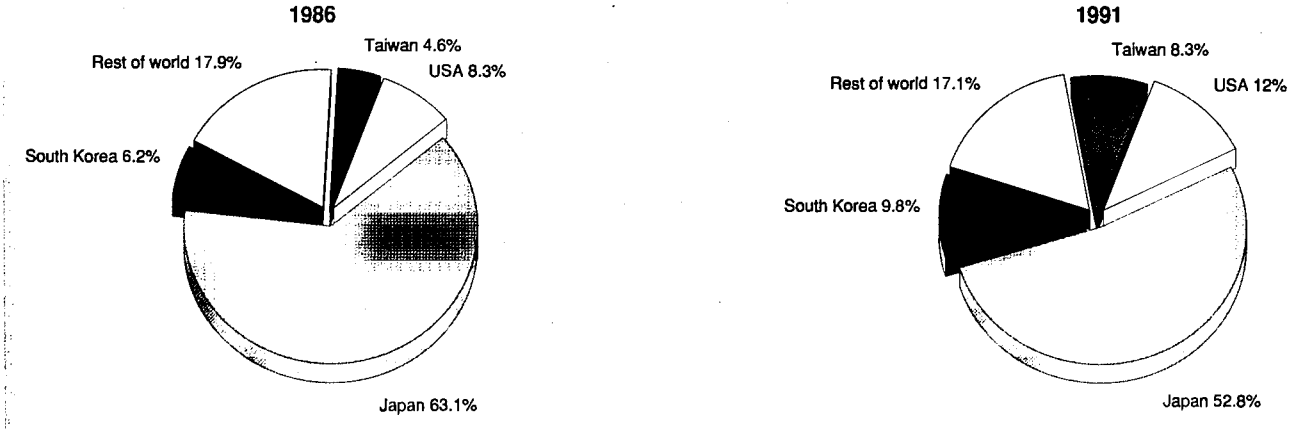
REGIONAL DISTRIBUTION

Certain regions have gained worldwide reputations as producers of superior products. These include Paris and Mirecourt in France, Berlin, Bayern, Hessen, Sachsen (Vogtland) and Baden-Württemberg in Germany, and London in the United Kingdom.

ENVIRONMENT

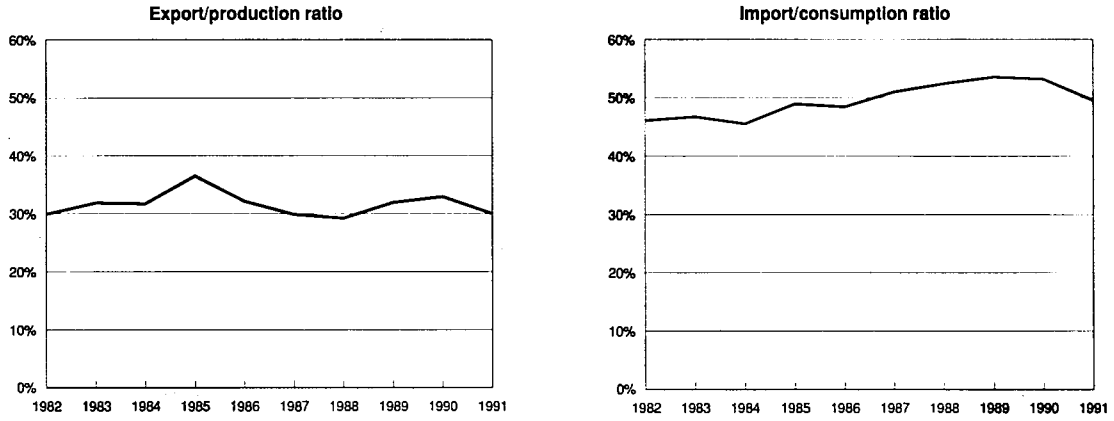
The musical instruments industry is relatively non-polluting. There are a few areas of concern to be addressed, however. First, the use of wood in pianos requires high quality wood

Figure 7: Musical instruments
Origin of EC imports



Source: Eurostat

Figure 8: Musical instruments
Trade intensities



Source: Eurostat

and adds in a minor degree to the decline of forests. Second, the modern electronic musical instruments use plastics. But this is of more concern to the plastics processing and plastics producing industries. Given the long life of instruments, these problems are negligible. Overall, the musical instruments sector is considered a clean industry.

OUTLOOK

The production of musical instruments in the EC grew markedly in 1991. This growth reflects favourable domestic demand. These circumstances are likely to continue for the early 1990s. Demand should reflect a gradual return to acoustic music as well as a steady development of new applications for electronic music.

Given the market forces discussed above, expectations are for further growth in demand to boost EC production, accompanied by some growth in employment figures.

Growing demand will also attract more imports from East Asian countries. Technological advances in electronics coupled with computerisation have enabled the Japanese firms to develop a strong competitive edge in terms of price and quality over EC firms.

In spite of certain advantages, the EC musical instrument industry is likely to face a number of difficulties in the next few years, owing to the nature of its professional structure and its lack of flexibility in responding to the latest consumer trends, which favour high-quality, reasonably-priced, all-electronic products. Parallel markets, such as the second-hand piano market, which often distort competition, may also cause problems.

Table 6: Musical instruments
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	4.5	6.0
Production	2.0	2.5
Extra-EC exports	5.0	5.0

Source: NEI

Written by: Netherlands Economic Institute
The industry is represented at the EC level by: Confédération des Associations des Facteurs d'Instruments de Musique de la CE (CAFIM).
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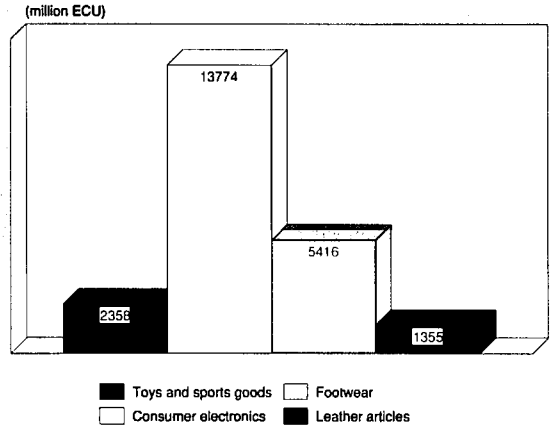
Toys
NACE 494

In 1990 and 1991, EC toy production suffered an economic slowdown in many countries. In 1990 the depreciation of dollar and yen also contributed to the troublesome situation for the EC industry. The industry has since recovered from difficulties due to deficiencies in its industrial structure and increasing competition from East Asia. Many of the products from East Asia are made for the large, US based, toy enterprises. The EC toy industry is becoming more concentrated under the influence of international competition and concentration on the retail side of the distribution channel. Video games were a booming sector in the early 1990s, and are likely to be a growing sector in the near future. The declining EC child population will put downward pressure on sales, but with more parents in higher income brackets, toy and game purchases will have a higher value added. The major challenge for the EC toy industry is to become more aware of market demand, and to concentrate on fulfilling consumer wishes.

Figure 1: Toys and sporting goods
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

The toy industry consists of manufacturers of the following products:

- cars and vehicles for children, such as pedal cycles, scooters, hobby-horses, pedal cars, dolls prams and similar toys;
- dolls of all types made of plastic or other materials, accessories and spare parts for dolls;
- other toys and scale models such as wooden toys, trains and electrical circuits, weapons, projectors and other optical toys, musical toys, model kits, construction games, miniature models made of cast metal, toys for babies and toddlers, figurines, structures with characters, soft toys and all other toys made of plastic, metal fabrics, rubber and other materials;
- articles for parlour games, table-tennis equipment, billiards, video games.

Sporting goods are also included in NACE 494 and in statistical charts, but will be dealt with in a separate chapter.

Main indicators

The toy and sporting goods industry produced goods worth ECU 6 billion in 1991. Apparent consumption for the EC's large domestic market reached ECU 9.6 billion in 1991. The negative trade balance reflects the lower production of toys and sports goods compared to consumption, although extra-EC exports grew during the 1980s. The market value for toys is around ECU 6.5 billion at retail prices.

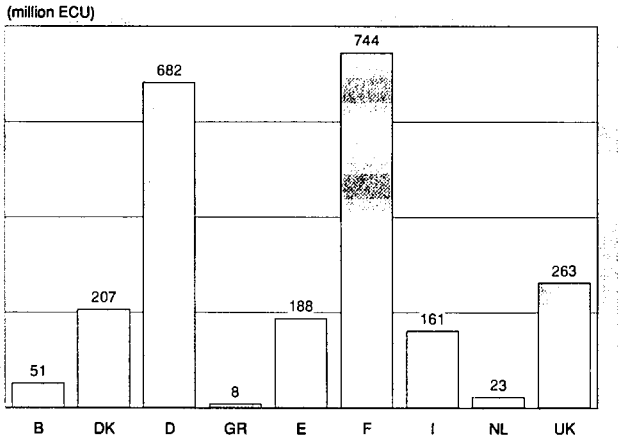
Employment in the EC industry declined strongly during the 1980s to 71 thousand in 1991 from 89 thousand in 1982. Only Greece experienced a growth of employment. The trend of declining employment ended for all EC countries in 1989, after which the level stabilised between 70-71 thousand. Countries with a large number of small and medium enterprises have been hit hardest, with Italy suffering the highest decrease.

Since 1986, video games have been the strongest performing sector. The introduction of the Game Boy from Nintendo, a small hand held console that can accept a number of game cartridges, has pushed the growth rates even higher. In 1991, the video games sector grew especially strongly in Germany, Spain, France, Belgium, Luxembourg, the Netherlands and the United Kingdom, to reach a value equivalent to approximately 25% of total market value of games and toys. In several of these countries the growth of the toy market can be fully attributed to video games. The increase in sales of video games has affected the other toy sectors only marginally, however. Many video games are bought for boys at an age where they traditionally stopped playing with other toys, so video games are not a substitute for other toys.

Board-games have been gaining interest from the public, as a result of more leisure time, higher disposable incomes and to a certain extent more emphasis on family-oriented activities in response to parent concerns regarding television watching.

France is the largest producer of toys in the EC. Production reached ECU 1 921 million in 1991. During the 1980s, France succeeded in strengthening this position. Germany is the next largest producer, with production of ECU 1 541 million. The production value of the other major producers, the United Kingdom, Italy and Spain, increased overall since 1985, although at a lower pace than in France and Germany, and their production values declined in 1990 and 1991. The German market was an exception to the trend of declining production and slow growing sales in 1990, with increases in production and sales of 6% and 11%, respectively. In 1991 only Germany, France, Denmark and Portugal (a very small producer) re-

Figure 2: Toys and sporting goods
Value added by Member State, 1991



NL is NEI estimate
Source: Eurostat

Table 1: Toys and sporting goods (NACE 494)
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	4 395	4 646	4 879	4 875	5 167	5 896	6 704	7 772	7 849	9 685	10 363
Production	3 732	3 808	4 112	4 208	4 360	4 616	4 897	5 553	5 580	5 993	6 292
Extra-EC exports	731	757	953	1 068	1 067	1 075	1 127	1 332	1 421	1 469	1 558
Trade balance	-663	-838	-766	-667	-807	-1 280	-1 807	-2 220	-2 269	-3 692	-3 914
Employment (thousands)	88.8	81.0	78.9	75.5	70.6	71.5	69.8	71.9	71.9	70.8	73.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Toys and sporting goods
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-2.9	10.2	5.7
Production	-1.2	3.3	1.8
Extra-EC exports	6.5	2.7	4.0
Extra-EC imports	-0.7	18.8	11.9

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Toys
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	378	408	514	569	584	594	617	705	766	831
Extra-EC imports	952	1 098	1 146	1 130	1 275	1 655	1 991	2 281	2 482	3 702
Trade balance	-574	-690	-632	-561	-691	-1 062	-1 373	-1 576	-1 716	-2 872
Ratio exports/imports	0.40	0.37	0.45	0.50	0.46	0.36	0.31	0.31	0.31	0.22
Terms of trade	78.9	73.8	89.0	100.0	91.0	71.2	61.6	61.4	61.3	44.5
Intra-EC trade	955	1 035	1 061	1 069	1 245	1 364	1 421	1 669	1 898	2 041
Share of total imports (%)	49.3	47.9	47.3	47.7	48.5	44.4	40.9	41.5	42.6	34.9

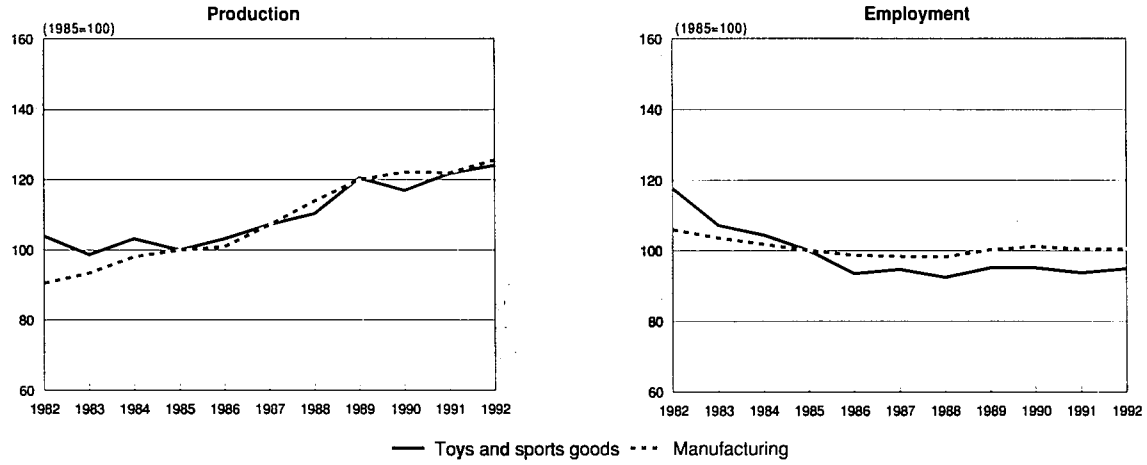
(1) Estimated
Source: Eurostat

Table 4: Toys and sporting goods
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	24.4	25.5	26.5	26.5	29.2	30.4	31.8	31.0	31.6	33.3
Productivity index	92.3	96.4	100.0	100.0	110.2	114.7	120.0	117.0	119.2	125.7
Unit labour costs index (3)	81.3	87.3	93.7	100.0	106.2	111.9	116.6	120.5	125.4	N/A
Total unit costs index (4)	74.9	85.6	92.6	100.0	110.6	112.9	122.5	139.7	134.7	145.7

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Toys and sporting goods
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

corded production growth, whereas in all EC countries toy consumption grew.

Recent trends

In the second half of the 1980s apparent consumption was especially buoyant, with annual average growth rates above 10%. Demand growth was more than fully met by imports: and the import/consumption ratio increased from nearly 22% in 1982 to over 39% in 1991. The troubled situation of small toy manufacturers selling primarily on a national basis during the 1980s is evident when the development of the toy production and industry employment in real terms are compared to those of overall manufacturing. Production in real terms in the EC rose by 1.8% a year during the 1982 to 1991 period. This compares to a growth in prices of 5.4% thus growth is due largely to price increases rather than volume expansion.

International comparison

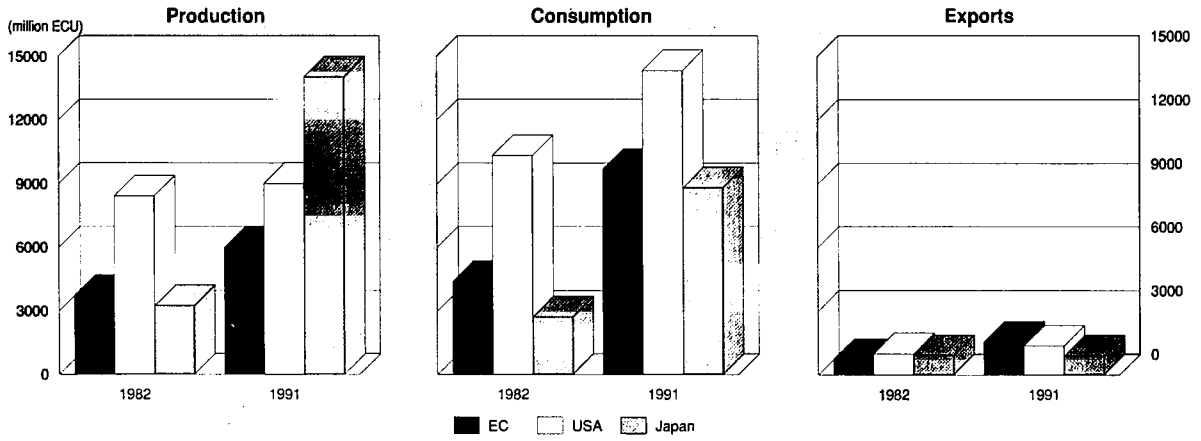
The EC is the third largest producer of games and toys in the world after Japan and the United States. While EC producers are gaining market shares relative to the USA they are losing their comparative advantage relative to Japan. Much of the fluctuation in positions is due to the variability of exchange rates. The figures in real terms, however, indicate a relatively more flourishing toy manufacturing industry in the EC than in the USA. The US market is the largest in the world. The USA has a large trade deficit in toys as a result. The apparent consumption of games and toys in the EC is one-and-a-half times lower than in the USA owing to a much lower unit consumption and lower average prices.

Foreign trade

The discrepancy between exports and imports of toys continues to widen. The export-import ratio dropped to 22% in 1991 from 50% in 1985. The trade balance also deteriorated to almost 3 billion ECU in 1991. Both extra EC exports and imports grew during the 1980s, but the latter at a much higher rate than the former.

Although the situation has improved slightly, the Europeans hold only a small share of the American market which is the most promising in terms of size and growth potential. EC exports accounted for 3.6% of US toy imports accounts in 1990, whereas the East Asian NIC's accounted for 52.5% and Japan for 36.7%. The USA has also become less important

Figure 4: Toys and sporting goods
International comparison of main indicators at current prices



Japan consumption and exports are 1988 data
Source: Eurostat, US Dept. of Commerce, US Bureau of Census, UN Trade Statistics Yearbook, Census of Manufacturers"

as a destination of EC exports. EFTA countries remain the most important geographical destination for EC exports.

Extra-EC exports of toys and sports goods are highest in Germany and France. For both countries, extra-EC exports are roughly equal to intra-EC exports. For Italy, the Netherlands and the United Kingdom intra-EC exports are significantly larger than extra-EC exports. Production in the United Kingdom is particularly export-oriented, due to a strong presence of affiliates of primarily US multinationals, which use their British branches to export throughout Europe.

Imports from Taiwan and Hong Kong have dropped dramatically. For the most part, this trade has shifted to China and Japan. Imports from China grew about 57.5% from 1989 to 1991. EC imports from East Asia are mainly the products of worldwide successful toy companies.

Extra-EC imports of toys and sports goods made up 53% of the EC market in 1991, compared to 27% in 1980. The EC industry's export capacity represented 66% of production in 1991 with 25% covering extra-EC trade.

Nine EC countries exported more than half their total exports to other EC countries. The five largest producers of toys have less reliance on intra-EC trade than the other countries. In Belgium/Luxembourg, Ireland and the Netherlands, 80% of total exports is intra-EC trade.

Imports are mostly extra-EC. Only five countries imports are more than 50% intra-EC. Portugal alone shows a high share of intra-EC imports (84%). The importance of imports from third countries is due to the heavy competition from East Asia. The main extra-EC importers are Germany and the United Kingdom, while France is the main intra-EC importer followed by Germany.

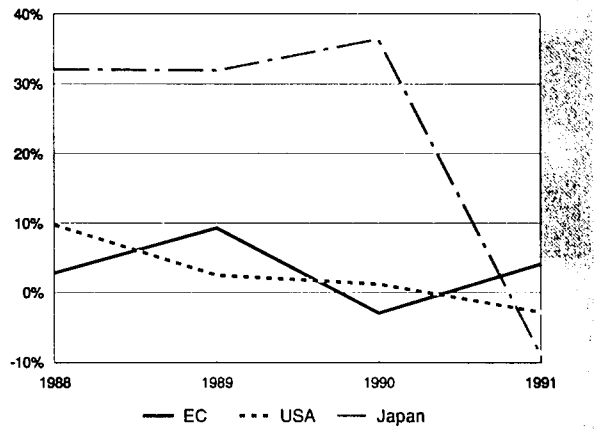
All EC countries are net extra-EC importers. In intra-EC trade Germany, Spain, Ireland, Italy and the United Kingdom are net exporters. Germany however, experienced an intra-EC trade deficit for the first time in 1991.

MARKET FORCES

Demand

Major determinants of toy and game consumption are the level of real disposable income and demographic changes. Rising income stimulates toys and games purchasing. This is relevant when comparing low GDP per capita countries like Portugal and Greece with the richer countries like Germany. Growth is more likely in the low, but rising income countries.

Figure 5: Toys and sporting goods international comparison of production growth at constant prices



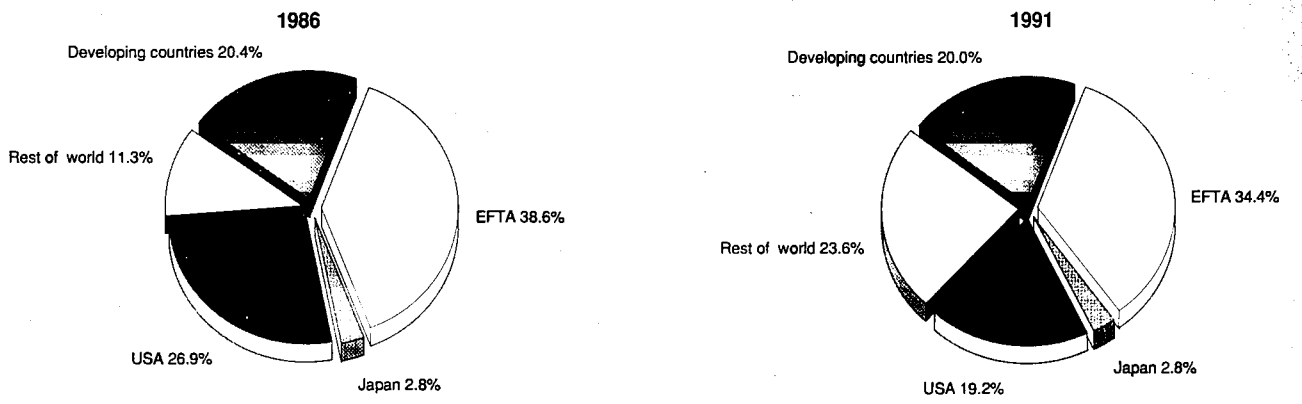
Source: Eurostat, census of Manufacturers

An important factor which will negatively influence apparent consumption in the near future is Europe's shrinking child population: it is expected that the population between 0 and 15 years of age will drop by 0.3% per year between 1990 and 1995. This decline will be moderate due to the counter force of people in the baby boomer generation, who will become parents in the 1990s. In some countries, such as the United Kingdom, this could be a stimulating force for infant toys. Furthermore, there is stiff competition from other leisure products such as clothes, records, cassettes and travel for teenagers.

Women are still much more important buyers of toys than men. The reputation and image of toys in safety, quality, "playability" (a toy being used more than once or twice) are as important as income.

The number of toys received per child per year and the amount spent on these toys has been increasing, as a result of the higher average age on which parents have their first child.

Figure 6: Toys
Destination of EC exports



Source: Eurostat

On average, these parents have a larger disposable income than in their early twenties.

The significant differences in access to commercial TV time from country to country also greatly influence consumer demand for toys. Demand is particularly influenced by TV advertising in the United Kingdom and Italy, less so in Germany.

Market prices could come under pressure as the importance of large retailers like Toys 'R' Us grows, with the currently large spread in prices for the same toy becoming smaller. However, the competitive nature of the toy market in general has ensured that prices have risen in line with the inflation rate. There are exceptions, including increasing prices for board games, and decreasing prices for video games.

Supply and competition

Toy manufacturers are in a weak competitive position both on EC markets and internationally. This is underscored by the growing market share of non-EC producers. While in 1980 net imports were 15% of apparent consumption, they grew to 38% of apparent consumption in 1991. This strong growth in apparent consumption, which has almost doubled in the last decade, allowed EC producers to expand their production. Additional efforts are necessary, however, to improve industry's position relative to American and Japanese multinationals.

The difficult situation in which the Community toy industry finds itself can to a certain extent be attributed to the characteristics and trends of the domestic market outlined above. However, other factors which are symptomatic of the state of the industry are also responsible for the weak competitive position of the EC toy industry as a whole.

The high wage costs in Europe are a major handicap for the EC toy industry in relation to foreign competitors, most of whom have relocated to East Asia. China and Korea have become the hub of international subcontracting because of the low labour cost. The handicap of high labour costs is particularly penalising in a sector where assembly operations are numerous and difficult to automate for small production runs.

Owing to their small size, most EC companies have a low investment capacity. Lack of financial resources is a basic handicap in the bid to compete with other producers.

In addition, because of insufficient production runs due to the patchwork nature of the EC market and the small size of firms, no benefits can be achieved from economies of scale comparable to those made by American multinationals. The latter companies offer a single world-wide range.

Production flexibility is a major advantage for toy manufacturers, since they have to deal with a cyclical market influenced by fashion trends. The EC toy industry has a low production flexibility. Flexibility obtained by home-based piecework and national subcontracting, which are widely developed in the EC toy industry, particularly in southern Europe, is not sufficient. EC manufacturers have very little access to international subcontracting compared with American and Japanese multinationals in the sector, who often have more than 50% of their products manufactured in Taiwan and Hong Kong. There are, however, clear indications that EC manufacturers are beginning to follow the pattern set by these competitors.

Weak international managerial capacity is also a problem. Ignorance of foreign distribution channels is a serious obstacle for small and medium sized EC firms with international ambitions. Their marketing approach is much less developed than that of foreign multinationals. Few EC firms now have the capacity to develop a licensing policy or to open up factories abroad.

Although the EC toy industry suffers from a number of disadvantages compared with its competitors, it nevertheless includes a number of young, dynamic firms capable of holding their share on both domestic and international markets. The success of such firms is based on creativity, quality products, and ability to transmit European culture through the traditional toys it offers, for instance, educational toys. These aspects form the first of three key factors, which have proven to generate global success for a toy company:

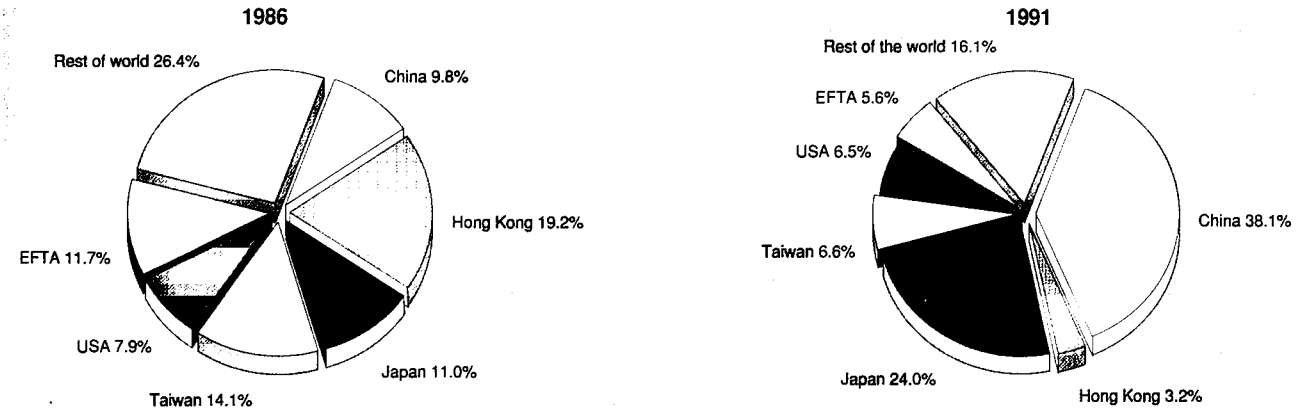
- Innovation in product development;
- Creation of 'concepts' which can greatly enhance the appeal of a toy;
- Effective advertising and promotion.

Production process

The strengthening of the EC's competitive position is clear from the growth in productivity which exceeded production growth. The share of value added in production has remained constant, so compared to other industries the toys industry has shown a not unfavourable performance.

Although the toy and sports goods production value is 60% of apparent consumption in the EC, product development takes place mainly at the headquarters of the world leading toy companies in the USA and Japan.

Figure 7: Toys
Origin of EC imports



Source: Eurostat

A large part of the success of international toy companies can be attributed to the use of third-party manufacturers, often in low-labour cost countries. Outward processing has become vital to the production process of the toy industry.

A key element in the toy industry is the licensing of product and the licensing of characters. These two forms of licensing account for approximately one quarter of the value of toys sold. Counterfeiting is on the rise, however, and the introduction of an international code is desirable to areas which must compete with counterfeits, sueh as the EC.

INDUSTRY STRUCTURE

Companies

In general, the European companies specialise in traditional toys, whereas companies located in other countries produce fashion toys which require high publicity costs and have a short economic life cycle.

The EC toy industry suffers from two main structural handicaps. The first is the high fragmentation of firms in the sector, because of the vast spread of different products. It is estimated that 80% to 90% of the firms operating in the sector on a full-time basis (excluding seasonal activity) employ fewer than 20 salaried workers.

The second problem is the absence of multinational firms comparable to American and Japanese groups, with the exception of Lego. This explains also why production is so dispersed. The main American multinational firms are Hasbro, Mattel, Fisher Price and Kenner Parker Tonka. In Japan, Bandai and Tomy are the leading multinationals.

The pressure of competition in the sector caused a number of companies, including some medium-sized companies, to go out of business in the 1980s.

Furthermore, the emergence of the superstore concept, with the example of the US Toys 'R' Us chain, means concentration on the retail side as well. The Toys 'R' Us chain is one of the few that are operating internationally. The outcome is a concentration on the supply side of toys into the hands of fewer, more professional, internationally operating companies.

The weak industrial structure has led to a fall in profitability levels in EC companies since 1980. This is mainly due to rising costs of production, marketing and advertising, which are difficult to pass on to the consumer because of strong competitive pressures in the sector.

Large companies in the toys industry are Lego from Denmark with around 3 000 employees in Denmark alone, Geobra Brandstätter (D), Ravensburger (D), Gebruder Märklin (D), Tonka France (F), Smoby et Majorette (F), Mattel Toys (I), Samosa and Burago (I) and PEG Perego Pines (I). The American Company Hasbro employs 3 200 people in the EC, spread among different subsidiaries over the EC countries, illustrating the importance of the US toy companies for the EC.

In the sector of video games the world leader is Nintendo (Japan), followed at a clear distance by Sega (Japan). Nintendo has completely conquered the Japanese and US markets, where one household in three owns a video game set.

Strategies

The toy industry is constantly trying to develop a new toy or game that could boost sales, like the introduction of Trivial Pursuit in the 1980s.

The business strategies of the successful companies have proved beyond question that ownership of manufacturing plant is not a cornerstone of business success. It is a necessity for a manufacturer to use the least expensive labour available when the production process is highly labour-intensive. All the world leaders have followed this strategy. The Lego company has a somewhat exceptional position inasmuch as it produces in Denmark and Switzerland, which have especially high labour costs. The explanation is the high level of automation and the need for high precision manufacturing.

In a market noted for unpredictable and large fluctuations of demand, flexibility in manufacturing and a marketing-oriented approach are necessary for companies to gain a competitive edge. To be flexible, most of the internationally successful toy companies use a mix of manufacturing plant and third-party contracted manufacturers.

REGIONAL DISTRIBUTION

The industry is highly concentrated geographically. Some 95% of the firms, accounting for approximately 90% of EC production, are situated in Germany, Italy, France, the United Kingdom and Spain. Within those five countries, firms are often located in a particular region: Bavaria and Baden-Württemberg in Germany, Lombardy in Italy, the Jura and Rhône-Alps (Ain) in France, and the Alicante and Barcelona provinces in Spain. Each country has its own specialisation:

- Germany: plastic toys, model trains and paper toys;
- Italy: bicycles, dolls and board games;
- France: die-cast and mechanical toys, board games and stuffed toys;
- United Kingdom: metal and plastic miniatures, table and board games and die-cast.

Each country has a production advantage. Germany is known for technical know-how; Italy's structure allows great flexibility and high product quality; France has particular knowledge in plastics transformation.

ENVIRONMENT

Although there is not much polluting activity in the production process of toys, the higher public ecological awareness does and will have impact on the demand for toys. Wooden toys benefit from this development. Recycling is an important issue in environmental policy and will have its effect on the toy industry as regards the packaging of toys. This is already true for Germany, where packaging of toys regulations have become more stringent.

REGULATIONS

The most important regulation in this sector is the EC toy safety directive of May 3 1988, published July 16 1988, which came into effect January 1 1990. Toys which fulfil the demands of the directive get the "CE" mark. This does not apply to toys which were already marketed before January 1 1990, however. There are physical, mechanical and chemical requirements. Furthermore toys have to be made of inflammable or slow inflammable materials and toys have to have clear indications and/or instructions for the consumer on how to handle the product. Normally, if the product fulfils the standards of the European standards institutes CEN and CENELEC, the toy will comply with requirements of the safety directive.

EC packaging requirements are also of importance, especially those which refer to the packaging of toys imported from countries outside the EC to meet the EC's safety standards.

OUTLOOK

The EC toy market is not likely to expand much in the coming years, given the prospect of a further decline in the child population and stiff competition from other leisure products. An exception is Germany, where the outlook is more promising

Table 6: Toys and sporting goods
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	3.0
Production	2.0	2.0
Extra-EC exports	2.0	2.0

Source: NEI

as a result of increasing leisure time, more interest in toys and games and the reunification.

Electronic toys will have strong growth for a few years, after which the future for this part of the market is quite uncertain, due both to the possible development of a bad reputation for these games with parents, and to saturation. It is expected that almost all growth in the toy market in from 1991 to 1995 will be in the video game segment.

The main problem for the European companies is to transform from product oriented enterprises to marketing oriented ones. Furthermore, cooperation will be necessary to cope with small scale production and to become more flexible. In this way international competition would be feasible, especially with large East Asian companies. Competitivity will also depend on which of two development strategies is chosen: leadership in traditional toys in the luxury and middle markets, or a strategy of marginal opportunities at the bottom end of the market to gain a foothold. The increased ages and incomes of parents, in addition to a cultural nostalgia for traditional toys. may affect this decision, but mass-produced toys are still expected to do well.

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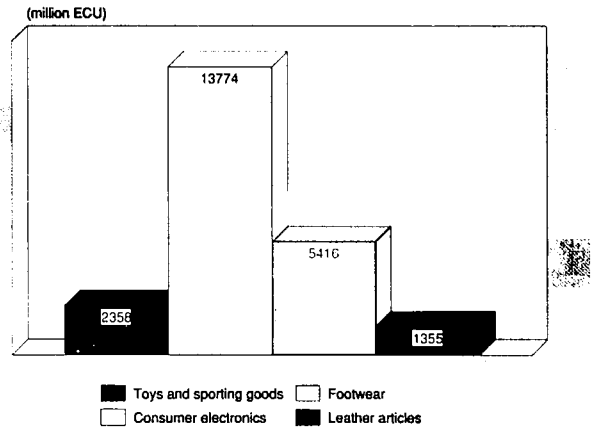
The industry is represented at the EC level by: Fédération Européenne du Jouet. Address: 45 rue de Trêves, B-1040 Brussels; tel: (32 2) 231 0730; fax: (32 2) 231 0838; and,
Toy Manufacturers of Europe (TME). Address: Avenue Tervueren, 13a, B-1040 Brussels; tel: (32 2) 732 7040; fax: (32 2) 736 9068.

Sporting goods
NACE 494.2, part of 451, 453

The EC market for sporting goods grew quickly in the 1980s but with highly differing rates between product ranges. In general, the more fashion-led consumption in the 1980s has stimulated the industry, but has also increased competition (particularly from abroad); putting prices under pressure. Furthermore, production could not follow demand, as competition from abroad has put prices under pressure. As a result, outward processing became more and more important. This trend is likely to continue.
The demographic trend towards a growing proportion of the population over 25 years old is leading to shifts in demand patterns: year-round recreation activities, higher quality products, and more individualistic sports are becoming more attractive.

Figure 1: Toys and sporting goods
Value added in comparison with other industries, 1991



Source: Eurostat

INDUSTRY PROFILE

Description of the sector

Sporting goods are covered by NACE 453 and by part of NACE 451 and NACE 453 for sports footwear and sports clothing, respectively. Detailed statistics are not available at this level of aggregation except for trade. Moreover, sporting goods manufacturers produce other goods such as toys, camping equipment and products which originally for sports but which are now employed for other uses as well. For example, the importance of fashion and casual wear is becoming ever more prevalent. It is increasingly difficult to discern between goods and clothing for use in sport activities and for leisure. This sector is therefore very difficult to quantify. Apart from trade figures, there are no statistics for the sporting goods industry (i.e. none for production, employment and investment) and much of the tables and figures in this chapter reference NACE 494, toys and sporting goods.

Main indicators

Margins in the sporting goods sector are usually a mark up on the producer price of 50% to 100%, which gives a rough guide to estimate the amount of production in the EC. Estimates for the market volume in France and the United Kingdom in 1991 amounted to 25 billion FF and £2.5 billion respectively, a total of approximately 7 billion ECU. This would mean some 4 billion ECU at producer prices. This estimate takes equipment as well as clothing and footwear into account. The figure covered under NACE 494.2 should be much lower, as this covers mainly sports equipment. A high estimate would be one-third of total value, some 1.3 billion ECU for France and the UK only. This figure could be doubled, when two other major producer countries, Germany and Italy, are taken into account.

The production of sports clothing has been growing slowly during the second half of the previous decade. In Germany, the average nominal increase was approximately 2% per year. The production in 1989 was nearly 376 million ECU, whereas sports footwear amounted to 87 million ECU. German consumption of all sporting goods categories is estimated to have totalled 3.8 billion ECU in 1989; of which 12.5% consisted of sports articles, 65% sports wear and 22.5% sports footwear. Italian output of sportswear in 1987 amounted to 772 million ECU (excluding swimwear). Demand reached 1,438 million ECU at retail prices. French output of sportswear reached 461 million ECU in 1987. For 1990, market estimates for sportswear amount to 2.1 billion ECU in 1987 at retail prices.

Recent trends

Demand for sport goods is generally rising, albeit at different levels and growth rates in individual EC countries, depending on their economic performance. The long period of economic growth in the 1980s combined with a more positive attitude towards sport (the fitness boom) has produced high growth rates. Markets have been saturated, however, during the general economic slowdown at the beginning of the 1990s.

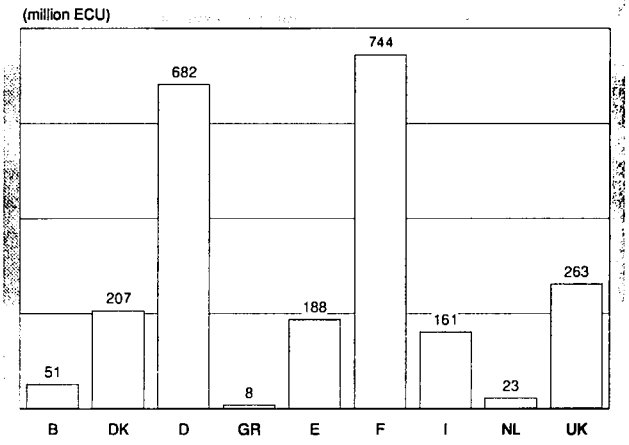
High degrees of saturation are already detectable in the large markets, (i.e. Germany, France, the United Kingdom and Italy), as well as in other countries with high purchasing power. These markets are more susceptible to fashion trends and to technical innovations such as all-terrain bikes.

Production of sports clothing in particular is presently done mostly through outward processing. As a result, many European manufacturers are also importers. Sports footwear production has declined according to market surveys; output has shifted to lower labour cost markets.

International comparison

From 1986 to 1990, the US Dollar was at a low value in relation to other major currencies, stimulating US sporting

Figure 2: Toys and sporting goods
Value added by Member State, 1991



NL is NEI estimate
Source: Eurostat

Table 1: Toys and sporting goods
Main indicators at current prices (1)

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(2)
Apparent consumption	4 395	4 646	4 879	4 875	5 167	5 896	6 704	7 772	7 849	9 685	10 363
Production	3 732	3 808	4 112	4 208	4 360	4 616	4 897	5 553	5 580	5 993	6 292
Extra-EC exports	731	757	953	1 068	1 067	1 075	1 127	1 332	1 421	1 469	1 558
Trade balance	-663	-838	-766	-667	-807	-1 280	-1 807	-2 220	-2 269	-3 692	-3 914
Employment (thousands)	88.8	81.0	78.9	75.5	70.6	71.5	69.8	71.9	71.9	70.8	73.0

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
(2) NEI estimates
Source: Eurostat

Table 2: Toys and sporting goods
Average real annual growth rates (1)

(%)	1982-85	1985-91	1982-91
Apparent consumption	-2.9	10.2	5.7
Production	-1.2	3.3	1.8
Extra-EC exports	6.5	2.7	4.0
Extra-EC imports	-0.7	18.8	11.9

(1) Estimates are used if country data is not available, especially from 1989 onwards. However for trade, only 1991 has had to be estimated
Source: Eurostat

Table 3: Sporting goods
External trade at current prices

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)
Extra-EC exports	417	472	606	695	656	631	620	691	717	716
Extra-EC imports	513	570	654	674	701	816	1 002	1 143	1 084	1 268
Trade balance	-95	-98	-48	21	-45	-185	-382	-452	-366	-553
Ratio exports/imports	0.81	0.83	0.93	1.03	0.94	0.77	0.62	0.60	0.66	0.56
Terms of trade	79.0	80.3	89.9	100.0	90.7	75.0	60.0	58.6	64.2	54.7
Intra-EC trade	410	429	492	524	574	606	608	667	705	754
Share of total imports (%)	44.5	42.9	42.8	43.7	44.9	42.6	37.7	36.8	39.4	37.2

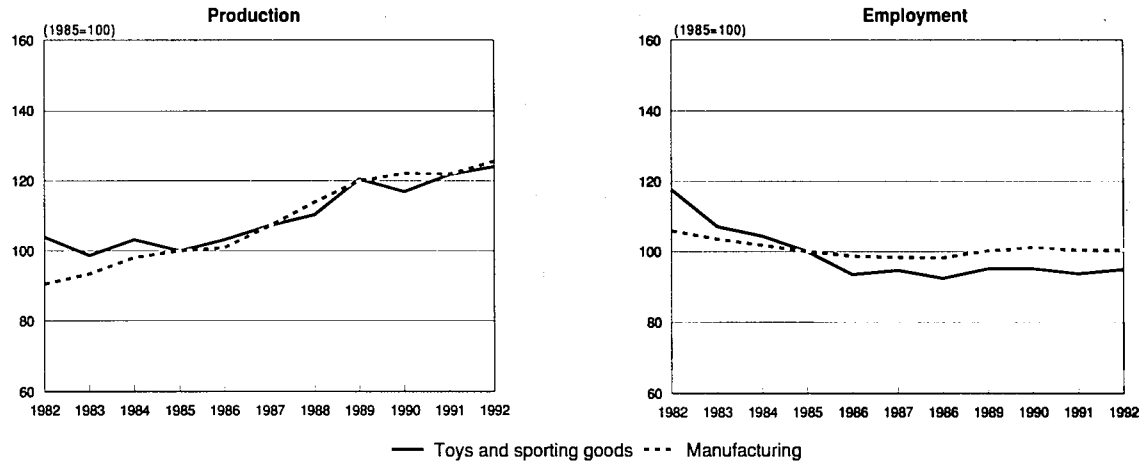
(1) Estimates
Source: Eurostat

Table 4: Toys and sporting goods
Labour productivity and unit costs (1)

(1985 = 100)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Productivity (thousand ECU) (2)	24.4	25.5	26.5	26.5	29.2	30.4	31.8	31.0	31.6	33.3
Productivity index	92.3	96.4	100.0	100.0	110.2	114.7	120.0	117.0	119.2	125.7
Unit labour costs index (3)	81.3	87.3	93.7	100.0	106.2	111.9	116.6	120.5	125.4	N/A
Total unit costs index (4)	74.9	85.6	92.6	100.0	110.6	112.9	122.5	139.7	134.7	145.7

(1) Estimates are used if country data is not available, especially from 1989 onwards.
(2) Value added per person employed (1991 prices)
(3) Based on labour costs per person employed at current prices
(4) Based on total costs per person employed at current prices, excluding costs of goods bought for resale
Source: Eurostat

Figure 3: Toys and sporting goods
Production and employment indices compared to EC manufacturing



1992 are NEI estimates
Source: Eurostat

goods exports (annual increase of 20%). In the USA, according to the official census of 1982, there were 1,452 companies engaged in the production of sporting goods.

The Japanese government is trying to increase consumption in their economy. As a result, the government has taken steps to gradually shorten work hours and increase leisure time. This development has given foreign manufacturers of leisure products and sporting goods major opportunities. The Japanese sports equipment market has experienced 6% growth in real terms from 1986 to 1991. Japan has roughly 1 500 manufacturing companies with some 28 000 employees.

Foreign trade

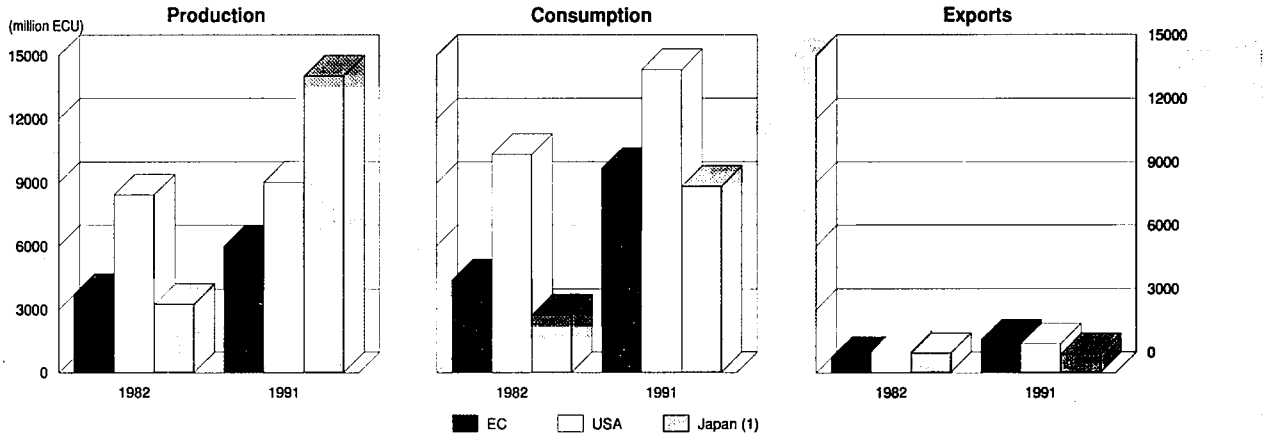
The EC recorded a trade deficit for the sixth consecutive year in 1991. The deficit grew due to stagnating exports, while imports from outside the EC rose to 1.3 billion ECU. The cover ratio (exports over imports) fell to 0.56, which is much below the levels recorded during the most of the previous decade. Although trade within the EC expanded, it did so at a slower rate than overall imports, resulting in a declining share of intra-EC imports in total imports. The dependence on non-EC countries becomes ever more prevalent.

During the years 1990 and 1991, exports came to a standstill after experiencing temporary growth in 1989. Exports to the United States were down for the second consecutive year and amounted to 144.2 million ECU in 1991. Exports to Japan rose 5% in value to 136.2 million ECU, despite the depreciation of the Yen. Growth figures in the second half of the 1980s were on average much higher. The chief exporter was France, followed by Germany, Italy and the United Kingdom.

Following a decline in 1990, imports grew 17% in 1991, an increase which is consistent with the figures for the years 1985-1989. EC imports from the United States rose the same percentage in 1991, and those from Japan a slightly smaller percentage. In real terms, however, this could actually be the reverse, as the US dollar appreciated and the yen depreciated. The main importer was Germany, followed by the United Kingdom, France and Italy.

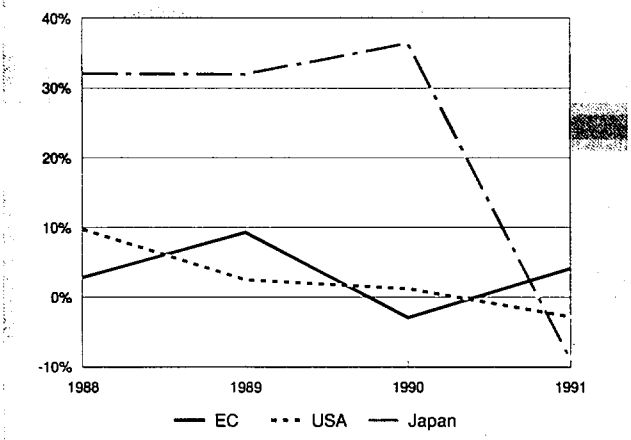
Intensified marketing efforts, notably by countries in Far East, South East, and South Asia, as well as by the USA and the EFTA nations, have led to increasing international competitive pressure. The main supplier countries outside the EC include Japan, Taiwan, South Korea, USA and China. China's rising

Figure 4: Toys and sporting goods
International comparison of main indicators at current prices



(1) Production in Japan are NEI estimates; Japan consumption and exports are 1988
Source: Eurostat, US Dept. of Commerce, US Bureau of Census, UN Trade Statistics Yearbook, Census of Manufactures

Figure 5: Toys and sporting goods
International comparison of production at constant prices



Source: Eurostat, Census of Manufacturers

share of imports reflects the move of manufacturers from Hong Kong to mainland China.

Intra-EC trade occurs mainly between countries where most sporting goods manufacturers are based and where the population has high purchasing power. These are the large countries already mentioned as the largest extra-EC importers and exporters.

The trend in sports footwear shadowed that of sporting goods in general, showing a deficit in 1990 of 294.6 million ECU. Of importance was the increase in imports from the United States, an expansion of 76.6% to 43.1 million ECU. Additionally, the United States reduced reliance on EC imports by 17.7%. Italy and Portugal were the only two EC countries to display positive trade balances: the Italian surplus attaining 207.3 million ECU. The United Kingdom showed the most serious deficit, some 169.8 million ECU.

MARKET FORCES

Demand

Factors affecting demand are:

- increasingly influenced by "lifestyle": fashion and leisure usage of sports clothing and footwear;
- sporting activities are increasingly evolving from competitive team sports into recreational activities for the individual;
- overall economic development, resulting in a moderate growth of personal disposable income;
- the continuing positive public attitude towards sport;
- sports equipment is much less susceptible to changes in fashion; furthermore, sports equipment tends to be more durable than clothes or footwear;
- demographic factors will be important: the proportion of people more than 25 years old will increase in the coming decade.

The generally good economic climate (at least in the long term), and the tendency of consumers to engage increasingly in activities with a sporting "touch" (due to growing amount of spare time and higher disposable incomes) have been positive factors for the development of the sporting goods industry.

But the sporting goods market is also susceptible to the peaks and troughs of the business cycle. Sporting goods tend to be discretionary items (i.e. they are among the first purchases to be postponed during recessionary times).

Supply and competition

Factors affecting supply are:

- growing concentration in trade and industry, with increasing market power wielded by a few multinationals;
- small businesses try to survive through a high degree of specialisation and by co-operation in production and distribution;
- competition by non-EC suppliers, notably from the Far East, East and South East Asia, continues especially in the lower price sectors.

The European sporting goods industry has until now been characterised by a large number of small and medium enterprises (SME's). In response to the growing concentration of large companies, these SME's seek cooperation in the whole of the EC. Furthermore, the market power of dealers is strengthened by the creation of European-wide distribution networks.

The increasing competition from the USA, Japan, East and South East Asia has been one of the negative factors for the development of the sporting goods industry. The other are the three consecutive mild winters between 1987 and 1990 for winter sports equipment, and growing environmental awareness which curb the expansion of certain sport activities such as motor sports and hunting.

Production process

The largest manufacturers of sporting goods in the EC rank among the world's leaders in product and production technology. Through constant R&D expenditure these manufacturers endeavour to use state-of-the-art materials and technologies. Small and medium-sized enterprises try to secure market niches, but in particular small businesses from Spain, Portugal and Greece still have much progress to make in the use of modern production methods. This applies to both sports equipment and clothing.

Two major market groupings of products can be distinguished:

- up-market items with high quality and strong brand names;
- simpler and cheaper products (mostly imports).

Internationally recognised European brands/manufacturers do not generally enjoy a competitive edge. With the exception of suppliers from the USA and Japan, many newly industrialised countries with advanced production methods produce first-class sporting goods and have been gaining growing shares in the European market, particularly in the lower and middle price categories.

INDUSTRY STRUCTURE

Companies

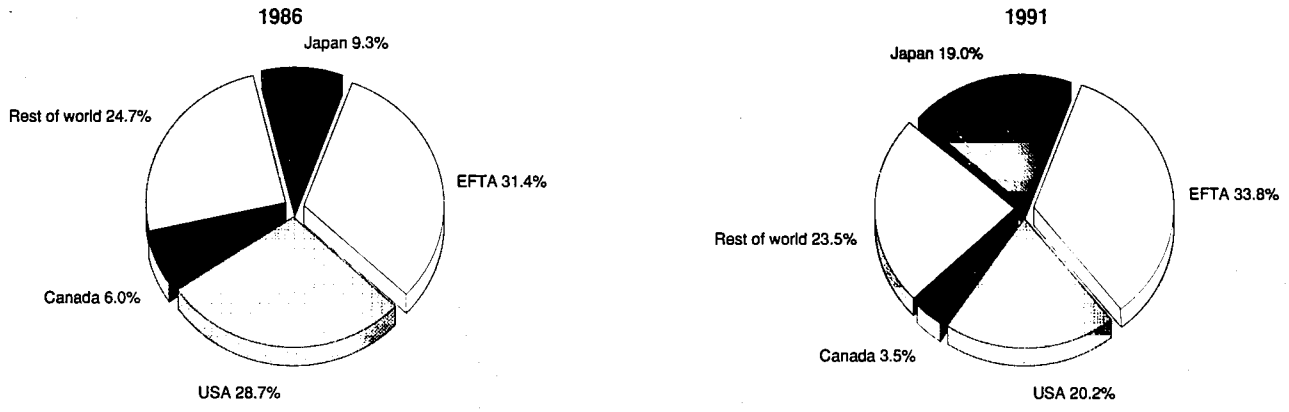
The main product groups and brands/manufacturers in the EC are:

- Adidas/Puma: sports clothing and footwear;
- Rossignol, Salomon: skiing and tennis equipment, golf clubs and equipment;
- Lacoste: tennis equipment, leisure clothing;
- Bogner: leisure clothing;
- Kettler: sports and fitness equipment;
- Dunlop/Slazenger: tennis equipment and clothing;

Strategies

The sporting goods market is in some segments highly competitive, and manufacturers have been seeking ways to improve

Figure 6: Sporting goods
Destination of EC exports



Source: Eurostat

their performance. In the 1970s and 1980s, numerous manufacturers pursued a policy of diversification and produced not only their core products but also sports and leisure clothing and footwear for highly varied activities. Profits tended to decrease after extensive diversification. This meant streamlining the product ranges, focusing on the companies' strengths, and disposing of loss-making divisions.

On the other hand, the dynamic behind the diversification has been inter alia the recognition of the higher rewards from other products. For example, running shoe brands could move into the sector of golf shoes. Furthermore, an all too high dependence on a specific season is also an incentive to diversify the product range.

Finally, the recognition of demographic changes by the companies has made them consider sports where consumers other than the young (male) adults are active. The increase in the older population sections with high purchasing power and a strong interest in sport has, for example, led to an increased interest in golf.

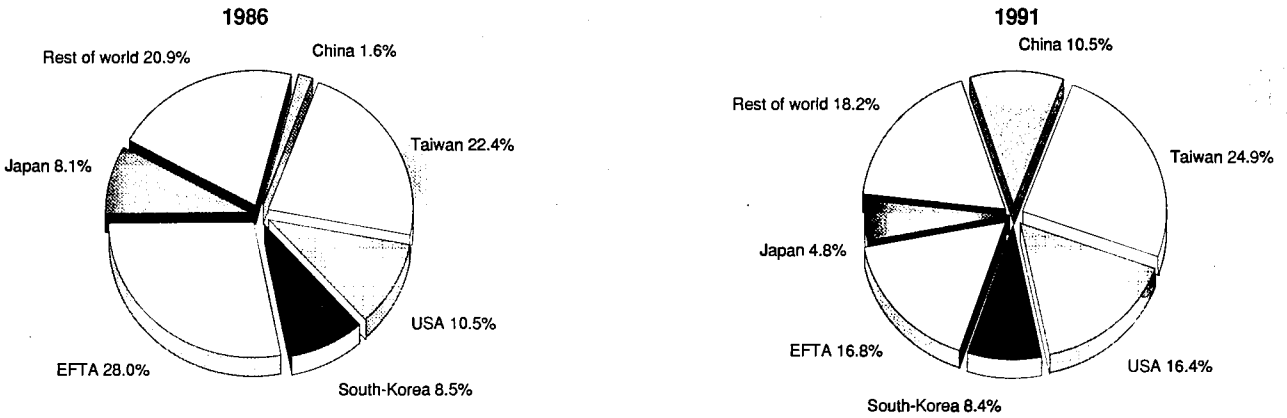
In sum, companies will tend to diversify in the future, but not as unconditional as in the past. A prime example is Adidas, which driven by the financial troubles in the 1980s, now has entirely abandoned the Adidas branded leisurewear sector and concentrated on key products. In 1990, a strategy which concentrated on key products, more outward processing, centralisation of functions and improved logistics proved successful.

REGIONAL DISTRIBUTION

The major producer countries in the EC are Germany, France, the United Kingdom and Italy. Figures about the number of companies engaged in sporting goods manufacturing can only be indicative, as it depends on small differences in interpretation if a company is considered to be in the sporting goods sector. This is especially relevant of the clothing sportswear sector. However, the most companies seem to be engaged in the sports clothing sector, and the fewest in the sports footwear.

Within countries the geographical pattern can be very different. In Italy, most of the manufacturers are based Lombardy and in Spain a majority of manufacturers are located in Catalonia. France and Germany, by contrast, have companies widely spread throughout the country.

Figure 7: Sporting goods
Origins of EC imports



Source: Eurostat

The chief countries of origin for the main product groups are as follows (main non-European origin countries):

- gymnastic and athletic equipment: UK, France, Germany, Finland, Norway (USA, China)
- tennis rackets: Belgium, Austria, France, Germany (Taiwan USA)
- golf equipment: UK, France, Germany (Taiwan, Japan, USA)
- table-tennis equipment: France, Germany, Sweden, UK (China, Japan)
- leather balls: Italy, UK, France, Germany (Pakistan, China);
- roller and ice skates: Austria, Switzerland, (Canada, China)
- cross-country skis: Austria, Finland, Italy (CIS)
- alpine skis: France, Austria, Finland, Italy, Switzerland, Finland, former Yugoslavia, (USA)
- aquatic sports equipment (incl. windsurfing): France, Austria, Switzerland, Italy, Germany (USA, China)
- leather sports gloves: Italy, France, Germany, Netherlands, Hungary (Pakistan, South Korea, Canada, USA)
- track suits: Italy, France, Germany, Portugal, Turkey, former Yugoslavia, Denmark, UK, Switzerland, Poland (China, Pakistan, India)
- ski suits (woven): Italy, France, Germany, Austria, Greece, Portugal, former Yugoslavia (China)
- ski boots: Austria, Italy, Germany, France, Switzerland, former Yugoslavia (South Korea)
- sports footwear: Italy, France, Germany, UK, Austria, Portugal, Spain, Switzerland, former Yugoslavia (China, Indonesia, South Korea, Taiwan)

ENVIRONMENT

Normally, sporting activities do not spring directly to mind when one thinks about environmental protection. Furthermore, a distinction should be made between the environmental hazards caused directly by the sporting goods industry and those hazards in which tourist services, for example, are responsible for.

Some of the outdoor activities are finding opposition though, especially by the environmental movement. The arguments are that some outdoor activities could be detrimental to the direct environment of the sport area. The general public does not consider them as a hazard to the environment.

On the other hand, recent efforts have been made to protect the environment in the concerned areas. National sporting associations and local and/or regional authorities are involved to protect the environment by local regulaitons for doing sports (i.e. minimum of snow for skiing, special routes for cross-country skiing).

However, other sports will benefit from the heightened ecological awareness and to compensate for stress of overcrowded and polluted cities. Cycling, windsurfing, and trekking are just a few examples.

REGULATIONS

Apart from import restrictions, there are no EC directives which are of direct importance to the sporting goods industry. This does not mean, however, that the industry would not be interested in EC policy. On the contrary, The following areas of EC law and policy are at the forefront of their interest:

- harmonisation of product standards;
- competition policy and distribution arrangements;
- intellectual property rights (strongly tied to GATT policy);
- import quotas; e.g. alleged dumping of Asian products has led the cycle manufacturers, for example, to ask for import restrictions on cycle imports;
- consumer protection.

OUTLOOK

Development of demand is likely to profit from technical developments and fashion trends. Production, however, will not rise as fast as demand because outward processing of especially clothing will continue. To this can be added the high potential of market penetration by fashion companies.

Generally, the successful firms will be those focusing on R&D, in market monitoring and on pursuing a niche strategy. Furthermore, brand images will play an ever more important role.

Table 5: Sporting goods
Expected real annual growth rates

(%)	1992-93	1992-96
Apparent consumption	3.0	4.0
Production	2.0	2.3
Extra-EC exports	3.0	4.0

Source: NEI

Competition from imports has already had a considerable effect on the industry and is expected to continue in the next five years. Improving competitiveness will be done by more outward processing in the clothing segment, and by investing in the latest production equipment.

In the sports shoes sector, considerable effort will be given by brand leaders to maintain their market shares, especially in the countries where recessionary trends are visible.

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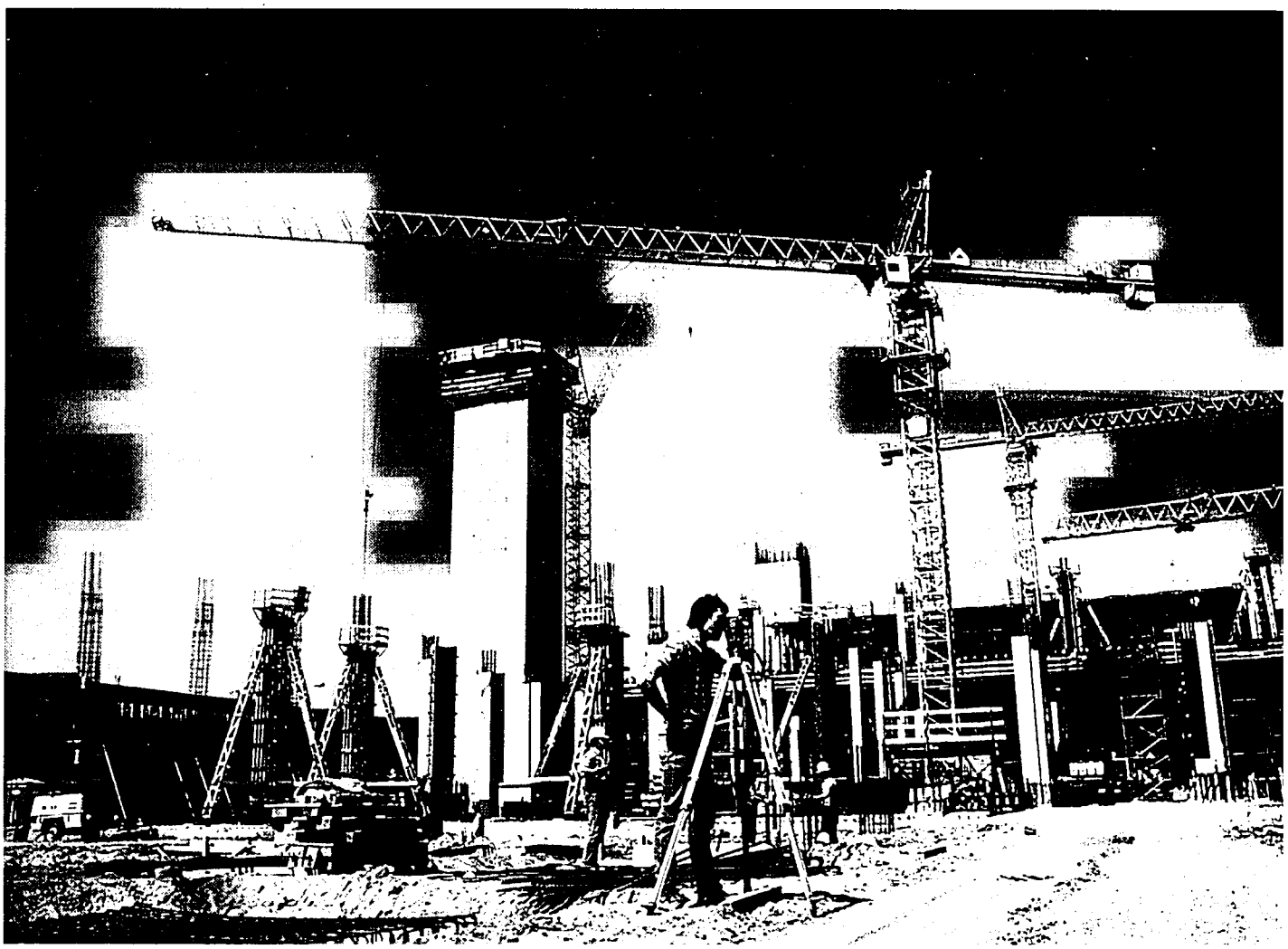
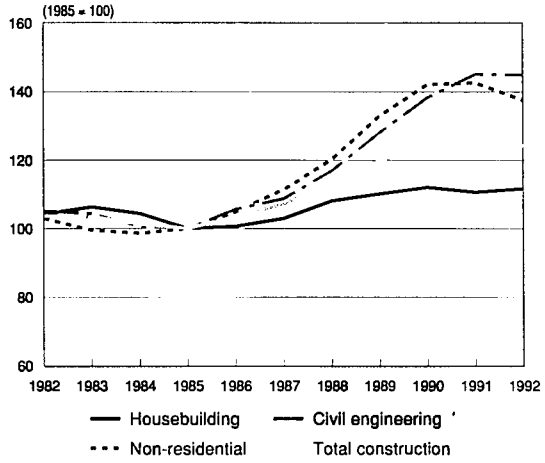
The industry is represented at the EC level by: Federation of the European Sporting Goods Industry (FESI); Address: PO Box 1160, D-5340 Bad Honnef 1; tel: (49 2224) 76 381; fax: (49 2224) 75 940.



Construction
NACE 50

The construction industry accounts for the largest share of all investment by public bodies and private undertakings in fixed assets and in private and public housing construction. Its output is relatively labour-intensive, so that it is one of the industrial sectors which gives the greatest employment. On the other hand, it uses a great deal of materials, so that its sales have considerable consequences for the output of other industrial sectors.
Despite relatively mobile production processes at locally changing building sites, the sector has a low capability for adjusting to changing demand through geographical mobility. Hence, apart from the few very large construction firms, foreign operations are only of secondary importance. Competition is more extensive in local and regional markets. However with the progressive completion of the European internal market, transnational competition might grow in the future.

Figure 1: Construction
Index of investment in construction in the EC



Source: FIEC

INDUSTRY PROFILE

Description of the sector

Construction activity takes place as building activity, as civil engineering activity, or a combination of both.

Building activity deals with the construction of new buildings for various kinds of uses and users. In addition to buildings for private undertakings (administration and production buildings) and for the various public bodies, this sector builds a considerable share of multi-storey dwellings and family houses. It also meets growing demand for the modernisation and repair of these buildings.

In civil engineering, construction firms engage in the construction of transport infrastructure (roads, railways and airports), hydraulic engineering (mainly rivers, canals, harbours, streams, sluices and dams), irrigation and drainage and waste water disposal. They also engage in the erection of purifying plants and construction involving bridges, tunnels, shafts, drilling, excavation works, and land improvement.

The boundaries between building and civil engineering are fluid. In the construction of new buildings, civil engineering works are also required, while in civil engineering, additional buildings frequently have to be constructed. The larger construction firms therefore offer both building and civil engineering services on an extensive scale.

Recent trends

There has been a change in output trends in the various branches of construction since 1991/92. While private commercial and public sector building and civil engineering are stagnant

Table 1: Construction
Annual production growth in real terms by country

(%)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(2)
EC (3)	-2.4	-0.4	-1.8	-1.4	3.4	3.7	6.2	5.4	4.0	0.3	-0.7
Belgique/België	-5.5	-6.4	-6.1	-0.6	3.0	3.0	14.7	7.5	7.1	2.0	-0.6
Danmark	1.0	0.8	7.1	6.7	16.5	1.9	-4.4	-6.1	-3.6	-7.7	-2.0
BR Deutschland	-3.8	0.8	0.8	-6.6	2.7	0.0	4.7	4.9	5.3	4.0	2.0
España	0.5	-2.5	-5.5	0.5	5.0	7.0	10.0	13.0	9.0	4.0	-1.0
France	-4.6	-4.6	-4.8	0.0	2.4	3.6	5.9	4.2	2.5	0.9	-0.2
Ireland	-7.7	-11.6	-8.6	-2.9	-2.8	-2.6	-3.6	9.6	10.8	-4.9	-2.2
Italia	-5.3	1.5	-0.8	-0.5	1.9	-0.7	2.3	3.6	3.4	1.2	-0.4
Nederland	-7.3	-3.4	3.9	1.6	5.1	1.8	11.1	3.2	1.4	-0.4	-5.7
Portugal	11.5	-2.8	-17.9	-5.7	7.4	19.0	12.0	5.3	5.0	4.5	4.0
United Kingdom	1.3	4.6	3.3	1.1	3.3	7.9	7.2	4.3	0.8	-8.6	-4.7
Sweden	-0.8	0.0	5.3	-0.9	2.8	5.2	3.8	6.6	2.1	-5.0	-10.0
Austria	-9.5	0.6	-3.9	1.6	2.6	3.3	2.5	0.7	4.8	7.4	3.7
Switzerland	-2.5	8.1	5.6	1.0	2.0	3.5	6.9	5.9	0.0	-5.3	-3.0
Finland	4.7	5.6	-4.6	0.1	-3.3	1.0	9.2	17.1	-0.8	-14.1	-8.3
Norway	-0.5	3.1	1.4	4.8	11.7	6.0	-0.8	-15.0	-11.9	-4.9	-2.5
Total	-2.0	-0.1	-1.5	-1.2	3.3	3.7	6.0	5.3	3.6	-0.2	-1.1

(1) Estimates
(2) Forecasts
(3) Excluding Hellas and Luxembourg
Source: FIEC (06/92)

Table 2: Construction
Annual production growth in real terms by sector (1)

(%)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(2)	1992(3)
Building	-2.4	0.1	-1.4	-1.9	2.6	3.8	5.7	4.4	3.3	-0.7	-0.7
-Housebuilding	-3.1	2.0	-1.8	-4.2	0.7	2.2	4.9	2.0	1.5	1.2	1.0
New (4)	-6.5	5.3	-2.4	-9.6	-2.2	-1.8	5.7	0.7	-0.1	-2.8	-0.2
Rehabilitation and maintenance (4)	1.6	-0.9	2.4	3.4	5.3	6.7	3.1	2.7	2.8	0.1	2.0
-Non-residential (5)	-2.7	-3.3	-0.9	1.5	4.8	6.4	7.9	10.4	7.0	0.4	-3.6
Private (6)	-3.4	-2.8	0.9	2.7	5.8	10.5	11.0	12.6	7.8	-0.2	-4.9
Public (6)	-1.2	-1.8	-3.0	-2.4	1.8	0.7	2.3	5.8	7.5	3.7	-0.2
Civil engineering	-0.7	-0.8	-3.7	-0.6	5.7	2.7	7.6	8.7	7.2	4.8	0.0
Total construction	-2.1	-0.4	-1.8	-1.4	3.4	3.7	6.2	5.4	4.0	0.3	-0.7

(1) Excluding Hellas and Luxembourg
(2) Estimates
(3) Forecasts
(4) Excluding Portugal
(5) New construction only
(6) Excluding Danmark and Italia
Source: FIEC (06/92)

Table 3: Construction
Volume of new overseas contracts, 1982-1990

(million ECU)	1982	1983	1984	1985	1986	1987	1988	1989	1990
Belgique/België (1)	N/A	927	1 014	865	508	344	499	758	N/A
Danmark	568	274	300	349	287	299	374	278	207
BR Deutschland (2)	3 507	1 584	2 085	1 190	805	893	832	922	4 720
España	1 049	717	591	463	305	314	320	402	447
France	7 637	8 139	6 548	6 818	7 143	7 799	6 599	4 993	7 070
Italia	1 754	1 521	1 536	3 501	1 877	1 577	1 235	2 346	2 727
Nederland	1 756	2 713	1 777	988	1 060	1 057	1 478	2 134	2 257
United Kingdom (3)	4 681	4 037	5 027	2 540	2 197	3 480	3 483	3 304	4 449
Finland	528	382	452	380	384	748	347	345	318
Sweden	639	900	995	875	530	680	804	1 588	844
Switzerland	409	258	200	173	195	211	235	284	163
USA (4)	46 224	33 483	39 163	38 008	23 171	15 858	21 997	35 390	37 156
Japan	3 776	4 831	4 816	6 102	5 480	4 714	5 218	7 106	5 647
Korea	13 656	11 735	8 242	6 148	2 236	1 473	1 354	N/A	N/A

(1) Includes figures of a new member for 1989
(2) For 1988 and 1989 approximately 3700 million ECU including affiliated companies; 1990 includes new contracts won by subsidiaries"
(3) The United Kingdom and Ireland; figures for 1982-85 are for the fiscal year"
(4) Top 400 firms
Source: EIC (09/91)

Table 4: Construction
Volume of new overseas contracts, 1990

(million ECU)	DK	SF	F	D	UK	I	NL	N	E	S	CH
Total	207.4	318.1	7 069.9	4 719.6	4 448.5	2 726.6	2 256.9	161.0	447.0	844.5	162.6
Africa	22.0	20.4	1 838.2	536.5	447.8	525.5	179.1	9.4	196.4	23.6	7.1
North America	0.0	23.6	1 131.2	2 039.3	2 106.	44.8	69.1	0.0	0.0	369.2	49.5
South America	3.1	0.0	1 060.5	1.6	0.0	461.9	158.7	0.0	76.2	0.0	0.0
Asia	1.6	10.2	707.0	203.5	607.2	402.2	226.2	0.0	0.0	4.7	4.7
Australia	0.0	0.0	0.0	429.7	405.3	1.6	14.9	0.0	0.0	0.0	0.0
EC	102.1	68.3	1 767.5	785.5	553.0	398.3	1 131.2	5.5	174.4	237.2	80.1
Other Europe	69.1	180.7	0.0	588.4	51.8	585.2	71.5	146.1	0.0	198.0	0.0
Middle East	9.4	14.9	565.6	135.1	277.3	308.7	406.1	0.0	0.0	11.8	21.2

Source: EIC (09/91)

or even declining after a decade of considerable growth, a revival is taking place in housing construction which in the 1980s experienced a lower rate of activity despite increasing demand for housing.

While the economic state of the construction industry in the EC follows the local economic trends of each Member State, it cannot be adequately and solely explained by this consideration. For example, while growth in construction was been more pronounced than that for the general economy in Germany and Portugal in 1992, in other countries it will fare worse.

The decline in almost all civil engineering branches since 1992 in nearly all the European countries shows very clearly the dependence of business activity in this sector on public expenditures on infrastructure works. Nearly all countries in Europe have considerably reduced their investment budgets in order to stem state indebtedness. These cuts have been especially severe in Spain and Italy.

International comparison

The EC is the largest construction market in the world. In volume terms, the EC market is around a third greater than the US construction market and around 10% greater than that of Japan. On a world scale, 1991 was a year of generally stagnating or slightly declining construction activity.

The main areas of activity in construction vary in these three large markets. In the USA, housing takes the largest share of construction and since 1991 has once again grown strongly. In Japan this applies to public sector building and civil engineering, and in the EC to investment in repairs and modernisation.

In Japan, investment in fixed assets in the form of buildings was relatively the highest with around 18% of GDP, compared to only 12% in the EC and approximately 10% in the USA. Until 1990/91 the growth rates for investment in all these markets exceeded the growth rates of GDP. Since 1991/92, they have been lower in all these markets. Only the construction markets in Germany and Portugal constitute a partial exception.

The future development of the construction industry in Japan and the USA will depend on growing demand for public sector building and civil engineering investment. In the EC it remains to be seen to what extent planned large-scale transport infrastructure projects and postponed civil engineering works will cause further delays or increases in production as a consequence of government budgetary and financial policies.

In transnational business operations the efficiency of the European construction firms can be clearly judged by their presence in the growing world markets. Thus, European construction firms meet approximately half of the transnational volume of orders executed in the growth markets of Europe and Africa and around a third of the Middle East markets. There they are in competition with US construction firms.

In these markets, with a share of less than 10%, competition from Japanese construction firms is of small importance. In the Asian market, on the other hand, the shares of Japan and the USA are more important, each having approximately a third.

Foreign trade

Transnational business operations amount to only around 5% of the total volume of construction and are carried out by only a few large firms. However, these conduct almost two-fifths of their construction operations abroad.

In the transnational business operations of construction firms there were clear signs of growth for 1991-92 in selected European markets, although viewed overall the European market is showing no signs of growth. These developments are due especially to increased competition, particularly among the large firms which work abroad mainly through local subsidiaries. At the same time, cross-border activities due to the Single Market also increased for small and medium-sized enterprises.

MARKET FORCES

Demand

Economic and technological structural change is giving rise to constantly increasing new needs in the EC. Demand is likewise increasing for alternative investment, especially in the form of modernisation and the repair of buildings. There are, however, widely differing demand and output conditions in the individual construction branches and EC Member States, according to whether the contractors depend on public sector or private sources of financing for their projects.

A restrictive budgetary policy, such as prevails in most countries, is therefore limiting both public sector demand for civil engineering and private demand for publicly assisted housing construction.

Growing interest rates and declining direct public assistance is leading to correspondingly smaller demand and output in the construction of flats. With a rising need for rental housing and continuing low profitability from investment in housing construction, growth in this construction branch can be expected only following an appropriate allocation of budgetary resources. This development will be replicated in 1992 mainly in the trend in housing construction in Germany. Therefore, the re-establishment of profitable market conditions for rental housing is important.

In the case of the remaining construction areas, financing costs and changes in them, along with profitability of building use, have had a much greater influence on construction output than changes in market volumes, production costs and capacity utilisation.

During the 1980s it was the service sector which assured an increasing dynamic in non-residential building which accounts for around one third of total construction. Since 1991, it has been these kinds of uses which have leading to individual production collapses in the relevant construction branches.

The demand for civil engineering develops mainly in a countercyclical fashion, as demand is accelerated or delayed by the budgetary, financial and economic situation of the relevant decision-making public bodies. Moreover, many projects come to the execution stage only after several years of planning, decision-making and procurement procedures. They then extend over several years of financial and technical accounting.

In modernisation and repair, growth trends are continuing in all construction branches. These construction activities are acquiring an increasing importance in relation to total building production, as well as for medium-sized and larger construction firms.

Few additional effects on demand, on the other hand, can be expected from innovations in building products and processes. This will come rather through innovations in new transport, communications and environmental technologies in the user fields which need new construction facilities to make these innovations a reality.

Supply and competition

The preparation for and the completion of the European internal market improve the competitiveness of construction firms engaging in cross-border business operations in the EC. Improved approval conditions for construction firms and materials to which they are accustomed in their home markets, better opportunities for participating in public tenders, and the elimination of formal obstacles to the transnational move-

Table 5: Construction
Top 20 enterprises by turnover, 1991

(million ECU)	Country	Turnover	Exports as a % of turnover	Consolidated profits (before tax)	Employment
Bouygues	F	9 228	29.44	91.1	69 615
SGE (Générale des Eaux)	F	6 409	42.22	67.5	72 963
BICC	UK	5 406	43.00	115.5	41 874
Philipp Holzmann	D	5 365	41.00	71.3	40 410
Iritecna	I	5 282	N/A	N/A	N/A
Tarmac	UK	4 600	15.00	30.0	31 734
Trafalgar House	UK	4 568	36.00	174.6	32 133
Skanska	S	4 480	13.00	133.7	31 000
SAE	F	3 909	28.40	4.4	25 538
GTM Entrepose (Lyonnaise des Eaux Dumez)	F	3 857	29.20	33.5	39 611
AMEC	UK	3 335	16.00	N/A	30 056
Hochtief (RWE)	D	3 138	32.00	97.7	26 941
Spie Batignolles (Schneider)	F	3 096	27.43	N/A	33 940
NCC (Nordstjernan)	S	2 878	5.00	-16.3	21 868
Beazer	UK	2 750	51.00	76.6	22 953
Bilfinger & Berger	D	2 582	46.00	66.0	56 376
George Wimpey	UK	2 501	18.00	N/A	14 400
Dumez (Lyonnaise des Eaux Dumez)	F	2 423	N/A	N/A	31 052
Cegelec	F	2 284	36.15	43.0	27 088
John Laing	UK	2 263	5.00	N/A	12 000

Source: Le Moniteur (11/92)

ment of construction equipment are making a significant contribution to this development.

Both overall and regionally, the construction operations of non-European construction firms in the EC are of little importance today. This applies both in quantitative terms and also to their impact on competition in construction in the EC.

Because of their supply capacity, most of the small and medium-sized construction firms operate only in partial markets and are therefore faced with specifically regional demand. Only the larger construction firms are in a position to re-arrange their capacities according to shifts in demand in the regional markets and in their individual sectoral partial markets.

This can lead to excess regional demand or supply in individual construction branches which makes it difficult to see the development of the general demand on the market as a whole. At the same time, this leads to special regional developments in costs and prices.

Production process

For construction firms, building materials and labour constitute the main cost factors. In the case of building materials there is close integration with the up-stream sectors of industry, such as the stone, sand, steel, chemical and wood-working industries. This integration is developing towards an increasing amount of prefabrication prior to delivery to the construction site.

The productivity increases expected from this are however also shifting parts of the value created by the construction industry to the supply sectors.

Because of their relatively small use of fixed assets, the financing costs of construction firms are structured differently from those of the other sectors of industry. Thus, fewer interest burdens arise in construction in connection with the financing of fixed assets. These burdens arise more in the pre-financing of construction projects during the execution phase and up to payment of the final account.

While the first factor favours the more rapid expansion of production capacity, large accounts receivable due to production conditions restrict expansion of business activity especially during periods of high interest rates.

The use of labour in the construction industry is influenced more by the structural impact of increased technological and commercial requirements than by a quantitative decline in production. The more recent production decline has therefore shown little effect on the level of employment in this sector, as the demand for qualified personnel is increasing and can be met only with difficulty.

INDUSTRY STRUCTURE

Companies

In the EC, construction is carried out to a large extent by small and medium-sized enterprises which represent more than 80% to 90% of European construction firms according to the definition of "SME". Their market share varies however from one country to another and also from one construction branch to another. Thus, their number in Belgium and Italy is relatively large, whereas it is smaller in France, the United Kingdom and particularly in Spain. In many civil engineering branches, for example bridge and tunnel construction, concentration of market shares is more pronounced than in most of the branches of general and road construction.

The large European construction firms work in several different building and civil engineering branches. They adjust the main areas of their business operations to developments in the individual partial markets. This applies also to the European and extra-European foreign markets, in which they carry out a considerably greater part of their production than the small and medium-sized construction firms.

Strategies

The structural changes in the construction markets of Europe call for adjustment measures on the part of construction firms: specialisation in the case of medium-sized construction firms operating at regional level, and further diversification in the case of larger firms. Some of the latter are increasingly extending their activity into non-construction services.

Table 6: Construction
Total employment

(thousands)	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC (1)	N/A	9 087.5	8 711.6	8 434.3	8 408.3	8 525.3	8 814.5	9 077.9	9 273.5
Belgique/België	231.4	212.3	198.1	197.0	198.1	198.3	207.8	219.0	229.0
Danmark	154.1	151.6	163.2	168.9	185.8	190.6	186.0	175.1	165.0
BR Deutschland	2 082.0	2 018.0	1 984.0	1 886.0	1 812.0	1 739.0	1 843.0	1 849.0	1 913.0
España	951.6	929.7	808.7	776.0	831.3	925.9	1 020.3	1 133.9	1 220.4
France	1 794.7	1 712.6	1 604.0	1 526.1	1 528.5	1 538.0	1 554.2	1 572.9	1 600.0
Ireland	N/A	85.9	83.1	75.7	72.3	71.3	70.1	70.3	76.0
Italia	1 790.6	1 778.5	1 675.0	1 651.5	1 633.2	1 615.0	1 610.0	1 598.3	1 633.4
Nederland	358.0	328.0	327.0	330.0	343.0	349.0	359.0	361.0	368.0
Portugal	408.0	377.9	349.5	331.1	332.1	354.2	362.1	365.4	365.7
United Kingdom	N/A	1 493.0	1 519.0	1 492.0	1 472.0	1 544.0	1 602.0	1 733.0	1 703.0
Sweden	277.0	276.0	260.0	260.0	257.0	278.0	279.0	289.0	314.0
Austria	135.0	130.0	127.0	128.0	124.0	124.0	122.0	124.0	130.0
Switzerland	N/A	157.6	161.8	161.7	157.5	167.6	175.8	170.8	166.4
Finland	183.0	183.0	183.0	178.0	185.0	184.0	188.0	201.0	205.0
Norway	145.0	145.2	145.7	149.6	162.9	172.8	171.7	148.7	139.7
Total	N/A	9 979.3	9 589.1	9 311.6	9 294.7	9 451.7	9 751.0	10 011,4	10 228.6

(1) Excluding Hellas and Luxembourg
Source: FIEC (06/92)

Production by several independent firms is thereby being brought together in one common individual service, usually in the course of the execution of the works as a main contractor along with sub-contractors, or as joint ventures. The present trend is for an increase in main contractor orders at the expense of joint ventures.

In addition to these project-related forms of cooperation, closer enterprise integration is also taking place through purchasing, participation, or cooperation agreements as part of preparations for the European internal market.

Thus, the larger firms can react more quickly to shrinking partial markets through mobility on a nation-wide scale, through additional diversification, and especially by integrating sub-contractor services of more specialised small and medium-sized firms into their offers.

In civil engineering the small and medium-sized firms, which specialise mainly in certain civil engineering branches, are scarcely in a position to engage in such product and service adjustments. Additionally, because of their small range of geographical mobility, they are compelled to resort to quantitative adjustments when their predominantly public sector clients shift the main areas of their infrastructure investment.

REGIONAL DISTRIBUTION

To a far greater extent than is the case with the other industry sectors, the regional distribution of construction capacity is the result of client location criteria. The method of production is entirely related to the construction site and pushes construction firms towards greater geographical mobility.

Small and medium-sized construction firms are capable of doing this only in their local and regional markets. Construction capacities are therefore dispersed according to demand for construction. For the most part, the predominantly small and medium-sized firms adjust to changed demand situations less through geographical mobility than through the establishment or reduction of production capacity.

Table 7: Construction
Employed workers

(thousands)	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC (1)	N/A	7 164.4	6 799.7	6 505.3	6 476.3	6 503.0	6 728.8	6 861.0	7 037.1
Belgique/België	190.0	171.1	157.0	156.9	156.8	156.0	164.7	175.7	185.0
Danmark	119.9	119.3	132.3	138.9	155.4	159.7	155.8	146.4	139.0
BR Deutschland	1 882.0	1 819.0	1 782.0	1 679.0	1 618.0	1 546.0	1 644.0	1 649.0	1 707.0
España	757.5	721.0	597.0	551.5	614.2	694.3	774.2	889.7	963.1
France	1 448.3	1 374.7	1 275.2	1 203.9	1 207.6	1 215.9	1 231.4	1 249.9	1 280.0
Ireland	N/A	68.5	64.4	58.3	55.9	53.4	51.4	51.5	56.6
Italia	1 248.0	1 217.1	1 165.7	1 140.8	1 120.1	1 089.1	1 092.0	1 080.1	1 109.7
Nederland	313.0	285.0	285.0	288.0	301.0	306.0	315.0	317.0	323.0
Portugal	N/A	304.7	286.1	266.0	262.3	280.6	291.3	290.7	288.7
United Kingdom	1 123.0	1 084.0	1 055.0	1 022.0	985.0	1 002.0	1 009.0	1 011.0	985.0
Sweden	246.0	237.0	230.0	232.0	232.0	233.0	234.0	242.0	266.0
Austria	133.0	128.0	125.0	126.0	122.0	122.0	120.0	122.0	128.0
Finland	166.0	163.0	163.0	159.0	164.0	159.0	160.0	169.0	171.0
Norway	113.9	116.0	117.2	120.4	132.2	142.6	138.6	N/A	N/A

(1) Excluding Hellas and Luxembourg
Source: FIEC (06/92)

Table 8: Construction
Self-employed workers

(thousands)	1982	1983	1984	1985	1986	1987	1988	1989	1990
EC (1)	N/A	1 922.8	1 911.3	1 893.6	1 931.9	2 022.1	2 085.4	2 216.8	2 236.2
Belgique/België	42.0	41.2	41.1	41.1	41.3	42.3	43.0	43.3	44.0
Danmark	34.2	32.3	30.9	30.0	30.4	30.9	30.2	28.7	26.0
BR Deutschland	200.0	199.0	202.0	207.0	194.0	193.0	199.0	200.0	206.0
España	194.1	208.7	211.6	224.5	217.1	231.6	246.1	244.2	257.3
France	346.4	337.9	328.8	322.2	320.9	322.1	322.8	323.0	320.0
Ireland	N/A	17.1	18.2	17.0	16.3	17.7	18.5	18.7	19.2
Italia	542.6	561.4	509.3	474.4	513.1	525.9	518.0	518.2	523.7
Nederland	45.0	43.0	42.0	42.0	42.0	43.0	44.0	44.0	45.0
Portugal	N/A	73.2	63.4	65.1	69.8	73.6	70.8	74.7	77.0
United Kingdom	N/A	409.0	464.0	470.0	487.0	542.0	593.0	722.0	718.0
Sweden	31.0	30.0	30.0	28.0	25.0	45.0	45.0	47.0	48.0
Austria	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Finland	17.0	20.0	20.0	19.0	21.0	25.0	28.0	32.0	34.0
Norway	31.1	29.2	28.5	29.2	30.7	30.2	33.1	N/A	N/A

(1) Excluding Hellas and Luxembourg
Source: FIEC (06/92)

A general or branch-related recovery of construction in individual areas of the EC will lead only conditionally to a general stabilisation, as available production capacity, especially of the small and medium-sized enterprises, can hardly be mobilised to move to the areas of demand.

In public sector civil engineering, and especially in transport construction, the regional distribution of production capacity is determined by the financial capabilities of the territorial authorities, particularly through the inflow of financial resources from outside, e.g. resources of the European Structural Funds for infrastructure works.

At the regional level even civil engineering capacity for investment in the protection of the environment is guided by the demand for these construction services and especially by the economic structures of the areas with greater environmental investments. In other regions supply bottlenecks can arise, if additional investment in the protection of the environment is required with the aid of civil engineering services.

ENVIRONMENT

Practically all branches of construction are increasingly confronted with environmental problems. New construction in effect transforms the use of land such that it brought within the scope of environmental regulations. In most cases, it is the construction industry's clients and the local supervisory authorities which must take the final decision as to how to address the environmental implications arising from new construction. The construction industry has many organisational or technological alternative solutions for such interventions, but in many cases they are turned down by clients because these solutions may be associated with higher costs.

On the other hand, an increasingly large part of the output of the construction industry is needed for environmental measures of a preventive or repair character. Thus the disposal of polluted water, for example, is carried out almost exclusively through use of these production services. This depends entirely on demand from public sector and private customers.

The structural policy of the EC is operating to an increasing extent in indicative fashion, as for example when, through the financial resources of the European Structural funds, measures for the protection of the environment are proposed at an early stage in the regions of Europe, in which there is also a backlog of demand in other infrastructure areas.

REGULATIONS

With the progressive completion of the European single market, harmonised and harmonising EC regulations are replacing the diverse national regulations and standards for the construction industry. This applies both to regulations for transnational use of building materials and temporary use of construction equipment and machinery, to the way in which contracts are awarded, and to the principal conditions of the contract. Common regulations on personnel use and its conditions are also appearing.

Although public procurement directives apply only to larger projects, they define tender and award procedures in general. In the same way the Construction Products Directive promotes not only transnational trade in these products but also construction abroad generally.

OUTLOOK

Regional economic structural change on the one hand and technological structural change on the other is giving rise in the EC to lasting new needs for land, the short-term, medium-term and long-term demand for which depends on the financing capabilities of the public sector and private clients.

Reduced expectations regarding the general trend of incomes and high financing costs are at present preventing these needs from developing into a corresponding demand.

More and more medium-sized and (though with some hesitation) large construction firms see a new field of activity in modernising and repairing buildings, and the market and productivity potential of this has not yet been exhausted.

In civil engineering new areas of special emphasis are coming more clearly to the fore, e.g. investment in the protection of the environment, the improvement and technological renewal of existing infrastructure facilities and the area of trans-European networks covered by proposals from the EC Commission, with consequential changes in the structure of construction operations and the composition of the labour force.

The especially dynamic development in the new German Länder will continue after 1992, as the expansion and reconstruction of the public infrastructure there will develop independently of general developments regarding interest rates, costs and budgets.

Despite rising needs for infrastructure installations, continuing restrictive budgetary policies in most countries of the EC are creating bottlenecks in demand which are pushing construction firms towards more sustained and increasing activity abroad. This is being facilitated to an increasing extent by the completion of the European internal market, and it assures greater transnational competition.

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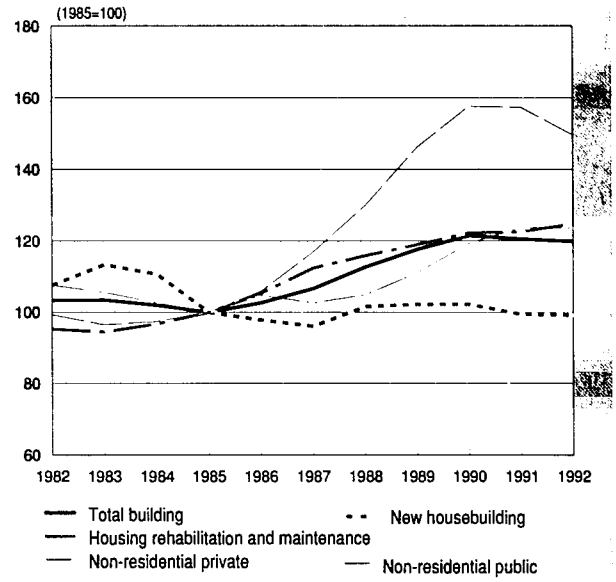
European International Contractors (EIC). Address: Postfach 2966, D-6200 Wiesbaden; tel: (49 611) 77 2268; fax: (49 611) 77 2285.

Building
NACE 501

The building sector is considerably influenced by the overall economic situation, by both current trends in economic activity and expectations of future trends arising therefrom. The response of the public authorities, in terms of their economic, monetary, credit and fiscal policies, also plays an important part in determining the condition of the industry.
During 1991 and 1992, a combination of conflicting short and longer term expectations, together with generally restrictive measures taken by the public authorities particularly in the area of monetary and credit policy, was reflected in an overall reduction in the level of demand. A small increase in output did not fully compensate for previous reductions, despite there being urgent requirements to be met in most regions.
Among small and medium-sized enterprises, competitive pressures have eased following a reduction in capacity. Among large construction enterprises, by comparison, competition is more intense. Growth in overseas markets is still so slight that firms are focusing their activities even more on national and European markets. There is little evidence so far of the expected easing of competitive pressures as a result of transfer of production capacity to markets of Eastern Europe.

Figure 1: Building Investment



1991 and 1992 are FIEC estimates
Source: FIEC

INDUSTRY PROFILE

Description of the sector

The building industry is responsible for the construction of new buildings for various use by both private and public sector clients. Meanwhile modernisation and rehabilitation work is assuming greater importance for the industry.

Construction plays a vital part in relation to different aspects of economic activity both public and private. Given that the need for buildings is always growing, building plays a key role in the economic and social development of all countries of the EC.

Because of the growth in value and volume of its use of raw materials, components and equipment, what happens in this sector is crucial for several other industry sectors at the same time: construction materials, timber processing, ceramic products, sanitary ware, the chemical industry and mechanical engineering, among others.

Levels of demand for the products of a range of other industry sectors also are influenced, directly or indirectly, by the level of activity in building, through either contractual or technological links: for example, furniture, office equipment and soft furnishings.

Table 1: Building
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (1)	1993 (2)
EC (3)	0.0	-1.0	-1.8	2.7	3.4	5.6	4.4	3.3	-0.6	-1.2	-1.3
Belgique/België	-3.2	-3.7	2.7	4.6	5.5	17.5	13.0	9.2	2.2	-0.1	-4.1
Danmark	1.0	14.4	6.8	17.1	3.9	-5.8	-9.9	-6.6	-7.6	-3.0	-1.7
BR Deutschland (4)	2.6	0.2	-8.3	1.3	0.3	4.8	5.0	5.8	4.5	3.3	-0.1
España	-4.0	-5.0	1.0	6.0	8.0	6.8	9.0	5.9	1.2	-0.8	N/A
France	-4.1	-3.8	-1.2	0.8	2.5	4.7	3.5	2.5	0.4	-1.0	-2.5
Ireland	-10.4	-11.4	-1.2	-3.2	0.6	-3.2	11.8	11.9	-6.3	-3.2	N/A
Italia	0.7	-1.0	-0.8	0.6	-1.3	3.2	3.5	3.6	2.0	0.0	-2.3
Nederland	-3.5	4.2	1.5	5.6	3.1	12.3	3.9	1.2	-1.0	-1.8	-1.7
Portugal	1.6	-11.2	-5.8	9.2	10.7	8.4	0.7	3.4	0.1	2.7	2.6
United Kingdom	4.9	4.2	1.8	3.3	8.7	7.4	3.6	-0.5	-10.4	-9.3	-0.9
Sweden	-1.2	5.1	1.4	3.6	7.0	5.1	6.5	1.0	-2.2	-10.9	-16.7
Austria	-0.3	-4.6	-1.5	6.1	4.5	7.8	-0.5	5.2	10.1	5.4	2.9
Switzerland	9.0	6.9	2.1	2.6	3.5	7.2	6.9	-0.2	-6.5	-4.6	0.2
Finland	7.0	-3.7	0.0	-3.9	2.0	12.9	16.7	-0.8	-15.9	-18.0	-8.8
Norway	1.0	1.4	6.4	15.0	3.4	-1.0	-12.8	-11.7	-10.8	-4.9	-0.8

(1) Estimates
(2) Forecasts
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (11/92)

Table 2: Non-residential building
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993 (2)
EC (3)	-3.4	-0.6	1.6	4.9	5.9	7.8	10.3	6.5	0.6	-4.6	-4.1
Belgique/België	-4.0	-4.6	0.9	6.2	5.9	12.1	8.8	8.0	4.5	0.1	-1.5
Danmark	-5.3	17.4	25.2	17.0	14.1	-6.6	-15.3	-6.4	-8.5	-8.2	-2.7
BR Deutschland (4)	-0.7	-0.7	-3.2	6.1	2.9	4.9	5.5	2.6	4.1	2.1	-1.7
España	-5.0	-4.0	1.0	6.0	9.0	9.3	15.6	10.0	5.0	2.0	N/A
France	-5.1	-3.4	1.0	4.7	7.2	9.9	7.0	6.3	3.0	-2.1	-5.5
Ireland	-25.2	-23.8	5.9	-7.4	6.7	6.8	12.4	23.8	-13.5	-5.0	N/A
Italia	-5.5	-2.0	2.9	5.4	0.5	6.2	5.2	4.8	2.4	-1.6	-2.8
Nederland	-6.5	3.9	2.9	7.3	4.3	11.6	6.9	6.7	2.9	-8.5	-3.5
Portugal	-1.0	-17.7	-4.3	17.0	14.0	12.0	8.0	8.0	1.7	2.5	2.0
United Kingdom	-0.5	7.7	4.7	1.3	9.2	8.1	20.0	8.6	-6.2	-15.7	-7.2
Sweden	-3.3	4.2	1.8	9.6	4.4	-0.5	7.5	-5.3	-9.6	-10.0	-10.0
Austria	-1.9	-2.5	0.8	7.7	6.3	7.5	-0.1	6.4	14.2	5.6	2.2
Switzerland	9.1	7.1	3.8	7.7	4.8	10.5	9.3	4.7	-2.0	-3.2	-0.2
Finland	16.7	-9.5	2.6	0.0	2.6	10.0	13.6	2.0	-11.8	-24.4	-11.8
Norway	0.0	1.7	9.8	17.6	3.4	2.0	-11.1	-6.9	-4.6	-5.0	-0.7

(1) Estimates
(2) Forecasts
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (11/92)

Because it uses labour-intensive production processes, the building sector of construction is still one of the industry sectors employing the largest number of personnel.

Main indicators

The economic situation in construction in the countries of the EC tends to reflect the overall trend in economic development in those countries. However, the economic growth trend does not provide a sufficient or certain indication of what is happening in construction: for example, in 1992 the rate of growth in construction output in Germany and Portugal was higher than that of the economy as a whole, while in other countries the level of activity in construction was still relatively lower than observed in other sectors of industry and commerce.

Meanwhile, however, the structural change which is occurring, as a result of developments both economic and technological, throughout the EC countries, has prompted a growing need for new buildings. This is particularly the case in those regions and countries - notably Spain, Portugal, Ireland and, most recently, Germany - where structural change is being experienced in especially large measure. However, new building activity in these countries is not fully reflecting the growth in construction needs, on account of both economic and budgetary constraints.

Nearly as great an increase is being experienced in the need for replacement investment, more especially in modernisation and rehabilitation of buildings, particularly in Spain, France and Italy. In these countries this branch of construction is making up for the recession in new building work.

Direct grant measures intended to encourage construction of buildings for rent, which public authorities have taken in the past, have not met with the results that were expected. However, in response to a growing need for rented accommodation, these measures have been reintroduced, with the backing of a suitable amount of budgetary resources, despite their past lack of success. This situation is reflected especially in measures taken in Germany and France. In the Netherlands, by comparison, such measures have been considerably reduced.

International comparison

The easiest way to make international comparisons of construction industry performance is to compare the commercial activity of construction enterprises carried out beyond their own national boundaries. Any broader comparison of construction market conditions and performance may be misleading because it can take into account only some of the complexities arising from differences in market size, construction needs, size of firms and the composition of demand.

The record of cross-border activity illustrates clearly the capabilities of European construction firms, especially in growing markets. European firms account for very nearly half the volume of orders placed in the growth markets of Europe and Africa, and a third in those in the Middle East that also are growing. In these markets they compete mainly with American firms, whose share is around two-fifths in Europe, one-third in Africa and a half in the Middle East.

Competition from Japanese construction firms in these markets is insignificant: they account for barely 10% of orders. In Asian markets, however, both Japan and the USA play a more significant part, amounting to roughly one-third of orders for each country, while European firms account for no more than one fifth.

Meanwhile, European construction enterprises are always well-represented in the part of the American market occupied by non-national contractors, their share of which is around two thirds. The role of Japanese firms in this market is growing, but in 1990 their share was still no more than one fifth. In addition, major European construction enterprises occupy an important place in construction activity in the USA carried out by the home-based industry, by virtue of their share holdings in American construction firms.

Foreign trade

In contrast to the years up to 1990, 1991 and 1992 have seen a rise in the volume of overseas work carried out by construction companies. Even so, this work still represents no more than around 5% of total construction work, and is only of significance to a few large construction companies for whom overseas work accounts for roughly a fifth of their turnover.

However, this does not tell the full story of the overseas activity of these companies because, for some years now, they have been increasing their financial stake in foreign firms to such an extent that they have come to be viewed, in some cases, as local companies.

The rising tendency of building activity abroad is most pronounced in the case of Spanish firms, with lower but still pronounced increased rates of activity in the case of French and Italian firms.

MARKET FORCES

Demand

Measures taken by governments have affected the construction industry both directly - by the priority given to public investment in construction in government spending, and by means of assistance for initiatives in the private sector - and indirectly - by favourable tax arrangements and fiscal and monetary policies.

In several countries, restriction of government spending has had direct and immediate negative consequences for investment in public works, especially in Spain where, after substantial growth in public investment up to 1990, demand for construction of public buildings has fallen by nearly a third.

In spite of opposite tendencies in public spending in Germany and France the outcome has not resulted in proportional growth in the demand for building construction. In 1991 and 1992, the increased German budget deficit brought about a substantial increase in infrastructure investment, especially in the new Länder, whilst demand for public buildings has remained unchanged. In France budgetary policy has at least not had any recessionary effect on the demand for public buildings.

The general development of incomes has on the whole had a rather indirect effect on the demand for building construction, especially multi-storey housing and new single-family dwellings. For instance the increase in real incomes has led to increased requirements in the quality of housing. Increased demand for accommodation is particularly evident in regions where economic growth is attracting additional population.

At the same time, however, the emergence of increased financing costs is squeezing anticipated returns from this sector in comparison to other forms of investment, and putting this type of long-term investment at a disadvantage vis-à-vis other forms of investment.

The factors which influence the multi-storey buildings sector are completely different from those which affect demand for other products of the building construction industry. In this area, variations in financing costs produce a more marked effect over the rate of production of buildings than either changes in the size of the market, production costs or the overall level of the capacity of the industry.

Up to now, it has been principally the substantial development of the services sector of the economy which has been behind the strong growth observed in the commercial building sector - shops, offices, hotels and restaurants, nursing homes, and private leisure centres, - which accounts for nearly half of total private non-residential building. Apart from a few regional focal points, however, the services sector has shown less growth in 1991 and 1992 compared with other years, and this has been followed very quickly by marked falls in output in the various relevant sectors of the industry.

More than half the total of public investment in building construction is carried out at local government level, where it is not the level of demand for building which will be decisive but rather the financial predicament of regional and local authorities.

In this case, it is incentive programmes concentrated at regional level which are most likely to bring about improvements in the infrastructure. Notably this is true of Portugal, and in 1992 to a lesser extent for Spain. Germany's eastern Länder are also benefiting from such programmes, following some initial uncertainties.

Throughout the EC, except in the areas noted above, the rate of growth in the public works sector in 1992 has either fallen back or even become negative.

As far as housing modernisation and improvement is concerned, a positive growth rate is being maintained in nearly all EC countries. This sector is assuming greater and greater

Table 3: Non-residential private building
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993 (2)
EC (3)	-2.6	0.4	16.1	7.4	8.2	9.5	11.4	7.0	0.7	-4.8	-4.6
Belgique/België	-1.4	1.9	8.1	12.4	10.7	18.4	13.7	7.6	1.6	0.0	-2.0
BR Deutschland (4)	2.6	0.0	-3.6	6.0	3.7	5.5	7.5	5.3	6.7	3.5	0.0
España	N/A	N/A	N/A	5.0	14.7	11.7	12.0	6.0	5.0	-1.0	N/A
France	-6.0	-4.0	0.1	5.0	8.7	13.0	9.0	7.6	3.9	-3.9	-8.0
Ireland	-28.6	-32.5	10.1	-6.5	12.6	24.6	24.1	27.1	-15.9	-10.0	N/A
Italia	-1.8	-2.9	8.3	13.0	1.6	3.8	5.5	5.6	4.2	0.0	-2.0
Nederland	-9.6	8.5	6.5	11.2	3.9	16.0	6.6	9.9	3.5	-3.7	-3.6
Portugal	-9.1	-12.7	-2.5	12.0	12.5	11.5	8.0	7.3	0.3	0.1	1.3
United Kingdom	-1.8	10.6	10.3	5.0	15.0	11.2	21.0	8.1	-9.4	-18.6	-9.5
Sweden	-2.1	12.2	7.4	20.0	10.1	-2.4	7.0	6.6	-17.8	-20.0	-10.0
Austria	-2.3	-5.4	8.0	12.5	12.7	12.6	1.9	6.8	13.3	6.7	3.1
Switzerland	9.2	8.0	8.6	8.4	6.8	12.7	10.3	4.8	-1.2	-3.8	-3.3
Finland	17.9	-9.1	0.0	0.0	3.3	6.5	21.2	5.0	-16.7	-25.7	-11.5
Norway	N/A	10.4	28.1	28.2	-7.5	-1.8	-19.9	-10.0	-18.8	-13.6	-9.0

(1) Estimates
(2) Forecasts
(3) Excluding Denmark, Greece and Luxembourg
(4) West Germany only
Source: FIEC (11/92)

Table 4: Non-residential public building
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993 (2)
EC (3)	-3.9	-1.9	5.6	-0.1	-0.3	3.8	5.4	6.6	2.6	-1.9	-1.8
Belgique/België	-7.7	-14.5	-12.1	-7.5	-6.9	-6.4	-11.0	10.3	19.6	0.7	0.9
BR Deutschland (4)	-7.3	-2.2	-2.1	6.3	1.0	3.5	0.9	-3.8	-2.7	-2.0	-6.9
España	N/A	N/A	N/A	9.0	-10.0	0.0	28.0	30.0	6.0	-4.0	N/A
France	-3.0	-2.0	3.0	4.0	3.9	3.0	2.0	3.0	0.4	3.0	1.0
Ireland	-19.4	-11.0	1.1	-8.6	-0.6	-18.4	-12.9	13.9	-5.2	3.0	N/A
Italia	-12.8	-0.1	-8.4	-13.6	-3.4	14.6	4.2	2.4	-3.5	-7.0	-6.0
Nederland	-0.3	-4.7	-4.8	-2.2	5.3	-0.1	8.0	-3.2	1.0	2.8	-2.9
Portugal	14.6	-25.4	-7.3	28.5	16.4	14.0	10.0	9.0	3.9	6.0	3.0
United Kingdom	1.4	3.4	-4.2	-5.5	-2.5	0.8	5.3	11.0	8.2	-4.5	0.0
Sweden	-4.6	-4.4	-5.3	-5.2	-6.0	3.5	8.4	-2.2	7.9	0.0	-10.0
Austria	-1.2	2.5	-10.3	-1.4	-7.3	-6.0	-6.1	5.1	17.4	1.9	-0.8
Switzerland	8.9	3.0	-3.4	6.3	1.3	6.4	7.2	4.5	-4.4	0.9	4.6
Finland	12.5	-11.1	12.5	0.0	0.0	22.2	-9.1	-10.0	11.1	-20.0	-12.5
Norway	N/A	-9.1	-8.3	10.7	23.9	10.1	-9.0	-8.9	8.8	2.7	5.0

(1) Estimates
(2) Forecasts
(3) Excluding Denmark, Greece and Luxembourg
(4) West Germany only
Source: FIEC (11/92)

importance for the building construction industry as a whole. Up to now building modernisation and improvement work has been largely the preserve of small construction companies. However, possibly as a result of the recession, a growing number of medium-sized enterprises, and even some large construction companies, are discovering a new field of activity whose potential has not yet been fully explored, quantitatively or qualitatively, by comparison with what has been achieved elsewhere in terms of growth of productivity.

As far as building construction is concerned, one cannot expect any further increase in demand resulting from innovations either in construction products or in production methods. For the present building construction differs from other industry sectors in that the product is significantly influenced by architects who stand between producer and client.

Supply and competition

For small and medium-sized construction enterprises competitive pressures have returned to normal following a reduction in total production capacity. Among large enterprises in the industry, on the other hand, competition is on the whole reduced. The growth, noted above, that has taken place in foreign trade in construction has directed the energies of these firms more towards overseas and particularly non-European markets. Experts had expected an easing of competition as a result of a shift in production capacity to the markets of Eastern Europe, but this has not yet happened to any significant degree. Indeed, it looks more and more as if one might expect building construction capacity of the countries of Eastern Europe to come onto Western European markets.

The industry's clients, for whom it provides buildings for a wide range of uses, are drawn from all sectors of the economy, both private and public. In none of these sectors, however, does the industry face any particularly strong market leverage on the client side. Even public sector demand for building construction is normally decentralised among a large number of authorities.

Following privatisation of public services, the market leverage of the State is being further reduced, even at local level.

However, some reversal of this trend may occur as a result of an increase in leasing of public buildings, given that some leasing institutions have considerable commercial strength which they could exercise.

The level of activity within the EC of construction enterprises from outside the EC is insignificant, whether at Community or regional level. Foreign investors often employ contractors who subsequently award the work to European contractors.

The process of completing the Single European Market is helping to bring about an improvement in the competitiveness of building firms enabling them to extend their operations into other EC countries. This is coming about especially as a result of easier market entry both for these firms and also for the construction materials which they are accustomed to use in their national markets.

Furthermore, former obstacles to cross-border movement of firms' construction plant and equipment are now being removed.

The activities of trade associations at European level, relating to completion of the Single European Market, are bringing about a better understanding of the fundamental parameters of different markets, especially in the area of public and private law, and at the same time reducing risks that have up to now considerably hindered construction firms wishing to compete in non-national markets.

Production process

The rising trend in total European building construction workload recorded over the past several years has continued in 1992, albeit at a slightly slower rate. Statistics show a real growth rate of around 3%.

However, this statement is of little significance for the analyses carried out and decisions taken by firms in the building industry, given that it relates only to the overall trend while growth is at different rates in different European countries and different branches of construction.

Most SMEs operate only in a limited part of the market, and therefore depend very heavily on trends at regional level. Only the large construction enterprises are able to re-allocate their resources in response to shifts in demand in different regions and sectors in which they have an interest.

It is therefore changes in the structure of market sectors in the different countries which provide the best basis for assessment and decision-taking by individual firms.

Major inputs and their productivity

Compared to other sectors of industry, building is labour-intensive and depends heavily on primary materials. On the other hand, it requires very little investment in fixed assets. Productivity improvements will be achieved mainly by the use of appropriate materials, effective management, and the skill level of the workforce.

As far as construction materials are concerned, there is close interdependence between the following sectors: aggregate, metals, chemicals and timber-processing. Firms wishing to improve productivity by using better quality and more expensive materials will seek to extend this interdependence by making more use of off-site prefabrication.

One may also note similar developments in transport, where better management together with prefabrication measures have led to productivity improvement.

Furthermore, growth in the flow of orders from main contractors to sub-contractors is marked not only by greater complexity of such orders but also by the exploitation of potential for increases in productivity by means of co-operation between more specialised firms in the same sector of the industry.

By comparison with other sectors of construction, the building sector requires, in relation to its output, much less investment in capital assets, consisting mainly of mobile plant and vehicles. On account of this, it has relatively less potential for productivity improvements.

Generally speaking, this arrangement is beneficial, when one thinks that the financial resources and financing costs of these assets are markedly lower. Lower capital requirements make it easy for new firms to enter the market place and for existing firms to increase their production capacity more quickly.

At the same time, reduction in production capacity is equally easy. However, the reduced need for capital, especially for capital subscribed by the proprietors of the enterprise, can in the case of expansion quickly expose weaknesses of the enterprise, if increase in the scale of its operations leads it to have to make payments in the short term to a large workforce and for heavy investments in materials, while on the other hand payments for the work done fall due only in the medium or long term.

The increase in leasing of construction plant and vehicles again highlights these relationships, if one considers on the other hand the reduced need for capital and for meeting the costs of financing, but on the other hand the threat to solvency from growth of production capacity or of the scale of operations of the enterprise.

The building sector has a very large workforce. As a result, fluctuations in production in this sector exert a strong influence on the total level of employment in the different national economies.

For example, in countries faced with a decline in construction activity the level of employment was relatively low in 1992 not just in construction but overall. In most EC countries, however, numbers employed in construction have increased, more especially in Germany and Spain, though in Italy and Portugal numbers have stayed at the same level.

Variations in numbers may however hide substantial qualitative changes in the make-up of the workforce, as firms are faced with increased commercial and organisational pressures in view of stricter standards and as a result of important changes in production techniques especially in respect of the use of prefabricated components.

Enterprises are experiencing more and more difficulty in finding personnel suitably qualified for commercial and technical positions in construction, which they have an urgent need to fill.

Staff and office workers are assuming greater importance compared to numbers of operatives on site, where the proportion of skilled workers is increasing.

Compared with other sectors, building construction employs a proportionately greater number of older workers (over 50 years old), which makes it ever more urgent to recruit a new generation of workers, and to improve skills. If this does not

Table 5: Housebuilding
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
EC (3)	1.9	-1.3	-4.1	0.8	1.9	4.9	2.0	1.7	-1.2	0.8	0.0
Belgique/België	-1.9	-2.4	5.3	2.2	4.8	24.9	18.6	10.8	-0.6	-0.5	-7.5
Danmark	5.3	15.5	-1.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland (4)	4.6	0.8	-11.2	-1.6	-1.5	4.8	4.7	8.0	4.7	4.0	1.0
España	-4.0	-6.0	1.0	5.0	7.0	5.4	5.0	2.8	-1.6	0.0	N/A
France	-5.2	-4.5	-2.2	-0.9	1.1	3.5	2.3	0.6	-1.3	-1.7	-2.4
Ireland	-2.0	-6.6	-4.5	-1.0	-2.5	-10.8	13.3	5.4	-1.7	-1.7	N/A
Italia	4.4	-0.5	-2.8	-2.1	-2.4	1.3	2.4	2.7	1.8	1.0	-2.0
Nederland	-1.1	4.4	0.4	4.2	2.1	12.8	1.4	-3.5	-4.7	-1.2	0.0
Portugal	3.0	-7.9	-6.4	5.7	9.1	8.5	-3.3	0.6	-1.0	2.9	3.0
United Kingdom	11.0	0.8	-1.2	5.6	8.1	6.7	-5.9	-8.7	-15.0	-1.9	5.4
Sweden	0.3	5.7	1.1	-0.3	8.9	9.0	5.8	6.0	4.1	-12.0	-22.0
Austria	1.7	-7.1	-4.3	4.1	2.0	8.2	-1.1	3.4	4.0	5.1	4.0
Switzerland	11.9	9.8	0.6	-1.7	2.3	4.1	4.3	-5.6	N/A	N/A	N/A
Finland	3.8	-1.9	-3.8	-7.8	2.1	14.6	20.0	-4.5	-19.0	-15.7	-9.3
Norway	2.1	1.0	2.9	12.3	3.4	-4.3	-14.8	-17.3	-19.6	-8.4	-1.0

(1) Estimates
(2) Forecasts
(3) Excluding Greece and Luxembourg
(4) West Germany only
Source: FIEC (11/92)

Table 6: New housebuilding
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
EC (3)	5.0	-2.6	2.7	-2.1	-1.7	5.7	0.7	-0.2	-2.9	0.2	-0.7
Belgique/België	-5.1	-1.4	5.2	3.7	2.9	29.2	21.0	11.1	-0.9	-0.8	-7.7
Danmark	11.4	21.0	-2.2	23.6	-3.2	-9.3	-9.5	-9.7	-12.5	-5.3	-2.7
BR Deutschland (4)	9.8	0.0	-20.6	-11.2	-9.0	4.7	5.9	10.9	6.0	5.0	2.0
España	N/A	N/A	N/A	4.5	4.5	5.0	4.8	1.0	-7.0	-5.0	N/A
France	-7.5	-9.2	-7.3	-3.1	1.7	5.1	3.0	-1.8	-4.2	-6.0	-8.0
Ireland	-0.7	-6.9	-4.7	-17.2	-12.6	-3.9	28.9	5.8	-3.3	-5.0	N/A
Italia	6.6	-1.5	-3.7	-5.7	-9.3	4.2	3.3	4.0	1.5	1.0	-2.6
Nederland	3.8	3.1	-10.9	7.7	1.8	13.6	-0.8	-9.3	-11.7	-1.5	0.0
United Kingdom	16.5	-4.5	-7.3	7.2	10.4	8.2	-16.8	-19.7	-16.8	8.1	11.9
Sweden	-9.8	-13.1	-11.2	-11.7	25.2	40.3	20.3	13.4	5.1	-25.0	-40.0
Austria	0.4	-10.0	-3.7	2.4	3.2	9.0	-2.1	-0.5	6.6	4.8	4.0
Switzerland	N/A	9.2	-0.6	-3.4	1.1	2.7	3.6	-6.5	N/A	N/A	N/A
Finland	2.6	-2.5	-5.1	-10.8	0.0	18.2	25.6	-6.1	-23.9	-20.0	-14.3
Norway	-0.8	-1.1	2.8	12.2	3.7	0.5	-16.2	-25.3	-24.3	-12.5	-1.9

(1) Estimates
(2) Forecasts
(3) Excluding Greece, Luxembourg and Portugal
(4) West Germany only
Source: FIEC (11/92)

happen, the effect of the fall in the number of skilled workers as more reach pension age will be even more acute.

The difference in wage costs in building construction between different EC countries, and in the balance between pay and other labour costs are relatively less important than the difficulties of finding sufficient numbers of suitably qualified personnel.

PRODUCT FEATURES OF THE INDUSTRY

Technological conditions

A rapid introduction of technological improvements which have already been developed is hindered by the fact that they must be capable of adaptation to building work on building sites; building sites which are invariably different in every case and are characterised by varying environmental conditions and contractual relationships.

In spite of remarkable progress in, for example the area of energy-efficient buildings, new advances in building processes, new materials and plant and site organisation are not discernible today.

By virtue of production methods employed on different building sites, the meteorological conditions lead to an adverse effect on building production particularly in the northern areas of the EC. Two exceptionally mild winters, have therefore resulted in a real increase in building production in these regions which in turn has brought about economies.

Non-residential building

After the high rates of increase in construction of private non-residential building, in the years up to 1990 and with weaker increases in 1991, an equally large decrease in new building activity has been estimated in this sector for all EC countries for 1992, with a further substantial decrease anticipated for 1993.

This correlation is very evident in sharply reduced investments in the private sector in the United Kingdom (with significant differences between industrial construction and commercial developments) and in the Netherlands, France and Ireland. There the market situation is also characterised by considerable supply surpluses. Outside the EC, this development can also be seen in Finland, Sweden and Norway.

Only in Germany is increased private investment leading to a growth in demand in this sector of the industry. In particular, in the new German federal states, investments by German and foreign firms are increasing rapidly.

In the public sector of the construction industry, on the other hand, the decreases for 1992 will be less marked than in the private sector, with similar falls anticipated in 1993. Exceptions to this trend can be found in Germany, Spain and the Netherlands.

Multi-storey housing construction

After two years of declining building volumes, a slight increase in demand for multi-storey housing construction may be expected in 1992; however, this is expected to be followed by a rather larger fall in 1993. Although, this development may be characterised by a further divergence between individual countries both inside and outside the EC. Finland and Sweden in particular are expected to suffer dramatic decreases in activity in this sector. Only the United Kingdom and Germany are expected to witness increased output in 1993.

The high pressure of demand for rental accommodation should have made considerably higher increases likely, particularly in Germany and above all in the new federal states. To date, private investments in particular are lacking in this product sector; in the new federal states this can be explained because the rents are regulated at a very low level with a still very high rate of interest.

In the Netherlands the recent considerable drop in new construction in multi-storey housing construction is mainly due to the high interest rates and the increasing fees for transfer of ownership.

Building modernisation

As in the years up to 1991, in almost all EC and EFTA countries, increased demand for the modernisation and renovation of residential buildings may be expected. In many countries this should even offset the decline in new residential construction.

Exceptions were the United Kingdom and the Netherlands in 1992. However, as these market sectors recover in 1993, Belgium and Italy are expected to decline.

Despite the urgent and extensive repair and modernisation required in the new German federal states, increases in this sector continue to show a shortfall due mainly to a lack of private investment.

INDUSTRY STRUCTURE

Companies

More than in other sectors, the building industry in the EC is characterised by a very heterogeneous structure with regard to the sizes and concentration of firms and their geographical distribution.

The size structure continues to be characterised by a multitude of small firms; about 80% of building firms in Europe employ less than twenty employees. The number of building firms with more than twenty employees is estimated at approximately 40 000.

The proportion of the total building construction turnover of a country, on the other hand, is more clearly shown by the economic significance of the large building firms with over 500 employees; it amounts in Italy to 18%, in Belgium 13% and in Germany 24%; on the other hand it is as much as 36% in France, 42% in the United Kingdom and 48% in Spain.

It cannot, therefore, be surprising that according to "Le Moniteur" of the 40 largest construction companies in the EC, 11 have their head office in the United Kingdom, 9 in France, 5 in Germany and 4 each in Spain and Sweden. Building construction in Italy and Belgium is sustained above all by smaller firms, in Germany mainly by medium-sized and in France and the United Kingdom above all by large firms.

Strategies

According to the size of the firm and its geographical region of operation, the cost-performance relationship shows considerable deviations. This obliges the firms to increase productivity, above all through increased used of prefabricated elements, increased mechanisation, plant hire and improved organisation of building sites with the cooperation of suppliers and sub-contractors.

The investment by building firms in plant and equipment fluctuates considerably from country to country, but compared to the costs of personnel represent a smaller proportion of overall costs when expressed in terms of depreciation. Increases in productivity usually arise through more efficient use of personnel and plant and equipment.

This correlation also becomes recognisable in the increasing use of leased plant and equipment and vehicles, through which technological improvements and plant inventories can be more rapidly put to use.

Changes in the product structure can be seen increasingly in specialisation by medium-sized, regionally active building firms and diversification in larger firms. The latter are increasingly extending their area of activity in non-building trade services, in particular with the development of real estate and its management, such as, for example, hotels and office buildings. This development is particularly marked in the United Kingdom and can be considered as a cause for a noticeable surplus of supply in these sectors.

A particular feature of the performance structure of this sector is the combination of the production work of several independent firms jointly in one single project, in general through the conclusion of contracts between main contractor and subcontractors or as a joint venture. The bigger the building contracts the more this kind of cooperation between firms in the same sector occurs.

As a current trend, an increase in the main contractor approach at the expense of joint ventures is evident. Building firms of all sizes are involved in this. This trend can be considered both as a consequence of increased specialisation and further diversification within the production sector.

In addition to these more project-related forms of cooperation between firms, outright purchase or takeover of firms as well as participation or cooperation agreements are also increasing. In these cross-border interrelationships, France, Germany, the United Kingdom and the Netherlands are particularly involved. These activities aim above all at the building markets in Spain, Portugal, Belgium and Germany. Their growth can be ex-

Table 7: Housing rehabilitation and maintenance
Annual production growth in real terms

(%)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992(1)	1993(2)
EC (3)	-0.9	2.4	16.3	5.7	6.3	3.2	2.8	2.8	0.4	1.4	0.5
Belgique/België	18.4	-7.2	6.0	-6.4	16.6	2.1	3.1	7.8	1.2	2.2	-5.9
BR Deutschland (4)	-3.5	2.3	5.2	11.1	6.5	4.8	3.6	5.2	3.4	3.0	0.0
España	N/A	N/A	N/A	6.0	12.0	6.0	5.5	5.0	5.0	6.0	N/A
France	-2.2	1.2	3.2	1.2	0.5	2.0	1.7	3.0	1.5	2.1	2.2
Ireland	-5.1	-6.1	-3.9	37.7	12.0	-18.6	-7.4	4.6	1.3	4.0	N/A
Italia	0.2	1.5	-1.0	4.8	9.5	-2.8	1.0	0.8	2.3	1.0	-1.0
Nederland	-7.2	6.3	15.9	0.6	2.5	12.0	4.0	2.8	2.1	-1.0	0.0
United Kingdom	6.6	5.3	3.5	4.5	6.5	5.5	2.5	-1.9	-14.1	-6.8	1.8
Sweden	10.3	21.1	8.3	5.2	2.3	-6.5	-4.9	-13.1	1.6	30.0	10.0
Austria	6.4	3.1	-6.2	9.4	-1.4	5.7	2.1	15.3	-2.9	5.8	4.0
Switzerland	N/A	13.0	7.3	5.9	7.2	9.2	7.7	3.5	-3.0	-5.6	0.6
Finland	7.7	0.0	0.0	0.0	7.1	6.7	6.3	0.0	-5.9	-6.3	0.0
Norway	16.0	10.0	4.1	12.9	2.2	-3.8	-8.9	-8.1	-2.7	1.0	1.0

(1) Estimates
(2) Forecasts
(3) Excluding Greece, Denmark, Luxembourg and Portugal
(4) West Germany only
Source: FIEC (11/92)

Table 8: Building
The top 5 companies in Europe, 1991

Company	Country	Turnover (million ECU)	Employees	Net profit (million ECU)
Compagnie de Saint-Gobain	F	10 758	104 653	403
Lafarge Coppée	F	4 529	30 830	177
RMC Group	UK	3 987	26 031	100
Pilkington	UK	3 710	43 700	13
Holderbank Financiére Glaris	CH	3 358	32 161	98

Source: DABLE

plained in particular by the preparation for and completion of the Single European Market.

REGIONAL DISTRIBUTION

The building site-related production method of operation obliges building firms to be more geographically mobile. With small and medium-sized firms this mobility is limited however to their local and regional markets. In addition, a marked geographical dispersion of building firms and, therefore of the whole building capacity continues to occur. Significant upward trends in the construction economy therefore, tend to result in company collapses rather than geographical shift of building resources which are in themselves mobile. Following the subsequent reduction in construction capacity, the necessary resources are then lacking during the economic recovery particularly in regions with an urgent need to catch up in building investments.

A general or sector-related upturn of building production in individual regions of the EC then reveals an unbalanced situation, since the available resources, particularly of the small and medium-sized firms, can hardly be mobilised in the regions most in need.

The consequences of this are, on the one hand, regional increases in building prices and, on the other the emergence of larger firms to fill the shortfall. This situation applies in 1991-1992 above all to Spain, Portugal and Germany.

REGULATIONS

The preparations for and completion of the Single European Market are affecting output, in addition to the diverse direct and indirect effects on building construction supply and demand, in particular through Europe-wide effective regulations.

The guideline for building products harmonises the conditions of authorisation for such products. It thus simplifies not only cross-border trade in such products, but also the building activity of the firms in their non-national European markets. The greater EC internal competition to be expected from this is, therefore, also related to building production overall.

The directives for coordination of the award procedures for public procurement are more far-reaching and have a more direct effect on EC internal competition in the building sector, since the government demand for building construction covers a significant proportion of the total output of the industry; particularly because private buildings which are mainly government financed are equally affected.

The threshold of 5 million. ECU limits these effects, however, to a sector of the building construction demand, in which there is either already strong cross-border competition between large building companies or this competition was previously limited for other reasons.

OUTLOOK

The economically and technologically-based structural change in the EC countries is characterised by an increase in demand for new construction and this, above all, in regions in which structural change is particularly marked.

Dampened expectations regarding the general development of income and high financing costs are hindering present day needs for corresponding growth in building construction output. New advances in technology are not evident. The technological improvements already initiated in larger building firms are being increasingly introduced in smaller firms. Productivity improvements can therefore only be achieved through improved organisation in building site procedures and increased off-site fabrication. In this way an increasing proportion of work let to general contractors on a turnkey basis is noticeable throughout the EC.

Medium sized construction firms all well as, to a lesser extent large firms, are paying increasing heed to the renovation and repair sector of the market which remains to be fully exploited.

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Civil engineering
NACE 502

Civil engineering delivers mainly public infrastructure installations, so that its business activity depends primarily on demand from the various public bodies. The production capacity of this sector thus depends less on the general trend in incomes than on the budgetary policies of these public bodies.
A decline of business activity therefore emerged in 1992 after several years of considerable growth rates. This decline is clearly due to diminishing state investment.
This heavy budgetary dependence is beginning to loosen in several areas of civil engineering. This tendency can be seen in the clear increase in private forms of organisation for public sector tasks, beginning with services and factory operations, and followed by associated infrastructure investment which can be carried out also with private sources of financing. This applies especially to the fields of transport, communications, waste and waste water disposal as well as to water and energy supplies. As a result the use of potential demand in these fields is less limited by budgetary constraints.
Also of value to civil engineering is the impact of major technological developments in transport, communications and the environment. Civil engineering production capacities on a large scale are required for their practical introduction. This impact is more far-reaching than technological developments in civil engineering itself.

INDUSTRY PROFILE

Description of the sector

In civil engineering, construction firms are active in the construction of transport infrastructure (roads, railway lines and airports), in hydraulic engineering (mainly rivers, canals, harbours, streams, sluices and dams), in irrigation and drainage, disposal of waste water and erection of purification plants, construction of bridges, tunnels and shafts, drilling, excavation works and land improvement.

Like the building sector, civil engineering makes extensive use of materials and is very labour-intensive, but additionally to a greater extent than building it makes use of plant. However it is less integrated with the other industrial sectors of the economy through client and supplier relationships. Hence changes in its production capacity have fewer downstream effects on general economic development.

Recent trends

Since 1992, after several years of strong growth in civil engineering production, there has been a decline in nearly all civil engineering branches in most of the countries of Europe. This clearly shows the dependence of business activity in this sector on public expenditures on infrastructure projects.

Nearly all countries in Europe have considerably reduced their investment budgets in order to check state indebtedness.

These cuts have been especially severe in Spain and Italy. In Spain the enormous investment efforts made in public sector infrastructure from 1988 to 1990 with growth rates of 20% to 25%, and an increase of 9% in 1991, have been followed by a decline in business activity of around 6% for 1992.

In France this decline is making itself felt mainly at local levels. Only on-going national large projects have helped to prevent a major decline in overall production.

Only Germany and Portugal represent exceptions to this general tendency towards decline. A special feature of both among the countries of the European Community is a great backlog in needs in Portugal and in the new German Länder. In East Germany extensive additional state expenditures from the Fund for the "Revival of the East" benefit mainly civil engineering, especially investment in transport infrastructure.

The decline in non-residential building is also having an impact on civil engineering, as a quarter of investment in non-residential building is accounted for by civil engineering works, such as supply piping, factory purification plants, pipelines, and drainage. Increasing requirements for protective measures against emissions give reasons to expect that this decline will be reversed from 1993 onwards.

Similarly spectacular growth rates are appearing outside the European Community, more recently in Sweden.

International comparison

The market situation of European civil engineering firms in foreign markets shows features similar to developments observed in building, especially as many large construction firms cover both sectors in their production.

The competitiveness of European civil engineering firms is shown mainly by their heavy involvement in various branches in foreign markets. Thus of the ten civil engineering firms most active in foreign markets worldwide, European firms are involved with seven in hydraulic engineering, with six in waste and waste water disposal, and with five in energy supply.

Foreign trade

In the transnational business operations of the civil engineering firms there are definite signs of growth for 1991-92, mainly in Europe, although, from an overall point of view, the European market is not registering any increase. This correlation follows from increased competition, especially among the large firms in this sector who work abroad mainly through local subsidiaries.

It is to be assumed that this development in the markets for public infrastructure works in Europe has already been influenced by the Public Procurement Directives.

European firms are also increasingly active in overseas markets for civil engineering, such as the Middle East and Asia. So far this has not been negatively affected by the fact that bilateral and multilateral financing institutions are abandoning project-related forms of financial assistance. This applies also to the European Development Fund which is increasingly limiting its support for individual projects in favour of promotion of deliveries of materials and technological co-operation.

Extraordinary rates of increase were achieved by Spanish civil engineering firms in the otherwise declining markets of Central and South America. A part of Spanish civil engineering capacity is also being used on an increasing scale in neighbouring Portugal.

MARKET FORCES

Demand

The demand for civil engineering services develops mainly in counter-cyclical fashion, as demand is accelerated or delayed by the budgetary and financial and economic situation of the relevant decision-making public bodies. Moreover, many projects come to the execution stage only after several years of planning, decision-making and procurement procedures. They then extend over several years of financial and technical accounting.

For an assessment of the development of demand it is necessary to know the special features of this sector especially in comparison with building. They arise almost exclusively from the kind of services provided and from the special requirements of predominantly public clients. France can be mentioned as

Table 1: Civil engineering
Annual production growth in real terms by country

(%)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991(1)	1992(2)
EC (3)	-0.7	-0.8	-3.7	-0.6	5.7	2.7	7.6	8.7	7.2	4.8	0.0
Belgique/België	-12.2	-15.0	-13.4	-11.9	-3.1	-7.6	2.2	-8.9	-7.7	0.9	2.9
Danmark	23.3	0.2	-8.0	6.4	15.2	-3.4	0.4	4.2	4.5	-7.1	3.9
BR Deutschland	-3.1	-5.2	2.8	0.7	6.2	-1.0	4.4	4.9	3.5	4.0	1.6
España	14.0	8.0	-7.0	-2.0	3.0	4.0	20.0	25.0	20.0	9.0	-6.0
France	-7.0	-6.5	-8.7	4.4	8.3	7.4	9.8	6.5	2.5	2.5	-1.0
Ireland	9.9	-15.7	1.4	-3.1	-1.6	-13.3	-4.8	0.8	5.7	1.7	2.2
Italia	-14.5	7.7	0.7	1.5	10.3	2.5	-2.3	4.3	2.4	-3.5	-3.9
Nederland	-9.9	-2.6	2.4	1.9	3.0	-4.5	4.4	-1.2	2.9	2.7	1.2
Portugal	13.0	-11.8	-15.9	-6.2	4.7	15.6	15.0	12.0	11.0	12.5	6.0
United Kingdom	1.6	2.6	-2.5	-3.7	2.7	1.8	5.8	8.1	8.1	6.5	7.2
Sweden	3.1	3.3	5.6	-7.0	0.5	-0.3	-0.4	7.0	4.7	-5.1	15.0
Austria	-10.3	1.7	-3.2	5.2	-1.2	2.0	-3.8	2.3	4.4	4.3	3.5
Switzerland	1.9	4.2	1.0	-2.9	0.2	3.6	5.6	2.1	1.5	1.4	0.5
Finland	2.0	-5.8	0.0	6.1	4.8	-0.9	-3.4	8.1	2.7	-1.4	-2.0
Norway	-3.2	8.5	1.5	-1.0	4.2	12.3	-0.4	-15.5	-2.8	11.6	2.6

(1) Estimates
(2) Forecasts
(3) Excluding Hellas and Luxembourg
Source: FIEC (06/92)

a typical example, as two-thirds of civil engineering production there is awarded by public clients.

In road construction, both the local authorities, for example, and the central government bodies decide on the projects. Their decision depends to a large extent on their own budgetary and financial situations. Thus expectation of loss of receipts can lead to short-term delays, while receipts which turn out to be higher will not, however, rapidly lead to an acceleration of projects.

Civil engineering depends less directly on the general trend of wages and salaries than on the budgetary possibilities of the various public bodies, which for their part are very much affected by the general trend of incomes.

It is difficult, especially in the short-term, for the demand for civil engineering services to be derived from the need for infrastructure installations or the relation to existing ones. This applies to the needs for transport infrastructure as well as for supply and disposal facilities. By contrast, specific developments in demand are more a consequence of political priorities for public investment and the budgetary framework.

During budgetary bottlenecks, politically decided large projects can therefore be spread out in time with corresponding consequences for the demand situation in the relevant branches of civil engineering. These interconnected factors can be clearly seen from the budgetary and finance laws in France, Spain and Denmark, in which, despite obviously continuing needs, civil engineering investment was spread out over time. The same can be seen with opposite effect, as in Belgium where the decrease of the 80's was reversed for the first time in 1992.

In civil engineering also, the benefits of additional demand cannot be expected at present from innovations either in production or processes. In some fields of transport, and in communications and environmental technologies, the services of civil engineering are required for the operational introduction of technological innovations on a large scale. As a result there is a considerable demand pressure on this sector.

Supply and competition

The market power of public clients operates more noticeably in civil engineering branches than in building. To be sure, demand in civil engineering also comes from many public bodies - as, for example, railways, telecommunications and airports - which operate in part autonomously in relation to their parent territorial bodies and which decide investment projects.

Nevertheless many civil engineering branches depend entirely on this public sector demand in their relevant branch. This applies especially to road construction and civil engineering works involving pipe-laying for supply and disposal facilities.

Noticeable, politically supported improvements in the public procurement system temper the possible use of this public sector market power and enhance competition. In the case of large projects the public procurement directives are operating in this direction. But these endeavours are also increasingly in evidence for small and medium-sized projects, though only with regional and local impact.

A typical example is the development in Denmark of a selective extension of open tendering to kinds of tasks and projects which were not previously put up for tender, coupled with the establishment of independent advisory procurement boards in which representatives of the various parties concerned participate.

Production process

Civil engineering, like building, is very labour-intensive compared with other industrial sectors. However, as opposed to building, it operates in most production branches with a greater use of plant. Improvements in productivity are therefore to be achieved both through the organisation and the qualifications of personnel as well as through fixed assets corresponding to the specific tasks.

However, in comparison with building, civil engineering reacts less flexibly to short-term fluctuations in the economy because of the higher amount of specialised fixed assets in the relevant branches of civil engineering. Adjustment through shifting a firm's production capacity from one construction branch to another in many case requires restructuring the equipment used.

Main contractor and sub-contractor contracts are less frequent in most civil engineering branches than in the building sector, because in these fields there are scarcely any services which could be more efficiently provided by various specialised firms.

The employment trend in civil engineering shows tendencies comparable to those of building. As a result there is an increasing demand for highly qualified personnel both on the technical and business sides of the firms.

Small reductions in employment due to declining construction production relieve this sector at present of the necessity of seeking highly qualified employees who, after personnel cuts lasting many years, become one of the main problems of the sector with every major enlargement of production.

FEATURES OF CIVIL ENGINEERING

Development of transport infrastructure

The largest part of construction work in this field still has to do with the renewal and enlargement of existing roads and rail links of national and, increasingly, transnational importance. With around one third, it also comprises the largest share of civil engineering production.

Special efforts in the field of new construction are being made principally in the countries with comprehensive plans for the development of transport. This is the case in Great Britain and France with new motorways, city ring roads, and the further development of the high-speed rail network.

In the development of high-speed rail routes, similar efforts are being made in the case of investments by the German Bundesbahn and the Italian state railways with corresponding effects on production in this branch.

In Spain infrastructure investments for the Olympics and the World Exposition were a special focus of investment until 1991. The decline in civil engineering production in this branch because of a very restrictive Spanish budgetary policy is probably temporary, as the linking of the new route networks to the rest of the Spanish rail network, with its different operating standards, and to the European high-speed rail system will bring about such a sustained demand pressure that renewed growth at a relatively high investment level is inevitable. Also the second national road plan will have a bearing on this development.

In Belgium, however, up to 1992, demand which has been increasing for years has not brought about such growth either in rail or road construction.

In Portugal the largest share of public sector investment expenditures went into the development of the main highways and the motorway network. There are signs of further growth there, because large-scale projects are close to execution: a bridge over the Tagus and a new international airport for Lisbon. Here resources from the European structural Funds are clearly having an effect.

In Ireland these resources of the European structural Funds will be effectively utilised only from 1992 due to lengthy planning preparations. There too they will be used mainly for development of the main highways.

In Denmark electrification of the main railway lines is being continued. In road construction future growth will be in the context of the planned Oresund crossing and the associated investment in road links.

Bridges, tunnels and shafts

Construction projects involving large-size bridges and tunnels form part of the development of transport infrastructure. An outstanding example of this is the Channel tunnel which is putting other plans for large-size tunnels and bridges in the shade.

Hydraulic engineering

This civil engineering branch is receding into the background in the countries of the European Communities during 1992. This trend is discernible even in the Netherlands which traditionally carries out large hydraulic engineering infrastructure works. The long-planned flood-protection works on the waterways cannot provide sufficient compensation in capacity, though they are leading to a slight increase in this production branch.

Different tendencies are being shown only by France, though on a considerably reduced scale in 1992, with its development of harbours, and by Portugal with its investment in national water distribution. Previously planned major hydraulic engineering projects have been postponed in Spain.

Waste water disposal and investment in the protection of the environment

There are general signs that the whole area of water supply and waste water treatment and disposal is a significant growth area for civil engineering in the European Community. This is especially noticeable in Belgium, Denmark, Great Britain and Portugal. The directive 92/271 establishing our obligation to treat waste water in municipalities with more than 2,000 inhabitants will assist this development.

While the civil engineering branch is still lagging behind road construction in quantitative terms, small and medium-sized civil engineering firms are benefiting from increasing demand at local and regional level. Even in markets which are in general decline there are signs of a sustained rise in investment in waste and waste water disposal facilities. However there is a real decline in Ireland because of a reduction there in resources from the European structural Funds for road construction.

Energy supply pipelines and excavation works

There was scarcely any change in 1992 as regards the situation in excavation works, insofar as they did not come under other civil engineering branches like road building. Production is being maintained, particularly in some regions of Germany through the recycling of industrial land.

Only in Ireland can considerable additional infrastructure investment in gas supply be recorded. It is being supported in particular by the European Structural funds. A gas pipeline across the Irish Sea is being indicated as a future large-scale project.

Modernisation and repair

As in building, the modernisation and repair of public and private infrastructure is accounting for a constantly growing share with increasing growth rates. Interest chiefly centres on bridge repairs, improvement of transport infrastructure, and renewal of faulty waste water disposal pipes.

These investments provide a sustained demand, especially for small and medium-sized civil engineering firms operating at local and regional level.

INDUSTRY STRUCTURE

Companies

Like building, civil engineering is variously structured, depending on size of firm and geographical distribution. Approximately four-fifths of the firms in this sector employ fewer than 50 workers. But around half of the workers of the sector taken as a whole are in firms with more than 500 employees.

In civil engineering, firm sizes are more closely related to the various branches than in the building sector. Thus road works and sewage disposal are carried out principally by firms of up to 50 employees, while construction of bridges, tunnels and shafts as well as extensive excavation works are carried out by firms with more than 1 000 employees. As a result, firms of varying sizes are affected in different ways by reductions in infrastructure investment, and this is hidden in the overall growth figures.

This is very clearly shown for France in 1991 and 1992 where infrastructure investment by the local bodies was considerably reduced, and this especially affected the small and medium-sized civil engineering firms. While the continuation of large-scale projects, such as the TGV Nord compensated for this development in the overall figures, it benefited mainly the larger firms.

As scarcely any sub-contracting firms operate in this civil engineering branch, a continuing concentration can be observed in this field which is already far advanced in France where more than a third of this business is accounted for by firms with more than 1000 employees.

Because of the general decline of construction in this sector, the establishment of new, specialised civil engineering firms is not taking place on the same scale as previously.

Strategies

Depending on the special nature of their products and services, the individual civil engineering branches are characterised by various combinations as regards the intensity of their use of personnel, materials and fixed assets . Hence strategies for productivity improvements focus on personnel, with the consequence of dismissals in the countries where demand has declined the most.

As in building, civil engineering is generally less intensive in its use of fixed assets than the other sectors of industry. Because of the decline in civil engineering production in 1992 and because of reduced estimated demand - in the public sector and demand as a result of private non-residential building - investment in fixed assets in this sector has also definitely diminished.

The production structures of this sector are also determined by the main investment areas in public sector infrastructure. This kind of change can hardly be matched by the small and medium-sized firms specialising mainly in specific civil engineering branches with adjustments in products and services or even only with little geographical mobility.

As civil engineering services involve less complex detail as to execution and equipment than building, the executing firms are for this reason more specialised in their relevant branch of civil engineering. Forms of co-operation among main contractors vis-a-vis sub-contractors are also less frequent than in building.

For the same reason it is to be assumed that integration of firms through purchase, merger or partnership agreements take place less frequently in civil engineering than in building. However there is no detailed documentary evidence of this.

REGIONAL DISTRIBUTION

Most civil engineering works call for great mobility on the part of the civil engineering firms for constantly changing construction sites and projects. This factor leads to larger migratory movements between the regions and, increasingly, the national markets in the European Community.

In public sector civil engineering, especially in transport construction, geographical differences show up according to regions and Länder because of the varying financial capabilities of these territorial bodies. But this applies also in the context of large-scale projects, such as the Channel Tunnel and the associated peripheral public sector investment, especially in transport construction.

As against this, regions with lower levels of economic activity are falling badly behind in civil engineering, with consequential, further disadvantage for their infrastructure. This is shown very clearly in the case of the Spanish regions which did not form part of the main areas of investment during recent years up to 1992 and have now been hard hit by the budget cuts.

Even the distribution of investment for protection of the environment depends on the economic structure of the territorial areas. Areas with older industry require larger environmental protection investment, in Germany, for example, in a proportion of 10 to 1 for North Rhine-Westphalia and the new Länder on the one hand and for Schleswig-Holstein on the other.

In civil engineering the resources of the European structural Funds show a clear impact with regional differences, especially in Portugal, Ireland, Greece and Southern Italy.

ENVIRONMENT

The construction of new and the development of existing transport infrastructure, particularly in road construction, comes up against environmental limits both in remote and populous areas because of its great use of land and its impact on the landscape. In civil engineering this leads in many cases to delays in carrying out investment already decided on.

So far there is no prospect of a solution which, though part of production in this sector, would offer improvements in the environmental situation during the development of transport infrastructure.

As against this, civil engineering is the sector where production operates more effectively than in the other sectors of industry on behalf of environmental protection measures in the sense of on-site prevention and repair. This applies in particular to the construction of waste water disposal and purification installations and also to measures - which are sometimes extensive - involving soil exchange in the case of contaminated ground.

The selective assistance of the European Community to regions with older industry is giving rise to growing demand for renewal measures which can be carried out by civil engineering, as soon as this assistance begins to take effect in the direction of new kinds of use and activities as well as private and public sector investment.

The scale of these infrastructure works is evident in districts in Lorraine and parts of the Ruhr area. However this experience is far from sufficient to permit a clear assessment of the required scale of future measures of this kind in the new German Länder.

REGULATIONS

Civil engineering is also being influenced by the preparations for and the completion of the European internal market in addition to the diverse direct and indirect effects on supply and demand in civil engineering, the regionally targeted resources of the European structural Funds, and, above all, by Europe-wide regulations of direct effect.

The Directive on Construction Products does not have the same importance for civil engineering as for building. However it also harmonises for this sector the approval conditions for these products and thereby simplifies not only transnational trade in these products but also construction operations by firms in non-traditional markets.

More far-reaching and of more direct consequence for competition in civil engineering within the EC are the directives on public procurement. However, an aggregate value of more than 5 million ECU limits the impact to a segment of demand for civil engineering in which either strong competition among large construction firms already exists or this competition has hitherto been limited for other reasons. The greatest part of the mostly smaller regional and local projects are not affected by it.

OUTLOOK

New areas of emphasis in civil engineering are coming increasingly to the fore, for example, investment in protection of the environment and he improvement and technological renewal of existing infrastructure facilities with consequential changes in the structure of construction enterprises and the composition of the work force.

In the field of financing, a rising need for infrastructure investment of transnational significance is forcing a discussion of reform of financing, especially with the participation of private investors who could free themselves from the restrictive constraints of state budgetary policy. This applies in particular to investment in transport in a pan-European context.

Developments in the new German Länder have triggered a special dynamic, as it has been possible for the development and repair of public infrastructure in the Eastern Länder of Germany to take place in large measure independently of the general trends in interest rates, costs and the budget, because of a considerable injection of public resources. However the expected impact on European-wide supply structures has failed to materialise.

In the other countries of the European Community there is no sign yet of an end to restrictive budgetary policies. This trend will continue to dampen demand pressure arising from the need for infrastructure facilities.

It is also causing structural shifts in the restricted investment volume, especially at the expense of construction of transport infrastructure. This demand bottleneck is also leading to a sustained and rising activity abroad of the civil engineering firms which is being increasingly facilitated as a result of the completion of the internal market and therefore ensures greater transnational competition.

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Industrial engineering

For the industrial equipment manufacturers of the EC, 1991 was marked by an increase of 9% in the current value of orders and by a number of transactions in the final stages of negotiation which helped to maintain business at a level comparable with that of the first months of 1992. These results compare favourably at world level, where there has been a marked up-turn in business, mainly as a result of major programmes of investment undertaken in several key sectors in the industrialised countries.
The energy, petrochemicals, oil, gas and communications sectors embarked upon major programmes of investment, either by increasing capacity and rationalising obsolete production units in order to improve their production costs, or by extending infrastructure networks, particularly in the rail sector and in telecommunications. Major programmes of investment were also dedicated to the protection of the environment and to improving the quality of life. In this respect, the EC industry made numerous investments aimed at reducing pollution, often on the basis of procedures developed by industrial equipment manufacturers.

INDUSTRY PROFILE

Description of the sector

Industrial engineering largely consists of supplying services: feasibility studies, technical process studies, market research, location studies, architectural and civil engineering studies, staff training, supply of capital equipment and systems, etc. The relative importance of these different activities varies considerably depending on the industrial sector concerned and the type of contract.

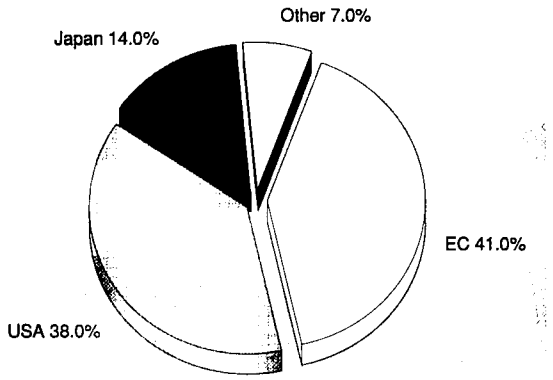
Owing to the specific nature of the activity, industrial engineering does not feature as such in any statistical records. In order to make up for this lack of data, the European Committee of Plant-makers (EUROPLANT) introduced a model for gathering data on the sector's activities. This system has not yet been adopted by all the EC countries, however it permits to discern certain patterns within the sector.

Main indicators

According to reliable estimates, the world market for the major industrial equipment manufacturers was worth around 118 000 million ECU in 1991, representing a slight increase by comparison with the previous year.

During 1991, the industrial equipment manufacturers of the EC had an order book of which the estimated value was 48 000 million ECU, representing a 9% increase in current value over the previous year. This increase has been reflected - to varying degrees - throughout all sectors of the EC countries. It has been particularly marked in Germany, the United Kingdom, Italy and France. These four countries account for some 90% of the total number of orders, of which approximately 35% stem from the EC market.

Figure 1: Industrial engineering
The world market for plant-makers



Source: Europlant

Recent trends

The early 1980s were particularly favourable for the industrial engineering sector, as firms embarked upon the final phase of several major industrialisation projects in the developing countries. After the historic slump in the period 1984-1986, a significant revival of the world market began following huge investment programmes generally linked to the energy sector and to large infrastructure networks. The effects of this revival were felt most in the industrial regions.

Following the large-scale rationalisations undertaken in 1984-1986, which were reflected by a marked fall in employment and an end to activity in the declining building industry, the sector experienced a period of stability in employment in 1991, and even a slight increase in the appointments of specialist staff to carry out specialised jobs on the work site.

International comparison

On a world-wide scale, the distribution of market shares of industrial equipment manufacturers, as shown in Figure 1, reveals no significant change from previous years. EC plant-makers remain at the top of the ranking, closely followed by the US industry. Japanese plant-makers are well behind, controlling a 14% share of the world market. US engineering firms, however, are still the world leaders in terms of both technological capability and size.

MARKET FORCES

Demand

It is interesting to note that the distribution by sector of contracts reveals a tendency towards concentration around those client industries with high technological value and considerable capacity for investment. The distribution by sector of contracts undertaken in 1991 is shown in Figure 2. The oil, gas and petrochemicals sector, which accounts for 32% of the total number of orders for the EC industrial equipment

Table 1: Industrial engineering
Estimated value of the world market for plant-makers

(billion ECU)	1980	1982	1986	1987	1988	1989	1990	1991(1)
Total amount of the contracts	77.6	125.5	61.0	86.6	102.0	113.4	116.8	118.0

(1) Estimated
Source: Europlant

manufacturers, has channelled most of its investments into petrochemicals (some 50%) and refining (over 40%). The main reasons for this investment are: to put new products on the market which are more compatible with environmental requirements; to improve the output and profitability of production units which have become technically obsolete; to remove possible risks to human safety and health.

In general, the tendency for most of the EC's plant-makers to focus increasingly on the internal market, following the decline of the markets in the developing countries which occurred in the mid 1980s, enabled them to adapt their structures to a changed market and to develop new technologies situated in rapid growth sectors. In this regard, it is interesting to note that around 35% of orders originated within the EC market which continues to offer favourable prospects. By contrast, the share of orders from the developing countries decreased slightly as a result of events in the Gulf which influenced decisions to invest or even led to the suspension of contracts in many countries bordering the region.

Supply and competition

At world level, competition remains very fierce and technical advantages remain very slight due to a policy of research and development which is strongly sustained by both American and Japanese industrial equipment manufacturers. Factors relating to price and reference to similar techniques currently constitute the main criteria for assessing competitors.

It is notable that, in recent years, Japanese engineering companies, which are usually subsidiaries of major Japanese business groups, have consolidated their presence in Europe, particularly in Germany and Great Britain. These subsidiaries are playing an increasing role in the preparation of projects intended for markets in bordering countries, and in many cases, are seeking European partners who are willing to enter into consortia or joint ventures, to share the risks of these projects. Japanese engineering companies are also increasingly looking to European industry to supply equipment and machines or to provide assembly services. This is particularly true in the case of projects financed by European loans.

Production process

The sector has not undergone fundamental modifications in recent years, but numerous operations are taking place which aim to increase the size of companies, by a policy of technological complementarity, or to identify synergies by developing networks of alliances.

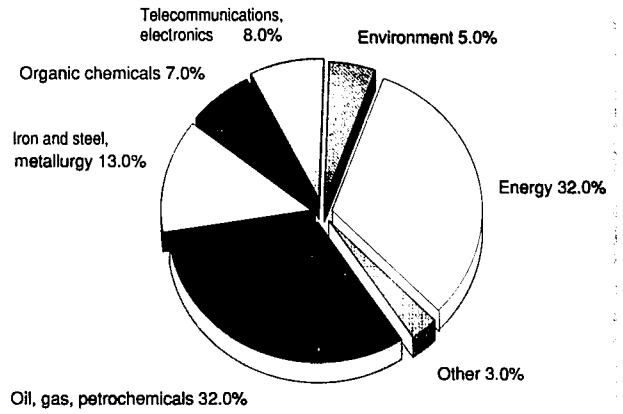
In many cases, technological cooperation, between equipment manufacturers designing systems, on the one hand, and industrial group investors on the other, has increased and has enabled new or more effective procedures to be developed. The major trends in technological development have focused on computerised production control techniques, the organisation of preventive maintenance and procedures for improving the quality of the industrial and urban environment. Particular emphasis has also been placed on procedures for the removal of pollution from industrial installations.

INDUSTRY STRUCTURE

Companies

A large number of plant-makers are first and foremost machine manufacturers. All the major mechanical and electrical engineering firms in the EC are active in the industrial engineering sector, and carry out a large part of their activities within the framework of large-scale industrial projects. Among the largest ones, one can recall Ansaldo, Fiatimposit and Nuovo Pignone (I), Mannesmann, Siemens and Krupp (D), Spie Batignolles, Alsthom and Air Liquide (F), Cockerill Mechanical Industries (B) and Fives Coil Babcock (UK).

Figure 2: Industrial engineering
Breakdown of contracts by industrial sector



Source: Europlant

OUTLOOK

Towards the end of 1992, a significant fall off in the volume of projects and number of orders is to be expected worldwide and certainly in the industrialised countries which have, until now, provided the impetus for growth. However, it is anticipated that the market outlook for industrial rehabilitation and for the infrastructure development programmes will, by contrast, remain positive.

Moreover, ecological pressure, mainly in the industrialised countries, will speed up measures for the protection of the industrial and urban environment and will be reflected by investment programmes which are careful to comply with the regulations increasingly produced by supranational consensus.

Finally, the imminent completion of the Single Market and the gradual creation of a European Economic Space also constitute factors favouring the development and accomplishment of the major infrastructure projects which are necessary to ensure their functioning. Furthermore, the technical assistance programmes provided by the EC for the countries of Central and Eastern Europe undoubtedly requires the restoration of their economies and, in particular, their infrastructures, to which priority must be given in order to establish a market economy. In this perspective, the EC's equipment manufacturers have already made preliminary contacts. Obviously, the implementation of these projects calls for a climate of confidence and political and social stability together with the provision of adequate sources of finance; the European Bank for Reconstruction and Development is without doubt the appropriate instrument to fill this role. Moreover, the re-establishment of peace in the countries bordering the Gulf should bring about a revival of the process of industrialisation in several oil-producing countries with which western equipment manufacturers have constant links.

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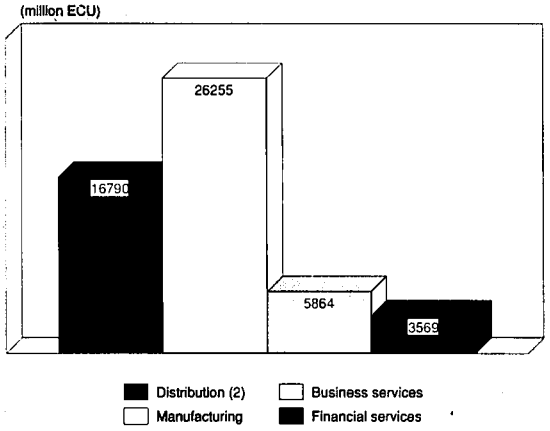
E15

Distribution
NACE 61-65, 67

The EC distribution sector is undergoing considerable restructuring. Changes include concentration, reduction in the number of traditional wholesalers, transformations in the retail sector and a tendency towards diversification and internationalisation. Moreover, the future of the distributive trade sector will be influenced by the completion of the internal market and the opening-up of Eastern Europe.
The sector represents about 14% of output and employment in the European Community. These figures have remained relatively constant over the last ten years, showing that the distribution sector has grown in line with economy.

Figure 1:Distribution
Employment compared to selected sectors, 1990 (1)



(1) Excludes data for Italia
(2) NACE 61 to 65, 67
Source: Labour force surveys, Eurostat

INDUSTRY PROFILE

Description of the sector

The industry is divided into two subsectors: wholesale distribution and retail trade.

Wholesale distribution (NACE 61) is defined as "units exclusively or primarily engaged in the resale of goods in their own name to retailers or other wholesalers, to manufacturers and others for further processing, to professional users, including craftsmen, or to other major users".

Retail distribution (NACE 64 and 65) is defined as the distribution to final consumers of:

- food, drink and tobacco;
- dispensing chemicals;
- medical goods, cosmetics and cleaning materials;
- clothing;
- footwear and leather goods;
- furnishing fabrics and other household textiles;
- household equipment, fittings, appliances, hardware and ironmongery;
- motor vehicles and cycles;
- motor fuels and lubricating oils;
- books, newspapers, stationery and office supplies;
- photographic, optical, jewellery and other retail distribution.

These definitions describe the function and product areas characterising wholesalers and retailers. They do not cover the fact that many organisations perform both functions, or that the ownership of wholesalers and/or retailers may reside in operators from another subsector of the supply chain (such as manufacturers), or that manufacturers in some areas carry out their own wholesaling and retailing and are not thus covered by the statistics for the latter sector.

A further important point is that the definition of wholesalers ignores the increasingly wider role that many operators within the sector are playing. For example, the change in manufacturing to tightly-managed production techniques (such as Just-In-Time) means that the whole distribution chain is becoming more sophisticated, and that wholesalers are also taking on functions such as packaging, quality control and administration. None of these is included in the NACE definition, but they nevertheless affect the contribution to the economy of the sector as well as the profile of the wholesaler.

INDUSTRY STRUCTURE

There is great change occurring within and between the subsectors of the distribution industry. This change can be summarised as:

- concentration, expressed in terms of a reduced number of larger operators, and closer vertical links between manufacturers, wholesalers and retailers;
- a general reduction in the number of traditional wholesalers, bearing in mind the fact that the concept of wholesaling seems to have different meanings within different Member States;
- a series of transformations in the retail sector, with significant differences between Member States. Overall a slower increase than before in hypermarkets, a rise in franchising and a proliferation of forms of distance selling are prominent features;
- a tendency towards diversification of activities into other service areas and some specific moves towards internationalisation.

The concentration phenomenon is more evident in northern Member States, with not only a rationalisation in the direct retail sector, but also the emergence of purchasing groups and voluntary chains to benefit from economies of scale.

Wholesaling is often thought of as an activity of the past, in that the traditional operator now often finds himself squeezed out either through a manufacturer's wish to control distribution himself or through the large retailer's practice of upstream extension.

However, some forms of wholesaling are on the increase, such as wholesaler-owned voluntary chains and specialist operators who focus on specific end-users (such as schools and hospitals). "Traditional" wholesaling does survive in raw materials and bulk products because of the logistics involved.

Geographic variance remains of great importance in the structure of the distribution industry. The structure of retailing continues to evolve, with marked differences between the north and the south of the Community. In the north, concentration and larger outlets are the new trends. In the south, smaller shops remain very prominent.

An interesting trend is emerging within the retail sector, whereby,

- retail groups are the typical operators in food retailing;
- voluntary chains feature in non-food retailing; and,
- franchises are moving into services (travel, financial services etc.) as well as goods.

Diversification of activities is occurring, whereby producers (typically non-food) set up retail operations, or where retailers offer services such as travel, financial services, restaurants, etc.

Internationalisation tends to occur towards neighbouring Member States at first, because of cultural similarities. Non-food retailers are the operators most prone to internationalise, with great attention having to be paid to national consumer tastes. The Euro-consumer does not yet exist, even if consumption patterns are moving closer together.

REGIONAL DISTRIBUTION

The most obvious influence of geography on the sector is in the different definitions of what a wholesaler is, and in the role of the small retail outlet.

In Germany, for example, wholesaling tends to be thought of as the distribution and procurement activity of manufacturers. In France, the tendency of manufacturers to subcontract sales activities and of retailers to subcontract buying, results in wholesaling being seen as a large growth sector. The Dutch import-export agencies, which are major economic operators, contribute to that country having the feeling that the sector is dynamic, while in the United Kingdom, a more restrictive view is taken, namely that of the old-style "middle man" between manufacturer and retailer, now in decline.

Taking these differences of perception into account, the major feature of geographical variance in wholesaling is that the northern Member States exhibit much more evidence of a blurring of activities between manufacturer, wholesaler and retailer then do those in the south.

As for retail, large food and non-food shops are steadily increasing their dominance of the market in northern Member States (including France) while the small operator survives tenaciously in Italy and Spain. The overall importance of the small outlet should not be underestimated; for example, the 80 largest food retailers in the Community do less than 60% of the total business.

Concentration in retailing is thus correlated with the level of economic development of the Member State, except for Italy, which retains its high number of small shops. Franchising and non-shop retailing are also notable for some geographic variance, explained in the monograph on retail distribution.

ENVIRONMENT

Traditionally, the distributive trades have been seen as pure intermediation functions, only operating in response to supply impulses, and therefore not at all involved in the environmental debate. This view, however, is set to change. Distributors, especially purchasing centres in the retail sector, are increasingly playing a pivotal role in translating trends in consumer preference into final demand and are thus able to boost the sales and the production of so-called "eco-goods".

Moreover, more and more distributors are taking on new functions, including packaging. This activity entails a series of environmental issues which has to be taken into account by the sector.

OUTLOOK

The changes inherent to the sector itself (concentration, increased used of technology, vertical integration and diversification) must be seen together with extraneous developments such as the creation of the Internal Market by 1 January 1993 and the potential opening-up of East European markets.

While the achievement of an integrated EC market will require a European distributive systems (and the Community's actions in the transport, competition, investment, structural funds and enterprise policy areas are helping this to come about), operators in the distributive seetor face two conflicting pressures in seeking to meet the challenge. The first is the inereased competition from other Member States as the concentration and integration in the sector, encouraged further by cost reductions following the completion of the Internal Market, forces them to broaden their horizons and seek cross-border opportunities. The second feature is the continuing requirement to respect local culture in delivery of services, a feature which reduces the scope for rationalisation and internationalisation.

The key may thus be effective streamlining of operations through technology, enabling the operator to carry out more activities at an overall higher level of sophistication. Electronic Data interchange (EDI), Electronic Point-of-Sale (EPOS), and Direct Product Profitability (DPP) techniques are used widely as essential tools in upgrading activities.

The problem is, of course, for smaller players, who may find that the required investment in technology is too great for them to support.

The opportunities created for logistics planning and management by the abolition of internal frontiers should contribute to expansion in physical distribution activities. Taken together with the liberalisation in road transport, this area should see major change. This will in turn produce a situation where distribution strategies will influence consumption patterns and where marketing activities typically performed by manufacturers may be taken on by distributors and traders.

Lastly, reduced consumer spending on retail goods will reinforce the battle for market shares and therefore influence the present structure of the industry.

Written by: Commission of the European Communities, DGXXIII

Wholesale distribution
NACE 61

Wholesale trade is a hidden force in the European economic process. It employs approximately five million people (4% of the EC working population) and consists of 600 000 businesses. It provides the integration of different added-value functions that have to be performed to distribute products from manufacturer to users: composition of catalogue, sourcing, storage, assembly, re-packaging, distribution, support and financial services. The position and power of wholesalers in the distribution chain depend on their ability to create unique added value for suppliers or buyers. Based on the distribution dynamics, wholesalers have three strategic options: distribution partner for suppliers, sourcing partner for buyers and integrative wholesaling. The Single European market and the opening of the Eastern European market create many opportunities among which the need for European wide distribution networks, integrated chain management to create total quality for buyers, and alternative distribution modes. The European wholesale trade has a strong base to face this challenging future.

INDUSTRY PROFILE

Wholesaling is nowadays a difficult activity to define. Its function has evolved over time and different types of wholesale organisations still coexist in various phases of development stages. However there is still, according to the NACE 61, a definition of wholesale distribution:

This class includes units exclusively or primarily engaged in the resale of goods in their own name to retailers or other wholesalers, to manufacturers and others for further processing, to professional users, including craftsmen, or to other major users. The goods can either be resold in the same condition or after undergoing the kind of processing, treatment, packing or repacking to which they are usually subjected by the wholesale dealer. Generally speaking, the latter's role involves, on one hand, the storing of goods and, on the other hand, taking title to or having the right to dispose of the goods in question. In addition to a breakdown according to range of goods, there are classifications based on other criteria which are also useful for the wholesale trade, e.g.: breakdowns according to economic links, geographical area of activity (importexport, transit, domestic trade) etc.

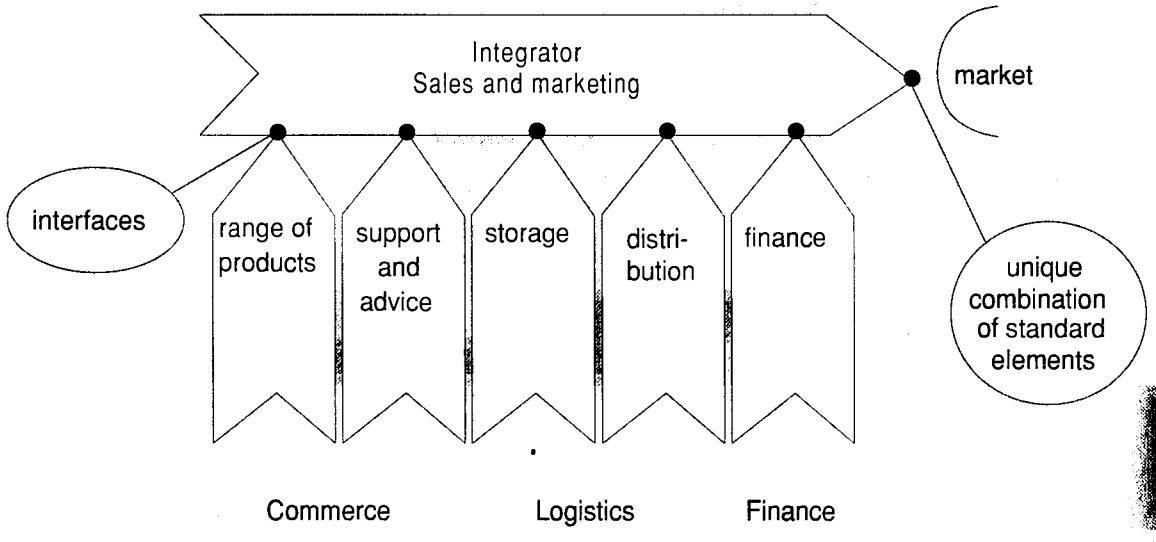
Wholesale trade provides the integration of different added-value functions that have to be performed to distribute products from manufacturers to users. In Figure 1 we show the interface fields in which wholesalers have to perform in their role as integrators of different functions.

Wholesaling is more and more the excellent execution of integrative management because many of the functions can be contracted out to specialised third parties. The wholesaler will always perform the most critical function for the buyers by himself. Transport and distribution, for instance, are contracted out by many wholesalers while the composition of the assortment is performed inhouse. Storage could also be contracted out, but is rarely done. Functions with capacitylike characteristics (i.e. functions that are performed with standardised methods and which require high volumes to realise low unit cost) often can be contracted out while functions with special designed features often have to be performed inhouse. The latter truly create the added value for the buyers. The position and power of wholesalers depend on their ability to create unique added value for suppliers and buyers in the distribution chain.

The integrative role of the wholesale trade is focused on the transformation of processes surrounding purchasing (creation of large volumes, sourcing, storage, catalogue composition, material management) into those surrounding sale (market-oriented assortments and services, commercial support, distribution, customer service, training). Wholesale trade is therefore bridging differences in the distribution chain between place, time period, quantities, capacities and price requirements. The functions performed or integrated by wholesalers are described more in detail in Figure 2. Successful wholesalers integrate existing functions (purchasing, storage, distribution) according to a developed marketing formula and with the help of resources, into a unique set of values. This formula should be focused on either market/client segments or functions and consistently implemented.

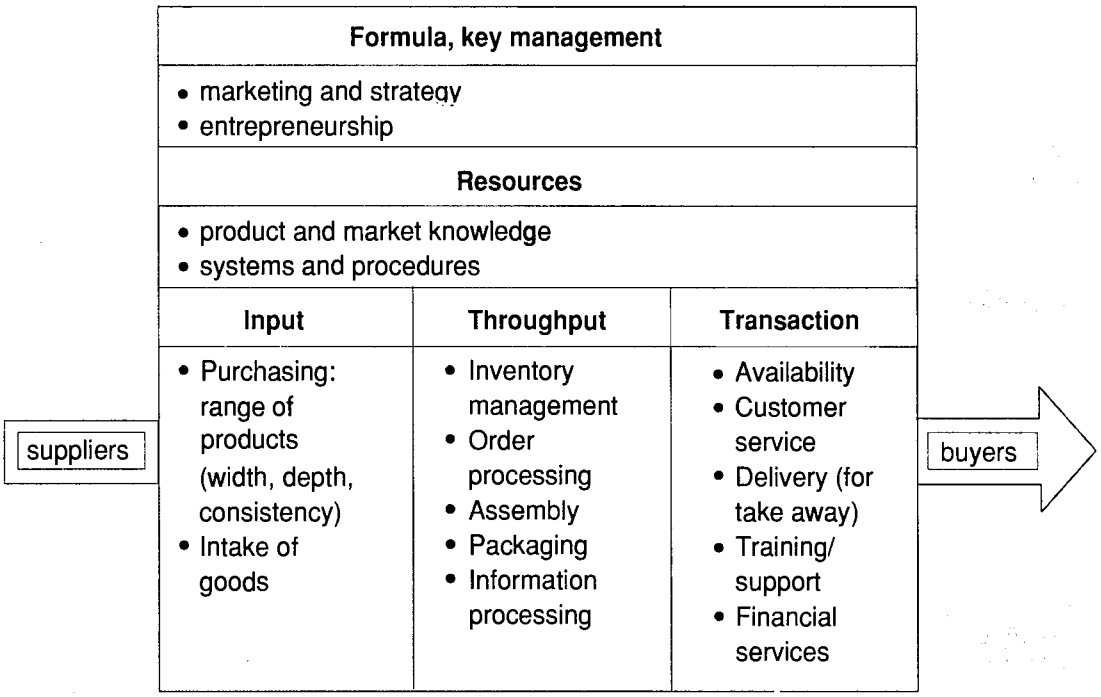
Wholesale trade is a very diverse service industry. It performs its integrative role throughout the total economic process from raw materials to final enduser products. And the integrative

Figure 1: Wholesale distribution
Wholesalers, the integrators of different service functions



Source: A.T. Kearney

Figure 2: Wholesale distribution
Wholesale trade functions



Source: A.T. Kearney

role can be fulfilled by different types of businesses, in some cases integrated with the supplier or buyer organisation. The following examples can be given of segmentation dimensions of the wholesale trade business:

- product orientation: raw materials, semifinished goods, non-food and food consumer products;
- geographic orientation: international trading houses, importers, exporters; for the domestic markets distributors and cashandcarries, can be distinguished;
- functional orientation: logistics service providers (physical distributors), commercial traders (agents), financial brokers and the fullservice wholesaler;
- ownership: integrated wholesalers (sales companies, purchasing departments/companies) and independent wholesalers.

In real life wholesale businesses are combinations of the previous mentioned dimensions. The functions integrated or performed by the wholesale trade are unavoidable functions in the economic process. Therefore the fulfilment of the functions can be found within independent wholesale businesses or upstream, downstream the distribution chain with sales companies of suppliers, or the purchasing department of buyers.

The wholesale trade employs approximately 5 million people, which is 4% of the EC working population. The differences between the Member States are minor: Greece 3%, Denmark

Table 1: Wholesale distribution
Main indicators

		Businesses	Employees (1) (1000 units)	Turnover (billion ECU)
Belgique/België	1988	48	141	98 (3)
Danmark	1990	25	137	60
BR Deutschland	1990	115	916	425
Hellas	1988	23	114	N/A
España	1988	46	502	65
France	1990	102	1 009	257
Ireland	1988	4	45	N/A
Italia	1988	109	1 058	192
Luxembourg	1989	1	7	N/A
Nederland	1990	54	376	142
Portugal	1988	31	94	9
United Kingdom	1989	117 (2)	917	279

(1) All figures apply to 1990 and include agents and scrap/waste wholesalers
(2) Including agents
(3) 1990
Source: Eurostat, NVG, BGA

Table 2: Wholesale distribution
Largest EC wholesale companies, 1990

	Country	Ranking in Euro top 500	Turnover (million ECU)	Employees
SHV	Nederland	122	6 800	32 800
Casino	France	134	6 490	39 000
Docks de France	France	161	5 440	23 390
Gedelfi	BR Deutschland	163	5 370	N/A
Edeka Zentrale	BR Deutschland	176	5 030	730
Toepfer International	BR Deutschland	211	4 280	N/A
OCP	France	242	3 650	6 110
Lidl & Schwarz Stiftung	BR Deutschland	305	2 680	15 000
Bollore Technologies	France	318	2 560	15 970
Sonepar Distribution	France	349	2 357	N/A
Unigro	Nederland	493	1 580	4 250
AAH Holdings	United Kingdom	497	1 570	7 040

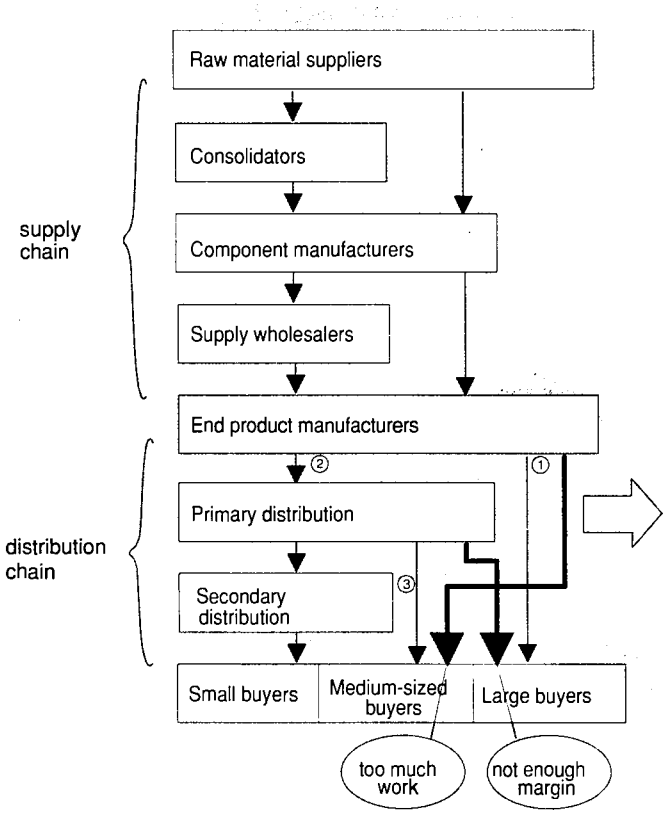
Source: Euro top-500, European Business Press Group 1991

5%, Netherlands 6%, Germany 3%, United Kingdom 3%, France 4%, Spain 3%, Belgium 3%, Portugal 2%, Ireland 4%, Luxembourg 4%. Female employees account for approximately 30% of the EC wholesaletrade workforce. For the individual Member States this percentage varies between 22% (Portugal, Ireland) and 36% (Germany).

The turnover generated by the wholesale trade in the EC is between ECU 1 500 and 2 000 billion. Given this total turnover 35% to 45% of the EC GDP is related to wholesale trade. There are some Member States where wholesale trade is a historical economic force shown by the turnoverGDP relationship: Netherlands 70%, Belgium 60%, Denmark 55%. Turnover has grown the last years in most Member States with 3 to 4% annually. Important growth sectors were capital goods and agricultural products.

More than 600 000 businesses are involved in wholesaling in the EC. The larger part of these businesses is smallscale. About 70% 80% employ less than 10 persons. And less than 5% of the businesses generate 30% 40% of the total turnover. These large businesses can be found in the steel and electrical sectors. Wholesale trade businesses in the southern countries, in particular, operate on a very small scale: Spain, Greece,

Figure 3: Wholesale distribution
Supply and distribution chains



Customer service elements	Distribution options 1	2	3
• Filtrate			
- product	√	√	√
- rule			√
- order			√
• Order leadtime		√	√
• (Un)loading facilities			√
• Tracking/tracing	√	√	
• Inventory management			√
• Order systems			√
• Complaint settlement			√
• Delivery accuracy		√	√
• Ordersize (small)			√
• One delivery			√

Source: A.T. Kearney

Portugal and Italy. In Germany and France concentration has taken place to a certain extent.

The structure of the wholesale trade is largely due to the rather low entry barriers for new businesses: minimal legal requirements, no specialist education is required and the necessary startup investments are relatively low. Many wholesale businesses therefore start every year but at the end of some years many have failed. Research has shown that half of all new wholesale businesses fail within the first five years of their existence. In Table 2 a list of the largest EC wholesalers is given. The selection has been made out of the Euro top500 companies of the European Business Press Group. Thirteen companies of this top500 had wholesaling as primary business activity.

MARKET FORCES

Wholesaler functions are performed at different stages in the process from raw materials to end-use. This process can be divided among the supply and distribution chain. Raw materials and semifinished products typically apply to the supply chain, while capital goods and consumer goods apply to the distribution chain. In both chains different requirements are asked for regarding logistics, commerce and finance. The customer service requirements, in the distribution chain for instance, differ greatly among the three distribution options as shown in Figure 3.

The structure of the supply and distribution chain is based on the efficiency and effectiveness rules of distribution. The smaller and more numerous the buyers, the more distribution levels that are necessary for effective distribution. The price levels depend on the multiplier which are determined by the distribution-flows in the total market. These price levels are more or less balanced and justify the lines of supply. Therefore, a wholesaler will not in the long run supply large buyers because the margin is too small and suppliers will not distribute to the mediumsized buyers because this will require too much sales effort. The wholesale trade is directive in the distribution chain because it gives direction to the lower levels, distributes directly to endusers and industries. And by this very fact the wholesale trade influences direct deliveries from suppliers to endusers.

The European economy is going through a change process that can affect the distribution chain and the position of the wholesaler largely. The most important changes are:

The integrated value added chain is dismantled. Shifts take place downstream and upstream leading to concentration and specialisation of production units. Assembly, for example, or customisation of packaging will be outsourced to third parties near the customer base. This creates added value opportunities for wholesalers.

Distribution is becoming for many industries a key factor for success, especially in mature businesses where product quality and specifications very quickly become standards. The only discriminating factor will be the variable features of the products (customer service, availability) provided by distributors.

The industry focuses more on corebusiness and searches for specialised partners to take care of distribution and customer services.

New parties enter the market for distribution services: specialists in warehousing and physical distribution that provide European distribution services to large manufacturers. These logistics service providers do not interfere with the commercial process (as wholesalers do) but often these suppliers themselves take care of marketing and sales or plan to do so. These specialists are ready to take over the logistics activities of industry and wholesalers because they have their information systems in place and have locations throughout Europe. They are often part of large transportation companies willing to invest in the creation of these services. Their margins are substantially lower compared to the wholesale trade.

Although wholesaling is local business, internationalisation and concentration through mergers and acquisition will continue for reasons of economies of scale in sourcing, warehousing and formula exploitation. And the large suppliers operating at the European level ask for distribution partners that can supply European wide distribution services.

Professionalisation of management techniques, profiling, and market approach will continue at all levels: commercial profiling, development of formula, use of management techniques which are already used in other business sectors (Direct Product Profitability (DPP), market segmentation, private labelling).

Suppliers and buyers require improved integration of business processes in order to realise higher levels of customer service at reduced cost. The developments in EDI provide excellent opportunities to link the business processes of the different players in the distribution chain. The use of bar-coding, scanning techniques and online computer links will impact cost efficiency, human resource policies and the need for large investments (in the initial phase) to a large extent.

REGULATIONS

The EC regulations will affect, directly or indirectly, wholesale trade in Europe. The sector will be directly influenced by a set of already adopted measures concerning VAT harmonisation, product liability, the status of trade agents, exclusive agreements, safety, technical standardisation, and competition.

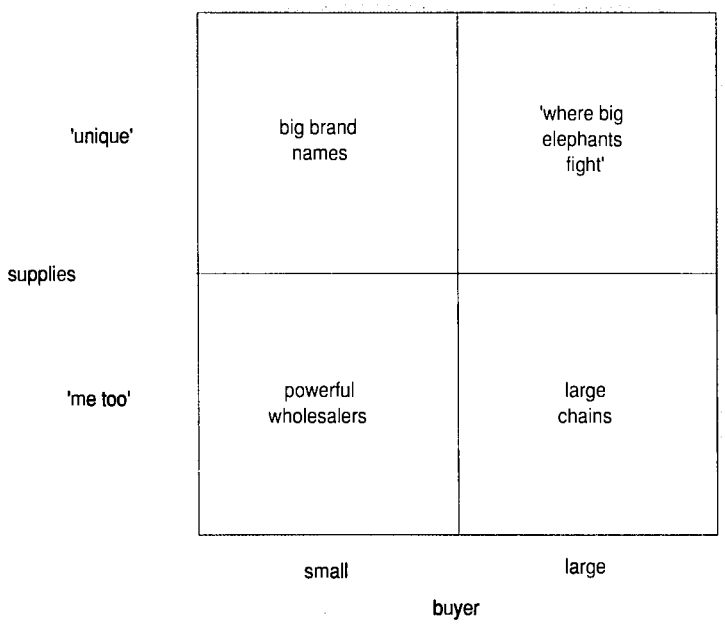
Turning to VAT harmonisation, under the terms of the agreement of June 25, 1992 (Directive 92/680/EEC), from January 1, 1993 the Member States must have a standard VATrate of at least 15% and abolish the higher VATrates. They will be allowed to maintain the zerorate and the extralow rate (1% and 4%) which were existing on January 1, 1991, but will not be allowed to introduce new reduced rates, except for Spain and Luxembourg which will be able to apply new extralow rates. The VAT will be collected in the country of destination. This means that pre-financing is not anymore necessary for companies selling products in other Member States. Definite decisions on this part have not yet been made.

The internal market will also entail harmonisation of the rules regarding product liability. The regulation (Directive 85/374/EEC) speaks of a reversal of the burden of proof: the plaintiff will no longer have to prove fault on the part of the defendant. Another change is that not only the manufacturer is considered to be the producer, but also the importer of products from outside the EC is deemed to fulfil the same role. This regulation will lead to increased costs (supplementary insurance premiums, higher claims for damages, increased number of claims) for:

- wholesale companies which import products from nonEC countries;
- wholesale companies which market goods whereby the consumer cannot discover the identity of the producer;
- wholesale companies selling goods under their own brand name;
- wholesale companies which change some part of the goods.

Directive 86/653/EEC regulates the position of the independent trade agent. The purpose of this regulation is to stimulate freedom of establishment of agents within the EC. This directive regulates the relationship between principal (i.e. machinery producer) and agent including their mutual rights and obligations, such as providing each other with appropriate information and compensation and the ending of the agreement.

Figure 4: Wholesale distribution Power matrix



Source: A.T. Kearney

Contrary to agents and producers, distributors are not very well protected in the EC. Only in Belgium and in Finland are distributors actually protected and entitled to legal indemnity. Although a more positive jurisprudence towards legal indemnity for distributors is developing, the distributors are still at a disadvantage as compared to the producers with respect to legal protection.

Exclusive agreements between producer and distributor are not allowed in the EC because protection of territory is prohibited. The EC council directive 83/83/EEC lists some conditions under which an exclusive agreement between supplier and distributor is exempted: bilateral agreements between one supplier and one distributor, concerning the resale of goods (not services).

Directive 89/655/EEC requires that all existing, new and secondhand work machinery and equipment comply with the minimum on safety and health. The consequences of this directive are simplified intra-community trade, decreased costs and therefore increased exports. The harmonisation of the safety requirements is envisaged through the introduction of the EC label.

In 1992 the European Commission published a Green Paper on reform of the Community's efforts in the field of technical standardisation. The aim is the creation of uniform standards in sizes, weight, qualifications, safety, hygiene and veterinary requirements and all other technical standards which are specific to certain sectors. This harmonisation will simplify and stimulate international trade. The European Commission has now proposed the creation of a European Standardisation Forum, increased participation of interest groups and advocates greater visibility and implementation of European technical standards.

The European Commission stimulates free competition. Concentration of industries creates economic advantages but should not limit free competition. The EC therefore prohibits mergers leading to possible unfair competitive positions (Directive 89/4064/EEC). Mergers between companies that have to be examined by the Commission have the following characteristics: the aggregate worldwide turnover is more than 5 000 million ECU and the aggregate Community-wide turnover of at least two of the companies concerned is more than 250 million ECU.

Besides controlling the wholesale service industry through directives, the EC acts as a stimulator of alliances to share knowhow and cooperate on technological innovations. The European Interest Grouping is the first EC legal entity which enables European companies to cooperate on a legal and European base.

In addition, the EC works indirectly as a catalyst for the wholesale service industry through the liberalisation and harmonisation of transportation and financial services, making international trade easier and financially more attractive. Cost advantages because of the liberalisation and harmonisation could be partly counterbalanced through increased preliminary controls and certification.

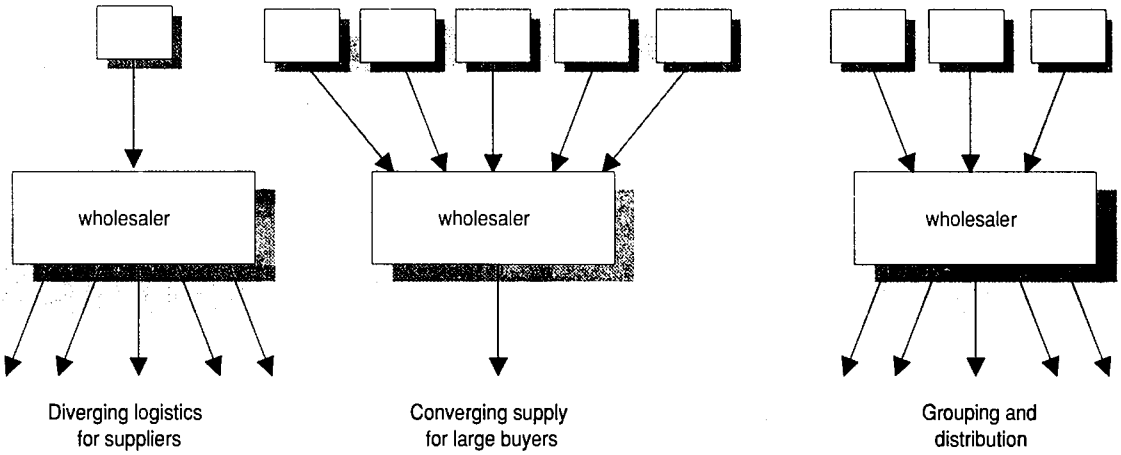
STRATEGIC OPTIONS FOR WHOLESALERS

In the distribution chain a power struggle is going on. In Figure 4 we describe the position of the wholesale trade with the help of two dimensions: purchasing power of buyers and 'unique product' proposition of suppliers. The four areas where the relative power position of the players in the distribution chain differ are:

- the area of the large brand suppliers;
- the area of the large purchasing chains;
- the area of the wholesalers;
- the area where large brand suppliers share margins with large purchasing chains.

The situation in many markets differs largely. In the food market for example, the big brand suppliers and large retail stores struggle for dominance. The wholesale trade has, except for some specialisation, completely disappeared. In the electrical materials market, the independent wholesalers are dominant although the brand suppliers become stronger and stronger. Another example is the toy market where chains have taken over the position of the wholesalers. In capital

Figure 5: Wholesale distribution
Different market situations require different strategies



Source: Eurostat

goods it is still the wholesaler/importer (which can also be the sales companies of the manufacturers) that directs the distribution chain.

In this power struggle wholesale trade has the largest added value for medium and small sized buyers who do not themselves have the facilities and volumes to buy, import and export directly from suppliers.

The strategic options of the wholesale trade depend on the market situation. In a market situation where many buyers exist as well as many suppliers of 'me too' (or non differentiated) products, the role of the wholesaler is typically the 'independent specialised' one. This market situation requires the typical wholesaler, who has a complete catalogue, to perform the requested logistics services well and has good sourcing channels to cover more or less all his clients' needs.

If, however, the market situation is different in the sense that only a few, unique, suppliers exist and many small buyers, the wholesaler should be a distribution partner for these suppliers. In this case, the wholesaler is specialising in logistics services such as storage, distribution, information (EDI) and customisation.

In the third case, when there are a few large buyers and many me too suppliers, the opposite happens: the wholesaler is a sourcing partner for the buyers, taking care of wellorganised supply, product selection and efficient sourcing.

These three market situations require three different strategies (see Figure 5).

Option I Distribution partner for suppliers

Based on the market situation with many buyers and a few unique suppliers, the wholesalers provide distribution services to the manufacturers:

- make products available as 'widespread' as possible (European distribution);
- offer customer services throughout Europe to the buyers;
- have uptodate EDI systems with online links in the suppliers information systems;
- provide inventory management;
- provide market information to suppliers.

The suppliers have often branded products and therefore take care themselves of marketing. They need a partner to cover the logistics operations and distribution.

Option II Sourcing partners for buyers

When many metoo suppliers share the market and only a few large buyers dominate the demand, the strategy calls for a sourcing partnership with these buyers, offering on a tailormade base:

- global sourcing of products;
- account management;
- storage facilities and inventory management;
- integration of supply with the buyers' justintime needs.

The wholesaler in this case becomes an integrated part of the purchasing department of a selected number of buyers.

Option III Integrative wholesaling

In the many buyers/many suppliers situation, the wholesaler fulfils the total range of consolidating and integrating functions in the field of commerce, logistics and finance. Critical are:

- the creation of catalogues and their updating;
- effective usage of Direct Product Profitability mechanisms to know the profitability of products and client groups;
- highquality EDIsystems to create quick response services;
- creative and innovative power to update the services offered, add new products and services and to professionalise the organisation on a permanent base.

In real life these three strategic options can be implemented within one wholesale company for its different market segments. The organisation has to fit the implementation of the three different strategies in the organisational principles which means separate management procedures and systems.

REGIONAL AND INTERNATIONAL COMPARISON

All Member States have their own distribution infrastructures and trade history. Therefore we cannot speak of one EC wholesale service industry. The scope of this monograph does not permit an indepth analysis of the differences, but in the following paragraphs, some characteristics are described.

France

The wholesale trade holds a strong position in the French economy, especially in the international trade business. Concentrations have taken place resulting in the emergence of large, multidimensional trading houses with specialised divisions. These international trading houses are strong in food and capital goods. In the domestic market cooperative structures have emerged between regional wholesalers to share resources. Typical for France are also the wholesale centres where a variety of wholesale companies work together and present themselves together to the market. The French wholesale trade is especially strong in nonfood consumer goods and industrial supplies. In the food market its position has been taken over by the large retail chains.

Germany

The wholesale trade position in Germany is comparable to that in France. A strong concentration has taken place during the last years, which is why the average wholesale company in Germany is larger than in the other EC Member States. The wholesale trade in Germany is especially strong in industrial supplies. In food its position has been taken over by the strongly concentrated retail sector. Large parts of the national imports and exports are organised by international trading houses. Often these trading houses have historical links with the steel industry. The concentration and the links with powerful industries have made of the German wholesale trade a professional service industry with a respected reputation in the labour market - professional in the sense that substantial investments are made in systems and procedures to create new added value services.

United Kingdom

The wholesale trade in the United Kingdom is especially strong in nonfood consumer goods. The concentration in the retail business has limited their role in the food market. It is, however, true that, contrary to the other Member States, food wholesalers in the United Kingdom started voluntary retail chains to counterbalance the power of the retail giants. In the exports and imports business, independent merchants play an important role as well as the international trading houses. These trading houses are mainly important for the import of machines, means of transport and agricultural products. Merchants and trading houses are involved in approximately 4050% of the exports. For imports this is much less (15%).

Italy

Italy has primarily a smallscale distribution (infra)structure in which the wholesale trade serves to link manufacturers and retailers. In 1987 Italy had three times as many wholesale businesses as Germany. Wholesalers in Italy are spread amongst all market sectors. They are mainly focused on the domestic market. International trade is taken care of by the producers themselves or foreign trading houses and importers. The situation is changing slowly because foreign trading houses and distributors (from the US, Japan, Germany, France) are investing in Italy.

Netherlands

Just like Germany and France, the Netherlands has a strong wholesale sector. Wholesalers are very much internationally oriented and offer overseas producers European distribution. They also play an important role for imports and exports; approximately 6070% of the imports are organised by the wholesalers and 30% of the exports. There are some large international trading houses with strong Asian links. Strong wholesale sectors are capital goods and agricultural products.

Belgium

The majority of Belgian wholesalers are small or medium sized, often familyowned firms with a local area of operation. In the international trade larger wholesalers organised in cooperatives play an important role.

Denmark

Probably Denmark has the highest concentration in wholesale trade. A few large wholesalers and trading houses (for international trade) dominate the primary distribution level. Food and nonfood consumer goods are their main markets.

Ireland

Ireland has, like the SouthEuropean countries, a fragmented distribution structure. Therefore the wholesale trade is also in Ireland an important linking pin. The international trade is dominated by the English trading houses.

Southern Europe

Spain, Portugal, Greece are characterised by a very fragmented distribution structure. Retail and wholesale trade are smallscaled and have a traditional orientation. In all sectors wholesaling plays an important role. Concerning imports, wholesale trade holds a strong position in capital goods, whereas for exports it is strong in textiles and agricultural products. In Spain the concentration process has started, initiated by foreign investments.

Eastern Europe

Eastern Europe does not have a specific wholesale culture. Large stateowned departments took and take care of the distribution of goods and materials. The larger European wholesale concerns invest in Eastern Europe to build up a wholesale market for foreign products. They have the international trade and distribution logistics knowhow that the stateowned companies lack to a large extent. Wholesalers who open up subsidiaries in Eastern Europe have to face the limitations of poor infrastructures and almost nonexisting communication networks. Eastern Europe is for many wholesalers and trading houses a challenging market.

Japan

The distribution of machinery in Japan is influenced by its history and its social structure. The large trading houses, Sogo Shosha, are economically and politically powerful business entities. Their primary role is to provide links between various industrial sectors and parties, which are in turn able to benefit from trading houses' information networks and financial ties. Although Japanese multi-levelled distribution structure is very effective, the EC distribution structure tends to be more cost-efficient. However, in Japan distribution fulfils a strategic function, perceived as being as important as technology. This makes Japanese producers more powerful (and threatening) in the Japanese market.

USA

The distribution structure for machinery in the USA is more or less similar to that in the EC, although distributors in the USA focus more on satisfying customer needs and service requirements. The market focus makes producers and distributors organise distribution according to the grouping of client's needs. Distribution in the USA is used as a strategic tool to realise corporate objectives.

OUTLOOK

The European wholesale trade has a strong base for the future. It performs functions that have to be performed at some stage in the supply and distribution process. In some market sectors it holds a strong position, in others its functions have been integrated with suppliers or buyers. For the next years the European wholesale trade faces some interesting challenges:

The Single European market is expected to boost the European economy. Besides, manufacturers are concentrating on their core business leaving the other business processes to specialists

with local, technical and logistics knowledge. Both facts are developments that can contribute to a strong future position of the wholesale trade.

The Single European market and the opening of the Eastern European market will require European distribution networks. Logistics service companies are building up these networks which include sophisticated communications networks. Wholesalers have to take part in the creation of these European wide distribution networks through alliances, mergers or acquisitions.

The integration of the levels in the supply and distribution chain means that the borders between companies become fluent. Systems have to be integrated, procedures and commercial policies coordinated in order to improve the total quality for the buyers. Suppliers and buyers will therefore reduce the number of business partners they are working with. The intensified relationships will require investments and management time which will force a reduction of business relations.

The dynamics in the supply and distribution chain will force wholesalers to make strategic choices: logistics partner, sourcing partner or integrative wholesaling. The European wholesale trade is facing challenging opportunities but these require specialisation on a market segment, on specific wholesale functions for a selected number of business partners. Focus on the business process of the customer and find ways to add value to this process will be the key factor for success.

Concentration will continue in retailing. European retail chains will emerge that integrate wholesale functions in their own organisation. Alternative distribution forms will arise with the help of the continuing developments in EDI. Direct computer links between buyers and suppliers or public sales information systems will make the representatives of the wholesale companies redundant. The wholesale trade will be forced to innovate its services on a continuous base focused on adding value to the business process of its buyers or suppliers.

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Retail trade
NACE 64, 65

Retailing is an important and significant force in the European economy, representing, for many manufacturers, the means of access to consumers. Although the retail trades in Europe strongly reflect national characteristics, a number of common themes can be identified. Core market development has occurred alongside diversification into other retail and services sectors and geographical markets. At the operational level, retailers have increasingly adopted the marketing concept as they seek to increase sales. These developments have also necessitated investment in the means to control costs and to manage the operation more efficiently.

INDUSTRY PROFILE

Retailing is a dynamic and complex sector involving a range of company types of varying scale, operating in a variety of product sectors and through a diverse and changing network of outlets and selling techniques. This dynamism and the traditional lack of attention paid to the retail sector makes national comparison of statistics relating to the retail trade difficult. Despite the existence of NACE classifications, national statistical offices and major trade associations produce data based on a range of different definitional criteria.

Commonly data is collected on the basis of a variety of definitional aspects which mix features such as type of business (e.g. independent, multiple chain), type of establishment (e.g. department store, hypermarket), selling technique (e.g. mail order, self-service) and product range (e.g. food, clothes).

The NACE 1970 classification of 'Retail Distribution' encompasses classes 64/65 and is essentially based on the product groups sold, namely:

- food, drink and tobacco (641/642);
- dispensing chemists (643);
- medical goods, cosmetics and cleansing materials (644);
- clothing (645);
- footwear and leather (646);
- furnishing fabrics and other household textiles (647);
- household equipment, fittings and appliances, hardware and ironmongery (648/649);
- motor vehicles and cycles (651);
- motor fuels and lubricating oils (652);
- books, newspapers, stationery and office supplies (653);
- other "non-food products" (654/655, 656).

Under the new scheme of NACE Rev 1, due to come into operation in 1993/94, "Retail Trade, except of motor vehicles and motorcycles; repair of personal and household goods" is found in Division 52 of Group G. This classification has moved the motor trade to a new category, defined more detailed product groups, and incorporated second-hand goods retailing and repair businesses into the retail trade category. The NACE Rev 1 involves the retail sale of:

- non-specialised stores (521)
- food, beverages and tobacco in specialised stores (522)
- pharmaceutical and medical goods, cosmetic and toilet articles (523)
- new goods in specialised stores (524)
- second-hand goods in stores (525)
- non-store sales (526)
- repair of personal and household goods (527)

Retailing is the final link in the distribution channel between the consumer and the product manufacturer for the majority of consumer goods. In its simplest form, retailing is the activity which makes goods and services available for purchase and consumption by consumers. The role of retailers in the distribution channel varies with such factors as the characteristics of the products and service concerned, and the type and nature of business relationships with others involved in the channel. Traditionally retailing does not in itself create goods and services, and consequently the activities performed by retailers reflect this role. Increasingly, however, retail activity now adds value to products and services and enhances them in the eyes of consumers.

Notwithstanding the problems of comparative data in this sector, the retail trades are a significant contributor to the European economy (Tables 1 and 2). Best estimates from Eurostat suggest that retail sales in the twelve member states amount to around 1300 billion ECU. This turnover is generated by almost 3.3 million businesses and 13.2 billion employees.

Table 1: Retail trade
Contribution of retailing in the national economies, 1990

	Number of companies	% of total number of employees	Added value
Belgique/België	14.8	7.4	15.4
Danmark	11.4	7.7	13.4
BR Deutschland	19.0	8.3	10.1
Hellas	34.5	9.5	12.4
España	30.2	11.7	13.8
France	21.4	9.4	13.2
Ireland	25.5	9.4	9.5
Italia	30.3	10.3	15.8
Luxembourg	19.5	9.9	13.5
Nederland	15.2	10.0	12.7
Portugal	34.0	7.7	17.3
United Kingdom	19.4	10.2	12.8

Source: Eurostat

Table 2: Retail trade
Key data, 1990

	Turnover (billion ECU)	Employees (thousand)	Businesses (thousand)
Belgique/België	35	274.7	127.8(1)
Danmark	24	208.6	48.1
BR Deutschland	322	2 353.0	439.0
Hellas	20	338.2	175.0 (1)
España	85	1 434.0	454.9 (2)
France	260	2 090.0	461.8 (2)
Ireland	8	100.0	20.0 (1)
Italia	230	2 401.0	934.8
Luxembourg	3	18.1	3.5 (2)
Nederland	45	637.5	95.0
Portugal	20	366.3	173.3 (1)
United Kingdom	250	2963.0	347.8 (2)
EC total	1 296	13 184.4	3 281.0

(1) 1988
(2) 1989
Source: Eurostat

To view the retail trades as a single homogenous international entity is naive. Despite the growth of cross-border retail activity and the international transfer of retail concepts, management techniques and retail and manufacturer brands, retailing is still predominantly an industry with strong national characteristics.

The diversity of retailing can be illustrated by reference to two dimensions: organisational form and selling techniques. These are often confused in statistical series. The type of firm or business organisation operating in the retail sector can be one of several types:

- independents,
- corporate chains,
- contractual chains,
- consumer co-operatives.

The importance of these categories varies from country to country and in different retail product sectors.

Independents are companies in which the owner is typically directly involved with the day to day management of the operation, therefore there is generally little scope to operate many outlets. The majority of businesses engaged in retailing are independents, but in terms of market share the unaffiliated or 'true' independent is generally in decline.

Corporate chains may be privately owned, publicly quoted or government controlled organisations. This type of organisation operates a number of establishments or 'branches', and is generally becoming the dominant organisational type in most countries, particularly in northern Europe.

Contractual chains allow any type of organisation to contractually combine with others for various activities. Historically the benefits of co-operation in the buying function stimulated contractual chain formation, but most of these contractual chains now also involve marketing and other management activities. Contractual chains commonly take three forms. Voluntary chains are groups led by wholesalers to which retailers affiliate. Spar and Vege are examples of voluntary chains in the food sector which operate in a number of European markets. In contrast, retailer buying groups comprise groups of retailers collaborating for buying and marketing activities. These collaborations may involve both independents and corporate chains. In the food sector Leclerc and Intermarché (France), Edeka (Germany), and Crai, Selex, and A.O. Conad (Italy) are typical examples, whilst in the non-food sectors Intersport (sports goods) Euro-Active (photographic equipment) and Expert (electrical goods) represent this form of organisation. In the last decade, franchising, in which one organisation (the franchiser) offers another (the franchisee) the opportunity to benefit from its marketing and operational systems via a contractual relationship, has grown rapidly in most countries. The European Franchising Association identifies over 2 200 franchisers in the EC (excluding Greece and Luxembourg) with almost 106 000 franchisees and a turnover of over 50 billion ECU.

Consumer co-operatives are organisations owned by consumers operating under specific national legislation defining a co-operative. This ownership pattern provides co-operatives with a distinct, highly democratic, administrative structure. The fortunes of consumer co-operatives within the EC have fluctuated. Major difficulties have occurred in France and Germany, whilst these organisations remain significant forces in Denmark and Italy.

A second, yet distinct, dimension of retailing is the selling technique employed. This dimension has several aspects, the importance of which again varies from country to country and with retail product sector. Aspects of selling technique include:

- nature of sales point,
- sales method,
- scale of outlet,
- product range,
- location.

Nature of Sales Point: the majority of retail sales occur via fixed retail outlets or stores. However, for certain product groups and in certain markets, itinerant outlets and non-store retailing should not be discounted. Non-store retailing involves mail-order, door-to-door selling, vending machines and home selling and is more important for non-food lines.

Sales Method: in fixed retail outlets traditional counter service has been replaced in many cases by self-service sales techniques. This has implications for store layouts, staffing and customer service.

Scale of Outlet: for fixed retail outlets statistical distinctions are often made on the basis of size, particularly in the food trades. In spite of a broad international consensus that super-

Table 3: Retail trade
Changes in retail sales volume, 1985-1991

	Index 1991 1985=100	Annual change % 1985	1986	1987	1988	1989	1990	1991
Belgique/België	111.5	1.6	4.2	1.6	-0.8	4.2	7.1	-1.2
Danmark	102.0	1.1	2.6	-3.3	0.6	-0.7	0.5	2.3
BR Deutschland	129.6	N/A	2.5	3.6	2.9	1.9	8.9	5.1
Hellas	109.4	-2.5	-2.7	5.3	17.5	-1.2	-2.2	-6.0
France	117.3	0.8	3.7	2.7	4.7	2.9	1.9	0.4
Ireland	107.5 (1)	1.8	-0.5	-1.4	2.1	4.7	2.7	N/A
Luxembourg	111.2	-0.3	2.8	4.9	2.9	0.5	N/A	N/A
Nederland	120.1	0.4	2.5	3.2	1.7	4.3	4.9	2.0
United Kingdom	119.4	4.6	5.3	5.9	6.3	1.9	0.4	-1.0

(1) 1990
Source: Eurostat

markets are self-service stores with a sales area in excess of 400m^2, conflicting definitions arise for larger units. For example, whilst the French define hypermarkets as stores of over 2,500m^2 with a high proportion of floorspace devoted to non-food, German definitions distinguish between self-service warehouses in excess of 5 000m^2 and consumer markets of 1 500m^2 and above, whilst the British superstore definition of over 25 000ft^2 (2 323m^2) does not take into account any expected proportion of non-food floorspace.

Product Range: distinctions are also drawn between specialists (retailing a single product group), niche retailers (retailing very narrow product lines) and mixed retailers (retailing a number of product groups, often referred to as 'scrambled merchandising').

Location: locational distinctions may involve the physical location such as in-town, edge-of-town or out-of-town sites, and also locational features such as controlled environments, for example, shopping centres.

Although often confused in statistical series, organisational form and selling technique are two separate features of retailing. Independents and corporate chains may both operate self-service and counter service stores of different sizes in different locations.

MARKET FORCES

The demand and supply issues in retailing may be addressed by reference to trends in retail sales volume and the operational strategies of retailers. At the operational level the emphasis has been upon both enhancing sales and controlling costs. Both of these have been aided by the application of technology and the development of management skills in the retail sector.

Consumer demand for the services provided by retailers is shown in part by changes in retail sales volume (Table 3). Indexed sales figures for the 1985-1991 period reveal national differences in growth in total retail sales volume. Such figures alone however disguise fluctuations from year to year and between retail product groups. Annual changes in retail sales volume of two or three percentage points are not uncommon as retail sales are very vulnerable to changes in consumer confidence. Britain is a case in point, where strong credit-driven growth in the mid 1980s disappeared at the turn of the decade. Similarly, differential demand is observed between retail product groups. Food, as the largest retail sector, tends to mirror the overall changes in retail sales volume and is less prone to dramatic swings in sales volume. Other non food sectors such as clothing and household goods are more prone to fluctuations in volume, for as non-essentials they are more dependent upon consumer confidence, and disposable income. Purchases of these produces can be postponed or eliminated more readily than those of food products.

The adoption of the marketing concept has been fundamental to the drive to enhance sales. The retailer is the closest of all the institutions in the distribution channel to the consumer and is increasingly using the knowledge derived from this position to develop activities more suited to consumer needs. Companies in the sector have recognised that consumers' perceptions of organisations and store formats is central to the retailing business and have responded accordingly. In general terms one observes a trend from a mass or generalist retail offer to a specialist retail offer. For example, in mail order

Table 4: Retail trade
Large food stores: hypermarkets and superstores of 2500 m+ (1)

	1975	1981	1986	1987	1988	1989	1990	1991
Belgique/België	70	79	88	88	N/A	98	N/A	N/A
Danmark	5	N/A	13	13	14	13	14	14
BR Deutschland	627	821	952	956	N/A	982	996	1 004
España	4	31	59	69	79	86	102	116
France	291	433	599	651	687	743	790	849
Italia	3	12	N/A	43	49	64	86	103
Luxembourg	3	3	N/A	4	N/A	5	N/A	N/A
Nederland	30	39	35	N/A	36	N/A	40	N/A
Portugal	4	4	6	7	8	16	18	20
United Kingdom	102	279	432	457	500	578	644	733

(1) At 1 January
Source: Institute for Retail Studies

Table 5: Retail trade
Employment structures in European retailing, 1990

	Total employees (thousand)	Of which female employees (%)	Of which wage and salary earners (%)	Part time employees as % wage and salary earners
Belgique/België	274.7	52.8	52.4	17.4
Danmark	208.6	58.5	82.0	37.8
BR Deutschland	2 353.0	64.1	84.6	27.8
Hellas	338.2	43.6	28.9	3.3
España	1 434.0	53.7	46.6	6.4
France	2090.0	50.3	74.1	25.3
Ireland	100.0	45.6	70.2	13.4
Italia	2 401.0	N/A	N/A	N/A
Luxembourg	18.1	51.6	80.6	11.5
Nederland	637.5	56.7	79.1	47.3
Portugal	366.3	45.6	46.8	5.3
United Kingdom	2 963.0	58.1	84.2	40.7
EC 12	12 184.4	57.0	66.0	27.0

Source: Eurostat

retailing this is reflected in the trend towards specialogues at the expense of general mail order catalogues. The aim is simply to apply basic marketing principles of segmenting the market, identifying target customers, their motives and values, and providing a retail offer to meet these needs.

This does not mean that the mass or generalist retail offer is totally inappropriate. For some consumer groups and purchasing decisions, and in certain environments, this type of offer meets consumer needs. The growth and spread of the large scale food store (whether hypermarket or superstore) shown in Table 4 is testament to this. In the large store sector, which is commonly associated with mass retailing, specialisation is taking place. Large store specialists are developing in most retail product lines (furniture; DIY; garden centres; clothing; shoes; records; toys), and many department store companies are adjusting their product ranges, effectively becoming large textile specialists.

The targeting of consumer groups and development of specialist retail offers is particularly visible in smaller store formats. A number of consumer values have been identified and specific formats have emerged to serve these needs. Amongst these values and corresponding retail formats are:

- the limited line discount store, which provides for customer requirements for low prices via stores retailing limited product ranges consisting of a few lines sold at low prices in sparsely decorated and staffed outlets;
- the convenience store, which provides for customers seeking to conserve time in their shopping habits. These stores carry relatively wide product ranges, but with limited lines usually consisting of a single major brand per line. Store decor typically stresses efficiency, and accessibility is at a premium via store location and long opening hours;
- the specialist store, which provides for choice through narrow product ranges but with considerable depth of lines and brands. Staff are generally capable of providing expert advice on the products carried as the customer motive for visiting these stores is to make a choice within a pre-determined product group;
- the style shop, which provides exclusivity or design originality via quality products in stores which carry few lines. Store fittings are of high quality and customer service in its various forms is also high;
- the branded goods store, which provides assurance to consumers who value the reputation of a single brand. These stores only carry the single brand which is what the customer values;

Table 6: Retail trade
Number of EAN scanning stores, 1981-1991 (1)

	1981	1983	1985	1987	1989	1991
Belgique/Belgie	0	12	115	278	648	1 147
Danmark	0	0	14	107	530	1 300
BR Deutschland	23	69	290	966	2 252	4 849
Hellas	N/A	N/A	N/A	N/A	N/A	N/A
España	0	2	36	188	912	5 039
France	2	37	420	1626	3471	6 650
Ireland	N/A	N/A	N/A	10	30	101
Italia	9	13	20	550	1250	3 690
Luxembourg	N/A	N/A	N/A	17	18	20
Nederland	1	36	137	386	740	1 100
Portugal	0	0	0	0	83	269
United Kingdom	7	42	160	793	2 792	6 043

(1) At 1 January
Source: EAN

Table 7: Retail trade
Largest retail based organisations by turnover (million ECU)

Organisation	1980/81	Organisation	1991/92
Coop Unternehmen	5 565	Metro	22 925 (1)
Karstadt	4 977	Tengelmann	22 778 (1)
Albrecht	3 933	Carrefour	16 227
SGCC	3 794	Intermarche	15 437
Schickedanz-Quelle	3 657	Leclerc	15 292
Carrefour	3 472	J Sainsbury	13 145
Kaufhof	3 161	Albrecht	13 000
Marks & Spencer	3 129	Promodes	10 970
Vroom en Dressmann	3 056	Tesco	10 856
Tesco	3 043	Rewe Bad Homburg	10 563
Tengelmann	2 767	Auchan	10 100
Leclerc	2 655	Otto Versand	9 767
GUS	2 642	Asko	9 717
J Sainsbury	2 558	Karstadt	9 347
GB Inno BM	2 473	Marks & Spencer	9 085
Promodes	2 468	Ahold	9 013
Hertie	2 356	Dehaize le Lion	7 352
Nourvelles-Galeries	2 336	Argyll	7 198
Rewe-Leibbrand	2 334	Schickedanz	7 179
Sears	2 312	Vendex International	7 151

(1) 1990/91
Source: Institute for Retail Studies

- service shops, which provide the customer with a skill or service usually in a short time period;
- locally specific shops, which respond to the consumer's wish for impulse or emotion-based purchases following a particular experience. The product range, theme and location of these stores are closely linked to a particular experience.

In all these store formats, the product range, store ambience and customer service levels are specifically tailored to meet the needs of identified consumer values.

Whilst marketing oriented activities such as these seek to increase sales and build customer loyalty, other operational activities are concerned with managing cost structures. For all retail organisations the largest element of costs is the cost of purchasing the product for resale. Consequently, great emphasis is placed upon maximising buying power benefits through scale or efficiency. As scale is related to the volume of products sold within a product range, sales growth via internal development, acquisition or collaboration provides the potential for greater power. The breadth of product ranges and number of brands stocked also influences power as sales volume is concentrated or dispersed over the lines or brands. Finally, efficiencies in decision-making primarily through centralisation or the co-ordination of purchasing provides for greater buying power.

Closely associated with the costs of buying, particularly for retailers with a high stock turnover, is management of the delivery and distribution of products to stores and customers. A clear trend in Europe is a move towards the centralisation of physical distribution, where suppliers deliver to a central point for redistribution rather than direct to the store. Often this process may involve the sub-contraction of this activity to specialist third party distribution companies.

A third element of cost structure which has changed significantly over time is employment structures (Table 5). Retailing is a major employer, particularly of females, and increasingly of part-time employees. Employment ratios however vary from nation to nation as do hourly labour costs. The trend towards part-time employment allows greater control over labour scheduling, matching staff levels with peak trading times which aids the control and management of labour costs.

The twin pressures for improved marketing and control are clearly reflected in changes in supply chain management in European retailing. Whilst buying terms and conditions are still the subject of debate between suppliers and retailers, in many sectors supplier relationships have become more collaborative than confrontational in nature. Co-ordination of the supply chain, enhanced by improved information on product movement, has grown. In addition, as retailers have incorporated the marketing philosophy into their approach to the business, they have increasingly regarded themselves as brands in their own right. The combination of activities, products and services offered by retailers "add value" to the basic product offering and provide a means of differentiation from competitors. The growth in retailer advertising reflects this trend, as does the development of retailer brand product ranges. The availability of retailer brand product lines again varies from sector to sector and between countries, but in most cases the role of the retailer brand has changed, particularly in the food sector. The original market position of these brands in food was as a low price/lower quality alternative to manufacturer brands, but as these brands carry the retailer's name and are unique to the store, they have been repositioned and their quality improved and increasingly they are associated with new product launches. This role has necessitated a change in the relationship with suppliers with a greater emphasis on quality control and product development.

All of these operational issues have been aided by the introduction of technology in retailing and the development of management skills. Initially technology investment was driven by the desire for better management of assets and the associated productivity improvements. Increasingly however a number of retail businesses are appreciating the potential for information technology to aid marketing and strategic management decisions. The acceptance of universal standards which allow item identification, data transmission and electronic processing have been central to the adoption of technology in retailing. For example, without agreements on bar-code standards, investment in item identification equipment such as scanning (Table 6) could not take place. Investment in such technologies has provided the information infrastructure upon which application technologies such as EFTPOS and EDI are based. These application technologies provide the information basis for improved management of the company.

Table 8: Retail trade
International activities of selected European retailers, 1990/91

(million ECU)	Turnover	% of total turnover	Sector
Tengelmann	12 656	55.7	Food
Metro	6 036	35.0	Food/Mixed
Promodes	5 506	34.3	Food
Delhaize le Lion	5 283	72.4	Food
Ahold	4 548	50.6	Food
Otto Versand	3 602	45.9	Mail Order
Carrefour	3 415	31.1	Food
Vendex International	2 809	35.3	Mixed
Albrecht	2 520	20.0	Food
Ikea	2 138	76.2	Furniture
Auchan	1 413	15.3	Food
J Sainsbury	1 356	11.8	Food
Marks and Spencer	1 056	12.7	Apparel/Food
GUS	1 014	26.9	Mail Order
Printemps/Prisunic	986	20.2	Mixed
La Redoute	879	35.0	Mail Order
Benetton	859	63.5	Apparel
Quelle	760	10.6	Mail Order
Dixons	726	30.6	Electrical
Ashley Group	546	91.0	Food
Hennes & Mauritz	530	53.0	Apparel
Docks de France	508	13.3	Food
Unigros	477	30.2	Food
Escada	470	70.0	Apparel
Casino	449	6.1	Food
Ratners	348	27.6	Jewellery

Source: Institute for Retail Studies

Technology alone however will not manage a business. Managers must still make decisions based on the information provided by technology. As the information available to managers has increased and changed in nature, management styles and structures have evolved to maximise the benefits. Although management styles differ, there is some evidence of a trend towards centralised decision making, whether at regional or national level. One could argue that the growth of franchising and the changing membership conditions of buying groups and voluntary chains represents a similar step amongst independent businesses to create a more uniform image and benefit from economies of scale and replication.

INDUSTRY STRUCTURE

Companies

The largest retail companies in Europe are now of significant size in terms of turnover to be ranked alongside businesses in the production sector of the economy. Given the size of the food sector, the majority of the largest companies are predominantly food retailers, although mail-order companies such as Otto Versand and Schickedanz-Quelle feature in any listing of major companies. Of these major companies the vast majority have either diversified operations or have made important international contributions to turnover. The exceptions to this observation are the British food retailers Tesco and Argyll which are essentially domestic based 'core' business operations.

The retail sector is accustomed to rapid change and this is reflected in the changing fortunes of these major companies over the past decade (Table 7). At the start of the 1980s a list of the largest retailers included the German and French co-operatives, which have since run into financial difficulty and have been dissolved, and a number of department store based businesses (Karstadt, Kaufhof, Vroom en Dressmann (now Vendex International), Hertie and Nouvelles-Galeries). The relative importance of most of these companies has since declined, to be replaced by food retailers.

Also apparent from any listings of the largest companies is that a number of them (Metro, Carrefour, Intermarché, Auchan, Asko and Argyll) have effectively been formed since the 1960s. These companies have grown rapidly through the introduction of new forms of retailing (e.g. the hypermarket, large store discount outlets) and growth through acquisition and collaboration. The largest organisation in 1991/92, Metro, has its origins in wholesale and cash-and-carry retailing, but through the acquisition of Kaufhof and others now has a major retail contribution to total sales. This contribution is likely to be reinforced by the major shareholding held in Asko.

Strategies

As they have grown in size, retailers have increasingly developed clear corporate strategies to maintain growth and survive within the marketplace. One basic strategy has been to seek product market dominance. Growth is sought within the existing 'core' product market as companies seek to increase their share of sales through new outlet development, or co-operation with or acquisition of others operating in the market. Within every country and retail product market in the EC examples may be found of companies employing this route to growth. The clear consequence of this strategy is product market concentration with a greater share of sales attributed to single organisations or collaborative groups.

An alternative strategy is to diversify beyond the original activities of the business into related or new product markets. This may involve a redefinition of the existing retail product market as existing ranges are widened to encompass related products or services. Similarly, other segments within a known product market may warrant attention. An established hypermarket operator for example may develop smaller store formats

Table 9: Retail trade
Structural differences in European retalling, 1990

	Number of enterprises per 1000 inhabitants	Persons engaged per enterprise	Turnover per enterprise (thousand ECU)	Turnover per person (thousand ECU)
Belgique/België	128	2.8	273	9
Danmark	94	3.9	375	9
BR Deutschland	63	6.5	813	12
Hellas	174	2	125	5
España	117	2.9	187	6
France	80	4.9	575	13
Ireland	66	4.5	348	7
Italia	162	2.6	246	9
Luxembourg	93	4.6	800	15
Nederland	68	5.1	446	8
Portugal	168	2.6	116	4
United Kingdom	56	9.5	779	8
EC	98	4.1	405	9

Source: Eurostat

such as discount or convenience stores. Possibly the most risky option is to diversify into new unrelated retail product or service markets of which the company has no experience or knowledge. Generally the diversifying business will have management expertise in one retail sector which is felt appropriate to the new sector. The consequence of this option is that the organisation develops a portfolio of different retail businesses. For example the largest seven DIY retailers in Europe are now subsidiaries of retail organisations with their main activities in other retail product markets.

A further type of diversification is geographical diversification involving activities outside the domestic market. Internationalisation in retailing takes a number of forms. At one level there is technology transfer where a retail format or innovation - such as the limited line discount store, the convenience store or hypermarket - is developed in a number of national markets. This transfer may or may not be directly linked to a single company. In addition certain retail activities such as buying and management systems may involve an international dimension. The formation of international buying groups in the late 1980s reflects this trend. For most, however, retail internationalisation is associated with a business itself operating in a foreign market. As Table 8 shows, a significant volume and proportion of sales is now accounted for by the overseas activities of retailers operating in a range of product markets. It is noticeable that many of Europe's largest retailers feature on this list. The management involvement in international operations will range from a financial stake in existing companies, to franchising, and everyday management control.

One consequence of these strategic trends is a clear growth in the scale and complexity of these organisations - which may now operate a range of store formats, often in different product and geographical markets. The changing retail environment further reinforces the importance of management information systems and management skills. Whilst some of these organisations remain private businesses and finance expansion through cash flow and bank loans, an increasing number are turning to the stock market for funds. This is particularly true of British and Dutch companies, but increasingly true of French corporate chains. Finance derived from such sources requires a return on investment which again places pressures upon firm control and management.

REGIONAL DISTRIBUTION

Within all the markets of the EC, regional differences in consumer tastes, particularly for food products, necessitate some product range adaptation by retailers. Also there are differences in access to certain types of retail facilities between rural and urban areas throughout the Community.

At a national level there are clear differences in the retail structure between northern and southern Europe. Essentially in southern Europe the retail trade is characterised by a larger number of business and outlets, lower turnover per business and person employed (Table 9) and lower levels of retail concentration. The independent business sector, whether acting alone or in some form of contractual chain, dominates the sector. The trends observed in northern Europe, however, are present in southern Europe, often inspired by retailers from other nations, hence the presence of French food retailers in Spain and to a lesser extent Portugal and Greece.

ENVIRONMENT

The concern over ecological issues in Europe generally has some impact on the retail sector. First the growing demand for 'green' or environmentally sound products (such as cosmetics, washing powders and paper products) has been taken into account in product range selection. A potentially greater impact however is in the area of packaging and packaging waste. This issue has come to the fore in Germany with legislation placing the responsibility for recycling packaging materials upon manufacturers and retailers, but is also on the political agenda in a number of other countries. In Germany, the Netherlands and France a number of leading retailers have already begun to take an active role in waste disposal.

REGULATIONS

The regulatory framework affecting retailing in the EC largely takes place at national level. The scope and range of policies specifically directed at the retail sector varies from country to country, and broad legislative activity to regulate industry in general (e.g. taxation and social protection legislation) affects retailing. In most countries retail-specific legislation has tended to be reactive rather than proactive, formulated in response to particular problems and political pressures rather than forming part of an overall strategic approach to the retail sector. In general legislation exists to control unfair competition, whether through monopoly control policy or the regulation of discriminatory and restrictive practices; to monitor establishment of retail businesses and premises; and to protect consumers.

The scope and effect of legislation is varied across the Community. Legislation to control the growth of large stores exists in a number of markets, with the effect of slowing growth (France and Germany) or preventing growth (Belgium); differences in sales tax and excise duties have lead to cross-border shopping in a number of markets, such as on the Danish-German border and the Irish-Northern Ireland border; and competition policy has prevented proposed mergers in the United Kingdom and Germany.

At Community level, various aspects of the Single Market will influence the retail trade. The mutual recognition of national product safety standards along with the removal of border controls will influence the sourcing, transport and movement of product; fiscal harmonisation (particularly of VAT) will potentially affect final prices to consumers; whilst aspects of the social charter will influence employment structures.

OUTLOOK

Retailing is an important sector of any national economy and will remain so in the foreseeable future. As retail internationalisation in its various forms increases over the next decade, similarities in the retail formats and management techniques seen in different countries will grow. This will be particularly noticeable in southern Europe as the retail trade 'learns' from the northern countries. Despite these trends, retailing will however retain distinct national characteristics.

In most countries and retail product markets the dominance of large organisations is growing. Scale will remain a key issue in retailing and contractual chains will provide an important means of achieving some of the benefits of scale for independent businesses. For many of the larger organisations national market shares in their retail product sectors are approaching limits which may attract the attention of public policy agencies. Continued growth through acquisition in these sectors may also be limited by a dearth of target companies. Increasingly then, attention will be focused on diversification and internationalisation as a strategic route to growth, and upon marketing and management control activities to increase the return from existing operations.

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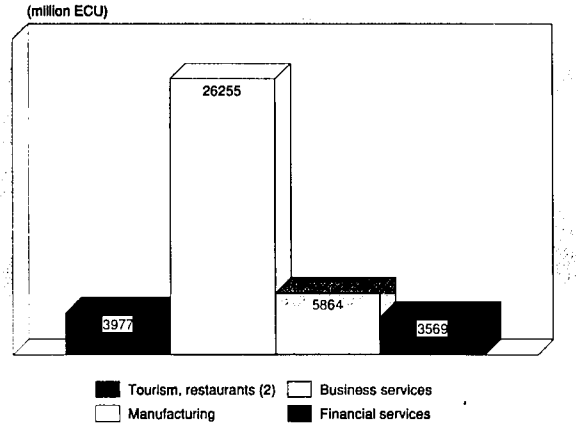
★ CITIZEN OF ★
EUROPE
★ MY COUNTRY 92 ★

Tourism

NACE 661, 665, 667, 771

The tourism industry is better viewed as a market than as a sector, as it impinges across a wide variety of services and industries, including not only accommodation, restaurants and travel services, but also craft industries, the entertainment industry, banking, business services, and the activities of local authorities in relation to national parks, historical monuments etc. The demands of European tourists have shifted discernibly over the last decade. Travellers are now more independent and better informed, and seek greater flexibility in their travel arrangements and a better quality of service at destinations. In general, today's tourists also have more time and more money leading to more frequent breaks and growth in long-haul holidays as tourists have become both more adventurous and more environment conscious. Industry operators have in large part reacted appropriately in evolving new tourism products and many southern Member States are in general successfully diversifying from, or enhancing, their traditional beach products. The outlook is for continued rapid growth in EC tourism revenues, but at a slower pace than overall international tourism.

Figure 1: Tourism
Employment compared to selected sectors, 1990 (1)



(1) Excluding Italia
(2) NACE 66
Source: Labour force surveys, Eurostat

INDUSTRY PROFILE

Description of the sector

Few industries have as pervasive an impact on local communities throughout the world as travel and tourism. The tourism industry is a widespread, complex network of businesses engaged in the lodging, feeding, travel arrangements and entertainment of tourists. A tourist is defined as a visitor staying at least one night in a place other than that corresponding to his usual environment. The main purpose of such a visit may be primarily pleasure, primarily business or a mixture of the two. Tourism is most commonly associated with "pleasure", rather than business, although within "pleasure" trips a distinction between "pure" tourists and visits to friends and relatives (VFR) is often made. The official World Tourism Organisation (WTO) definition of "tourist" omits the "excursionist" who does not stay overnight in the country or place visited, although this visitor is an increasingly important customer of the European travel and hospitality industries.

The diversity of the tourism sector is such that it is often better understood as a market rather than a sector in the sense that it impinges on may different parts of the economy. The most important of these include the lodgings subsector, catering, the sports and entertainment industry, travel services, and transport and craft industries. Within a wide definition of tourism, all of these subsectors, with the exception of lodging, also rely on other sectors, of which particular niches concentrate on tourism. The most important of these related sectors is transport, which is covered in chapter 22. This chapter examines the following subsectors:

- hotels (NACE 665);
- non-hotel accommodation (NACE 667);
- restaurants (NACE 661);
- travel services (NACE 771).

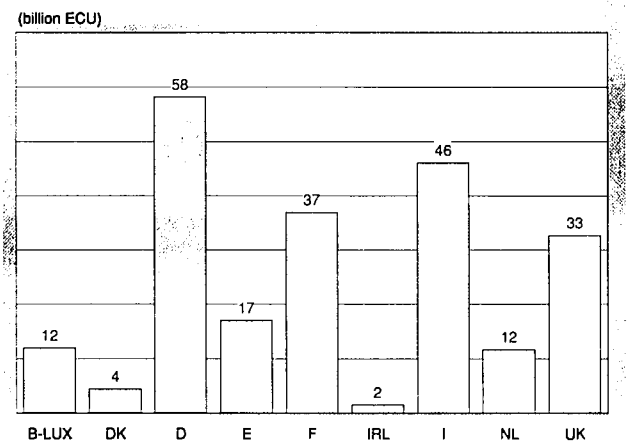
The average breakdown of tourist receipts, although this varies widely across different tourism outlets is accommodation (32%), food and beverage (25%), local transport (9%), recreation and entertainment (6%), shopping (24%) and other activities (4%). Tourism-related employment across the subsectors travel, shopping, entertainment, accommodation and meals is not distributed according to the distribution of expenditure on these items. The hotel and catering sector is particularly labour intensive and is likely to account for over 50% of tourism industry employment even though it only generates about a third of the expenditure.

The diversity and the fragmented nature of the tourism industry in the EC is a disadvantage when collecting and aggregating statistics, particularly on the individual subsectors. Discussions to develop a "Standard International Classification of Tourist Activities" (SITCA) are currently in progress between Eurostat and the World Tourism Organisation.

Main indicators

Revenue from international tourism in all EC countries represented 76.2 billion ECU in 1989, equivalent to 1.6% of EC GDP. Official data on domestic tourism is less easily available

Figure 2: Tourism
Value added in travel and tourism, 1990



Note: results for Portugal and Hellas not available
Source: The WTTC Report, 1992

Table 1: Tourism
Tourism revenue and employment by Member State

(billion ECU)	GDP (2)	International tourism revenue (3)	International revenue/GNP (%) (3)	All revenue (%) (4)	Tourism employment/ total employment (%) (4)
Belgique/België (1)	145.0	2.8	1.9	3.0	3.9
Danmark	95.0	2.1	2.2	4.5	5.3
BR Deutschland	1 080.0	7.9	0.7	4.6	5.2
Hellas	49.0	1.8	3.7	7.3	7.2
España	345.0	14.8	4.3	9.4	9.3
France	870.0	15.0	1.7	9.0	6.9
Ireland	31.0	1.0	3.1	6.2	6.3
Italia	787.0	10.9	1.4	4.5	6.4
Nederland	203.0	2.7	1.4	1.3	2.3
Portugal	41.0	2.5	5.7	6.0	8.6
United Kingdom	760.0	10.2	1.4	4.0	6.0

(1) includes Luxembourg
(2) 1989
(3) 1990
(4) 1991
Source: Eurostat

and not easily aggregated across EC Member States. However, with the exception of the Benelux countries, Eurostat estimated that all tourist activity generated over 4% of GNP in each Member State in 1988 and as high as 9.4% in Spain, indicating that domestic tourism expenditure is even more important than international receipts.

Data from the European Travel Intelligence Centre indicates that in volume terms domestic travel is the more important, with only one in five trips across Europe being to foreign destinations. The proportion for EC Member States only, however, is likely to be higher.

Many of the businesses that comprise the EC tourist industry are characterised by a high proportion of casual and family workers, many of whom escape the official statistics. Employment is also highly seasonal which distorts the information available. Within the tourism sector, up to 3.3 million full-time and part-time workers are employed in the hotel industry, which makes it the biggest single employer in the EC. The hotel sector is a particularly important employer of female staff and part-time and temporary workers. Part-time workers form 20% to 30% of the total workforce in the sector, depending on the Member State.

Table 2: Tourism
Employment in tourism amd travel, 1990

	Employees (thousand)	% of total industry employment
EC 10	14 000	10.2
Belgique/België	504	13.4
Danmark	219	8.4
BR Deutschland	1 833	6.6
España	766	6.1
France	1 700	7.7
Ireland	109	10.2
Italia	2 765	13.2
Luxembourg	23	0.6
Nederland	533	8.7
United Kingdom	2 747	10.2

Source: WTTC Report, 1992

Comparable data on the economic contribution of travel and tourism in the different EC Member States, and other European and non-European countries, is available in the latest World Travel and Tourism Council (WTTC) report "Travel & Tourism in the World Economy". Its contribution to European and world economic growth is considerable whether measured in terms of total sales, value added, capital investment, tax contributions, or employment.

According to the WTTC Report 1992, travel and tourism is Europe's largest industry, directly employing around 14 million people in the EC. The industry sells for an estimated worth of 600 billion ECU a year for the EC. It generates a value added of 290 billion ECU, equivalent to around 6% of EC GDP. The WTTC also estimates that annual growth in gross output of the tourism industry in West Europe averaged 10.4% from 1987 to 1990.

Recent trends

International tourism in the EC grew rapidly during the second half of the 1980s. In the 1985-90 period the value of international tourism expenditures by EC Member States increased by 70% to 77.5 billion ECU. The fastest growth in expenditures is evident in emerging markets of southern Member States, particularly Italy, while growth was slower in the more mature northern Member States. Receipts from international tourism in EC Member States grew more slowly from nearly 58 billion ECU in 1985 to almost 80 billion ECU in 1990.

International comparison

While international tourism expenditures by, and receipts for, EC Member States are much higher in both absolute and relative terms than the USA or Japan, to some extent this reflects the greater multiplicity of international borders and contiguous countries in the EC. Using World Tourism Organisation (WTO) arrivals data, there were eight European countries ranked among the top ten international destinations in 1990. Five of these were in the EC: France (first), Spain (third), Italy (fourth), United Kingdom (seventh) and Germany (eight). Similarly five of the top ten tourism spenders were also EC Member States.

While Europe remains by far the world's most popular destination for international tourists, it has been steadily losing market share through most of the 1980s. Preliminary data for 1991 shows a further sharp drop, although the effects of the Gulf War and the economic recession in major markets suggest 1991 was an atypical year.

Table 3: Tourism
Main indicators for tourism and travel at current prices

(billion ECU)	1985	1986	1987	1988	1989	1990	1991	1992
International receipts	57.9	57.3	60.6	65.1	71.5	79.5	83.0	88.0
International expenditures	45.5	50.2	56.6	62.9	68.6	77.5	82.0	86.0
Hotel guest nights (thousand)	547	557	569	582	600	615	600	620

Source: Eurostat and Fitzpatrick Associates

The WTTC 1992 report estimates that one out of every ten workers in the EC are employed in the tourism sector compared with one out of 13 in other countries of Western Europe and one out of 12 in Eastern Europe. These figures compare with one in 15 worldwide, one in 13 in North America, and one in 10 in Japan.

Foreign trade

There are no official statistics comparing extra-EC tourism revenue and expenditure, although it is apparent that both have been growing in recent years. The most important markets for tourism into the EC are the EFTA countries, Japan and the USA. Long-haul travel out of EC origins, in particular to the Far East and to North America, has increased substantially in recent years. For example, between 1985 and 1990 arrivals in the USA from the EC's four major tourism generating countries - Germany, United Kingdom, France and Italy - increased from 7.6 million to 13.6 million. In absolute terms Austria and Switzerland are the most important extra-EC destinations, particularly for Germans - there were an estimated 12.7 million West German arrivals in these two countries in 1990.

The importance of international tourism varies widely across Member States. In absolute terms the most important destinations are France and Spain which respectively account for 20.7% and 20.6% of all tourist receipts in the EC. Italy and the United Kingdom are also major destinations in absolute terms. Some Member States are more reliant on tourism than others. The less developed countries (Portugal, Spain, Greece and Ireland) all depend on international tourism to generate more than 3% of their GDP, compared to an EC average of 1.6%. Similarly, tourism receipts generated almost a quarter of exports in Spain and Greece.

As an import, tourism is most significant in the balance of payments of Germany and Denmark where its share of goods and service imports is around 8% against an EC average of 5%. Germany accounts for over one third of the total international tourist expenditure of EC members while the United Kingdom and France are the other important spenders. In per capita terms, Denmark, Belgium/Luxembourg and Germany top the list of spenders. Thus, international tourism is re-distributive of wealth within the EC in that the industry generally makes a net positive contribution to the balance of international payments for the poorer Member States, including Ireland as well as the Mediterranean countries and a net negative contribution to the accounts of the richer northern Member States.

Expenditure on international tourism as a proportion of private final consumption was highest in Denmark, but was also high (in excess of 4%) in Ireland, the Netherlands, (West) Germany and Belgium-Luxembourg. It remains particularly low, despite recent growth, in Spain, France and Portugal.

MARKET FORCES

Demand

The demand for holidays is influenced by a variety of factors which affect the decision whether to take a holiday, what type or length of holiday and where to take it. The most important of these factors include: income, particularly the level of discretionary income; available free time; age and family circumstances; comparative price levels in different destinations; attractiveness of other destinations; profession (particularly farmers and the self-employed); and second home ownership.

Table 4: Tourism
World top tourism spenders, 1991 (1)

	Total expenditure (million ECU)	Rank	Per capita expenditure (ECU)	Rank
USA	34 195	1	136	20
BR Deutschland	25 545	2	404	11
Japan	19 324	3	157	19
United Kingdom	13 554	4	236	15
Italia	10 734	5	186	16
France	9 958	6	177	18
Canada	7 245	7	274	14
Nederland	6 215	8	416	9
Switzerland	5 311	9	798	2
Austria	5 196	10	673	3
Sweden	5 040	11	586	5
Belgique/Luxembourg	4 474	12	454	7
Mexico (1990)	4 341	13	50	24
España	3 656	14	94	21
Australia	3 133	15	183	17

(1) Preliminary estimates. Figures have been rounded which causes some distortions
Source: World Tourism Organisation (WTO)

Table 5: Tourism
Regional shares of international tourist arrivals

(%)	1980	1985	1990
Western Europe	55.0	56.9	52.4
Eastern and Central Europe	13.9	9.3	11.3
Africa	2.5	3.1	3.4
America	18.9	18.3	18.8
Middle East	2.0	2.5	1.9
Asia and Pacific	7.8	10.0	12.2
World	100.0	100.0	100.0

Source: World Tourism Organisation (WTO)

The percentage of the population which takes at least one trip a year of one night or longer away from home is about 60% in Europe overall, but the level of trip-taking varies widely from country to country, ranging from as high as 87% in Iceland to 51% in Portugal, and even lower in the countries of Eastern Europe. The proportion of Europeans who take a leisure or business trip abroad tends to be considerably lower, ranging from 62% in Luxembourg to 13% in Portugal. The average share of all Europeans who travel abroad is around 26%. However, the level of travel abroad is actually higher than domestic travel in some markets, notably Belgium, Luxembourg, the Netherlands and West Germany. The vast majority of trips made by Europeans abroad are to neighbouring destinations, another reason for their high level in the Benelux countries. Domestic travel also tends to decline in favour of foreign travel as the market becomes more travel experienced.

The level of trip-taking is very much affected by income, educational and social status. Those with high disposable income tend to travel more frequently, rather than limiting themselves to just one trip per year. In addition, business travel - which is becoming increasingly important in these markets - is usually much more frequent than leisure travel. Northern Europeans are by far the most enthusiastic outbound travellers, especially those for whom foreign destinations are quickly and easily accessible by private car or other surface transport.

The level of trip-taking is much lower in southern Europe. The Mediterranean countries are popular holiday destinations in their own right, offering plenty of sunshine and opportunities for beach holidays, which are still the favourite choice of holidays for the majority of Europeans. In addition, southern Europeans have traditionally spent their main summer holidays in their own countries. Traditions are changing, as witnessed by the growth in outbound travel from a number of the southern European markets over the past few years. In the less mature European markets, the cost of travel is also an important deterrent to foreign holidays.

Table 6: Tourism
Trip-taking in the EC, 1990

(%)	Level of trip-taking (1)	Proportion of foreign trips
España	76	6
Nederland	74	32
Belgique/België	67	60
United Kingdom	67	22
Luxembourg	65	67
BR Deutschland	64	48
Danmark	63	28
Ireland	63	22
Italia	61	13
France	58	15
Hellas	56	10
Portugal	51	10
EC average	60	21

(1) Proportion of adult population taking a trip of at least 1 night away from home
Source: European Travel Intelligence Centre

In general, the level of holiday-taking rises more than proportionately with income. Results of a recent survey by Mintel into European lifestyles indicate that expenditure on holidays and home improvements predominate, if respondents' disposable income were to rise by 25%. High income generating countries also tend to be high tourist generating countries, of both the domestic and overseas varieties, although low income generally reduces the propensity of tourists to travel outside their own countries.

Similarly trends in international holiday-taking are closely linked to economic growth patterns in origin countries, often with a lagged effect into the following year. A recent Economist Intelligence Unit (EIU) report ("International Tourism Forecasts to 1999") estimated that for most countries about 90% of all fluctuations in travel growth rates around the long-term average can be "explained" by the relative cost of travel abroad and fluctuations in income growth rates.

The World Tourism Organisation (WTO) has identified a number of "mega-trends" which it expects to influence tourism demand, in the absence of a major catastrophe, over the next decade. These include a significant increase in long-haul tourism, a continuation of the growth of air travel unless rail travel is modernised quickly, a faster growth of organised travel compared with individual travel, an expansion of late bookings and bargain-hunting, an increase in hotel occupancy, greater short-break tourism especially that related to business travel, less day tourism as leisure time outstrips economic growth and, finally, an increase in special interest tourism. However, large segments of the travel trade still over-concentrate on a few mass markets and largely sun oriented products, leaving ample scope for further marketing of alternative tourism products.

More free time has also contributed to the growth of the tourism industry. In all EC countries collective arrangements ensure at least four weeks holidays for the majority of workers, with a further 7 to 14 days public holidays. In comparison with 15 to 20 years ago, this represents a substantial increase in the proportion of time available for vacationing. Along with rises in average incomes, this increase has contributed significantly to the growth of the European tourism industry, through an increase in second holidays and short-breaks as well as through a greater incidence of holiday-taking. Growth in incomes has also led to increases in the number of second homes. In Greece, Spain, Italy, the Netherlands, Denmark and France, over 10% of holiday-makers use second homes for holiday accommodation. Generally, the acquisition of sec-

Table 7: Tourism
Travel abroad from EC Member States by length of stay, 1990

	Short trips (1) (% of total)	Long trips (% of total)	Mean length of stay (days)
EC	28	71	9.1
Belgique/België	69	31	8.2
Danmark	25	75	7.2
BR Deutschland	22	78	10.0
Hellas	19	81	10.6
España	32	68	8.7
France	22	78	11.1
Ireland	16	84	11.7
Italia	N/A	N/A	N/A
Luxembourg	18	82	10.7
Nederland	27	73	10.0
Portugal	36	64	9.8
United Kingdom	16	84	10.9

(1) trips of 1 to 3 nights in length
Source: European Travel Intelligence Center, European Travel Monitor Luxembourg

ond homes indicates a reduced propensity to spend on conventional holidays abroad with most second homes being in the same country. However, the EC is in the process of drafting new proposals to harmonise laws relating to time-shares and second homes across Member States. This should lead to an increase in the proliferation of second homes owned in Member States other than ones own.

Short-breaks and second holidays not only tend to be taken in the off-season, but the growth in these supplemental breaks, as the number of vacation days available increases, appears to lead to a slight shortening in the duration of the main peak-season holiday. Short breaks accounted for 32% of foreign trips in Europe in 1991, compared to 28% in 1990. Short leisure breaks accounted for 19% of all international trips in 1991, up from 14% in 1988. The implication of this trend is that seasonal variation in holiday-taking will be reduced and growth in tourism expenditure can take place with relatively low additional capital investment.

Travel statistics often distinguish between "pure" holiday travel, visiting friends and relatives (VFR) and business travel. Business related travel is probably the fastest growing segment of the travel market. General business travel is not usually regarded as part of the tourism industry, although it is probably the most important component of airline and hotel demand. Business travel is determined by factors such as the level of economic activity rather than being influenced by the marketing and product development activities of the tourism industry. Expanding niches within the business market can, however, be regarded as tourism-related: incentive travel in particular, but also conferences and extensions to business trips which incorporate a strong leisure element.

The rapid growth of the tourism industry in Europe slowed substantially in 1991, as a result of a variety of factors including the Gulf War, unrest in the Balkans and recession in some of the major originator countries such as the United Kingdom, the USA and Australia, with the Japanese long-haul market also depressed by the wealth effects of the stock market decline. Thus, the major slowdown was in the lucrative long-haul market, where advance bookings were particularly affected by the Gulf War. In contrast, however, domestic and short-haul tourism in Europe was less affected as tourists, rather than forego their vacation plans, travelled to destinations closer to home.

Weather is an important factor in almost all "pure" holidays. Alongside institutional factors such as the timing of school and work holidays and long-standing traditions, the importance of the weather has contributed strongly to tourism long-standing problem of seasonality. However, there are changes in traditional patterns taking place which indicate that holidays are becoming more evenly spread (both across time and countries) and that there is scope for further spreading. These changes include a greater awareness of health issues and of the dangers of too much sun, resulting in a reduction in beach holidays and greater interest in sport and educational holidays. Furthermore, additional short-breaks and second holidays are generally spent in one's own or a neighbouring country. Finally, changes in the traditional north-south mass market package holiday pattern are taking place, because southern Europeans are becoming wealthier and travelling more, because business travel flows have increased and because a variety of factors combining to change the holiday patterns of northern Europeans.

Changes in population age structure also strongly influence the nature, incidence and timing of holidays during the 1990s. Traditionally those aged over 55 have been less likely to take a holiday than most other age groups. Thus, the ageing of Europe's population might be expected to result in a reduction in tourism demand, but there is strong evidence to suggest that the over 55s tourism market will be among the most lucrative tourism market segment over the next decade.

The USA has a population of 250 million people, many with a European heritage which is frequently utilised as a major marketing tool to attract US travellers to Europe. While it is also one of the world's largest and most active travel markets, a high proportion of travel is domestic. In 1988 out of an estimated 12 billion trips, only 14.4 million were to overseas

Table 8: Tourism
Trip-taking by EFTA countries, 1990

(%)	Level of trip-taking (1)	Proportion of foreign trips
Iceland	87	11
Finland	83	14
Norway	79	18
Sweden	79	15
Switzerland	75	41
Austria	59	34
EFTA average	77	22

(1) Proportion of adult population taking a trip of at least 1 night away from home
Source: European Travel Intelligence Center

destinations, just over half of them to Europe, mainly to EC countries. Europe's share of USA outbound travel has fallen in recent years. While the volume of US overseas departures increased substantially during the late 1980s, Europe's share has remained largely stagnant since 1985. It has fallen particularly sharply in 1991 as a result of a combination of factors including the impact of the Gulf war, the weak USD and the economic recession. This decline highlights the volatile nature of the US market which is particularly susceptible to exchange rate fluctuations and political developments. A similar demand trough was experienced in 1986.

The outlook for US travel to Europe, leaving aside volatility aspects, is for some, but not rapid, growth. Factors which could potentially constrain the growth of US travel to Europe include: the declining share of the population that could be characterised as having a "European heritage"; southward and westward geographical shifts of the US population; and lack of discretionary income and time in the fastest growing population segments (people in their late 30s and 40s who are tied down by high interest rates and dependants).

Business travel between the USA and Europe should continue to grow alongside the growth in international trade of goods and services, while ongoing moves promoting closer European unity will both stimulate business as US companies seek to assert their presence in the market and streamline travel by easing airline regulations and border controls. On the supply side, developments such as the growing importance of strong US carriers (United and American Airlines) in the airline sector and increased liberalisation will put downward pressure on fares and widen the number of US cities with direct access to Europe. Much the same factors affecting the demand for US travel to Europe in the 1990s are also affecting Canadian demand - decline in the relative size of the older population age-groups, population increases in the 1970s and 1980s being driven by non-European immigrants and population shifts towards British Columbia in the west.

Japanese outbound travel expanded very rapidly during the second half of the 1980s, doubling between 1985 and 1990 to over 1.1 million trips, and falling back in 1991. Europe's share of this growing total remained stable, with the exception of 1991. It occupied a third place behind destinations elsewhere in Asia and in North America. Like all long-haul travel, Europe bound travel from Japan is sensitive to fluctuations in economic growth and to fears about security. These factors are reflected in the decline in European arrivals from Japan in 1991, but this should only be a temporary interruption of continued growth. The factors behind the growth of international tourism out of Japan during the 1980s should continue to operate in the medium term. These include: growth in Japanese incomes; greater availability of leisure time and a change in attitudes to leisure and work across demographic groups; changing attitudes to overseas travel among the Japanese, aided by the appreciation of the Yen; links between overseas travel and Japanese overseas investment; government initiatives including overseas travel promotion campaigns, easing of restrictions, the use of fiscal incentives, air transport policy and the campaign against workaholism; and, promotions by EC tourist agencies.

The EFTA countries are also important source markets for EC tourism. In general they are relatively mature markets with similar demand characteristics to the more affluent EC Member States. The level of trip-taking is high, particularly the proportion of foreign travel. In 1990, the WTO ranked Switzerland, Austria and Sweden 9th, 10th and 11th, respectively, in the world in terms of expenditure on foreign travel. However, in common with many EC Member States, long-haul travel out of Europe by residents of EFTA countries is likely to increase during the 1990s.

Table 9: Tourism
Capital investment in travel and tourism, 1990

	Capital investment (billion ECU)	% of total industry investment
EC 10	73.8	7.2
Belgique/België	3.2	13.1
Danmark	1.3	8.1
BR Deutschland	18.2	9.5
España	5.0	7.0
France	8.6	5.5
Ireland	0.4	8.7
Italia	9.0	6.8
Luxembourg	0.2	0.5
Nederland	3.0	7.8
United Kingdom	8.5	6.6

Note: Results from Hellas and Portugal not available.
Source: The WTTC Report, 1992

Supply and competition

Supply is in general more than adequate to meet demand. There is clearly no shortage of travel agencies or tour operators from which to choose. The suppliers of the travel and tourism industry, i.e. airlines, hotels, etc., are cyclical industries and this can have repercussions on the availability of seats and rooms, particularly at peak seasons. On balance, consumers are in a buyer's market and this is reflected in price-setting and margins.

Production process

The main inputs of the industry are accommodation in a variety of forms (hotels, holiday villages, self-catering villas and apartments, caravans and campsites, entertainment facilities, and seats on aircraft, trains, coaches and rental cars). All services must meet the quality expectations of an industrialised world consumer market, although there is scope for a wide range from hotels without star to five star hotels and a similar range of transport options. There is constant demand for quality improvements at every level.

Almost all sectors of the tourism industry are labour intensive. Female participation is high, with percentages of between 45% and 65% in most Member States. The only exceptions are Spain and Greece where female participation falls to about a third. Employment of short-time and seasonal staff is also high. There is an overall correlation between the country's level of development and the annual working hours in the tourism sector with Germany and Portugal as the two extremes (under 1800 hours and over 2000 hours respectively).

The employment pool of young workers will shrink in the near future. The expected increase in the mobility of labour within the EC may help to alleviate the problems of regional shortages of skilled staff, but worries about labour shortages remain. One of the most serious threats to the hotel and catering sectors is that harmonisation of labour conditions will push up costs and prices in certain countries. There is currently a wide divergence, not only in weekly working hours, but also in wage rates. These differences in length of working week will have an effect on how labour is ultimately redistributed. Some of the labour shortage may also be compensated for by increased productivity and technological advances. Considerable new technology has been introduced into all segments of the tourism industry in recent years. However, the general impact has been on improved quality of service rather than on labour content reduction.

INDUSTRY STRUCTURE

Companies and strategies

Estimates by the World Travel and Tourism Council indicate that investment in the tourism industry in the EC in 1990 was around 74 billion ECU, equivalent to around 12.6% of gross output, although investment levels, despite the development of Euro-Disney, are likely to have fallen sharply in the more pessimistic climate of the early 1990s. While continued growth in investment in tourism infra-structure can be expected in the medium term, it is likely to be slower than during the second half of the 1980s. Opportunities for investment will be provided by the moves towards greater economic integration within the EC, accompanied by the expansionist trends of most of the major players in the tourism industry. However, most investment is likely to be in product development and in additions to existing infra-structure rather than in greenfield investment. Thus, the high level of take-overs, mergers and inter-selling of tourism assets and management contracts between major players in the industry can be expected to continue over the next few years.

In many of the less developed Member States EC structural funds provide an important boost to tourism investment. The increasing importance of EC wide legislation in areas such as environment, health and safety, competition policy and in tourism itself will also influence investment trends. In particular closer attention is being paid to environmental sensitivity in the planning of major new investments. The opening up of Eastern Europe will provide opportunities for investment outside the EC, but it is likely that the funds diverted to the east will be mainly from developing resorts outside Europe rather than from the EC. Investment in tourism infra-structure in eastern Europe is already quite high - the WTTC estimated 1990 investment at 76 billion USD, 81% of EC investment. The European Commission's strong policy focus on the opening of new markets through alternative forms of tourism (rural tourism, cultural tourism, youth, third age and social tourism) will also provide opportunities for new developments. The Commission's efforts to reduce the consequences of mass tourism, which they expect to become more acute in the next few years, through endeavouring to spread holidays over the year, will also open some new possibilities for the EC industry. There has already been considerable investment in new products aimed to both capitalise on the demand for new forms of tourism rather than beach holidays and to improve the spread of arrivals through the season.

REGIONAL DISTRIBUTION

The tourism industry has traditionally been regionally concentrated, generally in seaside or mountain regions. In Spain, for example, 30% of international tourists visit Catalunya while the Mediterranean coast is one of the high tourism generating regions within France, Emilia Romagna in Italy, the islands in Greece and Algarve in Portugal. The major European cities also tend to be magnets for tourism concentrations, in particular London, Rome and Paris.

ENVIRONMENT

There is a strong inter-relationship between tourism and the environment. On the one hand the environment in all its aspects (clean air and water, uncongested core areas of historic cities, thriving wildlife habitats, healthy indigenous cultures, etc.) are all key tourism resources, and often undervalued. On the other hand, growth in tourism has already contributed to deterioration of these assets and can potentially contribute to further degradation. Excessively concentrate growth in tourism has already contributed to destructive depletion of ground water reserves, elimination of coastal vistas, destruction of habitat for rare species, disruption of nature, destruction of historical buildings and so on. For example, water discharges from activities along the Mediterranean coast has had serious effects on, among other things, the bathing water for the 100 million tourists visiting the Mediterranean every year.

Europe's mountains are among the most threatened wilderness, mainly due to the rapid growth of skiing activity. Artificial snow machines, requiring millions of litres of water, make sudden changes to the water levels in feeder lakes and disturb the biological sediments in the lakes. Increased bed capacity affects local resources of small mountain villages. These must quite suddenly meet increased demand for water, sewage disposal (a large number of rural communities throughout Europe do not yet have structured sewage treatment facilities), communications (television, mail, telephone), and fast roads offering attractive transfer.

Two broad types of environmental impact with which the tourist industry must be concerned were identified in a recent report on Tourism and the Environment by the Economist Intelligence Unit (EIU). Destructive tourism, where the industry itself causes damage to the environment, includes overcrowded beach resorts in Mediterranean coastal areas lacking adequate infra-structure to deal with resultant 'loads, overvisited cultural sites leading to destruction of artefacts, and damage to alpine mountain areas from over development of ski-resorts. Anti-tourism development, on the other hand, relates to destruction of the environment by other industries which impacts negatively on the tourism industry. Examples include the impact of acid rain on forests and closure of beaches due to radioactivity or oil spills. Leaving wider environment considerations aside momentarily, tourism may continue, and in many cases has continued, to flourish despite environmental deterioration. A "shear" point exists, however, where the attractions of certain products will falter because of risen visitor aspirations or of the extent of destination deterioration.

However, industry umbrella groups, many national tourism organisations and the EC Commission are responding to the problems posed by environmental issues. The response from operators, however, is relatively muted, to some extent reflecting the small size and short-term horizons of most operators. Greater concern for environment issues is evident among many of the larger hotel groups.

In its 1990 report, the world wildlife fund, referring mainly to conservation of natural areas, accused the tourism industry of being slow to get involved in beneficial environmental projects. The flexibility with which large tour operators, airlines and even international hotel chains can shift between destinations enables them to take a more casual stance than would be justified by the long-term implications of their actions.

In preparation of the Earth Summit in Brazil, the World Travel and Tourism Council and six other umbrella organisations jointly collaborated to provide information on tourism's potential to enhance the environment.. The WTO has also developed twelve environmental rules which have been adopted by the industry organisations. These include:

- identify and minimise product and operational environmental problems, paying particular attention to new projects;
- pay due regard to environmental concerns in design, planning construction and implementation;
- be sensitive to the conservation of environmentally protected or threatened areas, species and scenic aesthetics, achieving landscape enhancement where possible;
- practise energy conservation;
- reduce and recycle waste;
- practise fresh-water management and control sewage disposal;

- control and diminish emissions into the air;
- monitor, control and reduce noise levels;
- control, reduce and eliminate the use of environmentally unfriendly products such as asbestos, CFCs, pesticides and toxic, corrosive, infectious, explosive or flammable materials;
- respect and support historic or religious objects and sites;
- exercise due regard for the interests of local populations, including their history, traditions, culture and future development;
- consider environmental issues as a key factor in the overall capacity development of travel and tourism destinations.

The EC Commission has used channels other than legislation to help improve the environmental record of Member States. These include financing of more environmentally-friendly product development through the Community Support Framework, funds for improving infra-structure in coastal resorts through programmes such as ENVIREG. The Tourism Unit of Directorate General XXIII is currently funding a research study on tourism and environment, and has also recently sponsored 23 practical pilot projects on "sustainable tourism". Campaigns and policies aimed at improving the seasonal spread of tourism arrivals also contributes to the amelioration of the potential damage of tourism on the environment.

Public awareness of environmental issues in relation to tourism are increasing, putting pressure on many segments of the tourism industry to react. A survey of German tourists by the Studienkreis für Tourismus indicated that the importance of environmental concerns among German tourists had more than doubled over the period 1985-88. Awareness centred mainly on environmental problems such as bathing water and dirty beaches, which had a direct impact on holiday enjoyment. These concerns have been reflected in changing tourism tastes and in product development. Two poles of "environmental" tourism can be identified. Firstly, there has been growth in various forms of agri-tourism or nature-based tourism which generally involves tourists taking holidays in uncrowded, generally rural areas rather than in the more popular and, in high season, often overcrowded conventional tourism resorts. Properly managed this type of tourism generally does little or no damage to the environment and in most cases is "environmentally sensitive" in that it depends quite strongly on the quality of the environment if it is to be sustained. At the other end of the eco-tourism spectrum are holidays which are deliberately designed not only to capitalise on environmental attractions but also to put minimum stress on the environment and to reduce the consumption of natural resources to an absolute minimum. The EIU report asserts that environmental consciousness is not a fashion which will pass, but one which will grow in strength and predicts fivefold growth in environmental tourism during the 1990s. On this basis the competitiveness of European destinations is likely to suffer as there are relatively few undisturbed natural areas remaining in Europe by comparison with the other continents.

Nature and adventure travel are among the fastest growing sectors of the tourist industry. The emergence of "ecotourism" or nature tourism coincides with the still increasing concern with environmental issues among people in general and in politics. Three holiday-maker types, who in increasing amounts are involved in nature and environment can be distinguished: the open air holiday-goer; the nature lover; and, the nature investigator. The contents of the product is mostly defined by a variety of nature oriented possibilities, in which relaxing and simply being in nature are most important to the holiday-maker. Social, cultural and historical aspects are of minor importance.

The first group consists of consumers with no interest in environmentally conscious forms of tourism and consequently definitely not in nature oriented recreation. Around a quarter of the tourists belong to this group. The second group, best described as nature lovers or open air holiday-makers, are interested in general nature oriented activities such as exploring by foot or bike, and making long beach, mud flat or nature walks. It is a fairly amorphous group, characterised by a certain limited amount of environmental awareness which also shows up in their needs for tourism/recreational supplies which satisfy an amount of criteria concerning environmental consciousness. This group can choose from a wide range of tourism recreational supplies which in some way meets these satisfactions. Over 60% of these consumers belong to this group. The third group, nature investigators, attach value to nature oriented activities (conducted forest walks, nature lectures, observing flora and fauna, etc.), besides the above mentioned activities. Their choice of tourism/recreational supplies are obviously more restricted. They visit nature parks, historical parks and gardens, bird sanctuaries, cultural historical monuments, campground accommodations in nature and visitor centres. Almost 10% belong to this group.

If managed properly, ecotourism allows travellers to experience cultures previously inaccessible, it brings revenues to remote regions and can contribute to making conservation economically viable. It is largely the presence of tourists that convinces national authorities to protect natural zones. A problem is of course that this huge demand to do "off-the-beaten-path" tourism to natural areas create a problem due to the fact that many natural parks are not yet equipped to benefit and to mitigate the negative effects.

REGULATIONS

A wide range of local, national and EC regulations impact on the tourism industry, although few are specifically designed with the tourism sector in mind. In particular, the industry's lobby groups having achieved favourable consideration in some aspects of the VAT and excise duty harmonisation process may now focus on derogations or special treatment in forthcoming Directives implementing the Social Action Plan - the tourism industry has a heavy reliance on low-paid, on female and on part-time workers. For this reason regulations on worker's residence permits and on the recognition of vocational qualifications across the EC are also of interest.

The tourism industry, particularly in Ireland and in the southern Member States have benefited considerable from EC-funded investment in recent years. Such investment has also been of benefit to rural areas and to declining industrial areas. Such granted aid has caused little concern in other service or industry sectors, nor has it attracted attention from competition authorities, since it is based on regional policy considerations.

Developments in consumer policy are about to have an increasingly important bearing on the tourism industry. The EC is presently developing a body of legislation aimed at improving protection for tourists. Areas covered include time share agreements, unfair terms in consumer contracts, distance selling, denied boarding compensation for airline transport, package holidays, rules governing computer reservations systems (CRS) and access to justice abroad. A directive exists on package holidays and Council has adopted a regulation establishing common rules for a denied-boarding compensation system in scheduled air transport. There are also regulations on the access to CRS and further measures are expected. The remainder of the areas mentioned are at earlier development stages.

The directive on package holidays comes into force on January 1, 1993, and is a cause of tension among different sections of the industry. It places liability for consumer compensation with tour operators, who complain that, apart from the directive containing ambiguous terminology, stricter hygiene and safety regulations should now be applied to the hotel sector. For

example, the regulations in the recommendation on protection of hotels against fire are non-binding. While the concerns of the tour operators are valid for some countries, in many Member States hotels are already subject to strict national and local legislation on health, safety and other hygiene requirements. It should also be noted that tour operators in some Member States are already required to lodge funds with national authorities in the advent that refunds to clients are required.

At present environmental regulations do not weigh heavily on the tourism industry. While planning laws are particularly strict in some Member States they are relatively lax, or inadequately applied, in others. Inspired by EC pressure this is already changing - for example, in some cases funding of tourism investment from the European Regional Development Fund in Greece has been threatened because of inadequate consideration to the environmental impact of certain developments.

OUTLOOK

The World Tourism Organisation (WTO) projects international tourist arrivals in the year 2000 to fall somewhere between 592 and 690 million suggesting an average annual growth rate in the 1990s of between 4.5% and 4.8%. Given the slowdown in tourism expenditure in recent years and the expected recovery in the world economy towards the end of 1992 and into 1993, a higher growth rate of close to 6% is expected over the next four years. However, it is also expected that EC Member States will continue to lose share, particularly of main holidays, to extra-EC destinations in the Far East and in Eastern Europe. This will be offset to some extent by continued growth in short-break holidays and growth in international tourism expenditures in the southern Member States.

Table 10: Tourism
Expected real annual growth rates

(%)	1992-93	1992-96
Turnover	5.0	5.0
Employment	3.0	3.0

Source: Fitzpatrick Associates, Economic Consultants

As a generating region for international tourism many West European countries may also come up against a ceiling limitation to foreign travel during the latter half of the 1990s. As a tourist receiving region western Europe is a mature destination with limited capacity to absorb ever-increasing numbers of tourists in its principal tourist attractions, a particular problem given the increasing concerns of tourists about congestion and over-crowded resorts.

Written by: Fitzpatrick Associates

Restaurants
NACE 661

The restaurant sector includes a diverse range of establishments from fast food take-away to haute cuisine. Rising levels of disposable incomes and greater female labour force participation, alongside changing tastes and increases in tourism expenditures have all contributed to a steady increase in restaurant revenues. Entry and exit barriers are relatively low with the result that the industry is predominantly populated by small independent establishments, although the rapid growth of fast food chains, particularly franchise outlets, has provided a high degree of uniformity in that subsector. While the use of new technology, mainly in food preparation, has been increasing attraction, the retention of workers is a growing problem in many Member States. The outlook for the industry is, however, relatively buoyant and the factors which have driven recent growth should continue to operate in the 1990s.

INDUSTRY PROFILE

Description of the sector

Among the most vibrant and visible commercial sectors of the EC, restaurants are present in virtually every local community. As a sector, restaurants are important to the EC economy and to those of its Member States, but they play their most significant role in their contribution to the local economy of almost every village, town and city in the EC.

There is substantial variation within the restaurant sector, from fast food outlets to high class restaurants, providing very different markets with a variation of the same service, the provision of ready to eat food. Most restaurants are stand alone operations, although some are an integral part of the services provided within other sectors, principally hotels but also including public houses, railways, ferries and night-clubs. There are also other service branches specialising in the provision of food including contract caterers, work canteens and messes and convalescent homes. However, while the type of operations are diverse, the sector is dominated by family restaurants.

There is a fine distinction at the margin among the sub-segments of the restaurant industry. Unlike hotels, most grading of restaurants tends to be unofficial, often relatively subjective and generally only applies to the top end of the market.

Main indicators

Eurostat statistics on restaurant turnover exists for only 8 EC countries and is particularly dated in the case of Denmark. Restaurant turnover has increased in recent years, continuing on an upward trend which is already well established, although there are variations across different Member States. Within this overall increase, turnover in the fast food and take-away sector has been growing most rapidly, although again there are substantial variations across countries with meals in bars and public houses showing the fastest growth in both the United Kingdom and Ireland. Surveys undertaken by Foodservice Consultants Society International (FCSI) across ten European countries appear to indicate little restaurant turnover growth during 1991, but with a slight upturn towards the second half of the year.

Also data on official employment in the restaurant industry is available for only a limited number of EC Member States. The evidence indicates that the trend in employment is upward but increasing much less rapidly than turnover. However, the FCSI survey results suggest that employment fell somewhat during 1991, reflecting relatively poor turnover performance, but that most respondents were optimistic about increasing employment numbers during 1992.

Restaurant services are not internationally traded although an important market for their services are foreign visitors on holidays or business trips. Estimates for expenditure by tourists on food vary from 20% to 25% of their total expenditure.

MARKET FORCES

Demand

The demand for restaurant services is influenced by a variety of factors including disposable incomes, demographic factors, changing consumer tastes and the level of tourist activity. The propensity to eat outside the home is most strongly, and positively, linked to increases in disposable income. As a result the general trend in demand for restaurant services in recent years has been upwards. Nevertheless, often seen as a luxury, private expenditure on eating out is vulnerable to dips in disposable income and the eating out market provides a good barometer of the economic climate, being one of the first industries to suffer from adverse developments in incomes or consumer sentiment. This is evident in the fall-off in the United Kingdom during 1990 and 1991. Overall, however, and reflecting this linkage, the proportion of total consumer spending on eating out has risen over the second half of the 1980s and it is estimated that the EC average is around 5%. The estimate hides substantial variations between Member States. In some cases these differences reflect the importance of the tourism sector, the proportion is above average in Spain and Portugal, while in others it reflects traditional attitudes to eating out. If the EC catering industry is to follow the USA, where it is often cheaper to dine in a fast food or family restaurant than to buy equivalent ingredients and cook at home, then the tendency for locals to choose to eat out on the basis of cost and convenience will become more es-

Table 1: Restaurants, snack bars, cafes and other eating places
Turnover at current prices

(million ECU)	1985	1986	1987	1988	1989	1990
Belgique/België	1 124	1 245	1 368	1 506	1 707	1 966
Danmark	1 459	1 582	N/A	N/A	N/A	N/A
BR Deutschland	N/A	9 298	N/A	10 637	N/A	N/A
España	N/A	N/A	N/A	N/A	11 655	N/A
France	8 088	8 663	8 714	10 448	N/A	N/A
Luxembourg	93	105	114	125	142	N/A
Nederland	2 135	2 276	2 400	2 550	2 805	N/A
United Kingdom	7 228	6 992	8 414	9 887	N/A	N/A

Source: Eurostat

Table 2: Restaurants, snack bars, cafes and other eating places
Number of persons employed

	1986	1987	1988	1989	1990
BR Deutschland (1)	267 570	288 538	302 582	307 114	323 832
France	264 692	258 697	292 591	N/A	N/A
Luxembourg	2 800	3 009	3 194	3 450	N/A
Nederland	75 104	79 758	86 900	92 200	N/A

(1) Wage and salary earners
Source: Eurostat

tablished. Already in the EC eating out has become both more commonplace and relatively less expensive.

The growth of tourism is clearly a major source of business for the consumer catering industry in the EC. Even when staying in self-catering accommodation the tourist tends to eat out rather than cook for himself; when staying in hotels and similar establishments there may be no choice but to go to restaurants and cafes. In common with many other companies who deal in the totems of popular culture, the large fast food firms view the relatively young and increasingly affluent populations of South Europe as providing the best prospects for continued growth in Europe in the 1990s. On the other hand the UK fast food market is regarded as stagnant with a decline in market share for hamburger and pizza restaurants which appear to have reached market saturation point. The main growth area in the United Kingdom during the 1980s, according to a recent report by Marketpower, was in meals served in public bars. Relatively rapid growth in demand for ethnic restaurants, particularly those with cuisine which is not well represented at present, is also expected across the EC.

The increasingly rapid spread of communications media, through satellite TV for example, aided by the growth of international tourism flows has accelerated the trend towards greater internationalisation of the restaurant market. Nowhere is this more evident than in the growth of US-type food outlets serving hamburgers and pizza. Increasing numbers of ethnic restaurants in many European cities are also appearing as internationalisation trends are coupled with increased confidence and a sense of experimentation of consumers. Conventional food service styles, products and concepts are being rendered obsolete by 1990s lifestyles. The youth market is dominated by fast food, but there are significant trends also towards, inter alia, health foods, pasta and the replacement of red meat and red wine by their white counterparts and by fish.

One exception to these trends is the resurgence of regional cuisine, especially in France and Germany. However, the overall trend is towards homogenisation, with the fast food-led multiples changing eating culture, even if France, Spain and Italy are working hard to preserve their own national culinary identity in the face of the US-inspired attack.

In cities and towns the national economy tends to influence the performance of restaurants. The performance of in-store cafeterias is closely related to the index of retail sales while unemployment, inflation, interest rates and other economic indicators all influence the performance of restaurants. While many meals consumed in restaurants are related to the working and travel patterns of customers, "dining out" is also an important leisure activity throughout Europe and as such is affected by the general levels of expenditure on leisure. Restaurants also compete with other leisure activities including cinema, theatre, home video and sports for the discretionary spending of the consumer.

Supply and competition

The key competitive factors in the restaurant industry are food quality, price and decor. Entry and exits barriers in the restaurant sector are negligible at most levels of the industry. As a result and because of the localised nature of competition in most cases, there is little danger of monopolistic practices emerging and strong competition is evident both within and across segments of the industry.

Take-away and fast food has been the main growth area in the European restaurant sector in recent years. US firms are providing the driving force behind this growth. Having expanded initially in the United Kingdom, they are now spreading throughout mainland Europe, where they are facing increasing competition from indigenous companies.

One of the critical issues facing the restaurant sector within the EC over the coming decade will be the availability of labour and the ability of the sector to compete with other industries in offering a worthwhile career to staff. Because it is dominated by family owned enterprises the concept of "employment" in much of the European restaurant sector is blurred. Very frequently husband and wife will work together in a restaurant and they may be helped by their children or other family members whose remuneration may be "in kind" rather than through cash payment. Throughout the EC, however, owners of family restaurants are discovering that their sons and daughters are being attracted into other areas of employment.

Where employment is regulated, pay and conditions in EC restaurants tends to be towards the minimum for each Member State. There are of course exceptions, but generally employment conditions in restaurants involve long and unsociable hours, relatively low levels of basic pay and a reliance by employees on gratuities and service charges. Pay and conditions tend to be best where agreements have been reached between employers and trade unions but these agreements also tend to be confined to the larger and more structured employers. Staff turnover in restaurants is high and there is a lack of structured training in several countries.

As demographic patterns develop and family sizes decrease, particularly in the northern Member States, the restaurant sector is likely to experience staff and skill shortages. This is already evident in the United Kingdom, Germany, Benelux, France and Denmark where restaurant chains are seeking to recruit part time workers, students and senior citizens as well as immigrants from outside of the EC. The problem is not as serious in southern Member States and it is possible that there will be migration of restaurant workers from Greece, Spain, Portugal and southern Italy to fill vacancies in northern Europe. However, such migration patterns in an increasingly integrated EC labour market is likely to add to pressures to improve wage and other working conditions in the less developed Member States.

Competition in the restaurant sector is similar to that in other services which are dominated by small individually-owned enterprises. The cost of entry to the business is relatively low and this encourages entrepreneurs to enter a local market,

particularly when restaurant business is seen to be growing. The establishment of restaurants is however governed by regulations in all Member States. These include the granting of planning permission, the certification of the premises by the local health authority and in some states the granting of license to sell alcohol. Generally regulations governing restaurants are not seen as barriers to competition, but the policy of some EC governments in relation to restaurant services along motorways could distort free competition in the market. The policy in Germany was the subject of dispute between McDonalds and GfnBAB which franchises motorway catering. Fast food outlets have traditionally sought to attract passing trade using "drive thru's" - Burger King, for example is improving its "drive thru" facilities by introducing the "video drive thru" which permits customers to see their order on a video menu as it is being placed. Future mergers to create national or supranational chains are also unlikely to distort competition in the sector.

Competition within the sector is complex and differs across market segments and locations. Price elasticity tends to be lower at the top end of the market where competition is based on reputation, image and a perceived high quality of food and service. These competitive criteria also exist in the broad segment of family restaurants in which marketing and advertising is rarely undertaken. Location is of course a key factor but ambience, quality of food and personality of the proprietor are also important. Price becomes a more important factor when the reputation of the restaurant is more confined to the local community.

While quality, image and location are important competitive factors in towns and cities, price takes on greater significance particularly in "in store" cafeterias and restaurants, in coffee shops and in the fast food sector. Overall the trend has been for prices to move in line with inflation but strong local competition has kept price increases below inflation in larger cities throughout the EC.

The relatively minor position of corporations and chains in the European restaurant sector and the American base of some major players make it difficult to comment on profitability. Statements from Hotrec, the EC hotel and restaurant association, and from national associations of restaurant owners indicate however that there has been a relatively high level of business failures among EC restaurants over the past decade and that the lack of expansion by the vast majority of restaurants reflects lack of profitability. For nine out of ten European restaurant owners the business is a "way of life" which is sufficient to provide a modest standard of living for a family. In the case of some of the major players such as the retail stores, restaurants provide a service which attracts customers and make a contribution to the overall profitability of the enterprise.

Production process

The preparation and service of food is labour intensive. The raw materials tend to be supplied in a fresh state, prepared by hand, cooked by traditional methods and served to diners at their tables. Pressures on the availability of skilled staff as well as high labour costs are however forcing the industry to look towards technology as a means of reducing unit costs. While progress in the area has been slow there are indications that automation and technology are playing a more significant role in the preparation of restaurant meals. These trends are most evident among restaurant chains and larger enterprises.

The bulk preparation of food and its storage under frozen or chilled conditions has been attractive to the catering industry for many years and has been practised successfully in hospital catering and in the provision of meals in industry and institutions. Frozen products, including meat, fish, potatoes and vegetables is used extensively in the fast food and "quick service" sectors and there has been a widespread development of freezers and regeneration cookers.

The chilling of foods after cooking and their service within a few days of chilling is also growing in popularity because of more efficient chilling and regeneration equipment. "Cook Chill" systems are now being used in cafeterias and in other popular restaurants in Europe as a means of reducing unit costs. The principal advantage of the "Cook Chill" system is that food can be prepared in batches to tight specifications and these "batches" can be used to compile meal menus. The ability to cook food in bulk and to "hold" it for several days has enabled restaurants using this system to reduce their staff requirement particularly at night or over week-ends.

Another system of cooking food in advance is *sous vide* which originated in France and is growing in popularity at all levels of the market. Under this system dishes, which can include delicate sauces, are cooked and preserved in a plastic pouch which is chilled, for regeneration prior to serving. The system has enabled caterers to expand their menu by having additional dishes under storage or chefs to prepare sauces in batches for use at a later date.

Electronic technology has assisted in the volume preparation of foods by offering greater control over traditional cooking media such as ovens and gas or electric ranges. The "combination oven" which can cook foods in several ways, is a product of this technology which has enabled designers to add "cooking cycle programmes" and electronic probes which measure temperature and moisture content of the food during the cooking cycle. Microwave ovens are also enhanced by electronic controls. Energy costs in restaurants are relatively high and this has led to greater emphasis on energy efficient cooking with the advent of halogen elements in electric ranges and induction cookers providing the most promising developments.

The choice of energy is a source of continuous debate within the sector with chefs traditionally expressing preference for gas because of its controllability while electricity is becoming increasingly competitive because of technological developments with energy-efficient cooking elements.

Some larger restaurants have installed computerised billing and stock management systems and there has also been considerable investment in electronic air conditioning and air recirculation systems.

The principal "stock in trade" of restaurants is food in a raw or semi prepared state. At all levels of the industry there is increasing demand for conformity to specification and continuity of supply. The "Quality" system has been employed informally by the vast majority of restaurateurs over the centuries and still works effectively today. It is based on a long term relationship between restaurateur and individual suppliers of meat, fish and vegetables. The butcher, fishmonger and vegetable supplier will invariably reserve their best quality stock for the local restaurant because of its purchasing power, the regularity of its demand and the product knowledge of the buyer.

Among corporate-owned restaurants, however, quality is achieved through more formal structures. Detailed specifications are drawn for each food item and there is a greater emphasis on partially processed or prepared foods which are frequently supplied in a frozen state. A growing number of corporate-owned restaurants now operate just in time systems similar to those operated by the manufacturing industry.

INDUSTRY STRUCTURE

Companies

While becoming increasingly dominated by big chains, as the growth in the fast food and take-away sector outpaces

average growth, all EC countries continue to offer an enormous range of family run restaurants and cafes that are central to the appeal and character of the industry. The increase in market share of the chains has, however, been at the expense of the traditional independently-run operations in addition to capturing overall market growth. The Marketpower study of the UK restaurant market also estimated that the catering market was becoming increasingly concentrated, with one in five private sector outlets either owned by a group, part of a consortium or operating as a franchise.

The sector includes chains of restaurants often owned and operated by conglomerates and multinational companies and it also embraces the fast food subsector which is growing rapidly throughout the EC and is largely controlled by American companies operating through local franchises. The largest catering group in the EC, McDonald's, fits this profile perfectly. Fast food restaurant chains are both multiple retailers and a production enterprise. In both the facets of their activities they have similarities with multinational multiple retailers and with multinational manufacturing enterprises. Like the retailers, expansion across national borders has occurred first and most substantially in the wealthiest EC Member States. Prominence is given to the names of the outlets and they are promoted and marketed like fast moving consumer goods. Alongside the name, uniformity of formula or format (decor, furnishings, staff uniforms, menus etc.) are key elements in the image and marketing of the chain, although concessions to national and local tastes are increasingly being made.

By far the most significant group of restaurants has little to do with corporations or "brands". Typically these restaurants which represent more than 90% of the sector across the EC, are family-owned and employ less than ten people, some of whom may be casual or part time employees. The local family restaurant tends to offer dishes based on local or regional cuisine. More and more this cuisine is offered outside of its country of origin. It is no longer unusual to find, for instance, restaurants serving Italian cuisine in France, Greek restaurants in the United Kingdom or French restaurants in Germany. A trend throughout Europe has also been the success of restaurants offering regional cuisine outside of their own regions - for instance Tuscany dishes in Veneto or the cuisine of Andalucia in Catalonia.

Family-owned restaurants span the full spectrum of dining out in Europe from simple take-away "fish and chips" shops in the United Kingdom to the award-winning restaurants of the famous French chef-patrons. The gourmet segment of the market is dominated by family-owned restaurants throughout the EC and in most countries it is the personality, reputation and skill of the patron who may be the chef or the maitre d'hôtel on which the success of the enterprise is based. Many such family-owned restaurants at the top end of the market are relatively large concerns employing up to 100 people and some, like the Roux Brothers in the United Kingdom and Paul Bocuse in France, have developed ancillary enterprises. More typical even at this level, however, is the restaurant serving 50 dinners each evening, owned and operated by a

Table 3: Restaurants, snack bars, cafes and other eating places
Top ten restaurant groups in Europe

Rank	Country of origin	Group	Country established	Branded outlets	Turnover (million ECU) 1990	1991	Number of outlets 1990	1991
1	USA	McDonald's	B,D,DK,E,F,GR,I, IRL,L,NL,P,UK	McDonald's	1 786	1 947 (1)	1 023	1 143
2	F	Casino		Cafeterias Casino, Aquarette, Blue Grill, Gariboo, Food Court Dune, Hippopotamus, Quick, Free Time	524	574	292	323
3	UK	Whitbread	D,F,NL,UK	Beefeater, Churrasco Henry's Cafe Bar, Pizza Hut, Roast Inns, TGIF	492 (1)	565 (1)	535	676
4	I	S.M.E. Sirea		Alemagna, Arabesque, Autogrill, Ciao Motta, Pizzico, Ferroviarie	614	466	340	N/A
5	UK	Grand Metropolitan	D,DK,E,F,IRL,NL,UK	Country Carvery, Burger King, Old Orleans	876 (1)	457 (1)	994	457
6	UK	Forte	D,UK	Happy Eater, Harvester KFC, Little Chef, Sbarro, Welcome Break, Wheelers	471	426	901	849
7	D	Lufthansa Service GmbH	D	Otto-Lienthal, Libelle, Intermezzo, Oase, Aerien	393 (1)	409	16	16
8	F-B	Wagons-Lits	B,D,E,F,NL	Eurest Relais Vander Heyden (traiteur) Aeroport, Ferroviaire Maritime	377	395	125	137
9	D	Bab Raststätten und Erfrichungsdienste Raststätten GFN	D	Erfrischungsdienste,	383	379	325	280
10	F	Accor	F,E	Actair, Arche, Arnos, Boeuf Jardinier, Caferoute, Gesario Courte Paille, L'Ecluse, Medas Pizza del Arte, Quick, Villa Pizza del Arte	342	367	321	350

(1) Estimate
Source: Néo Restauration

Table 4: Restaurants, snack bars, cafes and other eating places
Top ten fast food restaurants in Europe

Rank	Country of origin	Group	Countries established	Turnover (million ECU) 1990	Turnover (million ECU) 1991	Number of outlets 1990	Number of outlets 1991
1	USA	McDonald's (McDonald's)	B,D,DK,E,F,GR, I,IRL,L,NL,P,UK	1 786	1 946	1 023	1 143
2	United Kingdom	Burger King (Grand Metropolitain)	D,DK,E,F,IRL,NL,UK	386	389	334	363
3	France-Belgique/België	Quick	B,F,L	285	333	181	203
4	USA	Kentucky Fried Chicken (KFC)	D,DK,E,F,IRL,NL,UK	289	301	313	339
5	Italia	Burghy/Italy & Italy (Food Service System Italia/Cremonini) (Pepsico)	I	50	56	48	53
6	France	La Brioche Dorée (Groupe Le Duff)	F,E,NL,UK	N/A	46	N/A	126
7	France	La Croissanterie (La Croissanterie)	F,E,GR,IRL,I,P	40	41	152	155
8	France	La Viennoisèrie Paul Restauration Rapide (Groupe Holder)	F,E,UK	24	26	65	72
9	BR Deutschland	Le Cro Bag (""Le Croissant"" Knoop Trouiller GmbH)	D	15	18	38	40
10	España	Pokin's/Bocatta	E	10	14	16	24

Source: Néo Restauration

single proprietor and employing a staff of around 20. Where corporations have become involved in gourmet dining they have tended to do so in conjunction with hotels. The four and five star hotels of Europe pride themselves on their dining facilities and each will offer at least one restaurant serving gourmet food. The scale and variety of the food offered in hotels is also expanding. More hotels are now operating ethnic restaurants, offering an international menu and informal dining in brasserie and coffee shop styles.

Strategies

Investment by corporations has been most obvious towards the lower end of the market, particularly in the areas of popular catering, transport catering and fast food. Groups like Forte's Little Chef (UK), GIB (DK), Quick (F), GfnBAB (D) and Autogrill (I) have developed successful chains of restaurants close to motorways and associated restaurants can also be found in towns and cities. These chains tend to be national rather than transnational and a dominant EC-wide restaurant chain has yet to emerge. Many people in the industry believe however that associations and mergers will take place following the completion of the Internal Market and that the first "European" restaurant chain is likely to emerge along the motorways of the EC.

A transnational restaurant chain may also emerge through the retailing sector. Supermarkets and department stores already operate large chains of cafeteria style restaurants in France, Germany, Benelux, United Kingdom and Italy. The expansion of these stores within the EC would lead to the expansion of their restaurants also. Karstadt, Hertie and Kaufhof operate large restaurant chains in Germany and the Casino supermarket chain operates the largest group of restaurants in France with 238 outlets. Other large scale retailers involved in restaurants include GB-Inno-BM of Belgium. In addition individual restaurateurs have opened restaurants offering their own national or regional cuisine in larger cities of Member States. The EC capitals for instance are the location for restaurants in the style of virtually all Member States.

Investment by corporations from outside of the EC has been an increasingly important phenomenon since the early 1980s. This has been confined almost entirely to the fast food sector and has been spearheaded by the American chain McDonald's which had around 1 140 outlets in the EC at the end of 1990. Other chains which originated in the USA like Burger King (360 outlets), Kentucky Fried Chicken (340 outlets) and Pizza Hut (over 300 outlets) have also been making an impact on this segment of the market. Burger King and Pizza Hut are now owned by UK companies, Grand Metropolitan and Whitbread respectively.

Fast food (selling packaged, cooked food and drink at a counter to be consumed on the premises or taken away) and fast service (limited menu restaurants providing table service and take-away as in pizza chains) has been the fastest growing segment of the EC restaurant industry for more than a decade. Its popularity can be attributed to the European acceptance of American dining culture particularly among young people, to the expertise of the American chains in the areas of product

development, location of outlets, staff training, consistency in quality, and to changing living patterns in Europe. Fast food and fast service have been most successful where there are large groups commuting over relatively long distances, living outside of a family structure, living in an urban environment and operating under time constraints. The principal food products served in this sector include hamburgers, chicken, pizza, pastry, fish and potatoes. Entrepreneurs in each of the EC countries have established national and regional fast food chains which compete with the US-originating franchised outlets and in this area the United Kingdom with Wimpy, Casey Jones, Pizzaland and other chains has achieved considerable success as has France with Quick, Accor, Groupe Le Duff, la Croissanterie, Pomme de Pain and others.

Investment in the EC restaurant sector has also come from entrepreneurs from outside of the EC who have opened "ethnic" restaurants in almost every member country. Thousands of restaurants owned by immigrants and offering Chinese, Indian, Thai, Vietnamese, Argentinean, Indonesian and other cuisine are scattered throughout the EC, are seeing their market share increase.

The FCSI survey results indicate that, in general, investment by the industry during 1992 will be mainly aimed at improving information, reducing costs and attracting new customers, rather than increasing capacity. The main area where respondents expected to authorise more capital expenditure was on information technology.

REGIONAL DISTRIBUTION

Restaurants are ubiquitous in Europe and may be found in every village, town and city. The concentration and level of competition tends to be related to population densities - cities and larger towns have more restaurants per head of population than do villages and rural areas but the exception lies in areas of tourism interest which tend to have a large number of restaurants competing for tourism business.

ENVIRONMENT

The interest in healthy food will present a challenge to caterers in the next few years as will the demographic shift to an older population which, to-date, has not been a target of the large catering chains.

Restaurants tend to be kind to the environment, and are becoming even more so. Waste is largely biodegradable and easily disposable while cooking systems are generally environmentally friendly. Some concern has been expressed regarding CFC gasses used in refrigeration but this issue is now being addressed by refrigeration manufacturers. The fast food sector, however, is a major contributor to litter problems in many Member States. Some chains have taken steps to ameliorate litter problems - McDonalds, for example, now use bio-degradable packaging rather than expanded polystyrene.

Restaurant consumers have also expressed concern about the production methods used in the food raw material and while this has not as yet adversely affected the sector, some restaurants are winning popularity by guaranteeing customers that all dishes are prepared from organically-grown produce and that poultry and fish are not the product of intensive growing systems. Consumers are also showing preference for foods which are perceived to promote health and this demand has led to the creation of new style cuisine based on a healthy diet. Eurotoque, the EC association of chefs, has been active in promoting a positive approach by restaurant owners towards the environment.

REGULATIONS

There are a wide variety of national and EC regulations which impact on the restaurant trade. The most important include compliance with hygiene regulations and certification by local health authorities, regulations relating to working conditions, and in some cases the granting of a licence to sell alcohol. Hygiene regulations across the EC are in the process of being harmonised, EC labour legislation is constantly influencing conditions of work, particularly in the less developed states. Ongoing proposals for a directive on packaging will also affect the industry. Harmonisation of VAT rates (and excise duties on alcohol) will also have differential impacts on restaurants across the EC over the next five years.

Restaurants services are not included in the list of goods and services to which Member States may apply a reduced rate of VAT. However, the Member States which were applying a reduced rate to restaurant services at 1 January 1991 are allowed to continue to do so at least until the end of 1996.

OUTLOOK

The restaurant sector in the EC has been growing throughout the 1980s and this overall growth is likely to continue during the 1990s. The rate of growth will however be influenced by tourism trends, economic growth, national characteristics and demography.

Growth in intra-EC travel and in the number of visitors from outside the EC will increase demand for restaurant facilities. Those countries whose tourism is expanding are therefore likely to experience a higher rate of growth in the restaurant sector. Expenditure on restaurant meals is also related to economic conditions, although during the 1980s a growing share of household expenditure was devoted to eating out. Disparities in GDP and private consumption expenditure growth rates will create higher levels of demand for restaurant services in those Member States whose economies grow fastest. Much eating out is discretionary expenditure and is susceptible to income squeezes, as evidenced in some Member States during 1991. However, the outlook to the mid 1990s is for a recovery in GDP growth across most EC Member States - Business International forecast average GDP growth across the EC at around 2.5% per annum over the 1992-96 period. Increased spending on eating out somewhat above this level is expected.

Employment growth is expected to be below that of turnover. The level of automation is likely to increase, motivated by cost-cutting, service improvement and problems with attracting staff. Restaurateurs are also likely to seek other service innovations reducing labour usage, while the relative importance of less labour intensive segments, particularly fast food outlets, will increase.

Table 5: Restaurants, snack bars, cafes and other eating places
Expected real annual growth rates

	1992-93	1992-96
Turnover	2.0	3.5
Employment	1.0	2.0

Source: Fitzpatrick

National growth rates will also be affected by the prevailing tradition of dining in restaurants, which varies widely across EC Member States. Social attitudes towards eating out are changing and as the EC becomes more integrated the dining tradition is likely to spread somewhat throughout the EC.

Different segments will also grow to varying extents across Member States. For example, in relation to the size and wealth of France and Spain and the present under-representation of international chains there are good opportunities for expansion by these companies, while continued economic austerity will constrain growth of eating out in Greece.

Countries with an emerging youth population will also see more rapid growth in fast service and fast food restaurants and those with an ageing population will see more growth in health food and leisure style restaurants. As more people move into urban areas there will be fewer family meals, greater consumption of snacks and small meals and more dining in restaurants as a leisure activity.

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Hotels
NACE 665

The hotel sector comprises of a disparate variety of establishments in terms of size and range of services provided. Demand for hotel services is predominantly from tourists, with business travellers also accounting for a substantial proportion. Fragmentation of demand trends in recent years has resulted in growth, on the one hand, of bonded hotels providing a uniform product at different price/quality levels, and on the other hand, of hotels striving to differentiate their product. Concentration in the industry is growing as large hotel chains increase market share, while smaller hotels are increasingly joining voluntary associations. The outlook is for relatively slow growth during the first half of the 1990s.

INDUSTRY PROFILE

Description of the sector

The hotel sector comprises establishments which vary widely both in terms of size and services provided. At one end of the scale there are small, mono-located, family-run enterprises providing accommodation services and at the other are large hotels, frequently part of a chain, operated in a highly professional manner and providing a wide range of services. Such services might include restaurant and banqueting, public bar, health and leisure facilities, bureau de change, shopping facilities, business secretarial services and conference facilities. The incidence of hotels supplying accommodation only is now relatively small, with a discernible trend towards larger establishments providing a broader range of services and, as a result, the extent to which the business of hotels impinges on other service sectors is increasing.

Main indicators

Official statistics on hotel turnover and value added in different EC countries do not exist. Nor are there consistent definitions of hotels and similar establishments across countries, making aggregations and inter-country comparisons difficult.

Eurostat data indicates that the hotel industry is most important in Italy and the United Kingdom which have considerably more hotels than the other Member States, although the UK estimate includes inns and guest houses. Definitional differences are reflected when beds are used as an indicator of capacity. Italy had an estimated 1.6 million beds in 1988 compared to 1.0 million in France, 0.8 million in West Germany and 0.7 million in Spain (see Table 3).

Recent trends

Despite definition differences a trend increase in the volume of turnover in the accommodation services of hotels is evident from guest flows. Over the period 1985 to 1990 guest flows through hotels and similar establishments rose in most Member States, the exceptions being Spain, which experienced a slight decline, and the UK, where a sharp decline in bed nights from domestic residents was recorded. The most rapid rise was in Portugal, by an estimated 28%, and the smallest in Greece, 4%. Increases of 18% to 20% were recorded in most northern Member States.

Analysis of available bed nights indicates an increase in the supply capacity of the industry. Hotel guest-nights increased in most Member States over the 1988 to 1990 period, a continuation of the 1980s trend. While the number of foreign guest-nights fell in some countries, most notably some southern Member States, this was more than compensated for by rises in domestic guest-nights. A decline in both business and tourist demand led to some contraction in 1991, but growth is expected to resume in 1992.

The increase in the number of beds and bedrooms was against a background of a slight decline in the number of hotel and similar establishments. This reflects the industry trend towards larger units. Occupancy rates were above 60% in 1990 in each of the eleven EC Member States surveyed by Pannell Kerr Foster (PKF), ranging from 63% in Belgium to 78% in Italy.

Data collected by PKF on average room rates across different European countries places France's hotels as the most expensive, followed by Spain and Italy. Prices in EFTA countries tended in general to be higher than in the EC with particularly high average rates in Austria, Finland, Norway and Switzerland. Price levels and changes in the EC's capital cities, however, reflect local supply and demand imbalances and local property prices. Analysis by Business International indicates that the prices of hotels, particularly in the moderate/comfortable category, rose very sharply in Europe's major cities during the second half of the 1980s, with substantial differences across locations.

Official employment in the hotel industry is only available for the accommodation sector as a whole and then only for nine of the twelve Member States. The trend in overall employment is upward reflecting industry growth and the limited possibilities for capital substitution. The overall growth in total employment masks a decline in the number of self-employed persons, again reflecting the relative growth rates of larger chain operations at the expense of smaller traditional hotels. However, the high level of employment in the United Kingdom relative to its low number of bed-places highlights the problems of comparability using official data. These data problems are currently being addressed by Eurostat.

International comparison

Horwath International analysis of the overall performance of hotels across all the worlds regions indicates that income before fixed charges and revenue per room were highest in Europe in 1990. However, Horwath data relates mainly to chains.

Foreign trade

Available data on hotel-nights does not facilitate a breakdown into intra-EC and extra-EC "exports" and "imports" of hotel bed nights. However, most Member States distinguish between residents and non-resident guest nights, with the strongest growth in most Member States being non-residents guest-nights.

Table 1: Hotels and similar establishments in the EC
Main indicators

	1985	1986	1987	1988	1989	1990	1991	1992
Guest-nights (million)	547	559	569	582	600	615	605	620
Number of hotels (thousand)	159	159	160	159	157	156	154	154

Source: Eurostat

Table 2: Hotels and similar establishments
Number of guest-nights by Member State

(thousand)	1980	1985	1986	1987	1988	1989	1990
EC	438 342	546 702	557 262	568 928	490 754	598 150	494 373
Belgique/België	6 472	7 908	7 712	7 736	7 847	9 186	12 079
Danmark	3 845	4 038	4 153	4 443	4 537	4 656	4 950
BR Deutschland	131 235	128 509	131 299	134 878	140 260	146 980	155 387
Hellas	16 024	17 120	15 869	15 962	16 776	17 338	11 346
España	47 012	54 535	55 403	60 393	62 623	66 308	66 826
France	N/A	95 737	100 163	100 412	103 761	111 616	N/A
Ireland	5 325	3 375	1 309	2 954	1 257	1 505	1 652
Italia	113 891	122 801	126 674	129 953	135 402	136 845	142 977
Luxembourg	466	490	511	520	555	638	639
Nederland	8 058	8 690	8 620	8 189	8 793	9 459	14 299
Portugal	9 014	8 499	8 549	8 488	8 943	9 619	10 218
United Kingdom	97 000	95 000	97 000	95 000	N/A	84 000	74 000

Source: Eurostat, Tourism 1990

MARKET FORCES

Demand

The most important consumers of hotel services are tourists, accounting for nearly half of turnover (30% individual travellers and 19% group tours) in 1990 in Horwath International's hotel sample. However, while most group tours use hotels, a relatively high proportion of independent tourists use non-hotel accommodation. These include camping and caravan sites or, in the case of VFRs (visiting friends and relatives), family homes. Business travellers accounted for around 29%, rising to 40% if conference participants were included. Smaller hotels have substantially less business emanating from the group tours and conference market segments.

The distinction between tourist and business components of market demand is important because they are affected by different factors. While both are affected by the general level of economic activity, business travellers, and in particular the conference market, are more sensitive to economic downturns than tourists. International and domestic business demand is higher in northern European Member States reflecting higher GNP levels.

Recent analysis by stockbrokers Kleinworth Benson in the Economist Intelligence Unit's (EIU) Travel and Tourism Analyst suggests the service sector and its level of concentration are important components of the demand for domestic business travel. Large service firms tend to have a greater number of branches than their manufacturing counterparts and generate substantial travel within the firm by personnel from a broad range of functions such as accounting, finance, personnel, training, development, design and merchandising as well as traditional sales and marketing functions. Based on their analysis Kleinworth Benson suggested faster growth in domestic business travel in mainland EC states than in the United Kingdom in the medium term.

Closer integration of the EC Internal Market, and subsequent cross-border expansions will continue to increase the importance of inter-EC business travel. Traditionally, business travellers have been less price sensitive than tourists and while this still remains the case recent tightening of the economic environment has made firms more conscious of their travel budgets and costs.

General income levels are an important determinant of overall tourism demand and hence of demand for hotel services. In more prosperous northern Member States second annual holidays are now commonplace while in the southern Member States international tourism has recently grown. Such trends reflect rising incomes and increased leisure time. Increased frequency of holiday-taking spreads seasonal tourist flows and favours hotels relative to the other popular forms of accommodation. In addition, with increasing female participation

Table 3: Hotels
Number of bed-places

	1980	1985	1986	1987	1988	1989	1990
EC 7	3 180 039	3 519 724	3 537 041	3 610 037	3 728 328	3 802 261	3 867 849
Belgique/België	87 785	87 863	86 766	89 137	87 175	92 543	93 710
Danmark	68 574	70 960	73 588	79 004	83 973	85 014	88 468
BR Deutschland	568 038	750 595	748 892	739 258	795 244	811 025	824 546
Hellas	261 105	316 033	324 301	336 506	350 833	370 648	378 421
España	596 874	622 428	637 073	658 569	683 152	707 974	735 749
France	663 440	974 728	993 334	1 013 762	1 036 534	N/A	N/A
Ireland	42 484	39 351	39 583	40 147	40 783	N/A	N/A
Italia	1 550 168	1 617 211	1 608 360	1 646 513	1 665 319	1 670 451	1 678 910
Nederland	88 658	96 359	96 888	101 993	N/A	N/A	N/A
Portugal	47 495	54 634	58 061	61 050	62 632	64 606	68 045

Source: Eurostat, Tourism 1990

Table 4: Hotels
Room occupancy and average room rate, 1990

	Room occupancy (%)		Average room rate (ECU)	
	1989	1990	1989	1990
Belgique/België	64.6	62.2	62	73
Danmark	76.4	76.0	77	80
BR Deutschland	69.3	70.3	66	87
Hellas	69.0	70.4	63	70
España	72.5	69.9	90	99
France	75.8	74.8	104	116
Italia	78.9	77.7	83	93
Luxembourg	61.7	63.4	66	73
Nederland	70.6	69.6	70	74
Portugal	66.4	66.3	78	79
United Kingdom	71.0	69.4	86	90

Source: Pannell Kerr Foster, Eurotrends 1991

in the workforce and a tendency towards smaller families, a growing proportion of the European households have two incomes and historically high levels of disposable income. Thus, many hotels have increased average occupancy rates through the promotion of off-season short-breaks, particularly at week-ends.

The relative importance of international versus domestic demand varies widely across Member States. France, Greece, Italy, Portugal, Spain and to a lesser extent the United Kingdom and Ireland attract substantial numbers of foreign tourists. Traditional factors, such as climate and income levels, affect the habits of domestic holiday-makers across Member States with relatively greater usage of hotel accommodation in northern Europe. A slight reversal of the traditional north to south tourism flows has been evident in recent years reflecting increased international holiday-taking by southern Europeans and the declining relative importance of sun and beach holidays. Both of these trend should boost hotel demand somewhat at the expense of other accommodation.

Trends towards cheaper and independently organised holidays will adversely affect hotels at the upper end of the market although lower grade hotels will also face competition from non-hotel accommodation. On the other hand the ageing of the European population and continued growth in the importance of long-haul and business travel augur well for hotels at the upper end of the price-quality range. Not all independent tourists seek budget accommodation and many hotels at the upper end of the market are cooperating with other suppliers and adapting their product offer to attract the more lucrative segments of this market.

Within the tourism segment, international tourism is more vulnerable to economic conditions. The US market is particularly noted for its volatility, reacting strongly to political events such as the Gulf War and to the relative strength of the US dollar vis-à-vis European currencies. Having recovered slowly during the latter years of the 1980s after a sharp and mainly politically inspired decline in 1986, the number of US visitors to Europe fell substantially in 1991. The fall was mainly as a consequence of the Gulf War but also in response to the continued weakness of the US dollar and the downturn in the US economy. Visitor numbers from Japan, having doubled in the preceding five years, also fell reflecting similar nervousness about political developments and the wealth effect of stock market falls on potential travellers. Long-haul travellers are also much more likely to use hotel accommodation and in particular hotels at the upper end of the market. Long-haul origin markets are particularly important to hotels, particularly those at the upper end of the market. Tourists from EFTA countries are more likely to use budget or non-hotel accommodation than their long-haul counterparts, while initial flows from eastern Europe may also favour non-hotel accommodation.

Supply and competition

Characteristics of the hotel industry affecting competition include ease of entry and exit, the often localised nature of competition, and competition between segments within the industry and by non-hotel establishments supplying similar services. These factors ensure that, in general, monopolistic positions are rarely attained; exceptional hotels at specific locations, such as The Gleneagles in Scotland, may however be able to maintain excess margins. Thus, increasing competition through mergers of large chains in the European market

Table 5: Hotels and similar establishments
Employment

(thousand)	1988	1989	1990
EC 7	646.1	689.7	N/A
Belgique/België	13.3	14.1	N/A
España	117.5	126.3	129.9
France	172.3	184.0	N/A
Luxembourg	2.9	2.8	N/A
Nederland	22.1	23.6	N/A
Portugal	37.0	37.8	39.4
United Kingdom	281.0	301.0	318.0

Source: Eurostat, Tourism 1990

Table 6: Hotels
Regional comparison of performance, 1990

	Occupancy rate (%)	Average daily rate (ECU)	Total revenue (ECU)	Income before fixed charges (ECU)
Africa and Middle East	63.3	67.4	24 375	7 651
Asia & Australasia	69.7	56.7	22 088	6 222
North America	64.4	66.2	21 150	4 619
Europe	65.6	63.0	30 936	8 316
Latin America	65.4	44.1	17 471	2 749

Source: Horwath International

is not a cause for significant concern on the basis of inter-hotel competition at the present time.

Economic power is important in negotiations between the industry and upstream suppliers, such as major tour operators, but the need to maintain goodwill and quality standards generally tempers excessive exercising of power. Similarly, the emergence of anti-competitive practices through increasing vertical integration are less likely because of the volatility of the tourism demand, the "contestable" nature of the industry and the high degree of interdependence between its various segments. One issue causing concern is the use of Computer Reservations Systems (CRS), which are dominated by the main airlines, generating fears that clients seeking accommodation will be initially directed to airline-owned hotels. The EC has already agreed a regulation covering this topic and industry umbrella groups have been liaising to discuss difficulties.

The nature of the hotel industry is such that imbalances between supply and demand are generally localised in either time or space and invariably lead to variations in prices and in profit levels. Surpluses and shortages in "time" are most common. Thus, in 1991 a general downturn in tourism demand resulted in good deals for consumers but substantial losses for many hotels, particularly in the United Kingdom where hotel re-possessions reached a record high. Similarly, seasonal variations in demand for hotel rooms result in generally lower prices (or additional value-added in terms of special incentives) in many rural and resort hotels in the off-season, while many urban hotels are also capitalising on the growing short-break market to boost overall occupancy in hotels which are filled by weekday business travellers. Capacity imbalances in particular locations may also result in variations in profits around normal margins, while in certain cases, for example major sporting fixtures such as the Olympic Games, where both time and supply constraints put very strong upward pressure on prices.

The prices of hotels, particularly in the moderate/comfortable category, rose very sharply in Europe's major cities during the second half of the 1980s. The increases in price vary widely across cities reflecting different supply and demand conditions. Data collected by Business International indicates that the price of a single room in the moderate/comfortable category in Madrid rose nearly sixfold between 1985 and 1990. Price levels and changes in the EC's capital cities, however, reflect local supply and demand imbalances and particularly local property prices. In absolute terms, London hotels were the most expensive over the period 1985-90, followed by Paris.

Operating profits in recent years have generally been higher in chain-affiliated hotels than in their independent counterparts and this gap is expected to widen. Analysis by Kleinworth Benson in the United Kingdom indicates very substantial differences in trading margins and profits per room between affiliated and unaffiliated hotels. The importance of scale, particularly marketing-based economies, is being recognised by many small hotels and increasing numbers are becoming affiliated to voluntary associations or taking the franchising route. Horwath International analysis suggests profit levels expanded alongside demand in European hotels during the second half of the 1980s.

EC hotels cannot compete with most of their extra-EC counterparts in terms of price alone. The labour intensive nature of the industry ensures that hotels in less developed countries such as the Far East and Africa have a strong competitive advantage. Thus, EC hotels are often reliant on the tourism strengths of their location. Quality is also important. For example, in East European countries, cheaper prices are gener-

Table 7: Hotels and similar establishments
Number of non-resident guest-nights

(thousand)	1980	1985	1986	1987	1988	1989	1990
EC 10	N/A	91 490	88 507	92 279	95 532	104 975	N/A
Belgique/België	4 379	5 536	5 292	5 316	5 424	6 575	6 874
BR Deutschland	19 003	23 895	23 473	24 392	25 226	28 389	29 766
Hellas	5 608	6 523	5 888	6 167	6 043	5 942	N/A
España	9 228	12 438	13 587	14 116	13 636	13 185	11 573
France	N/A	18 870	17 322	17 319	19 509	24 257	N/A
Ireland	1 269	1 579	1 309	1 294	1 257	1 505	1 652
Italia	14 582	16 090	15 165	17 026	17 437	17 683	17 924
Luxembourg	419	448	450	464	485	542	530
Nederland	2 803	3 376	3 188	3 114	3 322	3 542	7 903
Portugal	1 909	2 735	2 833	3 071	3 193	3 355	3 632

Source: Eurostat Tourism Trends 1990

Table 8: Hotels
Guest types, 1990

(%)	Nederland	France	Deutschland	Hellas	Ireland	Portugal	United Kingdom
Business travellers	44.0	14.2	41.2	14.0	24.8	28.7	42.0
Holiday tourists	33.0	61.4	31.7	68.3	62.5	52.7	38.3
Conference delegates	12.0	8.9	15.7	6.8	6.5	9.9	15.0
Government officials	N/A	0.9	2.3	0.7	1.0	0.6	0.9
Other categories	11.0	14.7	9.1	10.2	5.3	8.1	3.9

Source: Horwath International

ally counter-balanced by quality considerations, not alone of the hotels in these locations but also of other local facilities. Improvements in this respect mainly as a result of ongoing investments by the major chains will remedy many of these deficiencies in the more developed East and Central European countries. The cost of travel to many non-EC destinations is also a prohibitive factor, as demonstrated by the increasing popularity of Asian locations. Reductions in the costs of long-haul travel can be expected to divert more tourists from competing EC resorts in the medium term. In addition there are worries, particularly in southern Member States, about potential cost increases as a result of ongoing EC integration reducing competitiveness relative to neighbouring destinations such as Turkey and Cyprus, although recognition of these concerns has been an aid to HOTREC in achieving concessions for hotels on VAT rate approximations and may arouse similar sympathies on the expected implementation of the Social Action Plan.

Production process

The services provided by hotels vary widely across the industry. At one extreme hotels may simply provide accommodation only, although this is relatively rare and a mixture of accommodation, restaurant food and retailing of alcoholic beverages is most common. However, the variety of services being provided is wide and includes banqueting, health and leisure facilities, a variety of business services, shopping, bureau de change, conference facilities, laundry facilities and touring services.

The hotel industry has traditionally been highly labour intensive, including substantial use of part-time and female workers. Increased automation is, however, apparent, particularly in northern Member States where problems with labour retention and the attraction of new workers are sharpest. The introduction of the 5 day or 40 hour week, night shift compensation, with weekends and holidays to enjoy, lure people away from labour intensive jobs with unsociable hours. Many hotels and chains have introduced innovative programmes to tackle recruitment and retention problems. These programmes involve improving the image of hotel work, implementing better working conditions, and evolving training and reward systems geared at enabling personnel to move within the industry with clear career paths. They also entail improved co-operation with schools in terms of curricula and their selection of candidates. While the Single Market process will increase the reservoir of labour available to the hotel industry, greater mobility and higher expectations may accentuate staff retention problems.

Increased use of technology - yield management and CRS, front office systems, in-house entertainment, improved kitchen equipment - is contributing to greater skill requirements for hotel staff rather than displacing labour. Among the most important of these is yield management. This involves applying basic economic principles to pricing and controlling room inventory for the purpose of maximising revenues. What makes contemporary yield management different from traditional pricing practices is the frequency and scope of the decision-making process. Advances in computer technology support immediate measurement of market forces and the practical application of economic theory. These techniques make it possible to update prices for all future arrival dates to match the market's demands each day and to tailor prices to different demand segments. Leisure traffic is normally price sensitive and books early, while business travellers are less price (but more quality) sensitive and tend to book late. Yield management enables the anticipation of late demand and the offer

Table 9: Hotels
Room rates in EC capitals

	Luxury Price, 1990 (ECU)	% change 1985-90	Moderate Price, 1990 (ECU)	% change 1985-90
Amsterdam	188	110	148	229
Athens	195	154	89	119
Berlin	203	N/A	92	N/A
Brussels	262	285	203	404
Copenhagen	245	255	116	N/A
Dublin	173	160	97	152
Lisbon	200	315	135	289
London	386	255	289	274
Luxembourg	162	220	80	211
Madrid	208	338	196	465
Paris	261	190	176	287
Rome	249	173	206	353

Source: Business International

Table 10: Hotels
Composition of sales, 1990

(%)	Nederland	France	Deutschland	Hellas	Ireland	Portugal	United Kingdom
Rooms	50.7	61.5	51.7	41.6	31.9	58.0	46.0
Food	27.5	25.6	27.4	40.0	37.8	24.1	46.3
Beverage	11.4	7.8	13.1	9.0	25.9	8.3	2.0
Other operational departments	6.0	3.8	5.9	6.6	3.9	7.1	N/A
Rental and other Income	4.4	1.2	1.6	2.8	0.6	1.2	N/A

Source: Horwath International

of an appropriate number of rooms at the higher rates these guests are willing to pay. Yield management systems are also useful for market information purposes, indicating where business comes from, when it is repeated and allows deduction of the crucial factors affecting decisions.

Driven by economic developments, the spread of large chains, the growing complexity of the industry's market and the availability of sophisticated management information systems there is a growing trend towards more professional management in the industry. This is reflected in labour saving strategies, such as the increasing number of hotels offering buffet breakfasts.

INDUSTRY STRUCTURE

Companies

Generally the hotel industry is fragmented but the importance of large hotel chains has increased considerably over the last decade. While many of these chains have brought a homogeneity to the industry in many European countries, the structure and importance of the hotel industry differs across Member States.

Nevertheless in terms of bed places offered there is considerable concentration in the European market. The top ten chains operating in Europe provide as much capacity as the next forty chains combined. It should be noted, however, that while the incidence of bonded chain hotels is increasing, in some cases these are run by independent hoteliers on a franchise basis. Pressure for increased size comes from economies of scale in marketing, greater ability to meet the trend toward market segmentation with a complete range of differentiated services and advantages in covering a range of major destinations in any specific area. The strength of the chain to invest in CRS is another factor which will shape the industry in the coming decade, although advances in technology will increasingly enable smaller hotels to avail of CRS.

In identifying the world's top hotels the International Hotel Association (IHA) distinguishes between three different types of hotel company - corporate chains, with a strong brand identification, professional hotel management companies (HMCs) and voluntary chains and associations. There is overlap between these categories. For example, Best Western, a voluntary group is included among the corporate chains because of strong brand image while many of the larger corporate chains have their own HMCs which may run the hotels of other groups in certain locations - Scotts Hospitality have recently come to an agreement with Marriott Corporation to run 13 UK hotels formerly marketed as Holiday Inn properties using the Marriott's budget brand Courtyard and the right to develop further properties using other Marriott brand names.

By global standards the top EC hotel companies are not as large as North American based chains, but are larger than their Asian counterparts. The 1991 listing of the world's top corporate chains in 1990 by the International Hotel Association (IHA) included eight North American based chains in the top ten, although the top corporate chain, Holiday Inns, is owned by a UK brewing conglomerate, Bass Plc. Similarly, the top ten second tier management companies listed by the IHA included only one EC company, the UK-based Queens Moat Houses Plc. However, reflecting the continued importance of small hotels in Europe the IHA listing of voluntary chains and associations had six EC-based companies, including the top three, among the top ten in the world.

Strategies

The most important developments in the hotel industry in recent years have been the expansion of the chains/voluntary associations and segmentation of hotel properties into branded

Table 11: Hotels
Operating statistics, 1990

	Nederland	France	Deutschland	Hellas	Ireland	Portugal	United Kingdom
Cost of sales/departm. revenue (%):							
Food	29	32	42	27	40	36	35
Beverage	20	24	23	19	54	20	34
Operating profit/departm. revenue (%):							
Rooms	70	69	69	53	72	76	71
Food and beverage	25	23	18	26	27	15	29
Gross operating profit/total sales (%)	30	31	26	11	19	28	32
Sales per employee (ECU)	59 253	64 425	51 821	28 763	31 320	28 315	39 690
Cost per employee (ECU)	N/A	23 167	18 045	11 027	9 513	9 327	11 843
Labour cost/total sales (%)	36	37	36	53	28	36	29

Source: Horwath International

Table 12: Hotels
World top companies

Corporate chains (1) Company	Headquarters	Parent HQ	Rooms	Hotels
Holiday Inn Worldwide	USA	UK	320 599	1 606
Best Western International	USA	USA	268 140	3 348
Choice Hotels International	USA	USA	201 048	2 102
Accor	F	F	159 877	1 421
Hospitality Franchise System	USA	USA	138 122	944
Second tier management companies (2) **Company**	**Headquarters**	**Parent HQ**	**Rooms**	**Hotels**
Tollman-Hundley Hotels	USA	--	137 104	1 176
Regal-Aircoa Companies	USA	--	36 516	152
Queens Moat plc	UK	--	19 970	175
Prime Management Company	USA	--	17 418	115
Interstate Hotels Corporation	USA	--	13 850	40
Voluntary chains / associations (3) **Company**	**Headquarters**	**Parent HQ**	**Rooms**	**Hotels**
V Tell International	UK	--	1 300 000	6 500
Supranational Hotels	UK	--	102 000	474
Logis de France	F	--	74 990	4 320
Leading Hotels of the World	USA	--	65 000	245
Golden Tulip Worldwide	NL	--	63 470	333

(1) Companies with a strong brand identification
(2) Professional management companies, often multiple franchisees, managing different brands as well as their own brands and independent hotels
(3) Groups offering marketing and reservations services to independent hotels and corporate chains
Source: International Hotel Association, Hotels, July 1991.

products each aimed at specific clientele. While different levels of service and quality across hotels has always been a feature of the industry, segmentation within the major hotel chains has resulted in increasingly distinctive products. It is also argued that too many brands within some chains may lead to customer confusion. Segmentation in Europe is not as advanced as in the USA but has increased substantially, to the extent that nearly all major hotel chains now have a range of differently specified products. For example, the French-based Accor/Wagon Lits group, which has a presence in nine EC countries, has a highly developed set of branded products, ranging from the four-star Sofitel to the one-star Formule 1. Through its recent acquisition of Wagon-Lits the expanded company now owns the latter's stable of brands, including the budget chain Primo 99.

The fastest growing segment of the market are the budget and "no-frills" establishments. Greater economic cohesion within the EC, and demand from Eastern Europe, are expected to contribute to increased demand for low-cost, no-frills establishments. As well as Formule 1, other budget and no-frills chains include the French sister companies Campanile and Premiere Classe, Forte's Travelodges and Holiday Inns' Garden Court. Segmentation is not solely based on simple price/quality features and includes resort hotels and those specialising in the growing conference market.

Consistent delivery of good service, particularly for business travellers, is the key element to maintaining loyalty as repeat business is the most cost-effective way of generating profits. Marketing, sometimes in partnership with other hotels or upstream services is a key strategy element in generating new business, but as articulated by Thomas W. Storey, executive vice-president of Radisson Hotels International "We have calculated it costs 15 USD to get a new trial guest and 2.50 USD to get a repeat guest".

While business travellers and some sections of the long-haul tourist market tend to find the uniform hotel product reassuring, many leisure travellers look for something more distinctive. The discussion on demand trends in the industry suggests that there is need for a wide range of products to catering for increasingly diverse forms of demand. The more a hotel can differentiate itself from its neighbour, for example by reflecting the special character of its surroundings, the more it is likely to appeal to the discerning guest. Similarly, with the growing importance of short-break holidays many hotels are becoming the central element in a package of accommodation and leisure activities designed to attract short-break guests, particularly in the off-season. Many resort and medium-sized hotels are also adding attractions such as fitness centres and other forms of all-weather entertainment.

Catering for new and alternative forms of tourism, such as activity holidays, also requires many hotels to re-think their strategy vis-à-vis non-hotel accommodation. Evolving packages to attract these new tourism market segments may involve coordination with other tourism and leisure facilities in the locality and other forms of accommodation. Cooperation between hotel groups is also a feature. For example, in order to improve its marketing in Europe Radisson has co-operated with SAS hotels, Mövenpick Hotels and Concorde Hotels. Similarly, cooperation between smaller hotels has resulted in segmentation, generally with a stronger leisure dimension, through the formation, or expansion of existing, voluntary chains.

While the top hotel groups in the EC are predominantly EC-owned, in general large hotel chains are international in character. Two of the top chains, Hilton and Holiday Inn, originated in the USA but have recently been purchased by UK companies. In post-1992 Europe the financing and building of hotels will ease with free movement of capital. The political and economic

changes related to the completion of the EC Internal Market and to German reunification should have a positive "ripple" effect on hotel investment. However, there are factors, a less buoyant demand outlook than during the late 1980s and the effects of the recent downturn in demand, which suggest many investments will be in existing premises. In addition there is probably already a sufficient number of hotels in most major EC locations to cater for increases in demand, suggesting most investment will be in the form of conversions and extensions of existing properties.

Discernible trends indicate takeovers are the preferred expansion mode. As current players seek further economies of scale and/or expansion into new markets, takeovers provide a better entry point than starting from scratch on unfamiliar territory. There have been a number of high profile mergers over the last year including that between Accor and Wagon-Lits, although a proposed merging of Air France and Lufthansa's luxury Meridien and Kempinski chains has been scaled back. Extra-EC hotel chains such as the US-based Marriott Corporation, ITT Sheraton and Radisson and Far Eastern chains such as Nikko, Seibu Saison and Aoki are also seeking to expand into Europe. Seibu Saison have recently purchased Scandinavian Air System's 40% share of Inter-Continental hotels having originally brought SAS in as a partner when they purchased the groups from Grand Metropolitan, while Aoki almost purchased Swissôtel. In general and with a view to the longer-term, Japanese investment has tended to aim for vertical expansion - hotels, restaurants, leisure facilities etc. - rather than a significant market share in a particular sub-sector, although the slump in stock market prices in Japan has slowed the flow of investment to Europe.

Similarly EC-based chains are expanding more across national borders as the gear up for closer European integration. For example, during the second half of the 1980s the UK hotel and hotel management company Queens Moat Houses expanded from a mainly UK base to the extent that 45% of its business is now in continental Europe. Encouraged by saturation in their domestic market, US chains are also likely to increase investment in the EC to improve their share in a market on which they are not in a leadership position. With increasing investment from large chains there is a danger that this concentration may threaten the competitive position of the many small, independent hotels and restaurants that create the uniqueness of the European tourism product. Such fears may be misplaced and smaller independent and efficiently run hotels should be able to establish themselves in their own profitable niche. Retaining traditional ambience and intimacy with their clientele are important marketing characteristics, but small hotels should pay adequate regard to modern marketing, technological and management practices. These practices may include investments to upgrade quality, and cooperation with other tourism enterprises and other hotels in promotion, reservations systems and information systems.

Airport locations will continue to provide prime locations for both expansion and the development of new hotels, although increasing emphasis on high-speed rail links should draw both business and leisure travel from the airlines, suggesting that railhead locations will also see new investment. Continued growth in business and leisure travel will also stimulate new investment in hotels at large business parks and in resort areas. Even Spanish resorts which have suffered from stagnant demand during the second half of the 1980s may see further investment as new demand from Eastern Europe materialises - Iberotel, for example recently announced that they were concentrating on development in the Mediterranean rather than the Caribbean and the Far East. Increased investment in budget hotels may also see traditional European heavy construction giving way to prefabricated units.

The opening-up of Eastern Europe is attracting considerable investment funds as there is a substantial supply deficiency, particularly of three star hotels. Some investment may be diverted from EC countries although it is expected that the bulk of the diversion will be from developing countries (with the exception of Asia). Another concern is that while elimination of restrictions on mobility of capital may encourage the large-scale investors, small operators may well continue to be hampered by the reluctance of banks and other financiers to inject cash into an industry which many do not understand. This will add to the concentration of the industry and the weakening of the independents.

REGIONAL DISTRIBUTION

Location has traditionally been considered the most important element governing the supply of hotel services. In general, hotel location follows demand rather than stimulating it, although there are exceptions. Thus, hotels are predominantly located in cities, specialising in business travellers, and in resort areas, specialising in tourist traffic. These factors, particularly the latter have led to significant variations in the distribution of hotels across Member States and within Member States. For example, the largest hotel in the EC is located in the Canary Islands.

ENVIRONMENT

Regulatory pressure on the hotel industry in relation to environmental issues is not extensive at present. There are three major pieces of environmental legislation which are, or will when they are adopted, affect the hotel industry. These are the requirement for an environmental impact assessment which is required for large projects, liability for damage caused by waste and the obligation to clean up contaminated land. The latter two are not yet in force and in general their impact will not be excessive. However, there is an expectation that regulatory pressure may increase with requirements for improved waste management and more consideration to how well hotel structures blend in with their surroundings.

The International Hotel Association (IHA) recently held a conference on hotels and the environment where the president Helga Holgersen warned of stringent regulations if hoteliers did not work to improve their environmental records. Identifying the environment as a key tourism asset and also noting that hotels may save on costs and gain in consumer goodwill, the IHA has identified environmental issues as a key concern for its members. An annual "environmental award" is presented each year in association with American Express, while more recently twelve environmental new year resolutions for 1992 have been drawn up. These resolutions cover the spectrum of environmental issues affecting hotels including care in planning and designing new projects, energy conservation, waste management, emission of pollutants and sensitivity towards ecological habitats, local populations and culture/heritage issues.

There are a number of key areas where hotels can improve their environmental record. In particular the construction of new hotels in terms of energy conserving design, materials chosen, location and blending with surroundings. With hotels already designed there is also considerable scope for improved waste management both through recycling and energy conservation. As with the yield management systems which are contributing to better pricing, management information systems are also enabling better control of costs including those with environmental implications. Demand size management (DSM), for example, is increasingly being used to control expenditure on energy costs and to extract more out of existing facilities. Attention to such details has been motivated by escalating power plant construction costs, excessive lead time to build new plants as well as the public's increasing environmental concerns (pollution, ozone depletion and greenhouse effect). With regard to such aspects the IHA is working

Table 13: Hotels
Expected real annual growth rates

(%)	1992-93	1992-96
Turnover	5.0	4.0
Employment	3.0	3.0

Source: Fitzpatrick Associates

on an environment code for existing hotels and for new construction. Hotels groups are also cooperating to promote good environmental practice. Hilton, Inter-Continental Hotels, Marriott, Meridien, Ramada and Sheraton are among a number of groups which recently signed an environmental charter for the industry covering areas such as waste management, product purchasing, air quality, energy conservation and noise pollution.

REGULATIONS

Hotels are subject to a wide variety of regulations both on local, national and European level, relating to health and safety, hygiene, sale of alcohol, planning permission and consumer protection. At EC level there is a range of measures which indirectly affect the hotel industry, such as the Directive on Package Travel, Package Holidays and Package Tours (90/314/EEC), a body of measures covering the protection of workers, workers' residence permits, environmental regulations and data protection legislation. The industry is more directly affected by the 1986 Council Recommendation on fire safety in hotels (86/666/EEC). The Package Holiday Directive stipulates in article 5 that the package tours organiser is liable to the consumer for the proper performance of the contract, in all aspects including hotel safety (without prejudice to the right of the organiser to pursue other supplies of services). The result is that those in the industry responsible for organising tours are applying pressure and calling for more binding regulations on hotel safety. Also, while some are calling for standard classification system for hotels, a number of hotel organisations are resisting.

Regulations on competition policy, particularly on abuse of a dominant position and state aids also potentially affect the hotel industry. However, as noted the hotel sector is generally regarded as relatively competitive and has not been the subject of attention from competition authorities. With regard to state aids, the hotel industry in quite a number of Member States, particular those in the south, received substantial state aid for infra-structural investment. This has not been contested by other sectors or hotel interests in other Member States - often part-funded by the EC 's European Regional Development Fund such finance is generally regarded as regional aid and as such allowable under existing regulations.

Initially, proposed changes on VAT harmonisation would have increased hotel prices and reduced competitiveness relative to extra-EC destinations. This was a particularly worrying prospect for Mediterranean Member States whose hotel prices were also under pressure from prospective EC legislation on other areas, particularly in relation to working conditions. Furthermore, these Member States faced direct competition from non-EC Mediterranean destinations such as Cyprus, Turkey, Malta and north African countries. Swayed, among other things, by these factors, hotel services are now included among a list of goods and services to which the Member States may apply a reduced rate of VAT.

OUTLOOK

The hotel industry has experienced relatively steady growth over the last decade, with temporary downturns, such as in 1991, reflecting the underlying vitality of their demand base. Over the next decade global demand for both tourist and business accommodation will continue to grow at a relatively rapid pace. However, the EC's share of global tourism revenue is likely to decline slightly while the EC hotel industry will also face stiff competition from alternative forms of accommodation and from more adventurous and more demanding tourists. The industry has the capacity and the flexibility to tailor its products to suit changing demand, as evidenced by the substantial changes which have occurred over the last decade. Value for money is another emerging criterion among EC tourists but adoption of new technology should enable hotels to provide better service and more targeted marketing while keeping costs from rising, although there will be pressure on labour costs from both a regulatory end and from dwindling supply. Growth in guest-nights in 1992 should pick up substantially in 1991 and remain steady, at 4% per annum over the following three years.

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Other accommodation
NACE 667

The other accommodation sector is made up of a large number of diverse types and sizes of establishment, dominated by the smaller operator. The demand for this type of accommodation is predominantly from tourists and tends to be domestic in nature. Growth has continued in the other accommodation industry as demand has moved away from traditional package holidays and towards more independent ones. Concentration within the industry is very low and the range of products in terms of cost and quality is very diverse. There is very little regulatory pressure and many of the smaller establishments, which are not recorded, can operate without constraints. Overall relatively slow growth is expected during the 1990's however some areas where new products have been developed will fair better than the traditional establishments.

INDUSTRY PROFILE

Description of the sector

The non-hotel accommodation sector encompasses a wide variety of establishments in terms of type, size and services provided. This sector includes camping sites, caravan parks, hostels, guest houses, bed and breakfast, social tourism establishments, rural tourism establishments, apartments, second homes, time-shares and integrated resort developments. Services offered by this sector range from simple accommodation with basic amenities to integrated resorts with restaurants, bars, shopping malls and health and leisure facilities. This diverse sector tends to overlap with the hotel sector. At the lower end of the sector small bed and breakfast establishments provide accommodation and simple meals. At the top end of the sector European organisations provide integrated resorts and timeshare accommodation. The former overlap with the hotel sector at the lower end of the market while the latter compete with the mid-range hotels. Within the separate categories of the non-hotel sector the services provided vary widely. Thus campsites may provide restaurants, bars, swimming pools and other leisure amenities or just basic facilities.

Main indicators

Due to the diversity and size of the sector official statistics on the turnover and value added in different EC countries do not exist. The use of different definitions of other accommodation throughout the EC make it difficult to make comparisons and obtain main indicators for this sector. Eurostat data on other accommodation provides detailed information on camping and tourist village accommodation establishments. However, data on other categories such as holiday dwellings and social tourism establishments are far from complete. Much of the data on camping and tourist villages is based on classified campsites and therefore under estimates the number of establishments and bed places.

France followed by the United Kingdom and Italy have the largest number of camping and tourist village establishments (see Table 1). However, the figure for Germany is based on tourist villages. Research by GFK Marktforschung Gmbh ("Camping and caravaning 1989"), indicates that Germany is also a main market and has an additional 2 000 campsites. Spain has the largest number of holiday dwellings, however, this figure must be treated with caution as it includes a large number of small establishments.

While the paucity of the data hinders cross sector comparisons, Eurostat data indicates that most of the bed places provided by the non-hotel accommodation sector are located in campsites and tourist villages. France provides the largest number of bed places followed by the United Kingdom and Italy. Whilst Spain has a very large number of holiday dwelling establishments it provides slightly fewer bed places than the United Kingdom (see Table 2).

Incomplete and slightly dated data on overnight stays in camping sites, from a GFK report on camping and caravaning, indicates that this sub-category of the other accommodation industry is most important for France, followed by Italy and Germany. Comparable information for the United Kingdom and the Netherlands is not available and the data for Portugal, Greece and Ireland are considered seriously under-recorded.

Self-catering accommodation, which includes rented flats, villas, chalets, cottages and single rooms is reported to represent the largest sub-category of non-hotel accommodation. Since a large proportion, perhaps 50%, of self-catering accommodation is let unofficially, it is impossible to obtain exact numbers. The data that exists suggests France, Spain,

Table 1: Other accommodation
Number of establishments, 1990

	Camping & tourist villages establishments	Holiday dwellings	Social tourism	Other	Total
EC	18 397	142 532	6 016	24 036	190 981
Belgique/België	725	N/A	413	515	1 653
Danmark	392	N/A	101	N/A	493
BR Deutschland	28	6 357	3 131	920	10 436
Hellas	316	N/A	N/A	16	332
España	928	117 673	N/A	N/A	118 601
France (1)	8 193	715	N/A	N/A	8 908
Ireland (1)	7	46	N/A	N/A	53
Italia	2 258	N/A	953	22 219	25 430
Luxembourg	127	N/A	12	N/A	139
Nederland	1 035	538	526	N/A	2 099
Portugal	157	N/A	58	N/A	215
United Kingdom (2)	4 231	17 203	822	366	22 622

(1) 1987 data
(2) 1988 data
Source: Eurostat

Table 2: Other accommodation
Bed places, 1990

(thousand)	Camping & tourist villages establishments	Holiday dwellings	Social tourism	Other	Total
EC	6 698	1 314	600	412	9 024
Belgique/België	373	N/A	69	28	470
Danmark	N/A	N/A	N/A	N/A	N/A
BR Deutschland	23	211	253	129	616
Hellas	82	N/A	N/A	9	91
España	571	384	N/A	N/A	955
France (1)	2 471	201	20	N/A	2 692
Ireland (1)	0	2	N/A	N/A	2
Italia	1 181	N/A	73	245	1 499
Luxembourg	12	N/A	1	N/A	13
Nederland	494	124	50	N/A	668
Portugal	261	N/A	11	N/A	272
United Kingdom (2)	1 230	392	123	1	1 746

(1) 1986 Data
(2) 1988 Data
Source: Eurostat

Italy, Greece and Portugal lead in the provision of such accommodation.

Approximately 460 000 European families constituting 1.5 million holiday takers own their own timeshare in over 700 holiday resorts. Most of these timeshares are situated in Spain followed by France, Portugal, the United Kingdom and Ireland. This category also includes gîtes which are generally rural properties let as holiday homes. France has the greatest number of gîtes followed by Germany and Italy (see Table 4).

While Spain has a relatively small number of gîtes it has over 90 000 officially classified furnished flats. In the United Kingdom, Ireland and Germany, bed and breakfast accommodation is very popular. Again there is little accurate data on the number of establishments and many of them are unrecorded.

Recent trends

It is difficult to gauge developments on an EC wide scale due to the lack of accurate information. Eurostat figures on growth in the number of bed places provided by camping and tourist villages indicates that the number in Spain increased by almost 50% between 1985 and 1990 while the number in Greece rose by over 20%. Over the same period the number of bed places fell by almost 70% in the Netherlands and by almost a third in Germany.

Social tourism accommodation increased between 1985 and 1990. In Belgium there has been steady growth, in Italy strong growth in the mid 1980s was followed by a steady decline, whilst the limited data for the United Kingdom indicates strong growth.

The timeshare sector has also shown strong growth with the number of households owning timeshare holidays in Portugal increasing by fourfold and the number in Spain nearly doubling.

Table 3: Other accommodation
Overnight stays in camping sites, 1986

Country	Number of overnight stays (million)	Foreigners (%)
Belgique/België	9.8	21
Danmark	10.6	36
BR Deutschland	16.5	24
Hellas	2.4	73
España	4.7	46
Luxembourg	1.1	89
France	130.6	31
Ireland	2.7	28
Italia	39.8	36
Nederland	N/A	N/A
Portugal	7.6	31
United Kingdom	N/A	N/A

Source: National statistical offices

International comparison

Usage patterns of non-serviced accommodation in the EFTA countries are comparable to those of the EC states; EFTA countries generally have high standards of accommodation with Scandinavian countries, particularly Sweden, noted for chalet style accommodation located in forest surroundings. Though no EC comparable data are available for the USA, the touring market there is very large. Americans have pioneered the recreational vehicle market and standards and levels of provision for mobile tourists in the USA are very high.

Foreign trade

There is insufficient data to ascertain a breakdown of non-hotel bed nights in terms of "imports" and "exports". Even if this data were available the large number of establishments that are unrecorded would undermine its accuracy. The proportion of "camping tourists" from outside each member state is typically in the range 30% to 40%. The ratio in Greece and Luxembourg is believed to be considerably higher.

MARKET FORCES

Demand

Demand for non-hotel accommodation is strongly linked to tourism demand, much more so than for hotels. Most of the non-hotel accommodation users are leisure travellers, with business travellers tending to use this type of accommodation when hotel accommodation is unavailable. The low level of business demand results from the nature of the accommodation which is generally booked well in advance, by the week rather than the day, and is at the lower end of the accommodation market.

Table 4: Other accommodation
Number of gîtes, 1988

	Gîtes
EC	62 783
Belgique/België	166
Danmark	145
BR Deutschland	20 000
Hellas	45
España (1)	71
France	35 000
Ireland	N/A
Italia	6 744
Luxembourg	N/A
Nederland	292
Portugal	N/A
United Kingdom	320

(1) Galicia, Basque Province and Balearic Islands only
Source: Gfk Marktforschung: Camping and caravanning survey 1989

Increasing incomes and discretionary leisure time are predominant factors determining the propensity of people to take holidays and use other accommodation. Both disposable income and available leisure time increased in the EC Member States during the 1980s. These changes have stimulated the demand for other accommodation. Much of the demand for other accommodation, particularly camp sites and rented accommodation, comes from family groups and tends to be linked to domestic tourism.

For a variety of reasons including income levels, the weather and the attractiveness of their own country as a tourist destination, the nationals of southern Member States of Greece, Portugal, Spain, Italy, and France are more likely to holiday in their own country. Thus much of the demand for other accommodation tends to be domestic in nature. In northern Europe, particularly Germany, the United Kingdom and the Benelux countries, there is higher demand for foreign holidays as travellers seek better climate and cheaper holidays.

The demand for other accommodation tends to be highly seasonal in nature and essentially limited to the warmer months, although winter sports generates demand for self-catering accommodation, particularly in the French Alps. There has been growth in activity and sporting holidays reflected by the overall increase in leisure and health and fitness of Europeans. Approximately 10% of all holidays taken in Europe are built around a specific activity or sport. This seasonality results partly from the nature of the product, thus camping and caravaning holidays are more suited to the summer months, as well as to institutional factors such as school holidays which determine when families can take their holidays. Holiday parks of the style developed by Sun International ("Sunparks") and Neckermann ("Center Parcs") have proven a highly successful formula by providing facilities such as sub-tropical swimming pools, saunas and high standards of catering able to generate high occupancy level throughout the year. Such formulae are also tailored to the growing popularity of short-break holidays.

The demand for other accommodation tends to be linked to the independent traveller and the trend away from package holidays towards the "go as you please" holidays should favour the other accommodation sector. The demand for campsite accommodation is strongly correlated with the use of cars as the transport mode. A recent survey by the European Travel Monitor considered the mode of transport used for international trips. This indicated that international tourism from Luxembourg, the Netherlands, Germany and Belgium tends to be car based and therefore more likely to use other accommodation. Very few international tourists from Ireland, Greece and the United Kingdom use car for even part of their travel, which indicates a lower demand for other accommodation. The opening of the channel tunnel is likely to stimulate international car travel between the United Kingdom and mainland Europe, which should in turn increase demand for the non-hotel accommodation industry as UK residents avail of the opportunity to tour Europe without incurring the expense of car-hire.

Citizens of Denmark, the Netherlands, France, Belgium and Luxembourg tend to have higher caravan ownership and would therefore tend to have a greater demand for campsite and caravan park accommodation.

The demand for social tourism accommodation is most prevalent in France and Belgium where a certain part of the population who are unable, generally for financial reasons, to go on holidays are encouraged to do so. Under social tourism schemes accommodation is made available for people in low incomes, pensioners, large families and the handicapped. The schemes either provide holiday vouchers or aid for constructing tourist facilities. In France vouchers are distributed by the Agence Nationale pour les Chèques-Vacances (ANCV). These vouchers are accepted by 30 000 establishments and more than 2.5 million French people benefited from the scheme. In 1990, 190 million FF or two fifths of the expenditure was spent on other accommodation with the majority spent at social tourism establishments and rural gîtes. There is still potential for growth in social tourism since there is

Table 5: Other accommodation
Camping and tourist villages

(number of bed places)	1985	1986	1987	1988	1989	1990
Belgique/België	340	357	358	354	378	373
Danmark	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	34	34	32	24	24	23
Hellas	67	65	69	77	78	82
España	385	406	438	457	470	571
France	2 407	2 471	2 446	2 451	N/A	N/A
Ireland	N/A	N/A	N/A	N/A	N/A	N/A
Italia	1 055	1 095	1 142	1 145	1 173	1 181
Luxembourg	N/A	N/A	13	12	12	12
Nederland	1 568	1 560	N/A	517	500	494
Portugal	215	231	246	248	257	261
United Kingdom	N/A	1 129	1 204	1 229	N/A	N/A

Source: Eurostat

Table 6: Other accommodation
Social tourism accommodation establishments

(number of bed places)	1985	1986	1987	1988	1989	1990
Belgique/België	48	53	55	62	71	69
Danmark	N/A	N/A	N/A	N/A	N/A	N/A
BR Deutschland	240	241	251	254	255	253
Hellas	N/A	N/A	N/A	N/A	N/A	N/A
España	N/A	N/A	N/A	N/A	N/A	N/A
France	20	20	N/A	N/A	N/A	N/A
Ireland	N/A	N/A	N/A	N/A	N/A	N/A
Italia	8	149	95	92	69	73
Luxembourg	1	1	1	1	1	1
Nederland	9	9	N/A	48	49	50
Portugal	9	9	1	11	12	11
United Kingdom	N/A	102	107	123	N/A	N/A

Source: Eurostat

latent demand for this type of holiday and for the associated accommodation.

The rapid growth in short break and week-end holidays has led to an increase in the demand within some sectors of the other accommodation market. Generally this sector will not benefit to the same extent as the hotel sector since many of the establishments are not suited for short breaks, and would not attract the higher income groups that can afford second holidays. The demand for caravan parks, campsites, holiday apartments is not likely to rise significantly. Integrated resorts and bed and breakfast style accommodation are more suited for short breaks and demand for this type of accommodation has increased as a result of the growth in the short-break market.

At present demand from eastern European countries is very low. It is expected that tourism flows from these countries will increase rapidly as their economies improve. However the low income levels in these countries will lead to a higher proportion of holiday makers using non-hotel accommodation, with the demand for budget accommodation such as campsites increasing.

The majority of EC holiday makers travel to the seaside, over 50% in 1985, and their holidays are very weather dependent. Nearly a quarter of all Europeans spent their holiday in the country. These holidays tend to be less weather dependent. Rural tourism has shown stronger growth than sun and beach tourism. In France where rural tourism has been promoted by the government 80% of visitors are travelling independently, 20% are foreigners, and 30% are on short-breaks.

The demand for non-hotel accommodation amongst long-haul travellers is generally very low. The industry has therefore not suffered as much as the hotel industry from the decline in US visitors associated with the Gulf War and the recession in the USA. The growth in long-haul tourism originating in the Member States is unlikely to have much impact on the non-hotel accommodation sector since many of these tourists would not have used this type of accommodation.

Supply and competition

The supply of other accommodation varies dramatically within segments of the industry. Integrated resorts and timeshare developments tend to be capital intensive with organised management structures. Similarly apartments and villa based establishments tend to be capital intensive and many of them are marketed through travel agents and as part of package holidays. At the lower end of the scale campsites and caravan parks tend to be less capital intensive whilst temporary accommodation in bed and breakfast establishment may be provided by altering the use of existing buildings rather than constructing new ones. Barriers to entry in the integrated resort and timeshare markets exist in terms of the high set up costs and the long lead in time associated with purpose built resorts.

Table 7: Other accommodation
European timeshare industry

(thousand households)	Timeshare owners' residence 1990	Location of timeshare 1987	Location of timeshare 1990	change (%)
Benelux	9	N/A	N/A	N/A
BR Deutschland/Austria				
España	3	107	200	87
France	60	45	55	22
Italia	40	30	40	33
Portugal	15	10	50	400
United Kingdom/Ireland	220	35	50	43
Scandinavia	40	15	20	33
Switzerland	70	20	30	50
Other	3	5	15	200
Total	460	267	460	70

Source: RCI/Hapmimag/Holiday Property Board (HPB)

Table 8: Other accommodation
International tourist trips from EC Member States by mode of travel (1)

Member State	Car (%)	Plane (%)	Coach (%)	Train (%)	Total trips (million)
Belgique/België	52	23	14	9	16.5
Danmark	37	38	15	12	5.9
BR Deutschland (2)	55	27	25	11	65.2
Hellas	18	54	23	5	2.3
España	35	35	25	8	7.2
France	38	49	18	13	14.8
Ireland	14	73	8	5	1.2
Luxembourg	62	12	19	7	0.4
Nederland	59	24	13	9	16.7
Portugal	45	28	24	8	1.8
United Kingdom	25	67	14	5	26.7

(1) The percentages may not sum to 100 as two answers are possible.
Figures for Italy were not available
(2) Includes the former East Germany
Source: European Travel Monitor (ETM), 1990

At the lower end of the market, in particular campsites and caravan parks, the set up costs are much lower and market entry is easier.

The supply of other accommodation tends to be seasonal in nature and a number of caravan sites and non-hotel accommodation establishments operate at full capacity in the summer while providing limited or no accommodation in the winter. There therefore tends to be over capacity for much of the year and shortages at peak times. In contrast integrated resorts, theme parks and timeshare accommodation provide service all year round and use significant price differentials in order to spread demand.

The supply of social tourism accommodation is dependent upon state funding and many of these establishments are in need of modernisation and upgrading. This segment competes with the commercial accommodation sector and is seen by some as unfair subsidised competition. However, this type of accommodation is aimed at a particular market segment and is designed to stimulate latent demand rather than divert existing holiday-makers.

A number of non-hotel establishments providing similar services to hotels, tend to compete with hotels towards the lower end of the market. Thus tourists might be faced with the choice of hotel or self-catering apartment. Competition within the bed and breakfast market has lead to improved quality and has thus brought about more direct competition with hotels.

Tourists in the non-hotel accommodation sector are clearly becoming more demanding and expect higher standards of comfort and facilities (e.g. sanitation, catering and sports facilities). In France, for example, around one fifth of camping sites have a swimming pool and/or at least one tennis court. The trend is therefore to improve the quality of the facilities and services supplied by the industry. There is, however, still considerable divergence both within and between Member States.

Table 9: Other accommodation
Number of touring caravans per 1 000 passenger cars, 1986

Belgique/België/Luxembourg	54
Danmark	62
BR Deutschland	26
Hellas (1)	15
España (1)	10
France	56
Ireland	19
Italia (1)	12
Nederland	71
United Kingdom	28

(1) Estimates
Source: European Caravan Federation

Competition in the non-hotel accommodation varies between Member States. In some Member States the market tends to be mainly domestic and the consumers choose between different regions. The other accommodation sector in southern Member States tend to attract a higher proportion of foreign visitors. It is estimated that nearly 70% of campsite users in Greece are from abroad. There is therefore an element of competition, particularly between other accommodation situated in coastal areas where the foreign tourists are sun seekers and less concerned by the cultural and heritage aspects of their holiday.

The opening of borders with eastern Europe has increased the competition for non-EC accommodation. This new market appears to be diverting visitor flows away from EC Member States. ETIC data indicates that nearly 7 million international trips were made from EC countries in 1990. A recent report for the EC Commission by IPK Munchen found that east European countries such as Hungary, Poland, Romania, Czechoslovakia, and Bulgaria generate healthy balance of payments surpluses on their tourism accounts.

Production process

The services provided by non-hotel accommodation vary widely across the industry. At one extreme campsites and caravan parks may provide a pitch or area of land as well as basic amenities, other establishments such as self catering apartments may provide accommodation while integrated resorts often have restaurants, bars, shops and health and leisure facilities. The variety of facilities and services being provided means that the production process differs significantly throughout the industry.

Campsites and caravan parks tend to be the most land intensive. Generally the industry is not as labour intensive as the hotel industry, since there are fewer services for the residents and there is usually an element of self catering. Many of the workers tend to be part-time, for example at campsites and ski resorts, and in the smaller establishments, such as bed and breakfast, family and female labour is used. The integrated resorts tend to be more labour intensive and the skills are similar to those in the hotel industry.

Table 10: Other accommodation
Distribution of Club Med villages in Europe, 1991

Country	Number of villages (1)	Number of beds (1)
EC	37	26 555
France	17	8 414
Italia	7	7 883
Hellas	6	5 094
España	5	4 241
Portugal	1	751
Ireland	1	172
Other Europe	18	11 835
Switzerland	10	4 661
Turkey	5	4 164
Yugoslavia	2	2 080
Bulgaria	1	930
Total	55	38 390

(1) On October 1, 1991
Source: Club Med

The majority of the establishments are not technology intensive. Some sectors such as theme parks which provide other accommodation use computer reservation systems (CRS), as do the apartments and villas which are marketed as part of a package holiday. Many small operators rely on local adverts or links through tourist agencies. Smaller pensions and bed and breakfast rely upon guide books and literature rather than travel agents.

INDUSTRY STRUCTURE

Companies

The pattern of campsite and caravan park ownership varies within the EC. In France, municipal authorities have traditionally been a major force in the ownership of camping sites but more recently the private sector has increased its presence and now has 54% of sites and 60% of pitches. Private sector sites are overwhelmingly in the hands of small businessmen typically running just one site although some of these may operate a number of sites within a region. The industry is very fragmented and dominated by a large number of small enterprises. There are a number of larger players who run organised campsites where the camping equipment is provided on site. For example Haven Spain and France Holidays, a subsidiary of the Rank Organisation which also owns the Butlins holiday resorts, offers 37 parks in Spain and France varying in size from under 250 to over 500 pitches. Similarly Keycamp holidays offers 75 campsites throughout Europe including mobile homes.

The integrated resort sector of the non-hotel accommodation industry has developed over the last 10 to 15 years. This represents a much more concentrated sector. The leading developers of health and leisure centres have been Dorent in Germany, Gran Dorado, Sun Parks and Center Parcs in France and Benelux, and the Sandcastle Centre and Center Parcs in the United Kingdom. The concept is highly developed in the Netherlands where the market is dominated by Center Parcs, in the United Kingdom the demand is still uncertain. In 1990 there were over 400 000 villa rentals and nearly 2.1 million visitors in the Benelux properties.

Club Med is an upmarket tourism product designed for those who enjoy activity holidays. It is based on a system of holiday villages and Club Med currently has around 105 holiday villages with a capacity of close to 68 000 beds in 34 countries around the world. Europe accounts for 55 villages and 38 390 beds (see Table 10).

The new Euro Disney resort in France is the largest theme park to have been developed in Europe and offers non-hotel accommodation including 14 rustic lodge sites with over 1 000 rooms and 400 wooden cabins. France has a further 35 recreational parks and 30 aqua parks. In the United Kingdom many of the theme parks are geared to day trip or the short break market and generally don't include accommodation, examples of this are Blackpool Leisure Beach and Alton Towers in the midlands.

Social tourism initiatives tend to be concentrated in Belgium and France. The VVF (Villages Vacances Familles) in France provide subsidised accommodation and has a capacity of 186 villages with a total of 67 000 beds and an annual turnover of 190 million FF. VVF was largely instrumental in setting up Euro-villages, which now has members in France, Belgium, Germany, Switzerland, Italy, Spain and Portugal.

Strategies

The general strategy within the other accommodation industry has been to improve the quality of the accommodation and facilities. Campsites now offer swimming pools, sporting facilities and even cinemas and discos.

The concept in the more sophisticated integrated resorts has been to transfer the ambience and environment of tropical resorts to northern European locations. These resorts also tend to be of a higher quality than the traditional resorts with swimming pools, tennis courts, restaurants and comfortable accommodation.

These resorts also tend to be more activity based with numerous sporting and leisure facilities, and most importantly of all a guaranteed environment all year round. The primary target group is families with small children.

The success of the timeshare establishments is largely due to their ability to offer exchange location. This initiative means that the owner does not have to return to the same resort every year. They are able to exchange their accommodation for another resort by using the services of the exchange companies. For example the owner of a timeshare in Tenerife may choose a holiday in France

REGIONAL DISTRIBUTION

Traditionally the location of other accommodation establishments has followed demand rather than leading it. Unlike hotels, other accommodation tends not to be concentrated in major cities, but is rather located away from these centres. This reflects the close ties with tourism traffic and in some cases the industry's dependence on climatic factors. The distribution of other accommodation establishments varies from country to country and depends upon the nature of demand and the type of establishment. Camping and caravan sites, and to a lesser extent second homes and timeshare accommodation, are generally located in coastal areas.

The emphasis for many of the other accommodation not found near the coast is rural areas. These include caravan and campsites as well as farmhouse accommodation. Theme parks such as Center Parcs and Sun Parks are not as dependent upon their location as they are activity based and generally self contained. Center Parcs in the Netherlands and the United Kingdom tend to be located in rural and forest areas.

ENVIRONMENT

In general the non-hotel accommodation sector has developed without major damage to the environment. Many of the subcategories such as rural tourism, camping and caravaning depend upon their location and environment as a major selling point. There is however scope for other accommodation establishments to become more environmentally friendly. Since

many of the users are independent travellers there tends to be a high proportion of car usage associated with this type of accommodation. A green paper from the EC indicates that the use of car as opposed to rail or bus increases congestion, produces more pollution and is a less efficient use of energy. At 25% occupancy levels railways use less than half as much energy per passenger kilometres as small engined cars. There may be scope to develop alternative modes of transport or to spread the peak season so that some of the negative environmental impacts associated with the car are reduced.

Under new EC legislation, an environmental impact assessment is required for large infrastructure projects. Since many of the non-hotel accommodation establishments are either small in nature or not capital intensive this is unlikely to have an impact on these areas of the industry. In the case of the development of integrated resorts and timeshare resorts there may be a need to increase environmental awareness. However, these resorts benefit from a clean environment and it is in the interest of the developers to ensure that any new developments blend in with their surroundings.

One area where the non-hotel sector has had a detrimental impact on the environment is in overcrowded holiday resorts where a large number of apartment blocks, generally linked to package holidays, have been crammed into coastal locations. Examples of these may be found on the Costa del Sol in Spain, in the Algarve in Portugal as well as on a number of Greek Islands.

There exists therefore a potential to improve the environmental record of some of the other accommodation sectors. The construction of new establishments might be controlled in terms of density, materials chosen, location and more sensitivity to the regions heritage and natural/historic environment.

REGULATIONS

Caravan parks and campsites are affected by a number of regulations both locally and nationally. These regulations vary across Member States but tend to cover the use of the parks in terms of the maximum number of pitches, the minimum size of the site, adequate drainage of the site, access to and within the site, car parking provision associated with the site as well as toilet and water facilities. In Ireland, for example, the minimum number of lettable pitches is 20, the density of the pitches should not exceed 20 per suitable acre, there should be one car parking space per pitch, a suitable hard standing service for caravan pitches and a set number of toilet facilities and water outlets depending upon the size of the park. In Spain the camping regulations are under the authority of the autonomous region, in Italy there are some common requirements nation-wide as well as regional legislation on the campsites within each region.

Regulations generally limit the proportion of fixed facilities that may be allocated to holiday parks, 15% to 20% is a typical ratio. The attractions to the operator of developing fixed facilities lie in the higher rent and profit levels available. There are a large number of parks which cater for fixed facilities, the caravan and mobile home owners usually pay an annual rent for the site. These parks are not regulated in the same way as touring or tourist parks since they are not open to tourist, they are however subject to similar regulations.

Caravan parks and campsites along with other accommodation establishments are governed by national regulations covering sanitary services, fire services and safety, food hygiene, and where appropriate licensing regulations related to the sale of alcoholic beverages. As well as these national regulations there may be a number of local regulations with which the establishments must comply. Examples of these include government planning and development acts, and local by-laws on access roads, and sewage disposal.

Generally the non-hotel accommodation is regulated in terms of the amount it may charge for the facilities it provides. The scale of charges for different types and sizes of accommodation are normally regulated at a national level.

Some of the larger accommodation providers within the other accommodation industry may be affected indirectly by EC regulations. The recent directive on package holidays may well affect a number of the suppliers providing apartments, villas, chalets or other accommodation as part of inclusive tour packages. Within the package holiday directive tour operators may be held liable if customers are not satisfied with their accommodation or if the facilities are not a true reflection of those advertised.

Forthcoming consumer legislation on access to computer reservation systems (CRS) may affect the way in which package holidays incorporating other accommodation products are sold. A proposal for a Council Directive on timeshare has been submitted on 2 July 1992. One of the fundamental problems is that national legislation cannot cover sales practices in another jurisdiction. In the United Kingdom the Office of Fair Trading (OFT) investigated the techniques involved in the sale of timeshare accommodation. The recommendations from the United Kingdom and Spain include the development of more acceptable practices including a cooling off period and the option to withdraw from the sale within seven days. The UK's minister for consumer affairs is now discussing the matter with the European Commission in order to seek the establishment of European law pertaining to timeshare sales throughout the EC.

Regulations on the harmonisation of VAT, will increase the price of non-hotel accommodation and reduce competitiveness relative to extra-EC destinations. However like the hotel sector the rate of VAT applied over the transitional period will be at the reduced rate which has not been agreed yet but will exceed 5%.

Table 11: Other accommodation
Expected real annual growth rates

(%)	1992-93	1992-96
Turnover	7.0	6.0
Employment	2.0	2.0

Source: Fitzpatrick Associates

OUTLOOK

It is difficult to provide an outlook for the non-hotel industry as a whole. While the demand for other accommodation in some Member States has experienced relatively steady growth over the last decade, for example in France, Spain, Greece and Italy, in others, such as Germany and the Netherlands, growth has been more static.

There is also variation within different sectors, with lower growth and in some cases a decline in the traditional holiday resorts in Spain and Portugal, and strong growth in theme parks and integrated resorts in northern Europe. While the development of timeshare accommodation slowed towards the end of the 1980s the number of owners is forecast to grow from approximately half a million in the early 1990s to around 1.5 million by the year 2000.

Over the next decade global demand for non-hotel tourist accommodation will continue to grow at a relatively rapid pace. Increased leisure time and disposable income coupled with more diverse products is likely to lead to an overall increase in demand. The general movement away from traditional resort holidays may adversely affect some areas of the

industry but generally increased growth will result from the shift towards more independent holidays and the demand for more adventurous holidays.

The shift towards new, higher quality and year round products is likely to continue. The use of CRS and the development of activity and theme holidays around non-hotel accommodation packages will attract new clientele and ensure that value for money is maintained without a loss in quality. Growth in guest-nights in 1992 should pick up substantially on 1991 and remain steady, at 6-7% per annum over the following three years.

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Travel services
NACE 771

Although 1991 was a difficult year for many companies involved in the travel services branch of the travel and tourism industry, there are indications that the public is turning more towards the trade to book travel arrangements. However, as travellers become more sophisticated in their demands, the inclusive tour package (IT) is losing favour to individually tailored products. Trends in both the business and leisure travel markets suggest value for money is an increasingly important criterion. The future success of individual companies in the sector will depend largely on their ability to meet these changing demands and this, in turn is likely to be linked to their ability to stay ahead of technological developments in the field and to strengthen their presence throughout the EC by acquisitions, mergers and other collaborative ventures.

INDUSTRY PROFILE

Description of the sector

The activities of the travel and tourism industry do not fit readily into standard international definitions. Operations and activities of the travel services branch which can be said to comprise retail travel agencies, tour operators, ground handling services and even car rental are often indistinguishable from other related sectors of the industry. As car rental is covered in chapter 2415, it is not discussed in this chapter on travel services. There is considerable vertical integration in the European travel industry. Hotels, airlines and other transportation companies all can and do have their own tour operating subsidiaries, developing either fully inclusive tour packages or partial package arrangements to help fill airline seats or hotel rooms.

Moreover, the majority of travellers, whether business or leisure, do not use the services of tour operators or travel agents to make their travel arrangements. They either book their transportation direct with airlines and other suppliers, or travel by private car, the dominant mode of transportation in Europe. A significant share of hotel and other accommodation reservations are also made directly. In addition, other organisations provide part of the services available from companies in the travel services branch. These include motoring associations, tourist offices and non-profit bodies such as trade unions, clubs, company staff associations and media groups. In some EC states, there are "social tourism" organisations which provide low cost holidays.

The difficulties in evaluating the importance of even the core sector activities are compounded by the fact that relatively few companies release operating figures, let alone consolidated results. The industry can be measured in terms of number of sales passengers/clients or volume of sales. The latter terminology is also confusing, since there is frequently no distinction made between real turnover and sales volume. Passenger figures in relation to travel agency sales cannot be readily equated with the number of holidays sold by travel agents, since the real value of the agent's sale is only the commission. Employment poses further problems, since employment in the tour operating and ground handling service sectors is highly seasonal and, therefore, fluctuates widely with no common conversion factors for part-time to full-time jobs.

The distinction between business and leisure travellers has always been difficult to identify and is becoming more so with the disappearance of border controls. Balance of payments data are generally used to measure the currency flows generated by travel and tourism. Often they provide an inaccurate measure since data collection methodology and analysis vary widely from country to country. With ongoing liberalisation of exchange controls, it has become even less useful.

Table 1: Travel services
West European outbound trips, 1991

	1991	% change 1991-90
Trips (million)	202.0	-1.4
Overnights (billion)	1 950.0	2.0
Average length of trip (no. of nights)	9.7	2.0
Spending on travel abroad (billion ECU)	147.0	2.6

Source: European Travel Intelligence Center: European Travel Monitor

Profiles of the leading travel and tourism groups in the travel services branch illustrates that the industry generally not built on a combination of the three core sectors (tour operating, retail travel and ground handling), nor even with an emphasis on one or two of them. In fact, only one of the top ten groups in the industry in the EC is wholly focused on this sector.

Main indicators

The only comparable data on the economic contribution of travel and tourism in the different EC Member States, and in the other countries, concerns the travel and tourism industry as a whole. A good source of information is the latest WTTC Report "Travel & Tourism in the World Economy". The 1992 edition is the second of an annually conducted study commissioned by the World Travel & Tourism Council from the WEFA group (Wharton Econometrics & Forecasting Associates). It estimated that there were 14 million people employed in the travel and tourism industry in the EC in 1990, generating gross output of 590 million ECU of which 290 million ECU was value-added.

According to the European Travel Monitor there were over 200 million outbound trips in 1991, over half of which involved some kind of bookings through the travel trade. About 30% are fully inclusive tour packages (ITs), usually off-the-shelf programmes developed by tour operators, and 23% of trips involve either part package arrangements, or transportation and/or accommodation booked through a retail travel agent. An additional 12% or so concern arrangements for transportation or accommodation booked directly with suppliers, and the remainder are fully independent trips, which have no prebooked arrangements.

Relative shares vary widely across markets but in general, the share of fully inclusive package tour arrangements has been slowly declining since the late 1980s, in favour of partly booked trips. This trend has been particularly marked in the low budget sector of the market, notably for trips from northern Europe to the traditionally popular sun and beach holiday spots in the Mediterranean.

Airline ticket sales channelled through IATA's (International Air Transport Association) Bank Settlement Plan (BSP) also provide an indication of the use of travel agents. The net sales volume of airline tickets issued by the BSP around the world in 1990 was 26.6 billion USD. Countries in Europe generating the highest sales volume through BSP were the United Kingdom, Germany and France. However, the decision by IATA to broaden the customer base of the BSPs and to encourage participation by other travel industry service suppliers such as railways, shipping lines, car rental companies, etc. means the figures are not totally reflective of travel agency sales alone.

Data on turnover in travel agencies and tour operating enterprises is available from the European Community Travel

Table 2: Travel services
Sales through IATA's BSP in Europe, 1990

Area	Number of approved locations	Number of participating airlines	1990 net sales volume (million ECU)
Belgique/België/Luxembourg	348	162	595
France	2 207 (1)	81	2619
BR Deutschland	2 153	87	3 489
España	2 987	47	1 806
Hellas	289	40	277
Ireland	256	28	220
Italia	2 262 (1)	62	1 848
Nederland	328	65	868
Portugal	380	30	255
United Kingdom	4 812	91	5 218
Austria	169	52	315
Finland	237	29	98
Scandinavia/Iceland	836	53	2 331
Switzerland/Liechtenstein	510	70	861
Turkey	128	32	126

(1) Includes domestic only agents
Source: IATA (International Air Transport Association)

Table 3: Travel services
Turnover of travel agencies and tour operating enterprises

(million ECU)	1991
Belgique/België	2 476
Danmark	528
BR Deutschland	8 048
España	8 449
France	8 683
Italia	8 600
Portugal	933
United Kingdom	16 901

Source: ECTAA

Agency Association (ECTAA) for a limited number of EC states. This indicates that turnover is highest in the United Kingdom, although the relatively low level indicated for the former West Germany casts some doubt on comparability.

Recent trends

Data on travel agency operations do not always distinguish between wholesaling and retailing activities. In a number of EC countries, there is little difference between a tour operator and a retail agent. Figures released by the European Community Travel Agency Association (ECTAA), the grouping of national travel agents' associations within the EC, indicate that the retail travel agency sector is expanding slowly. This evidence is not conclusive, however, and may reflect increasing membership of national organisations.

On the other hand, analysis of travel agency sales of airline tickets indicates significant growth both in the volume and the number of locations. The United Kingdom, however, is an exception, in that significant growth in sales was accompanied by a decline in the number of locations.

The apparent increase in number of travel agencies in the EC has been accompanied by growth in employment in some Member States, particularly in Spain, Italy and Portugal.

The recession and Gulf War had a significant impact on the airport bookings sector in 1991. This sector, which accounts for between 20 to 30% of the total market, is very high yield. But sales through airport offices and concessionaires were

Table 4: Travel services
Number of travel agencies in the EC

Country	1989	1990	1991
Belgique/België	1 030	1 050	1 068
Danmark	400	360	400
France	2 157	2 300	2 316
BR Deutschland	9 250	9 800	9 500
España	1 900	1 800	2 270
Ireland	318	330	N/A
Italia	4 682	4 890	4 980
Luxembourg	25	25	N/A
Nederland	647	672	N/A
Portugal	N/A	666	683
United Kingdom	N/A	4 302	6 093

Note: no information available for Hellas
Source: ECTAA

Table 5: Travel services
Airline ticket sales through travel agencies

Country	Agency locations 1987	1988	1989	1990	Net sales (million ECU) 1987	1988	1989	1990
Belgique/Luxembourg	300	375	338	348	467	413	539	595
France	1 659	1 721	1 980	2 207	1 107	1 697	2 069	2 618
BR Deutschland	1 605	1 764	2 051	2 153	980	1 499	2 989	3 489
Hellas	147	246	283	289	10	211	266	277
España	2 260	2 587	2 932	2 987	1 231	1 198	1 559	1 806
Ireland	204	228	245	256	142	153	203	220
Italia	1 821	2 003	2 266	2 262	1 693	1 395	1 626	1 848
Nederland	264	294	315	328	590	637	786	868
Portugal	219	318	365	380	10	163	207	255
United Kingdom	5 004	5 263	4 904	4 812	3 452	3 236	4 502	5 216

Source: IATA as quoted in Travel Business Analyst

down by 15 to 20%. Nevertheless, rental operators are seeking to extend their airport presence in anticipation of a return to a period of air traffic growth.

International comparison

Europe attracted close to 62% of worldwide international visitor arrivals in 1991, or 277.4 million, down 2% over 1990. Despite continued growth in arrivals and revenues, Europe's relative share of world tourism has been declining since the early 1960s. While data from the World Tourism Organisation (WTO) indicates that western Europe's share rose between 1980 and 1985, it fell back rapidly over the latter half of the decade to 52% in 1990. Five EC countries are in the top ten international tourism spenders, with Germany number two in the world after the USA.

Foreign trade

European inbound tour operators, handling incoming business from overseas markets, claimed increases in revenues and client numbers of up to 30% from 1987 to 90, although the Gulf War and the economic recession in major markets like Japan and the USA resulted in a decline in inbound visitor arrivals in Europe in 1991.

In the majority of cases, global estimates of travel to Europe can only be extrapolated from national visitor arrivals' and outbound travel statistics. Most visitors to Europe cover more than one country on their trip and are often counted twice by one country in Europe such as when they use the same country as gateway and departure point. So individual destination arrivals cannot just be added together. Airline statistics, where available, cover all passengers and not just those resident in the respective source markets, and visa statistics are difficult to obtain and frequently unreliable. Moreover, a significant share of long haul visitors do not use the services of the travel trade.

EC countries generated about 72% of the total international trip volume of 202 million from all European countries in 1991. This was 1.4% down compared to the previous year. The EFTA countries and Eastern Europe accounted for 14% each. Foreign travel accounted for an estimated 21% of trips (1990 data), although the relative share of foreign trips varied sharply from market to market.

In terms of destination share of travel and tourism, EC countries attract an estimated 58% share of all European trips. Although there has been a decline in Europe's share of worldwide international tourism, the region's importance as a tourist destination for travellers from outside Europe has continued to grow year by year.

MARKET FORCES

Demand

The final consumers of the travel services product are all those who take holidays or who travel on business although there can be intermediaries, such as clubs and associations, or corporations buying on behalf of their travelling staff. Official data on travel demand are difficult to compare country

Table 6: Travel services
Employment in travel agencies in the EC

	1989	1990	1991
EC 11	179 078 (1)	154 210 (2)	N/A
Belgique/België	5 500	5 600	4 800
Danmark	5 000	4 900	4 800
France	N/A	24 700	26 300
BR Deutschland	45 000	47 000	48 000
Ireland	N/A	2 500	N/A
Italia	23 878	24 920	29 400
Luxembourg	100	100	N/A
Nederland	7 500	7 500	N/A
Portugal	5 100	5 490	5 560
España	29 000	31 500	34 650
United Kingdom	30 000	N/A	N/A

(1) 1989 figure excludes Ireland
(2) 1990 figure excludes United Kingdom

by country. Private sector sources of statistical information do exist, but these data are generally confidential, reserved for paying clients.

60% of the Europeans take at least one trip a year, of one night or longer away from home. The level of trip-taking varies widely from country to country, ranging from as high as 87% in Iceland to 51% in Portugal, and still lower in the countries of Eastern Europe. The proportion of Europeans who take a leisure or business trip abroad tends to be considerably lower. The average share of all Europeans who travel abroad is around 26%, although the level of travel abroad is actually higher than domestic travel in some markets, notably Belgium, Luxembourg, the Netherlands and West Germany. Domestic travel tends to decline in favour of foreign travel as the market becomes more travel experienced.

The level of trip-taking is very much affected by income, educational and social status. When income rises travelling tends not to be limited to just one trip per year. In addition, business travel is usually much more frequent than leisure travel. In the less mature European markets, the cost of travel is also an important deterrent to foreign holidays, especially for markets located at great distances from the popular holiday destinations, like Greece and Portugal.

Most business travellers use the services of the travel trade for airline travel, though it is fairly common for corporations to deal directly with hotel chains when they can get a better deal for room accommodation, and with the railways and car rental companies for ground transportation. New technology is opening up the tourism industry, as well as improving communications. This can have both negative and positive effects. On the one hand, it is easier for people to book their own travel directly with airlines, hotels and other suppliers. On the other, travel agents are better able to respond to the increasing demand for more tailor-made products. While dedicated software enables access to information on travel and accommodation to the travel section of large corporations, only travel agents and airlines can issue tickets. This has helped maintain the role of travel agents in the face of technological developments but in the medium term there may be pressure for allowing large corporate access to blank tickets. Similar constraints have lessened the impact of information systems such as Minitel on travel agency sales, although Air France flights can be booked directly with tickets purchased at airports.

The extent to which Europeans planning holidays in or outside their own countries will use a travel agent depends heavily on how they plan to travel, what type of accommodation they will use and whether they speak the language and/or are familiar with the destination country. The majority of domestic holidays bypass the travel services branch completely, with people travelling by car to their destination and staying with family, friends, in their own or rented holiday accommodation.

A number of different factors have affected demand for travel and for travel services. Price is among the most important, as are political factors, the different taxes on travel, notably on air travel, and exchange rate fluctuations.

Increased airline liberalisation will allow greater access to markets by a greater number of carriers. It will put downward pressure on fares, compensating for possible VAT increases, but on many routes it is difficult to see fares falling below current levels. The increasing liberalisation of air transport in Europe in the run up to 1993 generated increased competition, resulting in an enormous passenger traffic growth generated since the mid 1980s. This has caused severe capacity constraints and delays at airports, dissuading some people from travelling by air.

Health risks and environmental damage are also examples of factors affecting tourism demand. There have been increasing concerns over dirty beaches and polluted bathing waters in the Mediterranean and other popular tourist resort areas and a desire for improved quality. Some travellers have shunned tour operators and destinations that have received bad publicity over their environmental record.

A lack of suitable products has impacted on demand from certain sectors of the market, particularly older people. The travel trade is well aware of the ageing of the European population, but the 55-plus age sector of the market is not always well understood.

There has been a wide range of new products and programmes introduced on the market over the last few years in Europe. These have both helped to stimulate travel and tourism to less developed regions and to encourage a better off-season utilisation of facilities. However, most of these new products have been targeted at people who already travel at least once a year away from home for holidays or other leisure purposes. Few have addressed the issue of people not travelling at all. The result has been an increase in number of trips per person travelling and notably, an increase in trips abroad. But the share of Europe's population that does not travel has changed very little. One of the fastest growing sectors is the short break market or trips of one to three nights. The bulk of short break travel does not use the travel services branch, but there has been strong growth in the commercial sector. Not just tour operators, but also airlines and hotel groups have launched their own programmes. Rural and urban tourism have also registered above average growth in the last couple of years, both in domestic and international markets. And in general, travellers are becoming more adventurous and activity oriented.

Shifts in demand towards long-haul travel are a two-edged sword for the travel services industry. On the positive side long-haul travel arrangements are more likely to be booked through an agency, but on the negative side the economics of long-haul charters are such that they are often relatively less profitable (more expensive "empty-legs" to cover at the beginning and end of the season). Increases in long-haul travel into Europe will benefit ground-handlers and car-hire.

Supply and competition

Supply is in general more than adequate to meet demand. There is clearly no shortage of travel agencies or tour operators from which to choose. The suppliers of the travel and tourism industry (i.e. airlines, hotels, etc.) are cyclical industries and this can have repercussions on the availability of seats and rooms at peak seasons. On balance, consumers are in a buyer's market and this is reflected in price-setting and margins.

Travel services for corporate travellers on business trips can cover a wide range of products, not just transportation tickets and hotel reservations. Car rental, theatre and restaurant bookings, visas, the provision of travellers' cheques and foreign currency are all part of the package of services offered. There are also increasing expectations for these services, in terms of price advantages and quality, since corporate travellers provide frequent high yield business.

Demand for travel services from leisure travellers is met by tour operators and/or retail travel agents. Car rental bookings are either handled by travel agents, or direct by suppliers. The tour operator is effectively a wholesaler combining travel, accommodation and ground handling services in a single package. The increasing independence and sophistication of leisure travellers are reflected in the product range.

The travel and tourism industry is highly price sensitive in most EC states. This appears to be less the case in countries where the industry is more fragmented. The price/quality trade-offs are also not the same for all groups and all nationalities. Pressure on prices comes from the nature of the demand, but also from the nature of the production process. The industry gains pricing advantages from bulk buying. But it has to ensure

Table 7: Travel services
Leading travel and tourism companies in the EC according to turnover, 1991

(million ECU)	Turnover 1991	Financial year ending
TUI	2 590	10.91
Wagons-Lits	2 171	10.91
Thomson	1 644	12.91
NUR	1 220	10.91
LTU (2)	1 130	12.91
Club Méditerranée	1 115	10.91
DER	1 056	12.91
ITS	963	10.91
Havas	958	12.91
Owners Abroad	916	10.91

(1) Figures for Club Méditerranée and Wagons-Lits are provisional. Figures released by TUI, NUR, LTU, DER, ITS and Havas are not consolidated in accordance with EC or international standards. TUI includes turnover of all groups in which it has less than a 100% stake pro rata to the turnover. This probably overstates the TUI performance. Figures for the other groups are more closely correlated with normal consolidation practices
(2) LTU has since acquired Thomas Cook from the Midland Bank.
Source: The Western European Package Travel Industry; EIU 1992

that once it has factored in its own operational costs staffing, catalogue production, advertising, computer reservation systems, travel agents' commissions the end result is a product which is still competitive with the product the consumer could put together himself.

Competition forces operators to keep price increases to a minimum, and this is achieved through bulk buying of seats and rooms, in some cases owning several stages in the production process, and by switching more capacity to and promoting more heavily lower cost destinations.

Production process

The main capital good employed, except in cases where the travel company owns its own aircraft or accommodation, is access to computerised reservation systems (CRS). The cost of these can range from a few thousand ECU to tens of millions, depending on the solution adopted. There is constant pressure to upgrade technology. Leading operators aim to provide real time connections with the consumer through travel agents (or their own sales outlets) with instant confirmation of bookings. In addition to the costs of CRS access, hardware costs and expenses for dedicated data lines, travel agencies in some Member States also require substantial finance for government "loading" schemes.

Besides the employment of quality management, the travel agency industry EC wide attracts counter staff who are generally relatively unskilled and badly paid. The industry attracts labour because of its glamorous image and the perceived possibility of free or low cost foreign travel. Labour turnover tends to be high as this perception is frequently not realised, or the realisation is not sufficient to compensate for the disadvantages of the job. Major travel agencies train their own staff, but much training is on the job, or through familiarisation trips to destinations or on courses run by tour operators. The tour operator sector and ground handling companies require seasonal workers, generally with human relations and language skills, to work at destinations during the season. No labour cost data are available and value added concepts do not apply.

Product innovation in the business travel sector takes the form of improvements in comfort, speed of service and of travel, and in flexibility at competitive prices. One significant new development in the industry in the last five years has been the merger of networks among business travel agents, as an alternative route to international expansion. EC travel agents are prominent members of these. The two largest are Business Travel International (BTI), incorporated in the Netherlands, and Internet. The EC members of BTI in mid 1992 were Holland International (NL) and its Belgium subsidiary Transintra, El Corte/Ingles (E), Hogg Robinson (UK), Havas Tourisme (F), Hapag-Lloyd (D), International Travel Bureau (IRL) and Kuoni Travel (I). The European members of Internet are ABR, DER and Rominger of Germany and Gastaldi Tours of Italy.

Innovations in the travel agency sector for the leisure traveller are primarily in improved computerisation. For the tour operator, there is constant innovation through the addition of new accommodation, new destinations and new products like short breaks, one-day plane trips, visits to Euro Disney, and to sporting and cultural events.

INDUSTRY STRUCTURE

Companies

There are no composite figures on the turnover of the travel services branch, nor on employment or number of companies, though it is clear that the sector is growing over the EC as a whole. Travel agencies and many tour operators are members of trade associations, but travel agency membership may be by branch or by parent company, so the figures are not homogenous. The EC travel agents association, ECTAA, groups the national associations. The European Tour Operators Association (ETOA), which comprises mainly inbound interests, and the International Federation of Tour Operators (IFTO), which comprises entirely outbound interests, include mainly the largest companies as members.

Major changes among the leading European travel and tourism groups in the last few years suggest that there has been increased concentration in the tour operating and retail agency sectors. This is reflected in the shares of the leading operators in individual EC countries, notably the United Kingdom, Germany and France. But, in fact, impressions might be slightly deceptive as far as the whole of the EC area is concerned.

In 1991, according to an EIU Special Report, "The West European Package Travel Industry", the top ten groups, in terms of turnover and excluding companies in the travel agency business only, accounted for 63% of the estimated 18.65 million ECU turnover of the top 50. Another study from Dafsa/Eurostaf suggested that in 1986, the top ten groups in the same categories accounted for 65% of the total turnover of the top 50 groups.

As the data are not strictly comparable, these figures can only be taken as broad indicators, and the difference cannot be regarded as statistically significant. The number of groups in the top half represented 86% of the top 50s' turnover in 1991, which was almost the same as 5 years ago (84%). The only clear shift appears to be among the three leading groups, whose share has actually dropped from 34% to 30% over the same period.

There are a number of non-profit organisations in the sector. These include organisations such as Villages Vacances Familles (VVF) in France, the Deutsches Familienwerk in Germany, Loisirs et Vacances in Belgium, and IGS in Spain. Several of these have significant leisure travel operations, including tour operating. VVF is the largest.

A number of the major travel companies are owned by public sector enterprises. The largest are DER (owned by the German Railways) and CIT in Italy (by the Italian Railways). There are also a number owned by or affiliated with state-owned or state-controlled airlines, in particular Air France, Alitalia and Iberia.

Table 8: Travel services
Leading European tour operators according to number of sales, 1990

Rank	Operator	Country	Number of sales (thousand)	Turnover (million ECU)
1	TUI (group)	BR Deutschland	3 518	1 954
2	TUI (Deutschland)	BR Deutschland	3 005	1 677
3	Thomson	United Kingdom	3 000	1 202
4	NUR (group)	BR Deutschland	1 898	953
5	NUR (Deutschland)	BR Deutschland	1 619	839
6	Owners Abroad (1)	United Kingdom	1 613	686
7	Hotelplan (group) (2)	Switzerland	1 460	588
8	ITS (group)	BR Deutschland	1 386	626
9	LTS	BR Deutschland	1 265	826
10	Club Méditerranée (group)	France	1 226	1 183
11	Nouvelles Frontières (1) (group)	France	1 136	449
12	Spies/Tjaereborg	Danmark	951	475
13	ITS (Deutschland)	BR Deutschland	862	355
14	DER	BR Deutschland	704	257
15	Airtours (1)	United Kingdom	683	257
16	Interhome (group)	Switzerland	662	144
17	Sun International (group)	Belgique/België	608	254
18	Hotelplan (Switzerland)	Switzerland	601	311
19	Ameropa	BR Deutschland	588	144
20	Frantour	France	530	289

(1) Data from secondary sources
(2) Includes consolidated figures for Interhome and Esco.
Source: Fremdenverkehrswirtschaft (FVW) from data derived direct from suppliers, except where stated.

Strategies

Despite the relatively constant pattern of concentration, there has nevertheless been considerable change at the top in the travel industry over the last five years, largely as a result of acquisitions. Growth in the domestic markets of the leading companies has been slowing, particularly for the tour operators. The growth in the tour operating business is currently in Spain, Italy and Portugal. German travel companies are finding growth in the five new states of eastern Germany. According to the German travel trade magazine, Fremdenverkehrswirtschaft (FVW), these markets accounted for 5.1% of German passengers and 4.5% of German-sourced tour operating turnover of the leading four companies TUI, NUR, LTU and ITS in 1991. There has been no consensus on strategies, however. A company-by-company description of the top ten highlights this clearly.

The top ten groups hold varying interests, not only in the three core areas of the travel services sector (tour operating, retail travel and ground handling), but also in related services, including hotels and catering services, car rental, airlines (owned by the group, e.g. in the case of the German LTU, for flights to holiday destinations, or through minority participation, e.g. the French Club Méditerranée), or railway sleeper services (in the case of Wagons-Lits in Belgium). Not two of the top ten groups look alike because of different specialisation. The top ten includes TUI (D), Wagons-Lits (B), Thomson Travel (UK), NUR (D), LTU (D), Club Méditerranée (F), DER (D), ITS (D) and Havas Tourisme (F).

The picture of who chooses to invest in this sector of the industry is also equally varied. TUI is controlled by a group of travel agencies (DER, Hapag-Lloyd, ABR and others); Wagons-Lits is now owned by a hotel group (Accor); Thomson by a printing and publishing group (Thomson of Canada); NUR is owned by a retailing chain (Karstadt); LTU by its founders and by the Westdeutsche Landesbank, as a significant minority shareholder; Club Med is a publicly listed company with a number of financial institutions, as well as American Express of the USA and the Japanese Seibu Saison group, among its minority strategic shareholders; DER is a subsidiary of the German Railways; ITS is another subsidiary of a retailing chain (Kaufhof); Havas is controlled by a communications group and has a property company as a significant minority shareholder; Owners Abroad is a publicly listed company in which institutional investors have significant minority stakes.

All the companies in the top ten, except DER, have made major acquisitions in the last five years. In some cases, the acquisitions were in domestic markets (Thomson, Owners Abroad, LTU, Club Med, Havas) but in others, they were in other EC and non-EC countries.

EC acquisitions include TUI's purchase of a substantial minority holding in Arke Reisen of the Netherlands; a restructuring of TUI's interests in France with a subsequent increase of its stake in Viajes Ecuador of Spain by Wagons-Lits; purchase of a controlling stake in Travelplan of Spain by ITS and by ITS' subsidiary, Holland International, of a controlling stake in Transcontinental and Transintra of Belgium; purchase of the Belgian Sunsnacks by NUR. LTU and Club Med have entered into a joint venture. There has also been some major divestment, such as by Havas Tourisme of its travel agency interests in Belgium.

The travel services branch has been highly segmented by national market until now. Only two of the market leaders, Wagons-Lits and Club Med, have brand names which are recognised EC wide, and only these two and DER operate in most EC countries. As of mid 1992, two, Owners Abroad and Thomson, were not represented in any way in the core sectors outside their own domestic markets.

In expanding into other EC markets, the competition for market shares and for the companies these groups have been buying comes from other European groups, and mainly other EC groups. There are only a handful of large non-EC groups in this field. These include American Express; Kuoni Travel of Switzerland; NRT Nordisk of Sweden; SAS Leisure of Sweden; and Hotelplan/Interhome of Switzerland.

The fact that there are a number of companies operating both as tour operators and retail travel agencies incoming and outbound in a several EC countries highlights the fact that regu-

Table 9: Travel services
Number of travel agencies per 100 000 inhabitants, 1990

Country	1990
Belgique/België	10.5
Danmark	7.0
France	4.1
BR Deutschland	15.6
Ireland	9.4
Italia	8.5
Luxembourg	6.6
Nederland	4.5
Portugal	4.4
España	4.6
United Kingdom	6.0

Source: ECTAA

lation does not seem to be a major reason why many EC travel and tourism groups have not expanded outside their own national borders. The main reasons would seem to be cultural barriers to transplanting their products and the fact that domestic markets have been expanding fast enough to satisfy the companies' need for growth. But there are major regulatory differences in areas such as consumer protection and conditions of market access. These are addressed by the EC Package Travel Directive, due to take effect on January 1, 1993.

Significantly, travel agencies which are essentially selling someone else's products, allowing them to adapt the products offered to local market needs, have expanded into other EC countries much faster than tour operators. The latter generally have to develop a tailor-made local product which accommodates local tastes in food, eating hours, type of accommodation, transport mix and quality, all of which are highly variable.

REGIONAL DISTRIBUTION

Many of the medium sized firms only have a regional catchment area. Specialists in some segments, such as coach holidays, can operate profitably from a local base. Although there are areas where the density of travel agencies is lower, this is not a major issue. On a Member State basis the density of travel agencies is highest in Germany and lowest in France.

Many tour operator products are available by mail and bookings can be made direct by phone and through viewdata systems. This method of distribution is especially popular in France and notably, for last minute sales bargains. It is expected to become more widespread as viewdata ownership expands throughout the EC.

ENVIRONMENT

There is evidence that the final consumer is becoming increasingly sensitive to the impact of travel and tourism on the environment, although this is not yet true in all countries. In Germany and the UK, where the package travel markets are the most developed, it is now common for large companies to appoint executives responsible for the company's environment policy and for the monitoring of destination hotels' energy conservation and other environmental practices. Hotels which do not comply with basic minimum standards can be struck off a tour operator's hotel listing. Catalogues are increasingly being printed on recycled paper and tour operators issue clients with guidelines as to how to preserve and protect the local environment at holiday destinations.

Travellers are more and more aware of the impact of tourism on the destinations they visit, although this concern has not yet translated into apparent concern over the type of transportation chosen to travel on holiday i.e. rail as opposed to car or plane.

Major tour operators also work behind the scenes, particularly in developing countries, to help local authorities plan sustainable resort development. Thomson has also been heavily involved in encouraging the recycling of some of the Balearic islands' mature resorts. The main specific regulatory pressures inside the EC come from environmental impact assessment or land use requirements for tourism developments. Regulations on night flying also affect the industry.

REGULATIONS

One of the main regulatory issues affecting the industry is increased consumer protection legislation, mainly through the EC Package Travel Directive, that comes into force on January 1, 1993. This will impact EC companies very differently because it is only a start towards harmonising highly varying national situations, and one which also leaves considerable discretion to the Member States in the implementation process. Other issues include the future of duty-free sales in the EC, the imposition of VAT on the industry's products, airline deregulation, environmental limits on resort developments, and transport policy.

OUTLOOK

While the average holidaymaker's yearning for sunshine, allied to a certain price-sensitivity, will ensure the traditional Mediterranean favourite resorts continue to top the popularity lists, the two-week inclusive package holiday (IT) geared to lying on a beach in the sun will probably not be enough to satisfy the market's increasingly sophisticated demands in the medium term future.

IT sales can be expected to stagnate, or decline, for short haul travel, although long haul travel could become more and more organised since it is often less expensive to take a long haul package than to try to organise such a trip independently. Choice of destination could increasingly be determined not simply by market demand or tour operator programme availability, but by capacity restraints and bottlenecks in destination countries and on airline routes.

Changing demographics will also have an impact on travel demand. But some of the greatest changes in the market are likely to be not so much demographic as psychological in nature. Personal values, such as having fun, relaxation and self-fulfilment, are becoming more important.

With increasing leisure time - a shorter working week, more part-time employment and more flexible working hours - this is likely to stimulate demand for travel and use of the travel services sector. However, while air travel is finally starting to filter down to the masses - reflected by the growth in the increased traffic through Europe's regional airports - there are still an estimated 40% of Europeans who do not travel at all. A significant share of non-travellers probably would like to travel if there were no economic or timetabling constraints. A number of new products need to be developed and measures taken, either by local or national governments, to stimulate this sector of the population.

The future success of individual companies in the sector will depend largely on their ability to meet this need for new products, as well as changing demands from increasingly sophisticated European travellers. This, in turn is likely to be linked to their ability to stay ahead of technological developments in the field and strengthen their presence throughout the EC by acquisitions, mergers and other collaborative ventures.

Table 10: Travel services
Expected real annual growth rates

	1992-93	1992-96
Turnover	8.0	5.0
Employment	4.0	3.0

Source: Fitzpatrick Associates

The European car rental market remains highly fragmented in terms of the customer base. Opportunities exist for expansion through both increased penetration in established markets and expansion into eastern Europe. However, in the short-term the focus is likely to be on improving customer service to improve board loyalty, particularly with business travellers.

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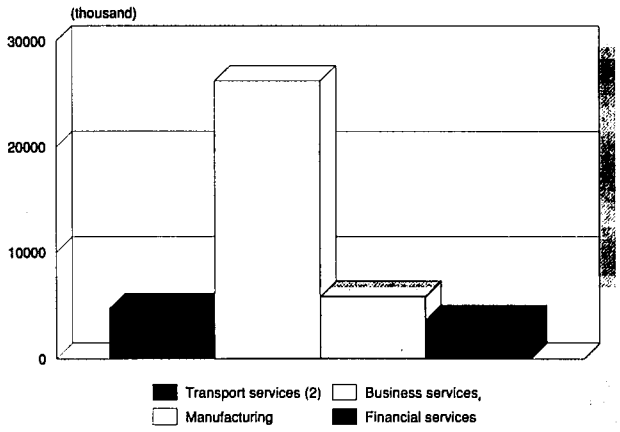
EURO
TUNNEL
32

Transport services
NACE 7

Transport is essential for the working of the economy. It is part of the whole production process from input to delivery to the customer. Its importance extends well beyond that of its 4% share of Gross Domestic Product. Transport services mirror economic activity and interaction. Increasing European integration will lead to more interaction and thus to more transport demand, of which service suppliers will benefit. Common policies for transport will help create a competitive environment. More competition will force the suppliers to invest heavily in modern equipment. Large investments in transport infrastructure are currently in progress. This will create the conditions and opportunities for integration and growth in the future.

Figure 1: Transport services
Employment compared to selected sectors, 1990 (1)



(1) Excluding Italia
(2) NACE 71 to 77
Source: Labour force survey, Eurostat

INDUSTRY PROFILE

Description of the sector

The transport services industry is primarily engaged in the conveyance of goods and passengers either directly or indirectly. Direct involvement relates to the actual conveyance of goods and passengers by various modes of transport. Indirect involvement relates to such services as handling when changing modes, traffic guidance, travel arrangement, freight brokerage, storage, etc.

NACE 7, the transport and communications industry, comprises the following two-digit classes:

- NACE 71: railway transport;
- NACE 72: other land transport, including urban transport, road transport and pipeline transport;
- NACE 73: inland waterway transport;
- NACE 74: sea transport and coastal shipping;
- NACE 75: air transport;
- NACE 76: supporting services to transport, including inland waterway ports, sea ports and airports;
- NACE 77: travel agents, freight brokers, storage and warehousing;
- NACE 79: communications, including postal and telecommunication services.

It should be noted that the categories above, apart from NACE 79, relate to companies which have as their primary activity transport services. Apart from these companies, however, transport also takes place in other economic units (own account transport) which is not captured in value added and employment statistics for NACE 7. When measuring physical transport activity (e.g. in passenger-km or tonne-km), however, transport in these non-NACE 7 units is included. For example, companies active in manufacturing regularly transport on their own account, as they do not want to rely on external transport services. Similarly, in family households, the use of the private car is not in itself an economic activity.

This leads to a situation where economic transport statistics only relate to companies with transport as their primary activity (excluding own account transport), whereas physical transport statistics relate to total transport (including own account transport). Interpretation of statistics can lead to paradoxical results. The share of own account transport, therefore, should be kept in mind.

Telecommunications and postal services, which comprise NACE 79, are covered in separate chapters in this book.

Recent trends

Total gross value added at market prices generated by the EC transport industry amounted to some 176 billion ECU in 1990, which is approximately 4% of EC GDP (own account transport not included). But the importance of transport in the economy goes well beyond its 4% share. Transport is part of the production process, a fact which is being recognised by a growing number of businesses. "Just-In-Time" delivery is such an example of how transport can be part of the production process. Transport and communication will also play an important role in gaining the benefits of European integration, as they enable interaction between Member States.

The importance of transport as an economic activity varies considerably by Member State. In countries like Germany, France, Ireland and the United Kingdom, the transport share in GDP is below the EC average. For Belgium, Denmark, Greece, Italy and the Netherlands, the share in national GDP is above 4.5%.

Transport value added in 1990 was double the figure for 1980. During the 1980s, value added rose by 7.4% annually (nominal growth). When taking real growth figures for value added into consideration, growth in the beginning of the 1980s amounted to only 1.2% (EC-7; 1980 to 1983). In 1984, a strong recovery in real growth occurred of 4.5%. Since then, growth rates declined again to about 1.7% annually (EC-7; 1984-87).

Employment in transport services amounted to 5.2 million people in 1990 (when including communication services: 7.6 million), which is 4.0% of total EC employment. When looking at the development of employment presented in Table 1, it is obvious that the sector encountered serious problems during the beginning of the 1980s. Between 1980 and 1982, employment declined by 1% per year, with a strong recovery in 1983. Employment rose fairly steadily to 1989, before declining substantially in 1990.

Inland transport services, the total of rail, road and inland waterways, account for 46% of total employment in transport and communication (see Table 3). Sea and air transport take a share of 7%. Direct transport services thus total 53% of

Table 1: Transport and communication
Main indicators of the EC transport sector

(billion ECU)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 (2)
Value added	91	97	104	111	119	128	138	147	157	167	186
Investments	30	31	32	33	36	39	42	46	49	52	57
Employees (thousand) (1)	4 698	4 664	4 605	4 778	4 936	4 903	5 041	5 238	5 281	5 503	5 235

(1) Hellas and Ireland 1980-82: includes communciations, source OECD; Italy 1990: source OECD
(2) Value added and investment estimated
Source: Eurostat, National Accounts ESA, Labour Force Surveys

Table 2: Transport services
Share of GDP at market prices

(%)	1980	1985	1988
Belgique/België	6.3	6.3	6.2
Danmark	5.7	5.5	5.5
BR Deutschland	3.4	3.3	3.3
Hellas	5.5	5.0	4.9
España	4.3	4.2	4.0
France	4.0	3.9	3.8
Ireland	3.4	2.8	3.0
Italia	4.1	4.3	4.6
Luxembourg	3.6	3.5	4.0
Nederland	4.4	4.3	4.5
Portugal	3.9	5.4	4.0
United Kingdom	4.0	3.6	3.3
EC	4.0	3.9	3.9

Source: NEI, based on Eurostat data

Table 3: Transport services
Employment by type of transport activity, 1989

(thousands)	Rail	Other land transport	Inland water-ways	Sea	Air	Support services	Agents	Commun-ications	Total	in % of total employ-ment
Belgique/België	51	64	8	5	10	27	13	80	258	7.2
Danmark	20	54	0	18	12	16	17	58	195	7.4
BR Deutschland	265	239	16	23	43	86	384	521	1 577	5.8
Hellas (1)	13	100	0	30	7	21	26	43	240	6.5
España	59	372	0	28	25	48	39	132	703	5.8
France	194	398	4	17	52	42	138	457	1 302	6.0
Italia	(2)	672	(2)	(3)	75	(4)	125	307	1 179	5.7
Ireland	4	18	0	2	5	4	5	20	58	5.3
Luxembourg	3	2	0	0	2	0	0	3	10	6.5
Nederland	24	139	6	11	24	24	52	84	364	6.0
Portugal	17	81	0	16	15	16	0	52	197	4.3
United Kingdom	115	605	0	57	83	76	239	489	1 664	6.3
EC	765	2 744	34	207	353	359	1 038	2 246	7 746	5.9

(1) 1987
(2) Included in other land transport
(3) Included in air transport
(4) Included in agents
Source: Eurostat

Table 4: Transport services
Evolution of passenger transport in the EC, 1980-1990 (1)

(%)	Private cars 1990	Change 1980-90	Railways 1990	Change 1980-90	Buses and coaches 1990	Change 1980-90
Danmark	79.6	3.0	7.2	-1.4	13.1	-1.5
BR Deutschland (2)	85.8	4.3	5.9	-1.1	8.1	-3.2
España	74.7	-0.6	7.6	-0.9	17.6	1.5
France	84.8	1.8	9.2	-0.8	5.9	-1.0
Italia	80.1	3.4	6.9	-2.4	12.8	-0.9
Portugal	80.2	5.3	6.9	-3.9	12.7	-1.1
United Kingdom (2)	88.2	4.3	5.2	-1.2	6.4	-3.1

(1) Based on passenger-km
(2) 1989
Source: European Conference of Ministers of Transport

total transport activity. Indirect transport services, the supporting services and other auxiliary services have a share in total employment of 18%. The remainder, 29%, relates to employment in communication services.

In passenger transport, the private car has become the primary mode of transport. This type of transport, takes between 75 and 90% of the market, leaving 10% to 25% to railways and buses and coaches (see Table 4). Over the years, railways and buses and coaches have lost market share to private cars. In general, the use of private cars reaches a saturation level in total passenger transport demand when this market share approaches 90%. Congestion, pollution and a need for low cost public transport generates a minimum requirement of railways, bus and coach services. In general, these needs are met with public transport services which are usually run with the help of government subsidies.

For international passenger transport, airlines have become an important mode for both business travel and tourism. Growth in passenger air transport has been very high during the 1980s, causing congestion problems in the airways and for airports. With high speed rail services, the railways are becoming more and more competitive for medium range distances.

The bulk of goods transport is done by road haulage. This mode takes a share of about 78% in total goods transport activity (air transport and shipping not counted, due to lack of comparable data). Railway services account for about 17%, whereas the remainder (5%) is done by inland shipping. During the 1980s a shift can be noted in this modal split. Rail services and inland shipping lost share to the advantage of road haulage. Road haulage has benefited a great deal already from increasing integration. With its relatively high flexibility, it is quickly able to meet new demand requirements. Furthermore, it seems that growth in the transport of bulk goods, the core business of rail and inland shipping, remains low. Rail and inland shipping do have opportunities, however, in unitised cargo (containers).

Another trend is the increasing importance of air freight transport services. Especially in the field of high value goods and perishable goods, air transport has a competitive advantage with its high speed of conveyance. This service is currently being integrated more and more with express mail service companies.

International comparison

The share of transport and communication in GDP in the EC is similar to that of the USA and Japan (about 6% of GDP including communications services). In absolute numbers, the USA's transport and communications sector is the largest: at 238 billion ECU it is slightly larger than the 223 billion ECU for the EC12 in 1987. The Japanese transport and communications industry, with 128 billion ECU, is small when compared with the USA or the EC.

The distinction between transport and communication for the EC and the USA reveals that between 1980 and 1987, both transport and communication for the EC maintained a share in GDP of 4% and 2%, respectively. In the USA, a shift can be noted: the transport sector lost 0.5 percentage points during this period, while communications increased 0.2 percentage points.

Growth in the three world regions between 1980 and 1987 is also different. Real growth in transport in the EC was higher than in the USA (1.5% versus 0.7%). For the total of transport and communications, Japan surpassed both American and European growth rates.

Foreign trade

Table 6 shows the international payments for EC transport services by branch. Exports in 1989 totalled 76.9 billion ECU and imports, 76.4 billion ECU. Intra-EC trade represented 40% to 42% of total trade. Road freight, rail and inland waterway transport (presented together under the heading "other transport") determine the largest part of trade. In world trade, 43% to 45% is done by "other transport"; in intra-EC trade, 52% to 55%. The larger share in intra-EC trade can be ex-

Table 5: Transport services
Community goods transport by mode of transport, 1980-1990 (1)

	1980	1990	% change
Road	69.7	77.8	8.1
Rail	23.5	17	-6.5
Inland waterways	6.8	5.2	-1.6

(1) Based on total transport activity in tonne-km; data for EC12
Source: CEC DGVII, Eurostat, European Conference of Ministers of Transport and NEI estimates

Table 6: Transport services
EC trade in transport services (1)

(million ECU)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Credit EC with world										
Sea freight	17 725	20 274	20 129	19 223	21 495	22 426	19 605	19 324	20 971	24 477
Sea passenger services	789	883	1 051	1 125	1 159	1 359	1 321	1 253	1 373	1 440
Air freight	1 613	2 136	2 246	2 345	2 865	3 158	3 191	3 254	3 368	3 688
Air passenger services	6 422	8 022	9 032	9 736	11 211	11 888	10 295	10 925	11 534	14 037
Other transport (2)	19 829	22 747	24 414	24 003	27 056	28 947	24 854	25 330	29 071	33 212
Total	46 378	54 062	56 872	56 433	63 787	67 778	59 268	60 085	66 318	76 854
Debit EC with world										
Sea freight	17 395	21 038	20 832	21 232	23 966	24 971	22 081	21 881	23 490	26 602
Sea passenger services	498	573	604	756	854	942	939	938	1 057	1 159
Air freight	792	1 237	1 263	1 212	1 465	1 506	1 369	1 407	1 925	2 161
Air passenger services	4 373	5 999	6 541	7 090	7 760	8 414	8 420	9 193	11 459	12 084
Other transport (2)	19 684	23 510	25 439	25 459	28 028	29 342	26 090	26 911	28 147	34 353
Total	42 742	52 358	54 680	55 751	62 073	65 175	58 900	60 332	66 080	76 362
Intra-EC trade										
Credit EC with EC										
Sea freight	6 367	7 741	7 921	7 258	8 455	8 597	7 624	7 532	7 847	9 042
Sea passenger services	326	378	436	458	487	540	609	590	694	703
Air freight	310	511	488	495	658	770	754	756	816	988
Air passenger services	1 620	2 175	2 281	2 372	2 728	3 009	2 789	2 585	3 524	4 123
Other transport (2)	10 153	11 599	12 446	12 028	13 475	14 097	12 303	12 908	13 839	16 127
Total	18 807	22 386	23 529	22 611	25 803	27 014	24 079	24 371	26 720	30 983
Debit EC with EC										
Sea freight	6 243	7 259	7 490	7 354	8 547	8 706	7 911	7 774	9 071	10 048
Sea passenger services	352	359	373	476	559	622	611	599	683	749
Air freight	217	372	370	346	443	432	377	377	524	638
Air passenger services	1 180	1 668	1 768	1 794	2 035	2 192	2 151	2 290	3 153	3 484
Other transport (2)	9 897	11 730	12 764	12 555	13 689	14 072	13 775	13 736	15 030	17 269
Total	17 800	21 311	22 742	22 526	25 273	26 024	24 827	24 779	28 463	32 191

(1) Road passenger transport, local and urban transport excluded
(2) Road freight, rail and inland waterway transport
Source: Eurostat

plained by the greater importance of sea freight in world trade (about one-third of total trade).

On average, intra-EC trade and total trade developed similarly throughout the 1980s. Trade figures for air transport services reveal very strong increases. During the 1980s, growth was on average above 9%; intra-EC trade was actually above 11%. Growth rates for sea freight services were below 5% on average; serious declines in the service trade occurred in 1983 and 1986/87 as a result of economic recessions.

TECHNOLOGICAL PROGRESS

In all subsectors of the transport and communications industry, progress in technology is substantial. It relates to the following items:

- the development of new information and communications technology ("telematics"), leading to new communication services.
- the application of telematics enables considerable improvements in transport service quality. Issues such as vehicle monitoring, goods and parcel tracing, container handling, etc. have become possible due to new applications of information and communication technology (e.g. Electronic Data Interchange).
- several research programs like DRIVE (Dedicated Road Infrastructure for Vehicle safety in Europe), IRIS (Integrated Safety Information and Navigation System) and EURET (Research and Technological Development Programme in the field of Transport) have been carried out with the purpose of improving traffic safety and integrating transport on an European basis.
- energy efficiency and reduction of exhaust emissions.

ENVIRONMENT

For certain emissions of air pollutants, transport is the most dominant source. Transport is responsible for about 80% of carbon monoxide emissions in the EC. For nitrogen oxides and hydrocarbons, transport causes 50% to 60% of all man-made emissions. Furthermore, transport emits 40% of all emitted particulates. Another pollutant is lead, emitted by automobiles burning leaded gasoline.

OECD data reveal a downward trend of polluting emissions by the transport sector in the Netherlands. This is the result of the growing use of more efficient engines, which have better fuel combustion and fewer emissions. The German transport sector was able to reduce carbon monoxide emissions and stabilise hydrocarbon emissions. In France, Italy and the United Kingdom, however, the trend for polluting emissions by transport is still upward.

These developments seem to be at odds with the use of cleaner technologies in most countries and with tighter emission standards, both of which have reduced emissions. Despite this, total emissions continued to grow, as the growth in transport has outpaced reductions in emissions. Furthermore, the stock of transport equipment is renewed only in a gradual way. Cleaner means of transport do not yet constitute a large part of the total stock, but will unquestionably grow in the short- to medium-term. The effect of emission reductions, therefore, must become significant in the coming years.

Table 7: Transport services
Energy consumption and emissions by mode of transport

	Air	Rail	Tram	Bus	Car
Gross energy consumption per vehicle/km (megajoules/km)	136.0	91.0	37.0	14.0	3.0
Gross energy consumption per passenger/km (million joules/km)	1.8	0.9	1.3	0.8	1.8
Emissions in gram/km per vehicle-km					
CO	125.0	4.7	0.1	8.9	7.4
CO2	11 000	6 625	2 644	979	215
Others	60.0	36.4	11.1	26.5	4.0
Emissions in gram/km per passenger-km					
CO	1.7	0.0	0.0	0.5	4.4
CO2	150	64	92	56	127
Others	0.8	0.3	0.4	1.6	2.4

Source: NEA

REGULATIONS

Most of the EC transport market is currently regulated on a national basis and therefore relatively fragmented. Whereas the domestic markets are regulated, the international markets are almost deregulated. In 1985, a ruling of the European Court obliged the Council to work out a common transport policy along the same liberal lines that hold for the rest of the economy under the rules of the EC.

The implementation of the common transport policy involves two elements:

- freedom to provide services and eliminate competition distortions;
- improvement of infrastructure and production means.

The latter element relates to large investments in infrastructure and new innovations in means of transport. The Community contributes to a number of infrastructure-related projects: the high-speed rail network, the Brenner transit route, the combined transport network of Community interest, the trans-Pyrenean links, the Scandinavian links. These projects fall within the first three-year action programme (1990-1992).

However, this Community programme has limited funds, and there are several projects of a pan-European dimension which are not funded by the Community: e.g. the Channel Tunnel, the Trans-European Motorway, the construction of the Rhine-Main-Danube Canal.

Innovation in transport means is led by European R&D programmes aimed at traffic safety, reductions in energy consumption and in exhaust emissions. The harmonisation of technical standards is currently going on in view of the Single Market programme.

Concerning the first element (freedom to provide services and eliminate distortions of competition), the Commission has made several proposals regarding the establishment of the conditions for cabotage. Most progress has been made on intra-EC road transport. Bilateral authorisations for transport between countries are replaced by EC authorisations after January 1, 1993. The transport ministers have also decided to eliminate all quotas as of the same date. From then on, permission to enter the market will depend on qualitative criteria. On January 1, 1990, the old tariff system within the Community was replaced with a new one which is based on free price fixing.

In inland shipping, there is already a liberal situation on the Rhine River, but initiatives will be taken to extend this to other waterways. Initiatives have also been taken to allow cabotage: each ship with an EC-flag is allowed to provide services within other Member States. This will increase competition on the European waterways.

The railway directive of June 1991 aimed at increasing the access to the railway market by "denationalisation" of track infrastructure as much as possible at the beginning of 1993 and onwards. Free access to the entire EC railway system, however, is only allowed to private companies involved in combined transport. Existing national railways from different countries are allowed to link up under the agreement, giving them access to each others' network. This applies to both freight and passengers. However, in rail transport, cabotage

Table 8: Transport services
Emissions of man-made air pollutants in the EC

(million tonnes)	Total		Mobile sources		Mobile sources as % of total	
	1980	1990	1980	1990	1980	1990
SO2	20 863	12 100	749	630	4	5
NOx	11 385	11 200	5 758	6 800	51	61
CO (1)	35 161	31 115	27 557	24 525	78	79
HC	9 448	9 000	4 506	4 800	48	53
Particulates	2 844	2 350	694	905	24	39
CO2 (million tonnes C)	930	887	146	187	16	21

(1) Does not include Belgique/België, Luxembourg, Danmark and Hellas
(2) Does not include Belgique/België, Luxembourg, Danmark, España and Hellas
Source: ERECO, Europe in 1996; based on OECD 1991

Table 9: Transport services
CO emission control history of new gasoline-powered automobiles in Europe

Year	Standard (depending on the vehicle weight) (g/km)
1970	25-55
1974	20-44
1977	16-36
1981	17-33
1985	(depending on the engine size) (1) 6-8-11

(1) 1985 conclusions to take effect in the EC 1988-1993
Source: ERECO, Europe in 1996; based on ECMT 1990

is not really feasible, as rail companies are forced by technical network differences to transfer transport to another company at the border. New infrastructure with harmonised technical standards may enable the introduction of rail cabotage in the distant future.

As regards the shipping market, in June 1992 the transport ministers decided to deregulate the market in four stages between 1993 and 1999. The first three stages refer to the deregulation of the EC sea freight market. The fourth and last stage concerns the deregulation of the EC market of passenger traffic by sea. There are however some exceptions concerning Greece (temporarily) and strategic goods.

Since 1987, European airlines have been subject to a process of deregulation, which has taken place in three stages. The third stage will be operational as of 1st January 1993. Although it is the most far-reaching package so far, the programme will not bring about a completely deregulated EC air transport market in 1993. It still includes safeguards with regard to the free settlement of fares and a transition period for the introduction of cabotage. Cabotage will only be introduced in April 1997. In the meantime cabotage under condition will prevail.

In the field of regulation aimed at environmental protection, measures concentrate on emissions of exhaust gases and particulates. The general aim is to reduce the burden for the environment caused by the transport sector. The standards for carbon monoxide (established in 1985) depend on engine size and have become effective during the 1988 to 1993 period. One of the consequences of this policy is the use of three-way catalytic converters in gasoline-fuelled automobiles.

Policies in passenger transport aim at reducing private car use to the benefit of public transport. This is being done to alleviate congestion problems on the networks in and between major conurbations in the EC. Additionally, it is beneficial to environmental protection initiatives.

Until now, intra-EC transport has been considered international transport and therefore exempt from value added taxation and excise duties. With the establishment of the Single Market, transport between Member States will become "domestic" and thus subject to one "national" system. In view of the Single Market, the European Commission wants to introduce value added tax and excise duties on international transport services. However, opposition from Member States and the sector itself have postponed initiatives for drafting regulations by the Commission. The Commission has not yet proposed a single VAT rate.

Table 10: Transport and communication
Expected real annual growth rates

(%)	1992-93	1992-96
Value added	2.0	4.0
Employment	1.0	2.5

Source: NEI

OUTLOOK

The prospects for the EC transport industry are quite positive. With increasing European integration, transport demand is likely to grow both in terms of the volumes of goods and passengers and in terms of the distances to be covered. It is not likely that such growing demand will be covered by own account transport. On the contrary, externalisation of transport and logistic services from existing industries will cause in itself a growth in professional transport services.

Another contributor to growth may be the opening up of the East European economies. It is expected though that during the first years of economic restructuring, only marginal growth in transport demand may occur. Transport suppliers from these countries may not be able to compete with EC companies yet and thus will not be a threat.

Large investments in infrastructure are currently made to extend the network capacity of the various transport modes, as existing networks operate at or above capacity levels. This will create new transport possibilities which are necessary for the growing integration of the EC market.

The Common Transport Policy aims at liberalising and harmonising the EC transport market, and improving the industry's efficiency. This will enhance competition and improve the quality of service offered under the condition of further economic growth.

The growth prospects differ of course for the different modes of transport. Given the long term character of the developments in rail transport, moderate annual growth rates are expected. Freight transport by rail (1%) is expected to grow slower than passenger transport (2%). Road passenger transport is likely to grow a slight 1% per year given the fact that private car use has not yet reached its maximum. Road freight transport is expected to grow much faster (4%) due to the liberalised market and new opportunities, although, tighter environmental regulations will act as a counterforce. Inland waterways transport will maintain its upward trend with moderate growth rates. Seaborne trade is expected to grow slowly in the short term, but faster in the medium to long term. Recovery in depressed markets like transport of steel and iron takes time. Air transport is considered to be a structural growth sector. However, the strong growth figures of the late 1980s are not expected to return in the short or medium term. Rates of 4% for both passenger and freight, however, are attainable.

Written by: Netherlands Economic Institute

Railway transport
NACE 71

Railway companies are controlled by single national operators, which precludes competition between individual railway companies and between railway companies and private firms. To increase competition and profitability some countries intend to privatise their railway. Moreover, in 1991 the EC Transport Ministers made the first step to liberalise the EC rail transport market in order to increase competition. The railway sector seeks to increase its competitive power by developing high-speed rail services, which should ultimately (with the aid of the EC) result in an integrated European high-speed rail network.

INDUSTRY PROFILE

Description of the sector

Rail transport services consists of companies which are exclusively or primarily engaged in the transport of passengers and freight by rail. This sector also covers equipment and supplies for numerous activities, including the private railway sector. Not included are: (a) railways which only serve one town (NACE 721.1), (b) repair workshops for locomotives, carriages and wagons (NACE 362.3), (c) local railway companies which operate regular bus services (NACE 721.2) and (d) sleeping cars and restaurant cars (NACE 666). In fact, the single railway companies of the Member States are making up the whole EC rail transport sector.

Throughout the eighties, passenger traffic has increased while freight traffic and employment have decreased. Passenger traffic grew at a virtually constant rate; the rate of reduction in the employment level declined slightly at the end of the reference period. Freight traffic moved downward until 1988, whereas during the period between 1988 and 1990 a very modest average annual growth rate was achieved. However, the number of tonne-kilometres performed in 1990 was less than in 1989. It should be stressed that these total freight figures conceal a structural change away from low value added heavy products to higher value products carried in containers or on road units (combined road/rail traffic). Although the total tonnage of rail freight declined annually with 0.9% between 1985 and 1990, the latter type of traffic grew by around 7.5% per year; its share in total rail freight transport increased from 7.5% in 1985 to about 11% in 1990.

Regarding both passenger and freight traffic as well as employment, Germany's DB, France's SNCF and Italy's FS are the top-3 railways in the EC, accounting together for nearly two-thirds of the total passenger traffic of the EC railway companies and for three-quarters of total freight traffic. SNCF is the single biggest company in passenger traffic; DB is the largest in freight.

As to passenger traffic, the majority (SNCB/NMBS, DB, DSB, RENFE, FS and NS) of the EC railway companies revealed an increase in their passenger traffic in 1990, varying from 2.2% (SNCB/NMBS) to 8.8% (NS); the remaining companies showed decreases (CH, SNCF and CFL and CP) ranging from 1.7% (CH) to 7.1% (CFL) or remained stable (CIE and BR/NIR).

For most of the companies (CH, RENFE, SNCF, NS, CP and BR/NIR) freight traffic was lower in 1990 than in 1989. The decline varied from 1.5% (CH) to 7.6% (CP); SNCB/NMBS, DSB, CIE, FS and CFS) grew with in the range from 1.2% (NS) to 5.2% (CIE). DB freight traffic remained unchanged in 1990.

Data on international passenger rail transport could only be obtained for intra-EC passenger traffic. The information, representing numbers of passengers refer to 1988 and 1989 only. Intra-EC traffic passenger turned out to be only 1% of the total passenger flow. As it can be safely assumed that intra-EC traffic holds the greater share in the total international rail passenger flows of the EC Member States, it can be concluded that international passenger rail traffic plays only a subordinate part in the EC.

Regarding freight traffic, Table 4 reveals that international trade in six Member States accounts for more than 50% of all freight transport. Besides Belgium and Italy, the quantities involved are limited. With the exception of Greece, most international traffic is intra-EC. This also applies to France, Portugal and Spain with international shares varying from 11% to 25%. Germany's rail freight traffic is also 25% international. However, less than half of it is intra-EC traffic. Due to its insular position, the UK has virtually no international freight transport by rail.

The major intra-EC flows are between Italy and France, Belgium and Luxembourg, Belgium and Germany, Germany and France, Germany and the Netherlands and between France and Belgium. These flows account for one-third of total intra-EC rail freight traffic.

MARKET FORCES

Demand

Past developments have not been in favour of the demand for rail transport. Increased private car ownership hit passenger rail traffic severely. Recently, however, the development of high-speed rail services has provided an opportunity to divert traffic from air to rail. Air traffic's comparative advantage over rail transport i.e. speed, is under pressure, because airports and air corridors are increasingly congested, causing considerable delays. The train, which is cheaper than the plane, will become particularly attractive for journeys between 400 and 600 kilometres. For example, on the stretch Paris-Lyon, air traffic's share declined from 30% to 9% after the introduction of the TGV. Moreover, in some EC countries, policy is recently explicitly dealing with influencing the demand for rail transport. Current concern with congested roads, airports

Table 1: Railway transport
Total EC railway traffic and employment

	1985	1986	1987	1988	1989	1990
Passenger-kms (million)	218 862	216 556	218 575	227 601	228 455	233 029
Tonne-kms (million)	184 242	175 321	175 034	179 506	182 630	180 514
Employment	1 146 429	1 117 968	1 077 817	1 022 579	987 575	966 005

Source: UIC

Table 2: Railway transport
Average yearly growth rates

	1985-1991	1989-1991
Passenger-kms	1.3	1.2
Tonne-kms	-0.4	0.3
Employment	-3.2	-2.8

Source: UIC

and airspace, as well as with pollution due to road and air traffic, are underlying this change in policy.

Structural changes in the economic structure in the EC countries away from transport-intensive industries such as coal and steel which are of particular relevance to rail transport hit the railway industry severely. Technical and organisational developments in other industries (just-in-time stock management and sophisticated distribution networks) caused a further growing demand for quick, flexible and reliable deliveries of relatively small quantities. These developments were detrimental to rail transport, because of its relative inflexibility and high transhipment. Moreover, lack of integrated, interborder coordination is not stimulating the demand for international rail transport.

Supply and competition

Railway networks are controlled by single national operators. Rail transport services in the Member States can be characterised, to varying extents, by state regulation, the importance of non-commercial obligations and political objectives. Large subsidies from the state generally cover operating losses and/or investment (see Table 5). The special nature of the rail transport system largely precludes competition between railway companies or free market across national boundaries. In order to increase competition and profitability, however, some Member States - Germany, the Netherlands and the UK - intend to privatise their railways. In the UK, this gave rise to interesting developments; four companies disclosed plans for exploiting the government's planned deregulation of British Rail. On the passenger side, Orient Express Hotels, the Virgin Group and Britain's largest private bus company Stagecoach Holdings plan to operate railway services. On the freight side, National Power, the electricity power generator wants to run coal trains to its power stations.

Apart from individual Member States, the EC is seeking to liberalise the EC railway industry. In June 1991, the EC Transport Ministers opened the door to liberalisation when they agreed upon the Directive aimed at increasing access to the EC railway market.

In 1990, labour costs were nearly 55% of total operating costs; the subsidies totalled on average more than 40% of the operating revenue of the EC railways. At the same time, the EC railway companies suffered a joint loss of six billion ECU. With 4.8 billion ECU, DB and FS contributed together amply to this deficit. The 1990 deficit was twice as high as in 1989.

Unit labour cost grew with an average annual rate of about 6% between 1985 and 1990; for total unit cost this growth rate was higher at more than 7%. The discrepancy between the development of the unit labour and total unit cost has particularly occurred since 1988.

Because the "production" of the rail transport services sector is expressed in two different units (passenger-kms and tonne-kms) while employment data are not broken down accordingly, neither total, nor separate (for passenger and freight traffic) data can be produced. However, the basic developments shown in Table 1 indicate an increase in labour productivity in the EC rail transport services sector during the period from 1985 to 1990; the number of passengers increased, whereas the employment level decreased and number of tonne-kms declined.

The international comparison reveals the different function of the railways in the EC, the USA and Japan. Considering the relation between passenger-kms and tonne-kms performed, EC railway companies are important to both passenger and freight traffic. In the USA freight traffic is predominant, whereas in Japan the emphasis is clearly on passenger traffic.

Employment in the EC railway industry is respectively three and one-half and five times as high as in the USA and Japan. Given the passenger-kms and tonne-kms performed, EC railway employment can be considered high.

Railway density in the EC and Japan is virtually similar; in the USA it is 40% lower. The EC railway network is less electrified than the Japanese one, 41% versus 57%. In the USA, electrification is insignificant.

ENVIRONMENT

Railway transport is a relatively "clean" mode of transport, particularly as far as air pollution is concerned. Electric traction allows for different energy sources to be used, preferably toward less polluting primary energy. Available data on cost

Table 3: Railway transport
Traffic and employment by Member State, 1990

Country	Company	Passenger transport (million pass.-kms)	Freight transport (million tonne-kms)	Employment
Belgique/België	SNCB/NMBS	6 539	9 544	45 205
Danmark	DSB	4 855	1 730	20 353
BR Deutschland	DB	43 560	61 357	235 975
Hellas	CH	1 977	647	13 324
España	RENFE	15 476	13 410	49 724
France	SNCF	63 761	50 667	202 081
Ireland	CIE	1 226	589	11 799
Italia	FS	45 512	21 217	200 405
Luxembourg	CFL	208	705	3 543
Nederland	NS	11 060	3 070	26 165
Portugal	CP	5 664	1 589	22 110
United Kingdom	BR	33 191	15 986	135 321
EC		233 029	180 514	966 005

Source: UIC

Table 4: Railway transport
International freight traffic by Member State, 1989

	Intra-EC (mill. tonnes)	Other (mill. tonnes)		Total (mill. tonnes)		International (percentage) Total	EC
Belgique/België	10.98	15.77	0.76	2.27	29.78	49.2	44.2
Danmark	1.06	0.63	0.75	0.37	2.81	56.0	33.7
BR Deutschland	14.24	20.10	21.02	15.68	71.04	24.0	11.6
Hellas	0.10	0.06	0.62	1.91	2.69	69.0	4.1
España	1.65	0.77	0.09	0.22	2.73	11.5	10.2
France	13.23	15.76	1.68	2.50	33.17	24.5	21.4
Ireland	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Italia	17.30	6.79	7.23	2.85	34.17	62.4	44.0
Luxembourg	6.72	2.61	0.0 (1)	0.11	9.44	77.1	76.2
Nederland	4.77	7.53	0.53	1.07	13.90	73.4	65.0
Portugal	0.34	0.33	0.0 (1)	0.0 (1)	0.67	11.0	11.0
United Kingdom	0.44	0.37	0.15	0.04	1.01	0.7	0.6

(1) 0.005 million tonnes
Source: Eurostat

and investment in the environment in the transport sector indicate that these are by far the lowest in the railway sector.

REGULATIONS

In June 1991, the EC Transport Ministers agreed upon a directive aimed at increasing the access to the railway market by the "denationalisation" of the track infrastructure as much as possible at the beginning of 1993 onwards. However, the directive is only the first step in the process towards total deregulation of the EC railway market. Free access to the entire EC railway system, however, is (under certain conditions which have not yet been worked out) only allowed to private companies involved in combined transport combined transport, which accounts for only about 5% total freight transport by rail. Consequently, the accessibility for private newcomers will only be marginal, whereas passenger traffic is totally excluded from the agreement.

Existing national railways from different countries are allowed to link up under the agreement, giving them access to each others' network and to the networks of railways in countries separating them. This applies to both freight and passenger traffic. In addition, national railway monopolies would be able to account separately for infrastructure and operating cost.

In late 1989, the Union International de Chemins de fer (UIC) launched the P.A.R.I.S. (Pricing, Accounting and Rolling Stock Interchange Simplification) in order to create recommendations to increase international rail competitiveness and revenues in passenger traffic. The prevailing price structure, therefore, should be removed. It is rigid, complex and unable to respond to specific market conditions and it also makes revenue accounting and settlement slow and inefficient. Further rolling stock interchange rules should be simplified to be better understood and more geared to market conditions. The programme consists of two stages. The first stage ended in September 1990. Recommendations on pricing, accounting and international route management were submitted and ratified in October 1990. Then the second phase was launched, including the implementation of the recommendations from the first stage and to come to further recommendations.

Table 5: Railway transport
Financial situation of EC railway companies, 1990

(million ECU)	Company	Operating costs Total	Personnel (%)	Operating revenue Total	Subsidies (%)	Operating result
Belgique/België	SNCB/NMBS	2 253.0	75.0	2 274.5	57.0	21.5
Danmark	DSB	1 235.7	43.3	1 235.7	N/A	0.0
BR Deutschland	DB	16 989.8	60.8	14 580.6	32.7	-2 409.2
Hellas	CH	276.5	71.3	133.0	36.0	-143.5
España	RENFE	2 997.3	44.9	2 871.7	47.8	-125.6
France	SNCF	11 244.3	52.7	10 502.4	30.0	-741.9
Ireland	CIE	452.8	53.1	452.7	23.9	-0.1
Italia	FS	13 940.4	46.8	11 545.0	72.1	-2 395.4
Luxembourg	CFL	244.2	78.8	237.9	78.7	-6.3
Nederland	NS	1 436.5	52.3	1 474.4	42.9	37.9
Portugal	CP	380.8	56.0	242.3	34.7	-138.5
United Kingdom	BR	5 511.7	58.2	5 384.7	19.2	-127.0
EC		56963.0	54.8	50934.6	42.3	-6028.1

(1) Excluding exceptional profits or losses and company taxes
Source: UIC

Table 6: Railway transport
Development of unit labour and total unit costs

(1985=100)	1985	1986	1987	1988	1989	1990
Unit labour costs	100	N/A	N/A	118	126	134
Total unit costs	100	N/A	N/A	118	127	141

Source: UIC

Table 7: Railway transport
International comparison of EC railway industry

	Pass.-kms (million)	Tonne-kms (million)	Employment	Railway density (1)	Electrified kms (%)
EC	233 029	180 514	966 005	54.3	41
USA (AAR) (2)	20 600	1 454 423	279 800	21.9	0.8
Japan (JR) (3)	222 670	24 752	197 100	54.6	57

(1) kms line/1000 km2
(2) 1988
(3) 1989
Source: UIC

TOWARDS AN INTEGRATED EUROPEAN HIGH-SPEED RAILWAY NETWORK

In 1989, the Community of European Railways (CER), comprising the Railway Authorities of the EC countries and those of Austria and Switzerland, published a blueprint for an integrated continent-wide high-speed network across all European countries to enable rail to compete more effectively against airlines on many major intercity routes. In December 1990, the EC Commission adopted the proposals and the Transport Ministers gave the scheme a favourable welcome. The creation of an optimal Community railway network hinges on new or upgraded infrastructure in 14 key rail corridors, covering a total of 30 000 route-kms (30% new 250-350 km/h infrastructure and the rest upgraded tracks for at least 200 km/h). It was thought that the recommended system could be operational by 2010. This seems optimistic considering the time taken to activate and finish current projects. In addition to the infrastructure investments, technical harmonisation is a prerequisite to maximising the potential of the high-speed train in the next century's European passenger market. Standardisation, for example, will be required for: (1) the electrification system (currently four different systems are operational in the EC: see Table 8); (2) the signalling system (virtually each country has presently its own signalling system) and (3) rolling stock (very different technical concepts are underlying the rolling stock, momentarily in use in the various EC countries.

There is still a long way to go before a fully integrated European high-speed network will be operational. Nevertheless, the projects currently carried out on a national basis, such as the construction of high-speed lines (e.g. in France, Germany and Spain), the upgrading of existing lines for higher speeds and the ongoing construction of the Channel Tunnel offer prospects for the realisation of such a network.

Table 8: Railway transport
Total and electrified kilometrage by EC country, 1990

Country	Company	Total kilo-metrage	Elec-trified %	km	Current supplied by: containery 25000 v. 50 cycl.	15000 v. 16 2/3 cycl.	3000 volts	1500 volts	Other	Third Rail
Belgique/België	SNCB/NMBS	3 479	65.9	2 294	-	-	2 294	-	-	-
Danmark	DSB	2 344	9.8	230	77	-	-	153	-	-
BR Deutschland	DB	26 949	43.4	11 693	1	11 555	7	20	-	110
Hellas	CH	2 484	-	-	-	-	-	-	-	-
España	RENFE	12 560	51.1	6 416	-	-	6 368	48	-	-
France	SNCF	34 070	37.0	12 609	6 626	1	-	5 869	-	113
Ireland	CIE	1 944	1.9	37	-	-	-	37	-	-
Italia	FS	16 066	59.2	9 512	-	-	9 512	-	-	-
Luxembourg	CFL	271	72.7	197	178	-	19	-	-	-
Nederland	NS	2 798	69.9	1 957	-	3	13	1 923	18	-
Portugal	CP	3 064	15.0	461	435	-	-	26	-	-
United Kingdom	BR	16 584	29.7	4 912	2 953	-	-	-	-	1 959
EC		122 613	41.0	50 318	10 270	11 559	18 213	8 076	18	2 182

Source: UIC, Paris

OUTLOOK

Rail's future share in the (growing) European transport services market will depend on its ability to meet customers requirements concerning speed and flexibility.

As for freight transport, the short- and medium term prospects are limited in this respect, because of its relative inflexibility. Moreover, the integration of the European railway system and deregulation of the EC railway market are primarily long-term processes, leaving the market in the short- and medium insufficiently integrated and accessible. Moreover, deregulation of the EC transport market in general will increase competition especially with the relatively more flexible road haulage industry. Therefore, the diversion of freight from road to rail are considered less probable than vice versa, although environmental considerations and congested roads may counteract this process.

Table 9: Railway transport
Expected average yearly growth rates

	1992-1993	1992-1996
Passenger-kms	2.0	2.0
Tonne-kms	1.0	1.0
Employment	-1.5	-1.5

Source: UIC, Paris

With regard to passenger traffic, the prospects for rail traffic are better. Improved railway services on the one hand and current concern with congested roads, airports and airspace as well as with pollution due to road and air traffic may favour rail transport. Moreover, high-speed rail services will be increasingly competitive with air traffic on distances between 400 and 600 kilometres.

With relatively the best prospects, passenger traffic by rail is expected to grow at a faster rate than freight traffic. However, no dramatic development for either of category of traffic is expected in the short- and medium-term, given the long- term characteristics of the developments that would favour rail transport. Passenger traffic, therefore is expected to grow by 2% per annum, both in the short- and medium-term; For freight transport an annual increase of 1% is predicted in the short- and medium term.

Furthermore, the rationalisation process is expected to continue, which will further reduce the employment level in the EC railway industry. The forthcoming privatisation of the railways in Germany, the Netherlands and the UK will also contribute to this decline. Privatisation of the Bundesbahn will for example cost 30,000 jobs. The rate of decline assumed to be similar for the whole forecasting period at approximately 1.5%.

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Public transport
NACE 721

Public transport has become important (especially in urban areas) as a solution to traffic congestion and pollution. Large investments are currently being made to improve public transport services, especially in the field of light rails. There is also a tendency to make public transport more commercial, where cost-based pricing and improved efficiency will be necessary. Increased competition of publicly owned transportation with private transport is gaining attention.

INDUSTRY PROFILE

Description of the sector

Public transport consists of units engaged in passenger transport by city underground, surface and elevated railways, tramways, (trolley-) bus and motor coach services. Services are provided by way of regular transport which means transport on scheduled routes following a fixed timetable. Also special regular services exist, that cater for specific categories of persons to the exclusion of other passengers (e.g. workers, school children, airline passengers). The provision of services is limited geographically to urban and suburban transport and transport in regions and conurbations.

Main indicators

For public transportation in major urban areas Germany is the largest country in terms of passenger journeys: in 1989 nearly 6 000 million passenger journeys were made. Also in terms of vehicle kilometres Germany is one of the biggest next to the United Kingdom. Both countries account for 1 000 million vehicle kilometres.

Bus service is by far the most widespread mode in public transport in the EC. In urban and suburban public transport it accounts for about 60% of passenger trips, 59% of vehicle fleets and about 90% of all transport systems. Measured in terms of fleet size, route length and number of routes the largest operating bus systems are to be found in the large European cities like Copenhagen, Paris, Athens, Rome, Madrid, Birmingham and London. Commuter rail or local train services follows far behind with 18% of passenger trips and 28% of vehicle stocks. Underground railway ranks third with 13% of passenger trips and only 8% of total vehicle stock. Light rail is not of great importance in the EC. It accounts for only 7% of passenger trips. Finally, the least significant public transport mode is trolley buses with only a marginal share in total passenger trips.

When looking at national bus and coach services Italy with 80 billion passenger kilometres ranks first in 1989. Germany follows suit with 53 billion, whereas France and the United Kingdom rank third and fourth respectively. In vehicle kilometres Italy and the United Kingdom show up as largest.

MARKET FORCES

Demand

As indicators of demand, Table 3 presents the number of passenger journeys and the population served for the major urban areas. The 106.7 million people living in the EC's largest cities completed 21 073 million journeys in 1989. Table 3 also indicates the number of passenger kilometres and the population served for national bus and coach services. For these services some 300 billion passenger-kilometres were made in 1989, serving 325.9 million people.

In order to make an estimate for service coverage, Table 3 shows the demand per head of population served in the various EC countries. Its interpretation must be done cautiously as local or national circumstances can influence the indicators substantially.

For urban transportation, the ratio in Table 3 reveals a high coverage in Italy, Portugal and the Netherlands. In Greece service coverage in urban areas is also relatively high. In Belgium, on the other hand, the indicator shows a very low coverage in cities. In terms of national public transport, a high ratio is shown for Denmark, Italy and Belgium. In Greece and the Netherlands, on the other hand, service coverage seems low.

Supply and competition

Table 4 presents some indications of supply of public transportation in the EC Member States. For all modes in major urban areas, the number of vehicle-kilometres per capita served indicates a relatively high service provision in countries like the United Kingdom, Denmark and Italy. The ratio amounts

Table 1: Public transport
Main indicators, 1989

	All modes in major urban areas		National bus and coach service	
	Passenger journeys (million)	Vehicle kilometers (million)	Passenger kilometers (billion)	Vehicle kilometers (billion)
Belgique/België	333	92.5	10.5	0.4
Danmark	289	101.3	8.9	0.5
BR Deutschland	5 973	1 000.0	53.0	3.5
Hellas	755	150.0	5.0	N/A
España	1 765	350.0	32.1	1.5
France	3 201	752.5	43.0	2.2
Ireland	182	50.0	N/A	N/A
Italia	3 562	600.0	80.0	4.7
Luxembourg	11	3.1	N/A	N/A
Nederland	512	91.0	10.0	0.6
Portugal	913	83.8	7.4	0.3
United Kingdom	3 577	1 010.0	41.0	4.6
EC	21 073	4 284.2	300.0 (1)	19.0 (1)

(1) NEI estimates
Source: UITP/TMG

Table 2: Public transport
Demand indicators of public transportation, 1989

	All modes in major urban areas			National bus and coach service		
	Passenger journeys (million)	Population served (million)	Ratio	Passenger kilometers (billion)	Population served (billion)	Ratio
Belgique/België	333	3.9	85.4	10.5	9.9	1 060.6
Danmark	289	2.0	144.5	8.9	5.1	1 745.1
BR Deutschland	5 973	34.4	173.6	53.0	62.0	854.8
Hellas	755	3.6	209.7	5.0	10.0	500.0
España	1 765	9.7	181.9	32.1	38.9	825.2
France	3 201	16.1	198.8	43.0	56.2	765.1
Ireland	182	1.1	165.5	N/A	3.5	N/A
Italia	3 562	12.0	296.8	80.0	57.6	1 388.9
Luxembourg	11	0.1	110.0	N/A	0.4	N/A
Nederland	512	2.2	232.7	10.0	14.8	675.7
Portugal	913	3.6	253.6	7.4	10.3	718.4
United Kingdom	3 577	18.0	198.7	41.0	57.2	716.8
EC	21 073	106.7	197.5	300.0 (1)	325.9	921.0 (1)

(1) Estimate NEI
Source: UITP/TMG

to 50 vehicle-kilometres per capita or above in these countries. A moderate service provision can be found in France, Greece, Ireland and the Netherlands with the ratio between 40 and 50. A relatively low service provision can be identified in Belgium, Germany and Portugal (ratio below 30). Concerning national bus and coach services, the ratio indicates a high service supply in Denmark, Italy and the United Kingdom, whereas it is low in Portugal, Spain and France.

When looking at the financing structure for bus operations in the EC Member States (Table 5), it shows that in some countries, fares account for the largest part and in others subsidies dominate. This is very much correlated with the underlying financing philosophy of public authorities in these countries. In the United Kingdom and Ireland and to a lesser extent Spain, Portugal and Germany, revenues are mainly from fare collection. In the remaining countries, a more subsidy oriented revenue system prevails: operations are financed by way of subsidies from collective means.

In general it can be stated that local bus operations tend to have lower fare revenues. In Ireland for example, Dublin Bus recovers 83% of total costs from fares, whereas Bus Eireann receives 96% from fares. Belgian public transport operators in urban areas cost recovery from fares was about 30% to 40% versus a range of 25% to 55% for regional bus operations. German bus operators achieve a cost recovery from fares of about 60% in urban areas and about 80% in regional areas. For Dutch bus companies, fares account for 25% of total costs in cities and 40% in regions.

An interesting cost recovery system has been introduced in France. Apart from fares and subsidies, a special taxation exists: the "versement transport". It is charged to business establishments with more than nine employees in areas with a population of more than 30 000. Fares effectively account for 50% of total costs, the taxation finances another 30% and the rest is received from other collective sources.

Production process

Measuring productivity in public transportation is difficult, although some indications for local bus transport can be derived. Conclusions however, can not really be drawn as

Table 3: Public transport
Supply indicators of public transportation, 1989

	All modes in major urban areas		National bus and coach service	
(million)	Vehicle kilometers (million)	Per head of population served	Vehicle kilometers (million)	Per head of population served
Belgique/België	92.5	23.7	0.4	40.4
Danmark	101.3	50.6	0.5	98
BR Deutschland	752.5	46.7	2.2	39.1
Hellas	1 000	29.1	3.5	56.5
España	150	41.7	N/A	N/A
France	50	45.5	N/A	N/A
Ireland	600	50	4.7	81.6
Italia	3.1	31	N/A	N/A
Luxembourg	91	41.4	0.6	40.5
Nederland	83.8	23.3	0.3	29.1
Portugal	350	36.1	1.5	38.6
United Kingdom	1 010	56.1	4.6	80.4
EC	4 284.2	40.2	19.0 (1)	58.3

(1) NEI estimate
Source: UITP/TMG

Table 4: Public transport
Local bus transport, 1989

Country	City	Vehicle km (million)	Passenger journeys (million)	Staff	Fleet	Route Length (km)	No of routes
Belgique/België	Antwerp (MVA)	7.1	18.2	N/A	131	236	22
	Brussels (STIB)	19.1	55	2 037	489	289	36
	Brussels (VVM)	20	32.3	650	290	690	43
	Charleroi (STIC)	3.7	11.4	354	90	109	22
	Charleroi (SNCV)	7	9.6	N/A	72	N/A	N/A
Danmark	Copenhagen (HT)	86.1	146	4 756	1 090	4 000	266
France	Lyon (TCL)	37.9	131.6	N/A	906	899	80
	Marseille (RMT)	23	98.9	N/A	582	630	136
	Paris (RATP)	151	837	15 400	4 012	2 900	269
BR Deutschland	Berlin (BUB)	38	185	2 565	660	776	63
	Berlin (BUG)	66.9	383.5	4 895	1 341	1 064	125
	Bonn (SWB/SSB)	11.5	N/A	583	204	461	32
	Frankfurt (SF)	12.3	N/A	N/A	222	268	40
	Frankfurt (DB)	7.3	11.7	N/A	125	445	22
	Frankfurt (FKE)	1.3	1.9	N/A	67	311	18
	Hamburg (HHA)	45.6	194.1	2 257	828	1 395	117
	Hamburg (VHH)	N/A	32	881	296	1 310	64
	Hamburg (PVG)	1.4	5.1	342	113	59	7
	Hamburg (KVG)	1	1.4	N/A	26	N/A	6
	München (SM)	30.3	172.4	N/A	573	412	75
Hellas	Athens (EAS)	120	516	9 450	1 800	4 215	330
	Athens (ILPAP)	14	113	2 295	401	173	20
	Athens (ISAP)	3.9	18.5	330	67	N/A	7
Ireland	Dublin	46.2	161.2	3 832	837	845	130
Italia	Milan (ATM) (urb)	36.8	557.9	N/A	1 665	390	52
	Milan (ATM) (sub)	19.2	92.1	N/A	N/A	605	41
	Naples (ATAN)	53.9	469.6	N/A	778	559	147
	Naples (CTP)	N/A	N/A	N/A	N/A	N/A	N/A
	Rome (ATAC)	122.7	737	12 243	2 772	2 041	228
	Rome (ACOTRAL)	N/A	102	N/A	1762	N/A	N/A
Luxembourg	Luxembourg	3.1	11.4	414	129	153	22
Nederland	Amsterdam (GUBA)	17.9	55	(1) 2 065	370	395	41
	Rotterdam (RET)	15.8	42.8	850	291	403	33
Portugal	Lisbon (Carris)	45.7	411	4 802	806	566	90
	Lisbon (RN)	N/A	38	2 448	N/A	N/A	N/A
	Lisbon (TCB) (2)	N/A	22.4	N/A	71	N/A	N/A
España	Barcelona (TMB)	36.3	202	2 864	807	691	83
	Madrid (EMT)	88.3	456.2	6 761	1 782	2 388	152
United Kingdom	Birmingham (WMT)	109.5	397.5	N/A	1 776	5 000	400
	Liverpool (Mersey)	53.2	165	3242	1 073	651	110
	Liverpool (NW) (3)	18.1	50	1300	470	N/A	120
	London	327	1 221	19 800+	5 000+	3 004+	556 (4)

(1) includes tramway
(2) 1984
(3) 1987
(4) London buses only
Source: UITP/TMG

indicators are sensitive to specific circumstances of location such as the average distance between stops and the length of lines.

In terms of vehicle kilometres per employee in local bus transport, high ratios can be found for operators in Brussels (30800 vehicle kilometres per employee), Hamburg (HHA: 20200), Bonn (19700), Rotterdam (18600), London (16500) and Liverpool (16400). Rather low ratios are identified for operators in Hamburg (PVG: 4100), Athens (ILPAP: 6100), Luxembourg (7500) and Amsterdam (8700).

Another indicator could be the number of passenger journeys (in thousands) per bus. Exceptionally high figures are calculated for operators in Naples (604), Lisbon (510) and Milan (390). Lower but still high ratios can be found for operators in Munich (301), Berlin and Athens (over 280), Rome (266) and Barcelona and Madrid (about 250). Relatively low figures are obtained for operators in Belgian cities, some French, German and English cities, the largest Dutch cities and the city of Luxembourg.

ENVIRONMENT

Strategies of public transport operators are very much dominated by public transport policies of national governments and the European Commission. These aim at stimulating the use of public transportation and discourage private transportation (cars). The reasons for such policies relate to the existence of road congestion and air pollution. In large urban areas, congestion and pollution from cars have become an especially

serious problem which can be alleviated by public transportation. Discouragement of private transport is usually done by way of heavy taxation on cars and fuel, which revenues could be used for subsidising public transportation operations and investments.

In its Green Paper on the Urban Environment the European Commission has suggested the following actions:

- encourage city authorities to incorporate public transport and road construction into their plans for land use and transportation;
- promote innovation in public transport, environmental-friendly vehicles and advanced traffic management systems by way of contributing to the cost of pilot projects and monitoring their effects;
- encourage EC-wide exchange of information in urban traffic management to maximise the benefits of a wide range of experiences;
- consider in detail the potentials for using economic instruments in private car transport such as road pricing and pay-tolls for the right to enter city centres.

One of the issues in executing public transportation policies is the principle for fare collection. This relates to the extent of cost recovery from fares and to the system of fare levels. In general, fare systems are based on zonal rates.

Certain modern fare collection systems operate by using modern micro-electronics. This requires the sales of so-called smart cards (i.e. cards with magnetic strips or micro-chips on which a number of "units" are stored). Customers consume units while using the network. Such modern systems are already in use in Hong Kong and Singapore. The advantage of such systems is that the use of electronics enables a good tracking of transport demand, as data on each trip can be stored on computer. Such tracking opens possibilities for in-depth analysis of traffic demand to improve the service quality and to identify bottlenecks very quickly. It can also enable proper division of fare revenues in case of multi-operator fare collection (e.g. cards valid for more network systems). A problem though is that introduction of these modern systems imply large investments.

In view of the Single Market becoming effective in 1993, not very much will change in public transportation. The only important issue could be the procurement of new vehicles. At present there is a marked tendency for local procurement. But this is likely to change as foreign suppliers should also get access to national markets. The building of new infrastructure like underground systems and light rail systems should also be open to foreign bidders.

Table 5: Public transport
Financing of EC bus operations, 1989/90

	Fares (%)	Subsidies (%)
Belgique/België	30	70
Danmark	50	50
BR Deutschland (Ost)	15	85
BR Deutschland (West)	60	40
Hellas	25	75
España	65	35
France	50	50
Ireland	80	20
Italia	20	80
Luxembourg	20	80
Nederland	23	77
Portugal	65	35
United Kingdom	83	17

Source: UITP/TMG

Large investments are currently being made in public transportation. For example, expenditures on new vehicles in Western Europe are running at about 4 000 million ECU a year with replacement rates averaging about 5%, but ranging from 2% in Belgium and the United Kingdom to 8% in the Netherlands.

Total investments in urban rail systems (both underground and light rail) through the 1990s is expected to be around 31 000 million ECU. Large programmes exist in France (e.g. extension of the RER network in Paris, new systems in Strasbourg and Rouen), Germany (e.g. integration of East German networks in West German networks may amount to 12 billion DM), United Kingdom (e.g. extension of the Jubilee Line in London and the Metrolink in Manchester, light rails in Birmingham, Sheffield and Bristol) and Italy (e.g. underground in Naples).

REGULATIONS

Competition between operators in public transportation hardly exists. This is due to the regulatory environment in which they operate. The environment varies from one Member State to another. In the next paragraphs the main features in the various countries are summarised.

Belgium

The responsibility for public transportation by bus is with the three regional governments of Flanders, Brussels and Wallonia. The national bus company and the urban public transport companies are reorganised into quasi-commercial regional companies owned by the regional government. Five local subsidiaries are created, which operate under "contrats de gestion" for four to six years providing monopoly power within the area. The regional public transport company decides on fare levels and the allocation of subsidies to operating companies. It also coordinates various activities such as ordering vehicles, a common statute for personnel, common services between operating companies, etc. Operating companies determine timetables and can decide on subcontracting operations externally.

Denmark

Danish county councils (except Aarhus and Fyn where the local authority is responsible) have created regional transport companies for the management of all regular public transport within the area. In general, these companies organise, plan and market the services offered. Operations are generally licensed out to (mostly private) companies. Revenues go to the regional transport company; deficits are financed by the county council.

In the Capital Region (Copenhagen and surroundings) the situation is different. A new law came into force on January 1st, 1990 engaging the Capital Region Public Transport Company in general transport planning, network preservation and integration of fare structures with those of the railways. Currently it is licensing out bus services in long term contracts by way of competitive tender procedures. By April 1st, 1994, 45% of all bus services should be licensed out in this way.

Other local rail services are operated under agreements with local governments. Agreements related to service levels to be provided and fares and subsidies to finance the services. A particular example is the metro service in Copenhagen.

Germany

Local and regional authorities in Germany control and coordinate public transportation solely by determining routes and fare systems and deciding on the licensing of services to private companies. In practice companies active in this field cooperate extensively with each other. Licenses can apply to all modes of transport, but the period of validity can vary. Subcontracting to other operators is allowed. In principle, fares must be set

Table 6: Public transport
Urban rail systems in the EC (*)

Country	City	Metro	Tram & light	railcommuter/rail
Belgique/België	Antwerpen		x (1)	x
	Brussels	x	x (1)	x
	Charleroi		x (1)	x
	Ghent		x	x
Danmark	Copenhagen	x		x
France	Bordeaux	UC		
	Grenoble		x (2)	
	Lille-Roubaix	x	x	x
	Tourcoing			
	Lyon	x		x
	Marseille	x	x	x
	Nantes		x (2)	
	Paris	x	UC	x
	Saint Etienne		x (1)	
	Strasbourg			
	Toulouse	UC		x
BR Deutschland	Aachen	x		
	Augsburg		x	x
	Berlin	x		
	Bielefeld		x (1)	
	Bochum-Gelsenkirchen		x (1)	
	Bonn		x	
	Braunschweig		x (1)	
	Bremen		x	x
	Darmstadt		x	
	Dresden	UC		x
	Dortmund		x (1)	
	Duisburg		x (1)	x
	Düsseldorf		x (1)	x
	Essen		x (1)	x
	Frankfurt-am-Main	x	x (1)	x
	Freiburg-Breisgau		x (1)	
	Hamburg	x		x
	Hannover		x (1)	x
	Heidelberg		x	
	Karlsruhe		x (1)	x
	Kassel		x (1)	
	Köln		x (1)	x
	Krefeld		x (1)	x
	Leeds-Bradford	x		x
	Ludwigshafen		x	
	Mainz		x (1)	
	Mannheim		x	
	Mulheil-Ruhr		x (1)	
	München	x	x	
	Nürnberg-Fürth	x	x	x
	Rhein-Ruhr	x		x
	Stuttgart		x (1)	x
	Ulm		x	
	Wiesbaden			x
	Wuppertal			x
	Würzburg		x (1)	
Hellas	Athens	x		x
Ireland	Dublin	x		x
Italia	Bologna			x
	Florence			x
	Genova		UC	x
	Milan	x	x (1)	x
	Naples	UC	x (3)	x
	Rome	x	x (1)	x
	Turin		x (1)	x
	Venice			x
Nederland	Amsterdam	x	x (1)	x
	Den Haag		x (1)	x
	Rotterdam	x		x
	Utrecht		x (2)	x
Portugal	Lisboa	x	x	x

Table 6 (continued): Public transport
Urban rail systems in the EC (*)

Country	City	Metro	Tram & light	railcommuter/rail
Portugal	Porto		x (3)	x
España	Barcelona	x	x (T)	x
	Bilbao	UC		x
	Madrid	x		x
	Malaga			x
	Soller		x (T)	
	Valencia	x	x (2)	x
United Kingdom	Aberdeen			x
	Belfast			x
	Birmingham			x
	Blackpool		x	
	Bristol			x
	Cardiff			x
	Douglas		x (T)	
	Edinburgh			x
	Glasgow	x		x
	Leeds/Bradford			x
	Liverpool			x
	London	x	x (2)	x
	Manchester	x		x
	Newcastle-Upon Tyne	x	x (3)	
	Nottingham			x
	Sheffield			x
	Stoke-on-trent			x

(*) List of systems in major EC cities not comprehensive
(1) Indicates a system extending or extended (includes subways)
(2) Indicates a system built new since 1978
(3) Indicates a system with no light rail features
(x) in operation
UC under construction or in design
(T) indicates a heritage tramway operated for tourist purposes
Source: Jane's/UITP 1991

at a cost covering level. Where this is not possible, subsidisation will be defined by the authorities. The State Government investigates the possibilities for deregulation.

Competition between bus and railway has always been strictly avoided. The Deutsche Bundesbahn itself operates various rural bus services through its subsidiary Geschäftsbereich Bahnbus (GBB; split in 25 regional companies) as a replacement for former rail services.

In former East Germany, the old situation was a very heavy involvement of public authorities in public transport operations. The situation is currently changing towards the present system in the western part of Germany.

France

In the Ile de France area (Paris and surroundings) the Syndicat des Transport Parisiens governs the main operators (RATP and SNCF) plus another 80 small operators belonging to professional associations. The STP defines policies, route coverage and revenue structure (fares versus subsidisation). Existing services cannot be moved from one operator to another. For new services, an operator can be chosen. Operators are allowed to subcontract service operations to others.

In the rest of France, the "départements" are responsible for regional bus transport. Usually bus services are provided under monopoly franchise contracts guided by administrative coordination of these services. In urban areas the "autorité organisatrice" controls local transport. This body determines itself service structures and fare levels and grants single area monopoly contracts for a limited time period. Three major groupings (Transexel, Transcet and CGFTE) control most of the operators in the market.

Greece

Prefectures govern Greek regional and local bus transportation. They grant public transport licences to cooperative associations in the regions. A cooperative consists of individual bus owners providing buses and drivers, and revenue collection staff for fare collection. In Athens, three government owned bus companies run the public transportation services within the city under the control of the separate public body OAS. Thessaloniki and Rhodes have systems slightly different from the prevailing system in the country. In Thessaloniki, a private operator has a license for 21 years duration to operate services; in Rhodes city a municipal operator runs the services in the city proper under the guidance of the prefecture.

Spain

Spanish authorities, usually the municipal council, grant concessions of between 8 and at maximum 20 years for the operation of a network of scheduled local bus services. The authorities determine the route structure and fare levels. Special regular services are allowed on condition that they do not compete with scheduled services.

Urban transport is provided by 185 companies, of which 28 are municipally owned and three are labour cooperatives. Private companies also operate in 129 of the 134 small sized towns (less than 100 000 inhabitants). In four of the five large cities (population above 0.5 million) the municipalities take charge of public transport themselves.

Table 7: Public transport
Analysis of total operating expenditure

Percentage of total expenditure	France	Hellas	Italia	Luxembourg	Nederland	Portugal	United Kingdom
Wages and salaries	76	43	72	75	50	55	65
Fuel	24	4	5	3	5	12	8
Financing charge		46	2	-	20	5	12
Purchase of goods		3	13	22	25	7	15
Internal charges		4	10			21	

Source: TMG/UITP

In inter-urban bus services, regional authorities grant concession rights to private operators. In case the service crosses the regional boundary, the concession is granted by the national government. Concession conditions are generally the same as those for urban transport.

Passenger services by rail are mainly provided by the state railways RENFE. In some regions, however, the regional government owns the network. Sometimes services are provided by way of a concession to a private operator using this network. Metro services (Barcelona, Madrid and Valencia) are provided by either state owned or municipality-owned organisations.

Ireland

Irish public transport is operated by the state-owned holding company CIE. This company owns three subsidiaries: Dublin Buses for bus services in the Dublin city region, Provincial Buses (Bus Eireann) for inter-urban and rural services and local services in the two major towns outside Dublin, and the Railways for all rail services including the rapid transit line in Dublin. The government is currently considering to introduce competition in the provision of transport services. A new authority is likely to be created for putting out to tender particular services and issuing licenses.

Italy

Public transport in Italy is governed by a concession system. In general, concessions are granted for long durations under monopoly conditions. In larger cities, the concession usually goes to the (generally municipally owned) local public transport company. Regional authorities provide long term franchises for longer-distance services and services in rural areas.

Table 8: Public transport
Total investment in metro and light rail transit 1990-2000

(million ECU)	Annual rates
Belgique/België	88-130
Danmark	23-34
BR Deutschland	461
Hellas	N/A
España	107-146
France	538-615
Ireland	N/A
Italia	654-960
Luxembourg	N/A
Nederland	20-58
Portugal	12 - 19
United Kingdom	500-654

Source: DTI Study/Bayliss

In some cases, national authorities issue concessions for inter-regional and other long-distance services. These concessions can be granted to any operator, either private or publicly owned. The body issuing the concession usually determines services, timetables and fares.

Luxembourg

In Luxembourg four networks exist in public transportation. These are:

- Luxembourg City Buses (AVL) for local and out of town services in the city of Luxembourg under the control of the city government;
- RGTR: a number of private operators providing bus services under the control of the Ministry of Transport;
- bus networks in the cantons of Esch-sur-Alzette under the control of a syndicate of cantonal authorities;
- CFL: the railway company provides not only rail services but also bus services on formerly existing railroad links and on routes determined by the Ministry of Transport.

The core body is the Ministry of Transport. It determines fares, timetables and services, coordinates the provision of services throughout the country and it grants 10-year concessions to operators with automatic renewal.

Portugal

Most public transport in Portugal is provided by public sector companies. Some local and regional bus services are in private hands under a concession agreement granted by the national or local government. In 1990, a law was passed to deregulate public transportation.

In Lisbon, Oporto and Coimbra, services are provided by companies owned by the municipality. For Lisbon and Oporto commissions have been established to control the implementation of a public transport plan. This plan should regulate the public transport system in the area.

In the rest of the country, the government strives for complete deregulation by imposing only qualitative restrictions in licenses for operators. Control over maximum fares is retained. Local authorities are authorised to supplement the network with subsidised services.

Netherlands

Dutch public transport is a fully monopolised system via a licensing procedure under the Passenger Transport Act. In urban transportation municipalities grant licenses to either the local public transport company (nine largest cities) or the regional public transport company (45 cities). Licensing in inter-urban and regional transport is governed by the Ministry of Transport. Licenses are granted to 16 regional bus com-

panies, which are all 80% subsidiaries of the state-owned holding company "Aandelenbezit Streekvervoer" since 1982.

Since 1988, private operators have the possibility to compete with the regional transport operators. Measures are taken to privatise bus companies. As a result, these companies engage in coach services and road passenger services. The Ministry of Transport continues its policy to stimulate public transportation, but more and more requires efficient cost-based operations and limitations to subsidies.

United Kingdom

British public bus transport on long distances has been privatised to a great extent. The then National Bus Company and Scottish Bus Group were split into 71 separate companies in order to get smaller more flexible entities offering long distance coach services. These companies should be able to compete with each other by way of pricing and service provision. While this has led to improvements in efficiency and quality, it has also resulted in reduced service quantity.

In local areas, services are also run on a commercial basis in which the operator determines fares, routes and timetables. In addition there exist subsidised services on certain routes. For London however, subsidisation prevails as London Regional Transport (LRT) compensates losses incurred by the bus and underground companies. Some services are provided by other bus operators under concession agreements with LRT.

Train services are generally provided by British Rail under a legal monopoly. In some local areas, however, a local network is operated by separate institutions.

OUTLOOK

Traffic congestion and environmental problems have initiated a new attention for public transportation. Especially in urban and suburban areas public transportation has become a priority issue and this is likely to increase. There is also a tendency to privatise public transportation activities to some extent. In this respect, private capital could become important next to publicly available capital.

These tendencies are not only characteristic to EC public transportation. Also in North America and South East Asia, attention to public transport has grown as a consequence of traffic congestion and pollution. Commuter rail has re-emerged in US and Canadian metropolitan areas and large investments are made to create new systems and improve existing systems. In Japan, commuter services in main conurbations have evolved into profit making private companies offering good services to the public.

Large investments will be needed in infrastructure (new underground lines, light railways), fleets (modern buses, vehicles for rail services), modern fare collection systems (smart cards) and service quality (comfort, service-reliability and flexibility).

Investments in railways and trolley bus systems are at an advantage as these are the least polluting systems. Light rails transport in particular seems to have made a comeback. On the other hand, research and development in buses is increasingly aimed at reducing exhaust pollution (e.g. in the Netherlands, the use of natural gas is tested). In addition, there is a need for investments in multi-modal facilities, such as park-and-ride, and passenger information facilities (e.g. at home via modern telecom-services like teletext or videotex).

Fare policies in view of privatisation tendencies are inclined to move into a situation where subsidisation of public transportation is no longer necessary. Hence, more cost-based pricing systems and efficiency improvements will get more attention in future. By contrast, policies also encourage people to use public transport rather than cars by way of low fares. By increasing costs of private car transport, the fares for public transport can be more cost-based, but can also remain relatively low.

Another development which will continue, is the further integration of public urban transport systems with other modes of transport. In some countries, good connections have already been created with the railways network. Furthermore, local railway networks have been connected with important airports. Examples are Schiphol Airport in Amsterdam, Zaventem Airport in Brussels, Charles de Gaulle Airport (via RER) and Orly Airport (via VAL) in Paris, Heathrow and Gatwick airports in London, Düsseldorf and Frankfurt airports.

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Road passenger transport
NACE 722

The road passenger transport sector is primarily composed by bus and coach services. The private car remains the most important competitor of this transport mode. Taking into consideration the recent French experience, the high-speed trains do not compete seriously with road passenger transport. From air transport more competition can be expected on the medium journeys market.

INDUSTRY PROFILE

Description of the sector

The road passenger transport sector includes companies exclusively or primarily engaged in the operation of taxi-cabs, chauffeur driven hire cars, regular and occasional motor coach services, etc. Apart from collective forms of transport services, a large part of the industry consists of coach services for tourism.

Main indicators

Table 3 shows that Italy has recorded the largest number of passengers-km in 1990. The importance of this transport mode in Italy is also reflected in the high number of enterprises which are involved in road passenger transport. These enterprises are relatively small in number of employees if compared - for instance - with the Netherlands. Compared to the other member states, the Dutch enterprises are also larger in terms of the average number of coaches per company.

Recent trends

During the 1980s the development of road passenger transport has differed from country to country. Italy recorded the highest growth rates, whereas the transport mode lost importance in Germany and the United Kingdom. In other Member States only small growth rates have been reached.

The small growth rates or even declines in the use of this transport mode are reflected in small growth rates of the stock of buses and coaches. Since 1984 the EC stock only increased by an average rate of 1.5%. Italy, the United Kingdom, Spain and France were the main EC countries stimulating the growth of stock.

International comparison

Also in the USA and Japan the development of the stock of buses and coaches - with annual growth rates of 1.4% and 1% respectively - reflects a limited growth of this transport mode. Among other factors, the intense price competition among American airlines has caused people to favour air transport instead of coach services.

In passenger-km, the four largest EC countries do not differ very much from each other. In all four countries the share of private cars as a transport mode has further increased since 1980. Rail is more popular in France, while road passenger transport is more popular in Germany, the United Kingdom and Italy.

MARKET FORCES

Demand

A growing demand for private mobility and the absence in some countries of adequate alternative public transport, are the main factors behind the popularity of private cars. Even high raises of excise duties on fuel prices have neither influenced car ownership nor car use.

In most EC countries, transport by private cars has been increasing faster than overall mobility. The highest share of private cars in total passenger transport has been reached in the United Kingdom (88.3%). The southern EC countries like Italy, Portugal and Spain are likely to record further growth of private car use. The use of buses and coaches within these countries has increased less than total passenger transport. A continuation of this trend is expected for the near future within these countries.

A large proportion of coach services is closely related to tourism. Tourism coach service in combination with accommodation arrangements (inclusive tours) is very popular among lower and medium income households and also among senior citizens. Operators, however, are trying to attract other market segments by offering high quality services on long-haul routes.

Especially during the economic recession of the early 1980s, coach services have made a strong progress as holiday transport mode. Since the mid-1980s, the share of long-haul coach services has stabilised in most countries. For example, in the Netherlands the share of buses and coaches for foreign holidays has been fluctuating around 14%, just behind aeroplanes (15%).

Supply and competition

In Spain and Germany, competition from the improvements in domestic rail networks and the introduction of high-speed trains could become a threat. In France, however, where the TGV is already operative for ten years the high-speed trains could not stimulate overall demand for railway services in 1990. Passenger transport by buses and coaches, however, recorded a 2.5% growth in the same year. The high-speed train seems to be more a competitive threat for regional air services than for the passenger transport by buses and coaches.

Fuel, depreciation, maintenance and wages are the main cost factors for the operators.

INDUSTRY STRUCTURE

The road passenger transport sector varies considerably from one Member State to the other. Although some very large

Table 1: Road passenger transport
Average annual growth rates

(%)	1980-86	1986-89	1980-90
BR Deutschland	-3.5	0.0	-1.7
France	0.8	0.4	0.8
Italia	3.4	4.2	3.8
United Kingdom	-1.5	0.0	-0.9

Source: European Conference of Ministers of Transport, NEI

Table 2: Road passenger transport
Modal split of passenger transport

(%)	1980 Rail	1980 Buses and coaches	1980 Private cars	1990 Rail	1990 Buses and coaches	1990 Private cars
Belgique/België	8.5	11.2	80.3	6.9 (1)	11.4 (1)	81.7 (1)
Danmark	8.7	14.7	76.6	7.2	13.2	79.6
BR Deutschland	7.0	11.4	81.6	6.0	8.2	85.9
España	8.5	16.2	75.3	7.6	17.6	74.8
France	10.0	7.0	83.0	9.2	6.0	84.8
Italia	9.4	13.7	76.9	7.0	12.9	80.1
Nederland	6.9	10.2	82.9	6.4 (1)	8.0 (1)	85.6 (1)
Portugal	11.1	13.9	75.0	7.0	12.7	80.3
United Kingdom	6.4	9.6	84.0	5.3	6.5	88.3

1) 1989 figures
Source: European Conference of Ministers of Transport

operators are active, the majority of the enterprises are small-sized. Medium and large sized operators tend to work more in the international market, in contrast with smaller companies which operate in national and regional markets.

Large operators in the EC markets are National Express in the United Kingdom, De Jong Intratours and Beuk in the Netherlands, Iberbus in Spain, GTI in France and Deutsche Touring (subsidiary of the German railways) in Germany. In some Member States, governmental or semi-governmental organisations play a role in long-distance transport.

On the European level, 40 operators of international regular services are members of Eurolines. Their membership of this organisation allows them to cooperate in arranging and publicising their services. Another example of such an organisation is Europabus which operates in Germany.

The greater part of the investments made by enterprises is for replacement of depreciated coaches. The intensifying competition and high customer requirements forces the enterprises to operate with high-quality buses and coaches with a broad variety of all modern features (e.g. air conditioning, air pressure suspension systems, video facilities, catering etc.).

ENVIRONMENT

Road passenger transport can be considered as one of the most environmentally friendly transport modes. In fact, it contributes to reducing private cars traffic and therefore road congestion and air pollution.

The amount of air pollution caused by road passenger transport itself and the energy consumption are clearly much lower (on a per capita basis) than the in the case of private cars.

REGULATIONS

The EC legislation has established three types of international coach services: occasional, shuttle and regular services. Occasional and shuttle services are basically tourist services. International regular services are subject to similar rules for national services (timetables, set routes and prices).

There is also a category known as special regular services, which mainly consists of the carriage of employees to their place of work and carriage of school children.

Only international occasional services are free from the requirement that prior authorisation must be obtained to run the service, from the States of departure, destination and often

Table 3: Road passenger transport
Passenger transport by buses and coaches

(billion passengers-km)	1980	1986	1987	1988	1989	1990
Belgique/België	9.1	9.5	10.0	10.2	10.5	N/A
Danmark	7.3	9.0	9.0	8.9	8.9	8.9
BR Deutschland	65.6	53.1	52.9	52.4	53.0	55.5
Hellas	5.8	5.0	4.8	5.1	5.1 (1)	N/A
España	28.1	33.5	35.2	37.5	37.5	38.7
France	38.0	39.8	42.2	41.9	40.3	41.3
Italia	57.8	70.5	72.7	77.2	79.8	84.0
Nederland	13.2	12.1	12.8	12.8	12.8	N/A
Portugal	7.8	8.3	10.0	10.0	10.1	10.3
United Kingdom	45.0	41.0	41.0	41.0	41.0	41.0
EC 10	277.7	281.8	290.6	296.0	299.0	N/A
Japan (2)	110.4	101.6	102.9	107.2	109.1	N/A

(1) 1988 data used again for 1989
(2) Only buses
Source: European Conference of Ministers of Transport, Japanese Ministry of Transport

Table 4: Road passenger transport
Stock of buses and coaches

	1980	1985	1986	1987	1988	1989
Belgique/België	19 560	16 817	16 449	16 095	14 212 (1)	14 329 (1)
Danmark	7 351	8 010	8 105	8 110	8 093	7 500
BR Deutschland (2)	70 350	69 207	69 325	70 037	70 186	70 478
Hellas	18 011	18 237	18 485	18 011	19 465	N/A
España	42 631	41 593	41 874	43 002	43 991	45 166
France	65 000	64 000	65 000	65 000	65 000	68 000
Ireland (3)	2 722	3 295	3 422	3 521	3 701	N/A
Italia	58 149	76 296	77 891	82 100	N/A	N/A
Luxembourg (4)	647	695	693	701	717	705
Nederland	11 000	11 600	11 400	11 600	11 677	11 892
Portugal	8 489	10 439	N/A	N/A	11 031	11 572
United Kingdom	78 250	74 743	76 268	78 200	80 700	80 700
EC (5)	382 160	394 932	399 412	407 377	411 773	417 644
USA	528 801	593 527	593 728	602 055	615 669	625 040
Japan	N/A	231 228	232 516	234 137	238 021	241 842

(1) Vehicles which have undergone a technical inspection
(2) 1st of July
(3) 30th of September. Motor coach and bus seating 9 persons and over with a current licence
(4) Only with current licence
(5) 1986-89: estimate
Source: Eurostat, International Road Federation (IRF), Japanese Ministry of Transport

the States in transit. Only the Member State where the vehicle is registered has to authorise the service. In national coach transport, the categories of service vary from country to country and within certain States there is no category of shuttle services.

The EC Council of Transport Ministers has recently adopted the regulation on the freedom to provide intra-EC services for road transport by coach and bus. Under this regulation, an authorisation is no longer required for most occasional services and for shuttle services if accommodation is included (inclusive tours). For regular services, however, authorisation is still required.

A proposal for a regulation on the conditions under which non-resident carriers may operate national road passenger transport within a Member State, has recently been adopted. The new freedom allows operators to provide certain non-regular services under the same conditions as resident carriers as from January 1, 1993 and all such services as from January 1, 1996.

The degree of regulation of coach services varies greatly between Member States. Certain Member States, such as the United Kingdom, have a very liberal system, where basically only qualitative controls govern the operation of a service (Transport Act). The Netherlands also have a relatively free system (Passenger Transport Law) for coach operations. Regular bus services (public transport) is strictly regulated. On the other hand, in Spain the 1987 LOTT legislation prescribes very detailed provisions governing all road passenger transport.

Furthermore, a Directive has come into force on 1 January 1990, strengthening the existing provisions for becoming a passenger transport operator. In particular, it specifies precise minimum financial requirements to ensure the viability of existing and potential operators and it makes the passing of a written examination compulsory for new entrants.

A parallel development to opening the EC market which will be of great assistance in raising standards of coaches and in ensuring the transparency of the market, is the introduction of a system of star rating for coaches. The International Road Transport Union (IRU) has set up this system and runs it. The number of stars awarded to a coach indicates to the tour operator and potential customer the quality of a coach.

OUTLOOK

The growth of passenger mobility within the EC will further stimulate road passenger transport. The growth rate of this transport mode, however, will be lower than overall mobility growth, as private car use, especially in the southern EC countries, has not yet reached its maximum. Attempts by national governments to discourage private car traffic in order to reduce road congestion and air pollution by cars, are not likely to have significant consequences for the ownership and use of private cars in the short term. The opening up of Eastern Europe has already and will further create new attractive tourist destinations for coaching. Investments in high-speed trains is not expected to threaten the road passenger transport in the coming years. The sector is likely to grow by 1% per annum in the 1992-95 period in terms of passenger-km.

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Road freight transport
NACE 723

Since 1982 road freight traffic has increased at an average annual rate of 4.4%. The period 1986-1990 accounted for the largest growth rates with an average of 5.7% per year. Favourable developments in the world economy had a positive impact on the volume of goods transported by road. The development pattern of the road transport industry is very similar across the Member States.
Developments for both intra-EC traffic and third-country transport volume have been positive. The freight rates for international transport have been under pressure because of the growing number of internationally active road transport companies.
The single market will bring about a better capacity utilisation of the European road haulage industry and lead to a further growth of intra-EC traffic. Community policy aims at eliminating physical barriers and harmonising taxes within the EC. In close connection with the EC policy on infrastructure and pollution the European Commission will give special attention to the less developed areas in the EC.
Although the opening up of Eastern Europe will tend to favour both passenger and freight traffic by road, its impact on the EC road transport sector is not expected to be substantial in the short-term.

INDUSTRY PROFILE

Description of the sector

The goods-haulage sector includes units exclusively or primarily engaged in the transportation of goods - regular or otherwise - by lorries or similar vehicles e.g. tractors, articulated vehicles, lorry-trailer combinations and road trains.

The market for merchandise road transport is organised by a national regulatory framework. Community measures and bilateral agreements between Member States. International road transport in the community is submitted to bilateral authorisations which are gradually being replaced by multilateral authorisations before being completely removed.

Main indicators

It is estimated that total road transport increased by 3.6% in 1990, to a level of 826 billion tonne-kilometres. This represented a slowdown compared to growth rates in 1989 and 1988.

With the exception of the Benelux, all the EC countries showed comparable market shares for total and domestic road freight operations. The proportion of domestic traffic in total road freight traffic for the EC is 80% and varies according to Member States from 79% in France to around 94% in the United Kingdom. For the Netherlands and Belgium, domestic road transport is less important than international haulage (44% and 39% respectively). With 18%, the Netherlands holds the highest market share in international EC road freight transport.

In 1990 the total amount of tonne-km achieved by intra-EC merchandise road transport among EC countries was estimated at 166 billion, accounting for 20% of total tonne-kilometres.

International comparison

The EC total fleet of 15.6 million vehicles is smaller of that of the USA and Japan, respectively 43.6 and 22.2 million vehicles.

Total road traffic between the Netherlands and Germany is very intense at 7.9 billion tonnes/km from the Netherlands to Germany and 7.4 billion tonnes/km in the opposite direction. The same intense road traffic can be observed between Belgium and France, as well as between Germany and the Northern part of Italy.

Transport increased exceptionally fast in Spain and Portugal. While in 1989, total international road traffic increased by 8.9%, transport to the Iberian peninsula grew by more than 20%.

MARKET FORCES

Demand

The eastern European countries are currently unable to cope with a substantial increase in road traffic. Road maintenance, upgrading and the construction of new motorways are necessary to prevent congestion and to ensure rapid flows of goods and passengers. Implementation of these measures require both considerable investments and time. The TEM (Trans-Euro-

Table 1: Road freight transport
Breakdown by country

(billion tonnes-km)	1980	1989	1990	Avg annual % change 1980/90
Belgique/België (1)	18.3	32.2	35.4	6.8
Danmark (2)	7.8	14.1	14.3	6.3
BR Deutschland (1)	124.4	137.7	143.0	1.4
Hellas (1)	N/A	16.5	17.2	N/A
España (2)	89.5	111.3	115.1	2.6
France (2)	97.4	127.8	131.0	3.0
Ireland (1)	5.0	5.3	5.4	0.8
Italia (2)	119.6	143.4	152.6	2.5
Luxembourg (2)	0.3	2.6	3.3	27.2
Nederland (2)	17.7	49.9	51.7	11.3
Portugal (1)	11.8	14.2	16.0	3.1
United Kingdom (2)	89.7	142.8	141.2	4.6
EC (3)	581.5	797.8	826.2	3.6

(1) For 1990 and 1990-80 average growth rate: NEI estimate based on DG VII figures
(2) For 1990 and 1990-80 average growth rate: NEI estimate based on ECMT figures
(3) For 1980: NEI estimate based on DG VII and ECMT figures
Source: ECMT, DG VII

Table 2: Road freight transport
Trends in national and international intra-EC traffic

(billion tonnes-km)	1983 (1)	1984 (1)	1985 (1)	1986 (1)	1986 (2)	1987 (2)	1988 (2)	1989 (2)	1990 (2)
National	417	427	435	455	538	570	615	641	660
International intra-EC	80	85	88	91	116	130	144	157	166
Total	497	512	523	546	654	700	759	798	826

(1) Basis: EC 10
(2) Basis: EC 12
Source: DG VII

pean Motorway), prepared and carried out under supervision of UNO, has the objective to come to an integrated Pan European road system. The TEM-project is not expected to be completed before the turn of the century. The deregulation of the road transport market in Eastern Europe is a long-term process.

The Single Market will increase competition and encourage the European road haulage industry to innovate and upgrade its services in order to meet developments in demand by shifting from general haulage to a wide range of specialised and sophisticated transport services. Hauliers will be engaged more in distribution than just in physical transport. Increased competition and the pressure to innovate will entail a process of concentration and co-operation. On the other hand an increase in the demand for specific services offers prospects for specialisation.

Finally the use of information and communication technologies, e.g. Electronic Data Interchange, Tracking and Tracing systems, makes market growth possible, which is in line with the possibilities that come with the single European market. The use of ICT itself has a stimulating impact on the market growth, since the services offered by the players in the transport market can be of better quality (like Just In Time) and/or cover a far wider range than a simple long haul.

Supply and competition

As far as national road traffic is concerned, it can be noted that of all Member States, the United Kingdom had the highest share in the total tonne-km of road traffic (21%), followed by Italy with 19% and Germany with 18%.

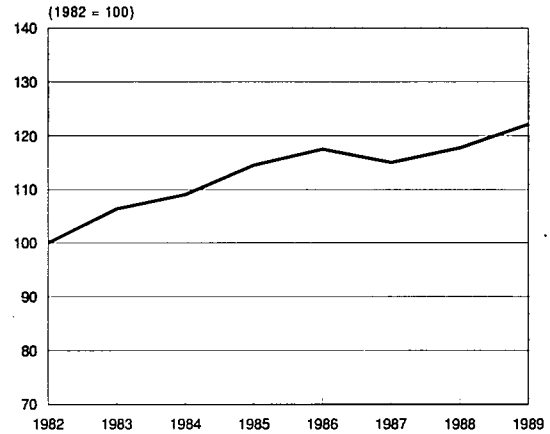
On the supply side the trend in the 1980s has been one of steady growth, accelerating in the last few years. Liberalisation and harmonisation will affect the supply side in several ways. Trade between Member States and thus intra-EC road traffic will increase. However, competition between hauliers from different EC countries will intensify, pushing freight rates downwards.

Comparison of market shares confirms the strong competitive position which the Netherlands hold in intra-EC road freight, in relative as well as in absolute terms. Belgium also is well placed on the intra-EC market. The intra-EC market shares of Germany and France are also high, but compared to their national traffic their contribution to intra-EC traffic is of minor importance. Spain is the only other country where intra-EC traffic is significant to the sector. The United Kingdom can be expected to increase its intra-EC market share after the opening of the Channel tunnel. That increase will probably affect competition between transport modes - sea and air freight - more than competition between UK and other road hauliers because the latter also stand to profit from the Channel tunnel.

Production process

Figure 1 shows the development of costs for hauliers of some EC countries. Total cost inflation was highest in Germany at an average yearly growth rate of 3.4%, followed by Denmark and France with 3.2%. As fuel costs decreased for all countries in the 1982-1989 period, the greater part of cost inflation must be attributed to wage increases.

Figure 1: Road freight transport
Evolution of total costs for EC hauliers (1)



(1) Belgium, Denmark, Germany, France, Luxembourg, the Nederlands, United Kingdom
Source: DG VII

Table 3: Road freight transport
Modal split of freight traffic in the EC, 1990

(% based on tonne-km)	Road	Rail	Water	Air	Total
Benelux	61.2	8.4	28.5	1.9	100.0
BR Deutschland	52.8	29.6	16.4	1.2	100.0
España	89.9	9.6	0.0	0.5	100.0
France	65.2	28.4	4.2	2.2	100.0
Italia	86.0	13.2	0.1	0.7	100.0
United Kingdom	87.9	10.2	0.1	1.8	100.0
Total EC 12	70.9	18.7	9.2	1.3	100.0

"Source: ERECO, Europe in 1996; based on national statistics

The average carrying capacity of semi-trailers (based on Germany, France and Belgium) has increased from 22.7 to 23.7 tonnes between 1986 and 1989, whereas the average carrying capacity of lorries and trailers has remained unchanged at 1.8 and 7.0 tonnes respectively. These low figures are of course due to the large number of small lorries. Based on seven countries of the EC, figures show that 7% of the lorries have a carrying capacity of 7.0 tonnes or more. Moreover, these lorries account for 45% of the carrying capacity of all lorries.

However, the picture changes when we look at the use of these vehicles. The average of tonne-km per vehicle in 1989 was 51 200. Greece, France (due to the large number of vans) and Ireland and Portugal have lower than average utilisation-rates. Denmark, Spain, and Italy are operating more or less on the average, whereas the other EC countries are all clearly operating above average. Germany, Belgium and the Netherlands have all utilisation rates of approximately 100 000 tonne-km per vehicle.

INDUSTRY STRUCTURE

Profile

The market is highly fragmented into many small transport companies. In most EC countries the number of road transport undertakings is slowly decreasing, which indicates a move towards some co-operation between companies or concentration in the sector.

Member States differ considerably in the number of hauliers, the evolution of this number, and the distinction made between own account transport and transport for hire and reward. Member States have different market access rules for long distance and short distance haulage respectively.

The road-transport sector is characterised by small and medium sized operators in the south of the EC and larger operators in the north-west. The turnover by single company is highest in Belgium. Luxembourg is not fully comparable because the country is so small and the part of the turnover that is realised in cross-border transport relatively large.

Of the other countries, the Netherlands and Belgium have a transport sector that is more than proportionate compared with Germany, France and the United Kingdom.

Strategies

The lack of sufficient investments in road infrastructures becomes a serious threat to the haulage sector. Apart from the problems facing road traffic in the Austrian and Swiss Alps, competition from the railways may increase. The investments in railway transport are developing fast, with investment in high-speed trains as well as in the improvement of the overall quality of railroad transport. The Channel tunnel will lead to changes in transport flows and logistic locations as well.

However, the balance in the modal split for freight traffic in 1990 remained undoubtedly in favour of road transport, with percentages varying between 53% and 90% (and far over 90% for the EC countries not mentioned in Table 3). Only in Germany and in the Netherlands is there a very substantial part of freight transported by other means.

The differences can be partly explained by the low degree of efficiency of alternative transport modes (Italy), by the low level of public investment in rail and inland waterways (Greece, Denmark) and on topographical grounds (Greece).

REGIONAL DISTRIBUTION

In 1989, the total amount of international transport between EC Member States was 557.9 million tonnes. EC countries in the north-west region - the Netherlands, Belgium, France and Germany - accounted for 84.6% of the total transport to

Table 4: Road freight transport
Total international intra-EC transport, 1989

(million tonne-kilometres; inward + outward + cross-trades)

From	To	D	F	I	NL	B	L	UK	IRL	DK	GR	E	P	EC
D			6 215	6 418	7 242	3 140	369	1 196	83	1 526	792	2 937	797	30 715
			7.5	1.3	7.3	0.4	28.1	18.4	53.7	7.7	-5.1	18.5	58.1	7.5
F		6 835		6 348	2 316	4 699	153	2 109	87	447	296	4 168	602	28 060
		9.2		4.9	12.2	13.1	-7.8	19.9	19.2	10.1	24.9	9.1	-6.5	9.5
I		7 976	6 766		2 415	2 534	100	3 387	213	478	295	2 450	1 023	27 637
		3.3	1.8		9	21	56.3	8.9	44.9	2.8	5	23.1	77.6	9.2
NL		7 868	3 634	3 750		2 142	55	700	30	605	326	1 697	240	21 047
		7.6	11.2	-9.6		4.9	31	9.7	-28.6	3.4	10.5	30.4	10.1	5.8
B		3 958	6 074	2 870	2 282		326	421	28	248	103	1 421	175	17 906
		8.4	6.2	13.3	-1.9		14	4	-6.7	-9.8	13.2	22.3	98.9	8.1
L		495	205	96	111	267		23	0	1	3	5	1	1 207
		21	0	43.3	27.6	18.1		0	0	0	0	66.7	-50	17.6
UK		1 106	1 405	1 675	318	255	6		225	90	158	1 252	276	6 766
		7	31.2	7.1	-0.3	42.5	50		-4.3	34.3	28.5	25.3	106	18.1
IRL		101	151	124	20	26	2	223		4	2	29	1	683
		21.7	18	96.8	0	160	-	8.8		-33.3	100	61.1	-80	26.7
DK		1 484	450	460	351	129	1	149	19		120	176	72	3 411
		13	-0.2	2.9	7.7	-0.8	-	44.7	72.7		23.7	26.6	41.2	11.2
GR		933	157	120	274	56	1	126	0	45		9	4	1 725
		-2.8	0	8.1	21.2	-5.1	-	15.6	0	2.3		0	-	3
E		3 195	4 572	1 573	1 170	965	7	1 568	47	161	18		949	14 225
		3	-2	15.9	8.8	5.8	40	-0.8	62.1	-18.3	38.5		25.2	3.9
P		525	763	509	113	100	8	255	0	73	0	976		3 322
		63	43.2	129.3	-21	78.6	60	90.3	-	-3.9	-	42.7		52.7
EC		34 476	30 392	23 943	16 612	14 313	1 028	10 157	732	3 678	2 113	15 120	4 140	156 704
		7.2	6.1	4.6	6.8	10.2	19.5	11.9	17.9	3.9	6.9	20	38.9	8.9

Source: Annual report 1989, CEC Directorate-General for Transport. Eurostat

Table 5: Road freight transport
Breakdown of the freight transport market, 1989

(billion tonnes-km)	National	International Intra-EC	Total
Belgique/België	12.5	19.7	32.2
Danmark	9.2	4.9	14.1
BR Deutschland	115.1	22.6	137.7
Hellas	13.8	2.7	16.5
España	96.0 (1)	15.3	111.3 (1)
France	100.4	27.4	127.8
Ireland	4.0	1.3	5.3
Italia	123.5 (1)	19.9	143.4
Luxembourg	0.3 (1)	2.3	2.6 (1)
Nederland	21.8	28.1	49.9
Portugal	10.2	4.0	14.2
United Kingdom	134.3	8.5	142.8
EC	641.1 (1)	156.7	797.8

(1) Provisional data
Source: DG VII

Table 6: Road freight transport
Number of goods vehicles

(thousands)	1970	1975	1980	1985	1989
Belgique/België	212	235	268	273	315
Danmark (1)	247	228	253	259	291
BR Deutschland (1) (2)	1 028	1 121	1 277	1 281	1 365
Hellas	107	198	389	602	746
España	717	1 014	1 362	1 529	2 224
France (1) (3)	2 065	2 325	2 457	3 779	4 790
Ireland	50	54	65	93	130
Italia (1) (3)	1 261	1 548	1 600	2 192	2 644
Luxembourg (4) (5)	9	11	9	9	11
Nederland	303	332	363	364	511
Portugal (1)	112	204	367	513	566
United Kingdom	1 664	1 820	1 808	1 972	1 975
EC	7 775	9 090	10 218	12 866	15 568
USA	18 797	25 781	33 667	39 196	43 637
Japan (3)	8 282	10 044	13 178	17 140	22 235

(1) Does not include road tractors
(2) At 1st July
(3) Includes three-weeled vehicles
(4) Method of calculation changed between 1975 and 1980
(5) OECD secretariat estimatesSource: IRF, Eurostat, UNECE, USMVMA and national statistical yearbooks
OECD Environmental Data, Compendium 1991

Table 7: Road freight transport
International EC transport, 1989

(million tonnes)	Total	NW Europe (1) to	NW Europe (1) from	Other EC countries to	Other EC countries from
Road	256.1	202.6	208.2	53.5	47.9
Inland waterways	205.9	204.9	204.4	1.0	1.5
Railways	70.7	43.2	59.2	27.5	11.6
Total	532.7	450.7	471.8	82.0	61.0

(1) Benelux, BR Deutschland, France
Source: Eurostat

other Member States and 88.9% of total transport from other Member States.

ENVIRONMENT

One of the most important problems concerning road traffic is air pollution; it harms the environment, may modify climate and contributes to acid rain. Among the major air pollutants are: Sulphur dioxide (SO_2), Nitrogen oxides (NO_X), Carbon monoxide (CO), Particulates (Aerosols), Lead (Pb) and Carbon dioxide (CO_2). Both gasoline-driven and diesel vehicles emit carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide, though diesel vehicles emit CO and NO_X at lower rates. Furthermore, gasoline vehicles emit lead, and diesel vehicles emit SO_2 and particulates.

Transport in the EC, including private cars, contributes a considerable part of carbon monoxide emissions (some 80%). The percentage shares of individual countries fluctuate between 60% and 95%, and vary greatly from year to year. Additionally, 50% to 60% of the emissions of hydrocarbons and nitrogen oxides stem from traffic. The contribution to the emissions of particulates and sulphur dioxide is lower. Whilst most emissions are produced by private cars, the emission of particulates originate mainly from diesel engines - important for freight traffic. New EC standards for heavy vehicle emissions, Euro I and Euro II, will reduce emissions by these vehicles by 55-65%, except for CO_2.

The EC commission has come up in 1991 with ideas for a combined tax on energy and carbon. Its purpose is to stabilise the emissions of the greenhouse gas CO_2 in the year 2000 on the level of 1990. The tax should begin in 1993 with a charge of US$ 3 per barrel of crude oil, rising to US$ 10 in 2000. This means that gasoline and diesel fuel prices would raise with 6% and 10% respectively. No final decision has been reached yet.

REGULATIONS

The issue of authorisations, the fixing of tariffs and driving times, the imposing of technical standards and taxes on motor vehicles, are actions that can affect the supply side of the market, for instance, the number of vehicles on the road. From January 1st 1993 onwards, all bilateral authorisations, transit and Community quotas will be replaced by Community authorisations, but these won't be subject to quantitative restrictions. From then on permission to enter the market will depend on qualitative criteria. On January 1, 1990, the old tariff system for international journeys within the EC was replaced with free price fixing.

By improved co-ordination, the EC is trying to improve the observance of social measures, e.g. to extend its span of control, to prevent drivers from neglecting the measure dating from November 1985 which regulates their hours of driving.

Other EC measures that may affect the road transport of goods are associated with the EC policy concerning environment and infrastructure. Other measures are especially aimed at improving the infrastructures of the economically less developed areas.

Another important aspect of goods transport is cabotage, which was not permitted in road haulage by any host state in Europe until recently. The decision which the EC transport Council has made about cabotage therefore constitutes a real breakthrough. During the transitional period (1990-1992) a quota of 15 000 allowances with a validity of two months was distributed among the member states. Furthermore cabotage is submitted to certain rules of the host Member State. However, cabotage only accounted for 0.1% of the combined domestic markets of the member states in the first year of operation (mid 1990 - mid 1991).

As to the future of cabotage, a final decision is due by end 1992. However, there remain strong opposing forces to a general introduction of cabotage. This is partly related to the differences in taxes and tolls. However, in the Benelux countries cabotage will be effective after the amendments of the national laws in the three countries.

OUTLOOK

The liberalisation and harmonisation of the EC transport market, the presumed ensuing growth of economic activity and a shift in demand towards fast and flexible transport will affect the volume of total transport. Environmental regulation, Eastern Europe, investments in road transport and other modes of transport and information and communication technology are other important aspects.

For hauliers, the European integration may produce some general advantages such as an increased transport volume, more third-country transport, less empty return loads, simplified foreign settlement, and co-operation with foreign transporters.

Table 8: Road freight transport
Expected annual growth rates

(%)	1992-93	1992-96
National goods traffic	3.0	3.0
Intra-EC goods traffic	4.0	5.0

Source: NEI

Intra-EC traffic will grow significantly faster than national traffic. One reason is that hauliers can react to future developments faster than other modes of transport because the rerouting of existing capacity requires little investment. however, saturation of roads will form a threat to the expansion of the road haulage sector.

Finally, the use of new information and communication technologies could give transport companies a competitive edge over non-users. The developments in this field are fast, and only keeping track of them requires already considerable effort.

After a slowdown in 1991 and 1992 due to the general weakness of the economy, the EC road haulage industry is expected to grow at average annual rate of 3 to 5% per year in the medium term.

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Inland waterways transport
NACE 73

About 40% of all transport between EC Member States is transported by inland waterway. After a crisis in the beginning of the 1980s, demand gained momentum again during the latter part of the decade. However, overcapacity hampers the development of the sector. Scrapping and modernisation policies are successfully improving the situation. Together with increasing demand (especially in the transport of hazardous goods and unitised cargoes) the prospects for inland shipping are modestly positive.

INDUSTRY PROFILE

Description of the sector

NACE 73 includes units exclusively or primarily engaged in the transportation of passengers and goods on rivers, canals, lakes, lagoons and within river ports. Tugs and push boats operating on inland waterways also belong to this NACE heading.

The sector of inland waterway transport consists of companies operating ships of various sizes to convey goods throughout Europe on the available inland waterway network. As passenger transportation is limited to some ferry boats across rivers and boats for river cruises, this part of the sector is practically negligible. Most inland shipping operates with unscheduled services. Operations using fixed time tables rarely exist.

Next to companies operating ships as their primary activity (professional transport), there are companies active in manufacturing that operate ships on their own account (own account transport). These companies want to have complete control on the availability of inland water transport facilities.

Main indicators

In terms of tonnage transported, the country with the largest volume is the Netherlands. Germany ranks second with a total tonnage of some 220 000. Belgium follows with about 95 000 tonnes and France is in fourth position with some 60 000 tonnes. In the other countries of the EC, inland shipping is a marginal activity. In the United Kingdom and Italy, only domestic shipping takes place; in Greece, Portugal, Spain and Denmark, inland shipping is virtually non-existent.

When measuring transport activity of inland shipping in terms of tonne-kilometres, the ranking changes. Germany takes first position followed by the Netherlands. France ranks third and Belgium fourth. The remaining EC Member States have marginal figures.

The majority of inland shipping activity is accounted for by goods transported on the Rhine River. Nearly 300 000 tonnes are transported annually on this main artery of inland transportation for the European continent. The river is the most important connection between the large ports in the Le Havre-Hamburg range (e.g. Rotterdam and Antwerp) and the European hinterland. Dutch and German inland shipping operators benefit from this advantageous situation.

National differences occur when looking at the distribution of goods traffic. In Italy and the United Kingdom, inland shipping is purely a national phenomenon, as there are no inland waterway linkages with other countries. In other countries, domestic transport is also relevant. This is especially the case in France, where half of inland shipping concerns domestic transportation.

The Netherlands is clearly an exporter country: some 40% of inland shipping relates to exports, whereas about 20% is imports. For Germany, the situation is reversed: about 40% of inland shipping relates to imports, whereas some 20% is exports. In Belgium, imports account for nearly 50% of total inland shipping (measured in tonnes), while exports account for nearly 30%.

Total tonnage in transit throughout the EC amounted to some 65 000 tonnes. The Netherlands with over 30 000 tonnes is the most important transit country, followed by Germany with another 15 000 tonnes. For Luxembourg, transit traffic is the most important traffic category: in terms of tonnage 82% is in transit; in terms of tonne-kilometres it amounts to 97%.

Table 4 gives an indication of the type of products that are transported by way of inland shipping. The sector specialises in the transport of massive bulk products, such as sand, ores, coal, chemicals, and oil. These can be basically distinguished in dry bulk and liquid bulk. The largest volumes of goods transported relate to petroleum products (17%), iron ore, iron and steel waste, etc. (13%) and crude and manufactured minerals (33%). In practically all countries, crude and manufactured minerals are the most important type of goods transported.

Table 1: Inland waterways transport
Total traffic on EC network, 1985-1990 (1)

(1000 tonnes)	1985	1986	1987	1988	1989	1990 (2)	Growth rate 1989/85 (%)	Growth rate 1989/88 (%)
Belgique/België	89 439	91 288	90 956	95 398	94 672	96 000	1.4	-0.8
BR Deutschland	210 401	215 246	207 548	218 564	219 484	220 000	1.1	0.4
France	59 353	58 486	56 968	60 340	50 300	60 000	-4.0	-16.6
Italia (3)	2 304	1 600	1 133	899	869	875	-21.6	-3.3
Luxembourg	1 761	2 021	1 922	2 173	2 055	2 000	3.9	-5.4
Nederland	221 479	238 116	240 671	249 532	259 491	265 000	4.0	4.0
United Kingdom (3)	7 200 (2)	7 507	6 855	7 219	7 195	5 993	0.0	-0.3
EC 7	389 947	406 337	403 050	427 411	422 008	443 000	2.0	-1.3
Growth rate (%)	-	4.2	-0.8	6.0	-1.3	5.0		

(1) For each country, the figures are: import + export + national transport
For EC 7, the figures are: total national transport + total export
(2) NEI estimate
(3) Domestic traffic only
Source: Eurostat, CEC DG VII, Transport Statistics Great Britain

Table 2: Inland waterways transport
Freight transport on the Rhine

(1000 tonnes)	1980	1988	1989	1990	Growth rate 1990/89 (%)	Growth rate 1990/80 (%)
Total goods carried	282 721	293 298	296 633	291 677	-1.7	3.2
International transport	170 251	188 232	191 966	189 093	-1.5	11.1
Of which between Nederland and BR Deutschland	129 894	138 706	142 260	142 997	0.5	10.1
of which transit through BRD	13 948	14 298	14 891	15 345	3.0	10.0
National transport	112 470	105 066	104 667	102 584	-2.0	-8.8
Total tonne-kilometres (million)	56 873	60 375	61 466	61 894	0.7	8.8

Source: UN, Transport Statistics for Europe, 1991 Annual Report

For example, in Germany about 25% of total inland shipping was crude and manufactured minerals, in France about 50%, in the Netherlands around 35%, in Belgium around 25%, in Luxembourg about 15% and in Italy about 40%.

Most of inland waterways transport throughout Europe takes place within the EC. Transport to and from non-EC countries mainly relates to transport links with Switzerland (Rhine) and the East European countries along the Danube and the Elbe rivers.

Recent trends

Average growth in total tonnage transported throughout the EC during the period between 1985 and 1989 amounted to about 2% per annum. This means an important recovery from the very depressed situation at the beginning of the 1980s. Annual rates however, fluctuate considerably. In 1987, a drop in tonnage transported of about 0.8% occurred, whereas in 1988 growth soared to 6%. Also, large differences exist for the individual member states. In Germany, average growth between 1985 and 1989 amounted to only 1.1%. In the Netherlands, on the other hand, total tonnage transported increased by 4.0%. Italian inland shipping is rapidly decreasing. France encountered a serious drop in total tonnage.

When looking at total tonne-kilometres, the EC total is about stable at 55 billion km. For the Netherlands, there has still been a growth of 2.3% on average during 1985 to 1989, whereas Germany and Belgium show growth rates between 0% and 1%, respectively. Italy, France and the United Kingdom, however, experienced a declining trend.

MARKET FORCES

Demand

Over the years, demand growth in inland shipping had been fairly limited. This was shown by the relatively low growth rates presented earlier. In other types of transportation, growth rates of demand were higher. This was due to the fact that the majority of goods transported related to traditional bulk products as inputs for traditional industries (e.g. refineries, steel industries, chemical plants), where growth rates of industrial activity have been moderate.

These industries are in need of cheap transportation for bulk goods. Speed is not really important, as long as there is a continuous flow of vessels transporting it. Interruptions of this flow should be minimal and not distort the production process in the plants.

There has been a structural tendency to reduce the volumes of goods to be transported. This has been done by transferring the initial processing of raw materials to the origin. As a result, total tonnage of raw materials reduced and the tonnage of processed materials increased. However, the increase does not compensate the decrease: e.g. instead of transporting a

Table 3: Inland waterways transport
Distribution of goods traffic, 1989

(%)		National Traffic	Imports	Exports	Transit
Belgique/België	1	20.8	47.8	28.5	2.9
	2	30.7	39.2	22.8	7.3
BR Deutschland	1	25.9	42.7	24.8	6.5
	2	25.0	39.0	20.5	15.6
France	1	48.2	19.4	27.1	5.3
	2	53.7	17.9	20.8	7.6
Italia	1	100.0	-	-	-
	2	100.0	-	-	-
Luxembourg	1	0.3	9.1	8.7	82.0
	2	0.3	1.9	0.8	96.9
Nederland	1	30.3	18.7	39.9	11.1
	2	20.0	20.5	42.7	16.8
United Kingdom	1	100.0	-	-	-
	2	100.0	-	-	-

(1) Based on tonnes transported
(2) Based on tonne-kilometers
Source: Eurostat

Table 4: Inland waterways transport
Distribution of products transported by inland waterways, 1989

(1000 tonnes)	Domestic	Export	International Import	Total
Cereals	4 082	7 658	8 296	20 036
Foodstuff and animal fodder	9 890	9 009	8 384	27 283
Oil seeds and oleaginous fruits and fats	3 893	5 274	5 240	14 407
Solid mineral fuels	18 733	11 503	11 782	42 018
Crude petroleum	954	95	297	1 346
Petroleum products	30 970	38 003	35 638	104 611
Iron ore, iron and steel waste, etc.	3 444	39 599	40 823	83 866
Non-ferrous ores and waste	974	3 770	3 376	8 120
Metal products	3 480	12 926	11 945	28 351
Cement, lime, manufacturing building materials	3 939	3 423	3 638	11 000
Crude and manufactured minerals	98 200	55 860	54 782	208 842
Natural and chemical fertilizers	4 690	7 096	6 851	18 637
Coal chemicals, tar	1 219	736	1 470	3 425
Chemicals other than coal chemicals and tar	7 506	13 830	11 605	32 941
Other goods	4 073	9 115	8 800	21 988
Total (1)	196 047	217 897	212 927	626 871

(1) Total is for BR Deutschland, France, Italia, Nederland, Belgique and Luxembourg
Source: Eurostat, Ereco, Europe in 1996

tonne of crude oil, less than a tonne of processed crude is transported.

Another problem on the demand side is that there is a tendency for monopsony power: demand is with a limited number of large industries, which are able to exchange information on the inland shipping market. In the Netherlands, for example, the transport of sand and gravel has been controlled by a cartel of sand and gravel traders and producers. Furthermore, some industries have arranged long-term transport contracts with shipping companies at guaranteed prices. In addition, some industries have their own vessels (own account shipping). They only need professional shipping to meet with peaks in their transport demand.

In the last five to ten years, unit cargoes like containers and roll-on roll-off (e.g. equipment for agriculture, cars and trucks) have become more and more important for inland shipping. This is due to a need with shippers to have reliable and cheap transport facilities for non-bulk products without the need to move these products in a fast way. Also unit cargos can be easily handled in multimodal (combined) transport concepts: a combination of rail, road and inland waterway transport. Such packaging of non-bulk goods is likely to continue and allow inland shipping to diversify away from traditional bulk tonnage.

Another tendency is that inland shipping has become important for the transportation of dangerous cargoes, such as highly poisonous or explosive chemical products. These substances require a high level of safety and safety standards from the transportation service providers.

Supply and competition

Inland shipping is capable of meeting the industry's requirements for bulk transportation which is cheap, energy-efficient, safe and reliable. The application of modern information and communication technology allows modern transportation concepts like Just-In-Time delivery and door-to-door transport chains. Some advantages offered by inland waterways in comparison to other modes of transport is the relatively low burden for the environment as the energy use per tonne is very low and the absence of grave bottlenecks in the used network.

The EC inland waterway fleet has a carrying capacity of 12.2 million tonnes. The Dutch fleet accounts for 49% of the total capacity, while the German fleet holds second position with 25%. The Dutch fleet has increased by 20% in ten years time, whereas the fleets of other countries has diminished. Overall, the EC fleet carrying capacity has been reduced by 6.2% between 1980 and 1990.

The fleet is characterised by the existence of a large number of private owners mostly operating only one vessel with the owner's family living on board. In general these vessels are old and relatively small in size and not in line with the latest technological standards. These ships are not demolished as the owners operate at or below economic cost prices, accepting very little or even negative returns. Large shipping companies exploiting fleets of 20 to 100 vessels mainly operate on the Rhine and its branches. Their fleets are generally large modern units enabling a high productivity and shorter turnaround times.

Table 5: Inland waterways transport
Comparison of modes of goods transport within the EC

(in tonnes)	Inland waterways	Road	Railways
Crude transport	56%	38%	5%
Total transport	36%	48%	13%

Source: ERECO, Europe in 1996, based on Eurostat

Table 6: Inland waterways transport
EC fleet in number of vessels and carrying capacity (1)

	Fleet	1980	1990	Growth rate 1990/89 (%)	Growth rate 1990/80 (%)	Fleet share 1990 (%)
Belgique/België	Vessels	3 297	1 942	0.5	-41.1	12.7
	Carrying capacity	1 844	1 523	4.5	-17.4	12.5
BR Deutschland	Vessels	4 153	3 077	0.1	-25.9	20.1
	Carrying capacity	3 672	3 056	-10.9	-16.8	25.0
France	Vessels	5 465	3 293	-9.4	-39.7	21.5
	Carrying capacity	2 537	1 653	-9.9	-34.8	13.5
Nederland	Vessels	7 891	6 998	11.4	-11.3	45.7
	Carrying capacity	4 960	5 969	-2.4	20.3	48.9
EC 4	Vessels	20 806	15 310	2.6	-26.4	100.0
	Carrying capacity	13 013	12 201	-4.9	-6.2	100.0

(1) 1 000 tonnes
Source: Eurostat; UN, Transport Statistics for Europe, 1991 Annual Report

The existence of small family-owned vessels which have not yet been scrapped and the introduction of modern large sized vessels has caused a structural imbalance between supply and demand. Overcapacity, therefore, has become a structural phenomenon in inland shipping. During the 1980s overcapacity was estimated at some 20% of the EC fleet.

Overcapacity has had a negative effect on the evolution of prices on the free market. Already during the 1930s price regulating systems and cargo sharing systems had been introduced, basically to guarantee ship owners a minimum income. This social policy led to maintaining the overcapacity problem.

REGULATIONS

To remedy overcapacity problems, national governments have introduced capacity-regulation systems. In May 1989, the Council established principles for an EC-wide capacity-regulation policy which is also followed by the Swiss authorities. It entails:

- measures to set up and coordinate the functioning of national scrapping schemes by harmonising the basic principles and procedures throughout the EC;
- provisions to prevent the impact of a coordinated scrapping action from being cancelled out by limitations on the bringing into service of new vessels.

The purpose of capacity regulation is twofold. Firstly, it should bring down the total carrying capacity of the fleet by deleting old tonnage. Secondly, it should modernise the fleet by introducing modern large-sized tonnage.

These policies have already been effective. Table 6 reveals a larger reduction in the number of vessels than the reduction in carrying capacity. This implies that the average ship size has increased while average ship age reveal a considerable reduction.

On the Rhine River, a free market situation prevails. The Act of Mannheim of 1868 guarantees free shipping on the Rhine and its arteries for all ships with flags belonging to countries signatory to the Act (Germany, France, the Netherlands, Switzerland, Belgium, and the United Kingdom). The Commission is in favour of including the Rhine-regime in its EC Transport Policy. However, a complicating issue is that Switzerland is not currently a Member State.

In view of the Single Market, initiatives are taken to allow cabotage: each ship with an EC flag is allowed to provide services within other Member States. This will increase competition on the European waterways. Price and capacity regulating systems are not favourable in future EC transport policies and are likely to gradually disappear.

THE NETWORK

The Rhine, being navigable over a distance of 1,000 km from Basel in Switzerland to the North Sea at Rotterdam is clearly the backbone of the EC waterway system. Other rivers like the Meuse, the Schelde and the Elbe are interconnected with the Rhine by means of canals navigable for vessels of at least 1,350 tonnes, (classified as a Europe, class IV, standard vessel). Furthermore, a coherent network has been created by waterways navigable for units with a loading capacity from 1,350 to 10,000 tonnes (pushed convoys on the Rhine and certain other sections) which covers most of Germany, the Netherlands, Belgium, Luxembourg and the northern and eastern frontier zones of France.

This network will be extended to Eastern Europe in 1992 if the capacity of the Rhine-Main-Danube Canal also supports the large size vessels. Except for this route, a northerly transit to Eastern Europe between the Netherlands and Germany is also possible through the Mittelland canal. It is not yet clear what measures will be taken to improve its capacity.

In the French hinterland, the rivers Seine and Rhône, being navigable for pushed convoys of 5,000 tonnes, play an important role. However, to date, these rivers are only connected with the main European network by narrow canals. Networks in Italy and the United Kingdom basically relate to the Po River in Northern Italy and navigable rivers and canals in the UK (e.g. Thames, Humber, Clyde).

Although no major bottlenecks exist, investments in new infrastructure continue to be necessary. Increasing ship size requires enlargement of locks and canals, the deepening of waterways and adaptation of inland water ports. Modern navigation facilities are also needed along the waterways.

OUTLOOK

Demand for inland waterway transport is likely to maintain its upward trend at moderate growth rates. In view of economic integration, transport demand among Member States will increase in terms of both volume and distance to the benefit also of inland waterways. In the field of hazardous goods transport and unitised cargoes, inland waterways are likely to gain.

The developments in Eastern Europe will affect traffic in two ways. Firstly, positive developments emanating from German unification and the opening up of the Eastern European econ-

Table 7: Inland waterways transport
Expected annual growth rates

(%)	1992-93	1992-96
Total traffic		
Volume (million tonnes)	1.5	2.5
Tonnes kilometres (million)	2.5	3.0

Source: NEI

omies. New market opportunities and intensifying trade will occur, but in the short term these effects may be limited. Secondly, negative developments may occur as fleets from East European countries enter West European markets, especially via the Rhine-Main-Danube canal. However, ship sizes are small and service standards can not really meet Western requirements.

Concerning capacity, the EC scrapping system is likely to be successful. Together with the present trends in demand, a new equilibrium between demand and supply can occur in the near future. This will allow better prices and better utilisation of ships.

Written by: Netherlands Economic Institute

Shipping
NACE 74

Over the past five years, the EC merchant fleet declined considerably as did carrying capacity (cwt), entailing a significant drop of the EC share in the world fleet and its carrying capacity. Although the EC's container capacity, measured in twenty-foot equivalent units (TEUs) increased, its share in the world's container capacity dropped. Remarkably, in recent years the EC fleet has developed more or less in line with the world fleet and its capacity. The foreseen gradual recovery of the world economy and developments within the EC will contribute to a further improvement of the position of the EC shipping industry. The developments within the EC concern the deregulation of the EC shipping market and the creation of an EC shipping policy aimed at achieving an efficient and competitive EC shipping industry, enabling EC shipowners to regain a major role in world shipping. Some European liner companies are actively engaged in extending European distribution networks to meet new requirements for intermodal transport and value added services. A large part of the tanker and bulker fleets will have to be renewed in the 1990s, which may cause the EC to improve its position in bulk transport.

INDUSTRY PROFILE

Description of the sector

The sector includes units exclusively or primarily engaged in the transportation of passengers and goods in sea-going and coastal vessels. Also to be classified under this heading are units exclusively or primarily engaged in the transportation of passengers and goods and in the operation of sea-going tugs. Deep-sea transport refers to shipping on long sea routes, coastal shipping or short-sea shipping refers to the conveyance of passengers and goods between national or European ports, including those on the Black Sea, the Mediterranean and Moroccan Atlantic ports.

Between 1986 and 1991, world seaborne trade grew by nearly 5% in volume; over the past two years the growth rate was lower, namely 3.0%. The seaborne trade's various products showed a similar development pattern, although their pace of development varied widely. Over the period between 1986 and 1991, most products increased at an average rate of 3.5% to 4% per year; grain grew at a lower rate, whereas crude oil grew almost twice as fast. Despite a slowdown in its development, crude oil maintained also over the past two years a significant growth; for coal and "other goods" the pace of growth declined recently, whereas the seaborne trade in oil products, iron ore and grain declined between 1990 and 1991.

Table 2: Shipping
Average yearly rate of change of seaborne trade

(%)	1986-91	1989-91
Crude oil	7.0	6.5
Oil products	3.5	-1.3
Total oil products	6.3	4.9
Iron ore	3.3	-0.5
Coal	3.8	3.0
Grain	2.0	-3.9
Total main bulkproducts	3.2	< 0.5
Other goods	3.6	3.0
Total seaborne trade	4.7	3.0

Source: Fearnleys Review 1991

Bulk products allow for the greater part of seaborne trade. In 1991, liquid bulk's share was 46%; the three main dry bulk commodities accounted together for 28% and the share of the remaining dry bulk (which is part of "other goods" in Table 1) is estimated at 5%. In tonne-miles bulk traffic held a total share of nearly 80% of the world's total seaborne traffic in 1991.

It is estimated that about one-third of the world's bulk traffic (in tonnes) has its origin or destination in Europe. The overwhelming part of these flows, 90% is inbound. Nearly half of it is comprised of crude oil and oil products, 18% coal and 16% iron ore, the rest is grain and "other bulk". Oil and oil products have their origin for 75% in the Middle East. Coal is mainly coming from the US, Australia and South Africa with a joint share of 75%. The main sources of iron ore are South America and Australia, allowing together for 60% of Europe's total iron ore imports by sea. Europe's grain supplies are mainly (80%) originating from the United States and South America. "Other goods", reflected by the liner trades, are spread evenly between inbound and outbound trade to Europe, where such trade reached 5464 million TEUs inbound and 5449 million TEUs outbound. Inbound and outbound trade with the USA accounted for the greatest shares: 24% and 21%, respectively. Regarding inbound traffic, the non-European Mediterranean countries followed the USA closely with 19%.

In 1989, the international seaborne trade within the EC amounted to about 216 million tonnes or 18% of the total international trade of the EC. About 80% of extra-EC flows was inbound.

The United Kingdom had the greatest share of intra-EC trade, with nearly 33%, followed by the Netherlands with 18%. Italy and France held the largest shares in the extra-EC trade, 19% and 17%, respectively: the Netherlands and the United King-

Table 1: Shipping
Development of world seaborne trade

(tonne-miles)	1986	1987	1988	1989	1990	1991 (1)
Crude oil	4 640	4 671	5 065	5 736	6 261	6 500
Oil products	1 265	1 345	1 445	1 540	1 560	1 500
Iron ore	1 671	1 728	1 919	1 983	1 978	1 965
Coal	1 586	1 653	1 719	1 798	1 849	1 905
Grain	914	1 061	1 117	1 095	1 073	1 010
Other goods	3 780	3 840	4 040	4 250	4 400	4 510
Total	13 856	14 298	15 305	16 402	17 121	17 390

(1) Estimate
Source: Fearnleys Review 1991

Table 3: Shipping
International seaborne trade by Member State, 1989

(thousand tonnes)	Intra-EC Inbound	Intra-EC Outbound	Extra-EC Inbound	Extra-EC Outbound	Total
Belgique/België	7 600	11 600	50 100	15 200	84 500
Danmark	5 800	6 500	28 500	10 100	50 900
BR Deutschland	19 900	7 200	56 700	21 400	105 200
Hellas	4 400	8 500	12 800	9 100	34 800
España	11 000	16 700	94 900	26 400	149 000
France	24 200	26 300	137 100	28 600	216 200
Ireland	N/A	N/A	N/A	N/A	N/A
Italia	18 700	9 500	162 800	22 900	213 900
Nederland	14 100	56 500	126 100	20 900	217 600
Portugal	6 400	4 900	20 500	2 900	34 700
United Kingdom	57 400	68 600	103 700	44 800	274 500
EC 11	169 500 (1)	216 300 (1)	793 200 (1)	202 300	1 211 800 (2)

(1) Essentially, these flows should be identical. Most probably the difference is due to the fact that some of the airports by sea (outbound) arrive through transhipment by another mode of transportation (road,rail,inland waterways) at their destination. Consequently the importing country does not consider this trade as "seaborne". Hence "outbound" is higher than "inbound" the foregoing "outbound" reflects the intra-EC seaborne trade.
(2) In order to avoid double counting intra-EC trade has been added only once to the sum of the "in- and outbound" extra-EC trade. As intra-EC "outbound" is considered to reflect the intra-EC trade 216 300 has been added to the sum of the extra-EC trades.
Source: Eurostat

dom followed with 15% each. For all EC countries, inbound traffic is dominant in the extra-EC seaborne trade.

In 1989, between 40% and 60% of vessels involved in international trade to and from the EC were registered in an EC Member State.

Between 1987 and 1992, the world's merchant fleet remained virtually unchanged. However, its carrying capacity (cwt) and container capacity (TEU) increased. In particular, the growth of container capacity was quite significant. During the past two years, both the world fleet and its capacity revealed an acceleration of their pace of development. This is also true for the various vessel types. Although their development varied considerably, the container fleet increased fastest.

A comparison of the development of the various fleets with the development of the relevant commodities shows that the world trade in crude oil developed faster than the oil tanker fleet. For dry bulk products, particularly over the period 1990 to 1992, the opposite was the case. The relative increase in the capacity of the dry bulk fleet, together with a significant decline in the demand for these vessels due to the worldwide crisis in the iron and steel industry, caused a considerable decline in the freight rates. The rates in the liner trade are also under constant pressure because of excess capacity. The rapid increase in container capacity in relation to the development of "other commodities" has enhanced rather than relieved the pressure on the rates. Excess capacity is expected to subsist, the container capacity, will not be drastically reduced. The fleet is relatively young and active, so there are no extensive scrapping programmes. Instead, replacement of first and second-generation container vessels will not entail significant withdrawals from the market. Although less effective and economic in the main east/west arterial trades, the older vessels are useful in the feeder trades and in supporting secondary services to and from the developing world.

In 1992, the aggregate capacity in service of the top 20 container carriers totalled 1 403 000 TEU, representing a 41% share in the world's total slots in operation. This was an improvement of their position over 1991, when they allowed for 1 246 000 TEU or 39.8%.

Asian carriers dominated the rankings. They did not only occupy nine of the top 20 places, but five of them were also among the world's top 10 liners. The Asian carriers together accounted for 698 000 slots, or nearly half of the top 20 operating capacity. Sea-Land and APL are representing the

Table 4: Shipping
Development of world fleet by type of vessel (1)

	1987 No. of ships	1987 DWT (thousand)	1987 TEU (thousand)	1990 No. of ships	1990 DWT (thousand)	1990 TEU (thousand)	1992 No. of ships	1992 DWT (thousand)	1992 TEU (thousand)
Oil tankers	5 723	240 744	--	5 753	248 483	--	6 035	263 482	--
Other tankers	1 629	16 489	--	1 693	16 391	--	1 896	18 729	--
Total tankers	7 352	257 233	--	7 446	264 874	--	7 931	282 211	--
Bulk/OBO carriers	4 967	223 185	323	4 915	228 601	393	5 043	240 590	413
Container vessels	1 027	21 105	1 142	1 147	25 026	1 435	1 273	29 595	1 734
General cargo vessels	18 108	108 174	1 032	16 899	100 621	1 125	17 165	101 741	1 240
Passenger vessels/ferries	2 614	3 445	9	2 785	3 621	14	2 918	3 875	16
Total fleet	34 068	613 142	2 506	33 192	622 743	2 967	34 330	658 012	3 403

All ISL infonnation used in this monograph refers to:
(1) ships of 300 gt/grt and over as of 1 January
Source: ISL Bremen

Table 5: Shipping
Average yearly rate of change by type of vessel

(%)	1987-1992			1990-1992		
	No. of ships	DWT	TEU	No. of ships	DWT	TEU
Oil tankers	1.1	1.8	--	2.4	3.0	--
Other tankers	3.1	2.6	--	5.8	6.9	--
Total tankers	1.5	1.9	--	3.2	3.2	--
Bulk/OBO carriers	0.3	1.5	5.0	1.3	2.6	2.5
Container vessels	4.4	7.0	8.7	5.3	8.7	9.9
General cargo vessels	-1.0	-1.2	3.8	0.8	0.5	5.0
Passenger vessels/ferries	2.2	2.4	13.1	2.4	3.4	6.7
Total fleet	0.1	1.4	6.0	1.7	2.8	7.1

Source: ISL Bremen

US in the top 20 with a joint operating capacity of 202 000 TEU (14.4%). ZIM Israel Navigation and UASC, the remaining operators are European; in 1992 their aggregate operating capacity was 398 000 TEU (28.4%). Five of them, including the third largest carrier in the world (Maersk), are based in the EC, allowing for a combined 323 000 slots in operation (23%).

With regard to the individual top 20 carriers the change in ranking of leading firms is remarkable; in 1992 Evergreen lost its leading position to Sea-Land Service. Evergreen's operating capacity remained virtually unchanged, whereas Sea-Land increased its capacity by 22.5%. CGM showed strong growth at 47%. As a result it moved from 20th to 16th position. Other operators with significant increases in their operating capacity were MOL (24%) and Cosco (21%). In contrast, due to a considerable decline in their operating slots, two companies dropped from the top 20: Gearbulk and Star Shipping, both breakbulk companies. Their operating capacity declined by 24% and 32%, respectively. They were replaced by UASC and MSC.

The top 20's order book totalled 194 000 TEU, which is nearly 14% of their joint operating capacity in 1992; it is 55% of the total foreseen new capacity (347 000 TEU as of May 1992) of the world's container fleet. The greater share of this, 231 000 TEU or 7% of the world's current slot capacity, is due before 1993.

Table 6: Shipping
Top 20 Liner operators in 1991 (1) and 1992 (2)

Operator	Country	Rank (3)	1992 TEU in operation	Order book (TEU)	Rank	1991 TEU in operation
Sea-Land Service	USA	1	134 000	--	2	109 600
Evergreen Line	Taiwan	2	129 000	22 100	1	128 500
Maersk Line	Danmark	3	112 400	4 700	3	100 500
Casco	P.R. China	4	100 600	36 800	5	82 900
NYK/NLS	Japan	5	98 500	19 400	4	89 600
Mitsui OSK Lines (MOL)	Japan	6	94 600	--	6	76 000
Am. President Lines (APL)	USA	7	67 600	--	7	65 400
K-Line	Japan	8	65 800	24 500	8	59 900
Zim Israel Navigators	Israel	9	63 500	3 000	10	53 100
NedLloyd Lines	Nederland	10	60 600	15 300	9	59 600
Hanjus Shipping	S-Korea	11	59 300	24 000	12	50 200
Orione Overseas Cont. Lines (OOCL)	Hong Kong	12	57 100	--	11	51 700
Yangming Marine	Taiwan	13	52 700	3 500	13	48 000
Hapag-Lloyd	BR Deutschland	14	51 200	13 200	15	43 200
P&O Containers	United Kingdom	15	50 000	15 200	16	40 000
Cie Général Maritime (CGM)	France	16	48 300	--	20	32 900
UASC	Kuwait	17	41 800	--	21	28 200
Neptune Orient Line (NOL)	Singapore	18	39 500	10 800	19	34 000
Baltic Shipping Co (BSC)	GOS	19	39 300	1 200	18	37 000
Mediterranean Shipp. Co (MSC)	Switzerland	20	36 500	--	22	27 400

(1) 1st February
(2) 1st May
(3) Ranking on the basic of operating capacity i.e. the capacity actually in service (owned capacity plus/minus in/out-chartered capacity)
Source: NedLloyd

Table 7: Shipping
Development of the EC fleet in world perspective

	1990			1991			1992		
	No. of ships	DWT (thousand)	TEU (thousand)	No. of ships	DWT (thousand)	TEU (thousand)	No. of ships	DWT (thousand)	TEU (thousand)
World fleet	33 192	622 743	2 967	33 964	642 651	3 129	34 330	658 012	3 409
OECD (1)	12 282	198 205	1 180	12 485	213 485	1 286	12 436	212 547	1 360
- EC (1)	5 414	91 657	726	5 421	94 499	788	5 391	94 805	848
- USA	544	22 365	222	531	23 571	227	514	23 668	233
- Japan	3 844	39 915	82	3 825	38 796	85	3 833	36 968	93
Open registry	7 045	220 183	700	7 015	220 743	720	7 345	237 981	849
Other	13 865	204 355	1 087	14 464	208 420	1 120	14 549	207 484	1 194

(1) including former DDR
Source: ISL, Bremen

During 1991, considerably less new capacity was ordered than in 1990: 145 000 TEU versus 189 000 TEU. Companies adopted a more cautious approach for various reasons, such as the uncertainty surrounding international trade as a result of the Gulf war, deepening economic recessions in the Far East, North America and Europe and low ocean freight rates due to overcapacity. These factors resulted in the delay and/or scaling back of several orders.

The development of the EC fleet could not keep pace with that of the world fleet. Unlike the world fleet, the EC fleet declined over the past five years. The decrease totalled more than 18% (4% per annum). The drop in the carrying capacity was less, namely 15% (3.2% per annum), whereas container capacity increased by nearly 13% (2.5% per annum). The USA and Japan were also facing a considerable decline in their merchant fleet over the reference period. In the USA, the number of ships declined by more than 38%; the carrying capacity was reduced by 3.5%, while container capacity increased by 12%. Remarkably in Japan the fleet as well as its carrying and container capacity declined. In particular the reduction of the carrying capacity by one-third is noteworthy. Contrary to the developments in the EC, the USA and Japan, the "open registry" and "other" categories showed growth in both their fleets and their fleet capacity. As to the capacity in particular the increase in container capacity was particularly significant, 72% for the "open registry" and 48% for "other countries".

The developments over the last five years entailed a decline in the EC's share in the world merchant fleet from over 19% to less than 16%. Its share in the capacity of the world fleet declined from 18% to 14.5% (cwt) and from 30% to 25% (TEU) between 1987 and 1992. These shares do not deviate much from those in 1990, indicating that during the period from 1990 to 1992, EC fleet capacity developed more or less in line with that of the world fleet and its capacity.

With the exception of Denmark, Ireland and Luxembourg, the merchant fleet as well as the carrying capacity of all Member States declined over the period 1987 to 1992. Belgium shows the greatest reduction. Its whole private fleet was transferred to Luxembourg which explains Luxembourg's growth in 1992. Other countries facing considerable reduction in their fleets were Spain, France and the United Kingdom. Spain's fleet was reduced by one third, the fleet reduction of France and the United Kingdom was about 28%. In the United Kingdom, the carrying capacity declined by more than one half (54%); for Spain and France this capacity was reduced by one third. Spain, France and the United Kingdom were also facing a decline in their container capacity. The same applies to Greece. In the remaining Member States the container capacity increased. Apart from Ireland and Portugal, with very small container capacities, the major increase in container capacity occurred in Denmark (75%), Italy (69%) and the Netherlands (42%).

Furthermore, it appears that Greece holds the greatest share in the EC fleet (26%), followed by Germany and Italy, each

Table 8: Shipping
Development of the EC fleet by Member State

	1990			1991			1992		
	No. of ships	DWT (thousand)	TEU (thousand)	No. of ships	DWT (thousand)	TEU (thousand)	No. of ships	DWT (thousand)	TEU (thousand)
EC	5 415	91 657	726	5 421	94 499	788	5 391	94 805	848
Belgique/België	82	3 017	23	80	2 931	23	31	50	-
Danmark	435	6 890	103	466	7 390	128	494	7 868	145
BR Deutschland	843	6 400	226	850	6 771	260	832	6 937	288
Hellas	1 417	37 621	68	1 398	41 039	62	1 423	43 531	70
España	424	5 838	16	399	5 639	16	368	5 059	17
France	207	6 214	59	202	5 531	53	199	5 378	56
Ireland	63	161	3	66	176	3	67	195	4
Italia	814	11 373	52	850	11 852	57	828	10 672	60
Luxembourg	2	6	0	1	3	-	48	2 624	20
Nederland	484	3 956	86	495	4 154	96	518	4 368	107
Portugal	70	1 015	3	78	1 232	5	75	1 342	6
United Kingdom	574	9 166	88	536	7 781	87	508	6 781	76

Source: ISL, Bremen

Table 9: Shipping
Structure of the EC fleet by Member State, 1991

	Tankers	Bulk/OBO carriers	General cargo vessels	Container vessels	Passenger ships	Total number ships
Belgique/België	35.0	23.8	17.5	10.0	13.7	80
Danmark	20.6	2.4	53.2	8.2	15.6	466
BR Deutschland	8.3	3.8	65.1	14.2	8.6	850
Hellas	22.9	29.3	30.3	1.2	16.3	1 398
España	20.1	8.5	50.6	4.8	8.0	399
France	29.7	6.4	33.2	8.4	22.3	202
Ireland	7.6	3.0	63.6	15.2	10.6	66
Italia	38.1	7.6	30.7	2.0	21.6	850
Luxembourg	100.0	--	--	--	--	1
Nederland	12.1	2.4	75.6	4.6	5.0	495
Portugal	23.1	11.5	52.6	5.1	7.7	78
United Kingdom	20.2	7.3	39.4	7.0	17.8	536
EC	22.4	11.9	45.5	5.8	17.4	5 421
USA	42.8	5.8	28.3	15.4	7.7	533
Japan	33.9	7.3	50.4	1.1	11.3	3 825

Source: ISL Bremen

accounting for about 15%. Greece also shows a much higher share in EC carrying capacity (46%), Italy is second with 11%, followed by Denmark and Germany with 8% and 7%, respectively. By contrast, Germany accounts for the largest share in the EC's container capacity (34%), followed by Denmark (17%) and the Netherlands (13%). Differences in the fleet structure by Member State allow for the differences in ranking on the basis of carrying or container capacity.

The composition of the fleet varies widely by Member State. The fleets of Belgium and Greece consist for the greater part of tankers and bulk carriers; contrarily in Denmark, Germany, Spain and Ireland, general cargo and container vessels account for more than 60% of the fleet.

For the EC as a whole, general cargo vessels hold the greater share. The same is true for Japan, where general cargo vessels account for more than half of the fleet. In the US, tankers are the main vessel type. Also deserving mention is the very low share of container vessels in the Japanese fleet.

National governments and the European Commission want to maintain an EC fleet not only for strategic and commercial reasons but also because of its contribution to the European economy in terms of income, employment, and balance of payments, etc. Employment of nationals has decreased from about 250 000 crew members in 1980 to about 118 000 in 1990. The decrease is due to the movement away from EC flags to open registers where manning costs tend to be low as well as to a rationalisation process.

In 1990 EC nationals of their respective Member State made up 85.2% of the total employment of the EC shipping industry. This share varies considerably by Member State. It is relatively low in Belgium, Germany and particularly in the Netherlands, where it ranges from 40% to 68%; for the United Kingdom and South European countries these percentages are much higher. In Spain, Italy and Portugal no foreigners are employed at all.

In 1992, the principal EC liner companies transported a total of 455 000 TEU, equivalent to 95% of the capacity of the EC's container fleet or nearly 54% of the total container capacity of the EC fleet. As for the separate companies, Maersk is by far the largest EC liner company. It is the third largest container operator in the world. Its capacity is more than twice the operating capacity of the three other EC carriers, appearing in the top 20 (Nedlloyd, P&O Containers and Hapag-Lloyd), ranging from 50 000 to 60 000 slots.

The scarce and fragmented financial information on EC liner companies indicate that revenues from shipping are only making up a part of their total revenue. CMB and Hapag-Lloyd showed the highest shares for shipping in their total revenue: 70% and 57%, respectively in 1991; by contrast, for P&O the contribution of shipping to total revenues was only 18%, for EAC 24% and for Nedlloyd 37%. As far as data permitted for employment it can also be concluded that often not more than half of the labour force employed by the major EC liner companies is related to shipping activities.

The order book for the ten main EC liner companies totalled 91 000 TEU in 1992 or more than 7% of the operating capacity. Seven out of the ten companies under consideration have placed new building orders. The German companies accounted for more than half of them. The planned extension of the Maersk fleet is very modest due to considerable investments in the recent past.

MARKET FORCES

Demand

In general terms, both manufacturers and retailers need a reliable and continuous flow of products at a reasonable price. Regarding major bulk commodities, which are inputs in the oil refineries (crude oil), the iron and steel industry (iron ore and metallurgic coal) and electric power plants (steam coal) the customers are largely in control of the flows to secure their regular supplies. They operate on a global scale. Regarding general cargo and containerised cargo in particular, customers are moving increasingly toward a global strategy.

Supply and competition

The shipping industry is very fragmented: there are major diversified liner companies as well as one-vessel captain-owners. Apart from large producers who carry their own cargoes there are important owners specialised in bulk shipping or in the rental or leasing of ships.

European short-sea trades, including intra-EC seaborne trade, still have the characteristics of regional markets. Mediterranean trade consists mostly of national traffic, which is reserved to the national flags, and international traffic across

Table 10: Shipping
EC shipping industry employment

	1988	1989	1990
Belgique/België	2 162	2 002	1 799
Danmark	7 900	8 154	8 800
BR Deutschland	13 207	11 816	11 778
Hellas	25 970	24 200 (1)	22 600 (1)
España	19 873	16 400 (1)	13 000
France	12 420	10 870	10 700
Ireland	1 330	1 103	1 200
Italia	26 000	25 237	26 090
Nederland	7 095	6 330	5 794
Portugal	1 850	1 790	1 711
United Kingdom	24 240	17 831	14 651
EC 11	142 047	125 733	118 123

(1) Consultant estimates
Source: European Community Shipowners Associations

the Mediterranean to North African countries (subject to bilateral agreements). Therefore, in these trades there is a lack of competition. By contrast, in and around the North Sea there is fierce competition between short-sea fleets due to the UK's national trade being open to all flags. The Federal Republic of Germany, the Netherlands and Denmark dominate international short-sea trades.

Short-sea owners dominate specialised trades under European flags, many owners of larger vessels having opted out of the trade under these flags. Specialised trades include chemical vessels, liquid-gas tankers, reefer trade, car carriers, the carriage of heavy lifts, and chartered containers. Markets for liquid-gas and reefer trades are much less volatile than those for tankers and bulk carriers, because owners either charter their vessels to the traders or join the freight pools of the large operators.

Regarding general-cargo North-South trades with many developing countries (particularly those in Africa and Latin America), conference trade is often divided in accordance with the 40:40:20 formula of the Unctad Code, whereby the national carriers in the trade between two countries each have a share of 40 percent, the remaining 20 percent to be divided among cross traders. The Unctad Code applies to conference carryings only, but some developing countries want to bring their whole liner trade within the scope of the Code, which would enable them to regulate the share of non-conference lines, generally referred to as outsiders.

Many liner companies, both conference members and outsiders, are operating on the principal East-West routes and although the world's largest container operators are involved in this, trade market shares of more than 10% are rarely achieved. Most of the shares are in the range of 2% to 9%. Furthermore, in the (for the companies) relevant North-South trade, the shares vary from 10% to 20%. Consequently, no single liner company is dominating the trade; the market is very competitive, which is enhanced by the prevailing excess capacity in the liner industry.

To cope with the fierce competition as well as in order to meet the ever increasing needs of the clients, some carriers are aiming at giving a global dimension to their operations. The forthcoming unification of Europe has further encouraged the concept of globalisation as a drive for greater penetration in the Single Market.

Globalisation involves "one-stop shopping" (i.e. door-to-door transport) and "no sweat arrangements". One-stop shopping refers to geographical coverage of the transport service; no sweat arrangements refer to the so-called value added services (i.e. integrated transport and ancillary services).

The response of the major EC liner carriers to the global and European challenge is very different. Nedlloyd and P&O have built up large transport networks and restructured them in line with the growing importance of intra-European trade. Container logistics on a worldwide scale and inland activities (storage, distribution and transport) on a European scale are underlying Nedlloyd's policy, which aims at being present in the whole transport chain with the view to provide a full logistic package. In 1988, therefore, Nedlloyd Road Cargo, Nedlloyd Air Cargo and Nedlloyd Lines Agencies were established. In addition, acquisitions were obtained in countries like Germany and the United Kingdom.

P&O follows a similar policy. It invested in key areas of surface transport industries and follows a strategy of acquisition. Furthermore, it developed P&O European Transport Services (POETS) grouping together European haulage and distribution activities. Unlike P&O and Nedlloyd, CMB, Delmas and Hapag-Lloyd continued to focus on their core transport activity and to enhance door-to-door operations for their deep-sea service clients. CMB has taken steps to become a leading door-to-door operator for the European market. Its deep-sea strategy is concentrated on North-South traffic. Delmas will become a global operator; Hapag-Lloyd concentrates on intercontinental door-to door transport, although they currently do some distribution in Europe for Far Eastern clients.

As for non-European carriers, Sea-Land is the only carrier from outside Europe whose activities have acquired a truly European dimension. In line with its intercontinental network, Sea-Land is aiming to strengthen its intra-European network. For haulage on European roads, Sea-Land reached a joint venture with Frans Maas as part of a policy of forming alliances to enter the EC market.

REGULATIONS

There are variations among Member States regarding their approach to shipping; the Mediterranean countries are generally well placed in bulk shipping and (with the exception of Greece) rely strongly on state-ownership, particularly in the liner trades. The northern Member States have a long tradition of privately- owned liner companies which have often developed into diversified groups. Many of these companies have reduced their stake in the bulk trades. There are, particularly in the United Kingdom, still many independent or

Table 11: Shipping
Major EC liner operators, 1992 (1)

Operator	Member State	Rank (2)	TEU in operation	Newbuilding orders, May 1992 (TEU)
Maersk Line	DK	1	112 400	4 700
Nedlloyd Lines	NL	2	60 600	15 300
Hapag-Lloyd	D	3	51 200	13 200
P&O Containers	UK	4	50 000	15 200
Cie Generale Mar.	F	5	48 300	--
EAC Transport	DK	6	29 200	--
Hamburg-Süd	D	7	27 300	--
Delmas	F	8	27 100	10 600
Deutsche Seerederei Rostock	D	9	25 200	13 500
Senator Line	D	10	23 200	19 300

(1) ISE May
(2) Ranking on basis operating capacity (see footnote 3, table 6)
Source: Nedlloyd

oil-company-controlled tanker and dry-bulk shipping companies, but most of their deep-sea tonnage is registered abroad.

Governments have offered throughout the years incentives to owners to keep their vessels under national flags. Nevertheless, an increasing number of vessels owned by EC nationals have been transferred to open registers. Initially, these registers were used to avoid tax liability, but in the last few years cost reduction (particularly of manning costs) has been the main motive. The main open registers are those of Liberia, Panama and Cyprus. EC owners with high labour costs under national flags would have been forced out of most trade if no cost-saving measures had been made by their governments such as investment allowances and government-supported research to advance automation and innovation.

Some countries have tried to mitigate the owners' plight further by creating offshore registers or similar schemes which allow employment by foreigners at lower wages and of nationals at reduced levels of taxation, often in conjunction with a permission to reduce crew levels. France has such an offshore register in Kerguelen, the Netherlands in the Dutch Antilles and the United Kingdom in Bermuda and the Isle of Man. In 1988, Denmark introduced a separate international register for Danish vessels, and Germany authorised a similar scheme in 1989.

These initiatives have now been followed with a proposal from the European Commission to introduce EUROS as a Community register. EUROS would operate in parallel to the existing national registers (i.e. vessels already entered on national registers could as an option of the shipowner also be registered in EUROS), in which case such shipowners would be entitled to the financial and fiscal benefits that would be provided through EUROS with a view to improving the competitive position of EC fleets.

The decline of tonnage under EC flags due to the open registers and protectionist practices of non-EC countries, the ageing of the EC fleet and the drop in employment underlie the development of an EC shipping policy. A start of such a policy was made in 1986, when the Council adopted four major regulations: 4056/86/EEC, 4057/86/EEC, 4058/86/EEC, which are exclusively focused on the protectionist policies and practices of non-EC countries, and 4055/86/EEC, which refers both to non-EC countries and EC Member States. The principles underlying these regulations are fair and free competition.

The main purpose of Regulation 4056/86/EEC was to set down rules in the context of a general shipping policy and to demonstrate their importance for the achievement of the EC's shipping policy objectives. It applies to international maritime transport services other than tramp vessels. Regarding liner conferences, the Regulation was aimed at stability, guaranteeing regular and reliable services to transport users.

Regulation 4057/86/EEC refers to unfair pricing practices in maritime transport; the need for the Regulation was caused by unfair pricing (continuous under-pricing) practices of non-EC countries. These practises are detrimental to the competitiveness of EC shipowners in international liner shipping. The regulation allows for a redressive duty to be imposed on the foreign shipowners concerned.

Regulation 4058/86/EEC is aimed at safeguarding free access to cargoes in ocean trade. The regulation provides for a procedure applicable when certain trade practices by a non-EC country threaten to restrict free market access by Member States' shipping companies. Regulation 4055/86/EEC applies the principle of freedom to provide services to maritime transport between both Member States and non-EC countries.

This regulation provides for the phasing out or adaptation to Community legislation of agreements between a member state and a non-EC country containing cargo clauses. This practice would seriously affect the trading interest of all countries by substantially increasing transport costs. Adjustment to Community law of agreements concerning trades not governed by the United Nations code of conduct will have to be completed by 1 January 1993.

Further mention should be made of the deregulation of the EC shipping market, implying the freedom of cabotage (i.e. the freedom of a Member State to operate on the domestic market of all the other Member States). On the 23rd of June 1992, the Transport Ministers of the EC Member States adopted in principle the regulation applying freedom to provide services to maritime transport within Member States. The text provides for a series of derogations for different trades in certain areas of the Community.

The following maritime transport services carried out in the Mediterranean and along the coast of Spain, Portugal and France shall be temporarily exempted from the implementation of the regulation:

- cruise services until 1 January 1995;
- the transport of strategic goods (oil, oil products and drinking water) until 1 January 1997;
- services by ships smaller than 650 GT until 1 January 1998;
- regular passenger and ferry services until 1999.

Island cabotage in the Mediterranean and cabotage with regard to the Canary, Azores and Madeira archipelagos, Ceuta and Melilla, the French islands along the Atlantic coast and the French overseas departments is also exempted until 1 January 1999.

This derogation shall be extended for Greece until 1 January 2004 for regular passenger and ferry services and services provided by vessels less than 650 GT.

In those areas outside the geographical scope of the above mentioned derogations, the liberalisation will be complete as from 1 January 1993.

OUTLOOK

Developments within the EC are expected to favour the EC shipping industry. To begin, the advent of "Europe 1992" and the resulting gradual deregulation of the EC shipping market will stimulate economic growth in the EC with an expected increase in the Community's share in world trade. Secondly, the four regulations adopted by the Council of Ministers at the end of 1986 aimed at increasing the competitiveness of the EC shipping industry towards non-EC countries may contribute to less protectionism and to fairer pricing in the liner trades. Thirdly, the clearly expressed aim of the EC to achieve an efficient and competitive EC shipping industry should also enable EC shipowners to regain a major role in world shipping using ships registered in the EC. The proposed EUROS register should contribute to that end.

Some European liner companies are actively engaged in extending European distribution networks to meet the new requirements for intermodal transport. A large part of the tanker and bulker fleets will have to be renewed in the 1990s, which may entail problems in private financing (i.e. financing by banks), given the risks and the huge amounts involved. The availability of both finance and reputable shipowners may enable the EC to play again a larger role in bulk transport. The vessels involved will be of proven design (there being no new technology under consideration) but there may be a new tendency towards larger vessels.

As a result of foreseen positive development of the world economy and the deregulation of the EC market, seaborne trade is expected to grow in the short to medium-term. Some markets, however, such as the iron and steel market are still depressed and the recovery process as well as the liberalisation of the EC market will take time, the development of the seaborne trade in the world is expected to be slightly faster in the medium-term than in the short-term.

Table 12: Shipping
Expected average yearly growth rates

(%)	1992-93	1992-96
World seaborne trade (tonne-miles)	3.5	4.0
EC fleet: CWT	1.0	2.0
TEU	5.0	5.0
Employment: EC shipping Industry	-5.0	-4.0

Source: Netherlands Economic Institute

The development of the world economy and implementation of the measures aimed at stopping the decrease of the EC fleet are also expected to have a greater impact on the medium-term rather than on the short-term. Carrying capacity has declined considerably over the past five years (though more recently this process seemed to have come to a standstill) is expected to develop at a much slower pace than container capacity, which revealed continuous growth in recent years. Although foreseen EC measures will have their main impact on container capacity in the medium-term, there are also countervailing powers which could cause a slowdown of the growth of the container capacity, in particular current excess capacity. As a result, the medium term development of container capacity is not expected to be faster than in the short run; growth is assumed to be identical in the short- and medium-term.

For employment, a strong downward development is expected to continue. Because of the reasons mentioned above, a slow down of the decline in the employment level of the EC shipping industry is foreseen.

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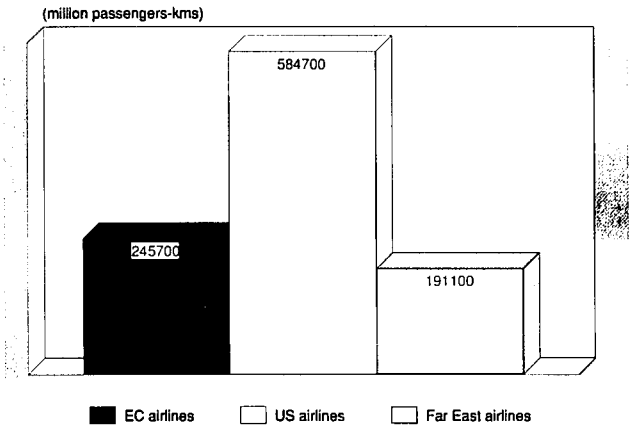
Air transport
NACE 75

EC airlines operate on a global scale. Consequently they are facing competition from a great number of non-European airlines. Competition is particularly strong on the North Atlantic routes, where the EC carriers have to cope with US mega-carriers, for which Europe has become a target for further growth. Moreover the EC airlines are facing increasing competition, because since 1987 they have been subject to a process of deregulation of the EC air transport market. At the beginning of January 1993 the third and last phase of deregulation programme will become operational.
The strategic response from the EC airlines to an increasingly deregulated, competitive global market has been cooperation, aimed at getting access to markets which are currently closed. Fundamental to this strategy is the forging of links with local and/or regional carriers together with the establishment of international alliances to generate traffic.

Figure 1: Air transport
International comparison of airlines



Source: IATA Yearbook 1990

INDUSTRY PROFILE

Description of the sector

The air transport industry consists of companies which are exclusively or primarily engaged in the transport of passengers and freight by air on scheduled or chartered services as well as helicopter and air-taxi services, local pleasure-flight operators, etc. and the town offices of airline companies.

Air traffic (excluding military air movements) is broken down into commercial and general aviation. General aviation, which will not be considered further here, includes private planes, air taxis and aerial surveying flights. Commercial aviation is divided between passenger travel - including carrier and charter traffic - and air freight, which includes regular air freight, courier transport and air mail.

In the present monograph attention is concentrated on scheduled passenger and freight traffic. In particular the national carriers of the EC Member States are covered, representing about two thirds (in passenger-km) of passenger traffic and virtually total freight transport (in tonne-km) carried out by EC carriers.

Main indicators

Both the growth rates for passenger and freight traffic as well as for employment were much lower over the period 1989-1991 than between 1985 and 1991. This was due to a stagnation in demand, which started in 1989 as a result of a declining economy. The situation aggravated further in 1991 when during the six weeks of the Gulf War air traffic declined dramatically. Although the situation improved afterwards, the 1991 performance of the EC carriers in passenger and freight traffic were respectively nearly 5% and 3% less than in 1990, while employment declined by more than 3%.

As for employment it should be stressed that its 1991 reduction was also the result of a rationalisation process, aiming at improving the sector's productivity level. The joint effect of the development of the factors dealt with before caused the labour productivity passenger-km/employment of the EC air transport to grow at an average annual rate of 2.7 over during the period 1985-1991, though it declined in 1991 by 1.2%.

Passenger traffic

British Airways, Lufthansa and Air France are the top-three EC scheduled airlines, accounting together for nearly 60% of both the total number of passenger-km and revenue of EC carriers. British Airways is the single largest EC carrier in passenger transport. Remarkable is KLM's fourth position.

Nearly 90% of EC passenger transport by air is international. However, the south European airlines show shares which are below 90%. This is particularly true for Iberia, Air France/UTA and Olympic Airways, showing shares of 77%, 79% and 84% respectively; for TAP and Lufthansa these shares are around 90%, whereas for the remaining west European airlines the international shares vary from 94% (British Airways) to 100% (KLM, Luxair and Sabena).

More than one fifth of total passenger-km are performed within Europe, which is equivalent to nearly 24% of the internationally achieved passenger-km. In terms of passenger flows these shares are 36 and 52% respectively.

International revenue from passenger traffic is nearly 85%. In terms of passenger-km this share being higher, the revenue per passenger-km accruing from domestic traffic is higher than from international traffic: 0.146 versus 0.096 ECU. However, revenue per passenger-km from international traffic varies considerably by route. Within Europe it is higher than for domestic traffic (0.186 ECU), while on other international routes it is considerably lower, around 0.065 ECU. This ex-

Table 1: Air transport
Main indicators

	1985	1986	1987	1988	1989	1990	1991
Passenger-kms (million)	176 412	177 645	201 356	213 271	227 892	245 695	234 451
Tonne-kms (million)	10 302	11 262	12 465	13 642	14 678	15 394	14 974
Employment	223 083	226 774	233 591	239 014	251 155	261 056	252 580

Source: AEA, Statistical Yearbook

Table 2: Air transport
AEA scheduled passenger traffic by carrier of Member States,1991

Carrier	Passenger-kms (million)			Revenue (million ECU)			Revenue/Pass.-kms (ECU)		
		International			International			International	
	Total	Total	Europe (1) (%)	Total	Total	Europe (1) (%)	Total	Total	Europe (1) (%)
Aer Lingus	3 786	3 725	48.2	458	440	77.6	0.121	0.118	0.190
Air France	33 711	26 790	20.4	3 231	2 827	42.4	0.096	0.106	0.219
Alitalia	18 187	16 356	29.6	2 006	1 717	57.8	0.115	0.105	0.191
British Airways	62 835	59 254	15.9	5 637	5 035	32.3	0.090	0.085	0.172
Iberia	20 473	15 567	34.7	2 181	1 505	55.2	0.107	0.097	0.154
KLM	27 307	27 305	10.3	2 295	2 294	24.1	0.084	0.084	0.196
Lufthansa	42 685	38 608	20.9	5 275	4 047	43.7	0.124	0.105	0.219
Luxair	258	258	100.0	66	66	100.0	0.257	0.257	0.257
Olympic Airways	6 193	5 231	41.8	540	385	60.4	0.087	0.074	0.106
Sabena	6 223	6 223	27.0	806	806	54.4	0.130	0.130	0.261
TAP Air Portugal	7 025	6 200	42.1	617	556	53.4	0.088	0.090	0.114
UTA	5 768	4 304	N/A	478	390	N/A	0.083	0.091	N/A
EC	234 451	209 821	21.2	23 589	20 067	41.2	0.101	0.096	0.186

(1) The data refer to all Europe, not only to the EC countries
Source: AEA, Statistical Yearbook 1992

plains the fact that the share of the revenue accruing from European traffic is nearly twice the European share in the total number of passenger-km performed.

Freight traffic

Although in tonne-km performed Lufthansa, Air France and British Airways are the three biggest EC freight carriers with KLM holding the fourth position, in terms of revenue KLM ranks second and British Airways fourth. In tonne-km the top-three freight carriers allow for 64% of total freight carried by EC companies (66% in terms of revenue). The single biggest EC freight carrier - both in tonne-km and in revenue - is Lufthansa.

With 96% of the tonne-km performed on international flights, freight traffic is even more international than passenger traffic. For the individual carriers the shares vary from 91% for Iberia and TAP to 100% for Aer Lingus, KLM, Luxair and Sabena.

European freight traffic is relatively insignificant. This is particularly true when measured in tonne-km, only 4% (just under 10% in terms of revenue). Hence revenue on air freight comes overwhelmingly from outside the EC. The revenue per tonne-km on these routes is about one third of that on routes within Europe. In 1991 freight revenue totalled 15% of total revenue.

Investment

In 1991 the EC fleet increased by 10% percent to a level of 1026. New types added to the inventory were the MD11 (Alitalia and KLM) and the BAe 146 (British Airways). About 75% of the additional aircraft was destined for the short-haul fleet (B732, MD80s and Airbus 320). It is worth to note that in 1991 more than half of the short-haul fleet was in compliance with the Chapter 3 noise standards The long-haul has mainly been extended with B747.

In 1991 British Airways and Lufthansa had the biggest fleet with 226 and 217 units respectively. Air France followed with 158 planes. These three airlines accounted together for 69% of the EC fleet.

In 1991 all the AEA members together placed orders for 64 new planes, which was considerably less than in the three preceding years; both in 1988 and 1989 over 200 new planes were ordered and in 1990 the orders for 148 new units were placed.

Table 3: Air transport
Country to country scheduled intra-European passenger traffic on AEA airlines, 1991

(thousands) To	B	DK	D	GR	E	F	IRL	I	L	NL	P	UK	EC
From													
Belgique/België		81	285	59	196	221	34	257	9	90	94	539	1 865
Danmark	85		370	35	84	166	25	115	0	131	39	340	1 390
BR Deutschland	292	365		310	620	1 046	96	992	0	440	184	1 984	6 329
Hellas	62	38	337		42	107	0	256	0	87	7	183	1 119
España	200	92	632	42		647	13	554	8	234	204	818	3 444
France	223	179	1 090	109	637		123	1 108	0	369	284	1 925	6 047
Ireland	35	24	96	0	14	121		29	0	62	5	1 335	1 721
Italia	256	115	990	245	556	1 129	302		2	77	116	929	4 645
Luxembourg	9	0	0	0	9	0	0	2		0	12	25	57
Nederland	90	130	439	84	236	350	61	276	0		76	647	2 389
Portugal	96	40	190	8	202	274	5	114	12	73		323	1 337
United Kingdom	493	340	2 007	176	813	1 813	1 287	947	28	648	313		8 865
EC	1 841	1 404	6 436	1 068	3 409	5 874	1 674	4 650	59	2 411	1 334	9 048	39 208

Source: AEA, Intra-European Country-to-Country Traffic, Annual Report 1991

Table 4: Air transport
AEA scheduled freight (1) traffic and revenue by carrier of Member States, 1991

Carrier	Tonne-kms (million) Total	Inter-national	Europe (2) (%)	Revenue (million ECU) Total	Inter-national	Europe (2) (%)	Revenue/Tonne-kms (ECU) Total	Inter-national	Europe (2) (%)
Aer Lingus	115	115	12.2	43	42	39.8	0.37	0.36	1.18
Air France	3 230	3 111	5.6	722	689	4.2	0.22	0.22	0.60
Alitalia	1 218	1 210	3.5	330	324	8.8	0.27	0.27	0.66
British Airways	2 236	2 196	2.2	458	446	6.9	0.20	0.20	0.63
Iberia	614	559	13.0	192	160	26.9	0.31	0.29	0.59
KLM	2 220	2 220	2.6	766	766	5.9	0.35	0.35	0.78
Lufthansa	4 093	4 070	3.6	1 277	1 252	9.7	0.31	0.31	0.81
Luxair	0 (3)	0 (3)	100.0	1	1	100.0	2.29	2.29	2.29
Olympic Airways	114	106	35.2	59	53	56.8	0.52	0.50	0.81
Sabena	486	486	3.6	139	139	11.6	0.29	0.29	1.90
TAP Air Portugal	163	149	23.0	60	54	37.3	0.37	0.36	0.58
UTA	485	455	N/A	166	152	N/A	0.34	0.33	N/A
EC	14 974	14 677	3.6	4 211	4 077	9.3	0.28	0.28	0.73

(1) Excluding mail
(2) The data refer to all Europe, not only to the EC carriers
(3) Less than 0.5 million tonnes
Source: AEA, Statistical Yearbook 1992

At the end of 1991 the order book of the EC airlines contained 318 units. British Airways and Alitalia allow together for nearly half of this number. The order book comprises 161 Boeings, 105 Airbus, 51 McDonnell Douglas types and one BAe ATP. A total of 93 orders refer to next generation aircraft still in the project stage, the Airbus 321 and 340 as well as the Boeing 777.

International comparison

The internationally operating US and Far East airlines achieved in 1990 respectively 65% and 115% more passenger-km per employee than the European carriers, indicating significantly higher labour productivity than in the EC. European airlines are facing the highest share of labour cost (36%) on total costs, closely followed by the US airlines, whereas Far East airlines' share of labour cost is considerably smaller. As regards the load-factor the EC carriers hold an intermediate position with 68.5%; it is lower than that of the Far East carriers (74.5%) and significantly higher than that of the US airlines (62.3%). Unlike the Far East airlines, most of the EC and US airlines are facing severe financial problems. In 1991 the European airlines suffered a joint loss of about one billion ECU. Within the EC British Airways and KLM hold currently the strongest financial position, though the profits of KLM are under heavy pressure, due to its 20% stake in the currently highly unprofitable Northwest Airlines. In the USA excess capacity together with free competitive pricing lead to fare wars, causing bankruptcy for three major US airlines (TWA, Continental and USAir) as well as for the smaller America West Airlines. These companies are allowed to continue their operations under the protection of Chapter 11 of the US bankruptcy code. In addition Delta and Northwest Airlines posted considerable losses over the first six three months of 1992 and so did American Airlines.

MARKET FORCES

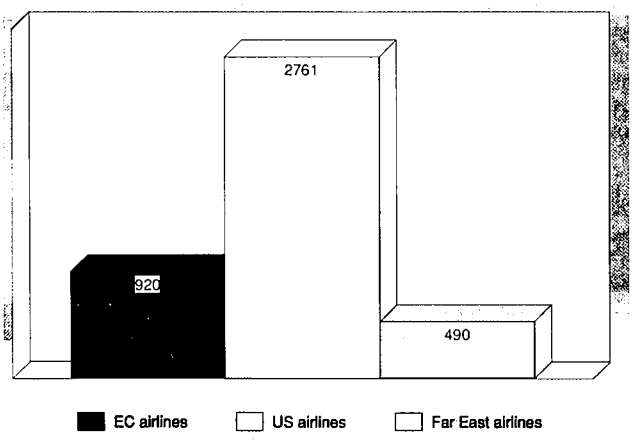
Demand

Given the global scope of air transport, the world's general economic situation is an important factor of the demand for air transport services in general and so is - as the Gulf war has demonstrated- the international political situation. The specific demand for services of the EC air transport industry depends on the competitive position of the EC carriers towards non-European airlines. In addition to the short haul, demand for air transport is also influenced by developments in surface transport modes, particularly railways.

Supply and competition

EC airlines operate on a global scale. Their joint network links most EC airports with 174 cities in the rest of the world; their intercontinental traffic accounts for more than 70% of total passenger-km. Consequently they are facing competition from a great number of non-European airlines. Competition is particularly strong on the North Atlantic routes, where the EC carriers have to cope with US mega-carriers. Europe has become a target for further growth of US airlines. These airlines can rely on massive domestic markets which are not open to European carriers. Contrarily the US carriers have access to all the major European destinations, in some cases with valuable concessions to establish European hubs, served by smaller aircraft and filled-up with local traffic. With current shares of more than 10% American Airlines and United Airlines brought about within the space of one year (July 1991-July 1992) a radical change in the market on the North Atlantic

Figure 2: Air transport
International comparison of number of planes



Source: IATA Yearbook 1990

Table 5: Air transport
IATA members' ranking: Top 20 scheduled passengers carriers, 1991

(million passenger-km)

Rank	Carrier	Total	International Total	International rank only
1	Aeroflot	148 998	15 569	18
2	American Airlines	132 313	32 130	7
3	United Airlines	131 728	42 271	2
4	Delta Air Lines	108 257	18 764	12
5	Northwest Airlines	85 786	37 264	5
6	Continental Airlines	66 680	17 040	13
7	British Airways	62 855	59 254	1
8	USAir	54 900	1 996	50
9	Japon Airlines	51 524	38 757	3
10	TWA-Trans World Airlines	45 271	16 021	17
11	Lufthansa	42 685	38 403	4
12	AIL Nippon Airways	35 648	8 024	30
13	Air France	33 711	26 790	9
14	Singapore Airlines	33 462	33 462	6
15	KLM	27 307	27 307	8
16	Quantas	26 505	26 505	10
17	Cathay Pacific	24 432	22 278	11
18	Alitalia	21 697 (1)	16 356	16
19	America West Airlines	20 778	516	50
20	Iberia	20 473	14 314 (1)	20

(1) Figures deviate from the corresponding AEA data.
Source: IATA Yearbook 1991 (WATS'), AEA Statistical Yearbook 1992

routes. They also intensified and changed the shape of competition on these routes. Besides considerable fare reductions, other marketing tools have been used. such as frequent flyer programmes and more comfortable travelling conditions (comfortable seats, more space etc.).

Within the EC the second phase of a three-phase deregulation programme is currently being pursued, meaning that the EC air transport market is not yet subject to free competition. Bilateral agreements between EC countries still "organise" this market, although increasingly more international routes are served by three airlines (80 in 1991, whereas 350 international routes were served by only one airline and 200 by two airlines). However, route competition in the EC can not be simply measured by the number of airlines serving a specific route, because air traffic in Europe is a mix of point-to-point and intercontinental, European and/or domestic transfer traffic. On average 25% of the passengers carried in the EC are transfer passengers. Hence airlines serving the same route compete within the route for both the point-to-point and transfer passengers; outside the route a variety of airlines may compete for the transfer passengers.

Furthermore, particularly within Europe on journeys between 400 and 600 km., the airlines are subject to competition from railway transport. The development of a high-speed European rail network will make rail even more competitive with air on such short journeys.

INDUSTRY STRUCTURE

Companies

Among the top 20 IATA member airlines there are six EC scheduled airlines: the top three EC scheduled airlines - British Airways (7), Lufthansa (11) and Air France (13), together accounting for nearly 60% of the total passenger-km performed by the EC, and further KLM (15) Alitalia (18) and Iberia (20). Apart from Aeroflot (the number of passenger-km of which has been reduced by nearly 40% since 1990), the top six IATA members are US airlines and so are number 8 and number 10. Unlike the European airlines the US airlines are mainly serving their domestic markets. In international traffic, therefore, British Airways ranked first and Lufthansa fourth.

As for freight traffic, EC airlines held high positions in the IATA top 20: Lufthansa (2), Air France (4), British Airways (6) and KLM (7). In international freight traffic Lufthansa held even the first position; Air France was second, whereas British Airways and KLM were fifth and sixth.

Strategies

Strategic response from the EC airlines to an increasingly deregulated, competitive global market has been cooperation, mainly in the form of collaboration and partnership among established European national carriers together with major airlines from the US and other continents. These partnerships aim at getting access to markets which are currently closed. Examples are the KLM/Northwest Airlines partnership and the attempt of British Airways to acquire a minority stake in USAir, which would enable British Airways to get access to the US market, whereas USAir, which is mainly involved in domestic traffic, would get the opportunity to extend its international operations. Companies seek at the same time cooperation with regional airlines (Lufthansa and Lauda Air) and with other national airlines (Sabena and Air France).

The partnerships comply with the concept of "hub and spoke", that central airports are fed by traffic from regional airports and vice versa. The large European airlines are developing domestic or short-haul intra-European services to feed their long-distance business from their main hubs. Fundamental to this strategy is the forging of links with local and/or regional carriers together with the establishment of international alliances to generate traffic.

Further cooperation is increasingly sought in capital-intensive areas such as computerised reservation systems and automated ticketing. Computerised reservation systems provide a marketing edge by giving airlines detailed information about their markets. This allows them to improve flexibility by facilitating the optimisation of the configuration of planes, routes and available seats as well as providing a wide range of other services at the same time as booking a ticket. Access to, if

Table 6: Air transport
IATA members' ranking: Top 20 freight carriers, 1991

(million tonnes-km)

Rank	Carrier	Total	International Total	International rank only
1	Federal Express	5 289	2 382	5
2	Lufthansa	4 093	4 070	1
3	Japan Airlines	3 361	3 121	2
4	Air France	3 230	3 111	3
5	Korean Air Lines	2 582	2 539	4
6	Northwest Airlines	2 459	1 570	9
7	British Airways	2 236	2 196	7
8	KLM	2 220	2 220	6
9	Aeroflot	1 914	346	32
10	Singapore Airlines	1 854	1 854	8
11	United Airlines	1 773	925	15
12	Cathay Pacific	1 457	1 398	10
13	American Airlines	1 234	656	19
14	Alitalia	1 218	1 210	11
15	Quantas	1 093	1 093	12
16	Nippon Cargo	1 054	1 054	13
17	Delta Air Lines	976	376	29
18	Swissair	945	938	14
19	Thai Airways	866	856	17
20	EL AL	862	862	16

Source: IATA Yearbook 1991 (WATS'), AEA Statistical Yearbook 1992

not ownership of, these systems is thus of paramount importance.

Moreover European airlines are responding to increased competition -particularly with US carriers- by introducing a wider range of marketing weapons. In addition to the "traditional" fare reductions mention should be made of frequent flyer plans and measures to make travelling by air more attractive, for example by making seats more comfortable and/or by creating more space for the air traveller.

ENVIRONMENT

Air transport can affect the environment in two ways: through the generation of noise and through the emission of toxic gases.

Although no reliable quantitative data on the contribution of air transport to environmental pollution exist, circumstantial evidence in the form of cost of air pollution in the EC indicates that, within the whole transport sector, air transport ranks second, but far behind number one, the road transport sector.

With regard to noise generation the air transport industry succeeded in reducing the 95 decibel take-off noise. Nowadays only 0.8 million people are living in areas exposed to this noise level as against 19 million in 1970.

As to air pollution the toxic gases involved are carbon dioxide, (the principal "greenhouse" gas), carbon monoxide, unburned hydrocarbons and nitrogen oxides. Energy conservation programmes gave rise to an immediate reduction (50% since 1970) in the carbon dioxide emissions, whereas the development in combustion technology led to a significant decline in the emissions of carbon monoxide and unburned hydrocarbons of respectively 90% and 70% since 1970. The research is currently aimed at reducing the emissions of nitrogen oxides which have been virtually unchanged over the past 20 years, because modern combustion technology involves higher temperatures and pressures making it less easy to control the volume of nitrogen oxides.

Furthermore, airlines try to diminish emissions from sources other than aeroplane engines, such as from ground vehicles and from aircraft maintenance. With respect to aircraft maintenance opportunities are being pursued to reduce chemical emissions and effluents.

REGULATIONS

Since 1987 the European airlines are subject to a process of deregulation. The EC Commission launched a three-stage liberalisation programme to encourage competition and reduce fares on the European air transport market. The liberalisation process should ultimately result in a fully deregulated EC air transport market, allowing EC carriers to operate all over the Community, offering all sorts of services at fares which can freely be set. The deregulation policy concentrates on three areas: capacity, pricing and market access.

Between 1987 and 1991 the set of proposals for the first and second stage were accepted. Recently the EC transport ministers agreed on the package for the third stage in the liberalisation process, which will be operational as of 1st January 1993. It includes still safeguards with regard to the free settlement of fares and a transition period for the introduction of cabotage i.e. the freedom of an airline from one country to operate unconditionally domestic flights in another country. Cabotage will only be introduced in April 1997.

In the meantime "consecutive cabotage" will prevail which means that EC airlines can offer national services within other Member States provided the following conditions are met: the flight originates in the country where the airline is registered and that it will not pick up more passengers than half of its seat capacity in the stopover in the foreign Member State. Together with consecutive cabotage the seventh freedom right will be introduced, allowing EC airlines to compete on international routes between other Member States without the currently prevailing condition that the flight should originate from their home countries. The EC airlines' right to set their fares has been limited by safeguards against over-pricing and

price cutting policies aimed at forcing smaller competitors out of the business.

OUTLOOK

The deregulation of the air transport market is promising for a rapid development of passenger and freight transport by air. However, future growth rates are not expected to reach the levels attained between 1985 and 1990, when they totalled 6.9 and 8.4% for passenger and freight transport respectively and 3.3% for employment. The air transport sector is currently facing a number of temporarily and structural problems. In particular congestion due to Europe's inadequate airport and air traffic control (ATC) infrastructure is a structural problem which limits airport capacity in relation to demand. These infrastructural deficiencies cannot easily be removed. Environmental constraints on new airport projects and on new runways at existing airports will severely limit such developments. A fully integrated air traffic flow management system (based on Eurocontrol) is not expected to be fully operational before 1995. Finally the EC airlines will be subject to ever increasing competition from non-European airlines, not only from the USA, but also from the Far East. Furthermore on the short-haul airlines will be subject to more competition from surface transport, particularly from high-speed trains.

The signalled problems are not expected to be drastically relieved during the forecast period. At the same time the deregulation process will continue, entailing gradually more traffic. It has been assumed therefore, that the growth rates for the medium-term will be slightly higher than for the short-term.

Table 7: Air transport
Expected annual growth rates

(%)	1992-93	1992-96
Passenger-kms	4.0	5.0
Tonne-kms	4.0	6.0
Employment	2.0	2.0

Source: NEI

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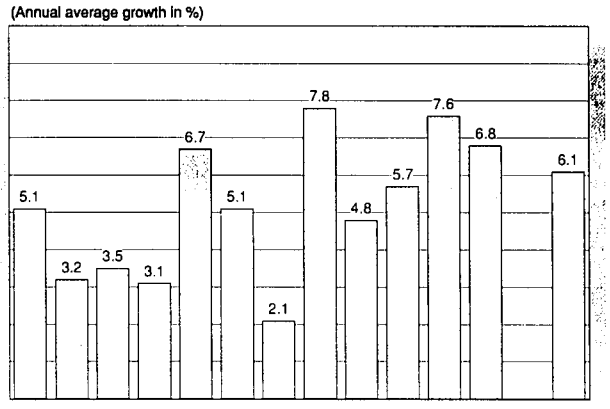
Postal and express services
NACE 790

In the past decade private operators have been able to seize the market for (non-reserved) high value added services. They created efficient networks with large capacities enabling high quality and reliability. These were the features asked by the users, which the traditional postal administrations were not able to cope with. Now the situation is changing considerably: postal administrations are becoming more market oriented; private operators have difficulties in maintaining the high quality networks and start to extend their services. Further policy initiatives put forward by the European Commission in its Green Paper will cause changes in the positions of both postal administrations and private operators.

Figure 1: Postal and express services
Postal administrations - Growth in number of items handled 1985-89



(1) Estimates based on shorter periods; excluded from EC-average
(2) Estimate based on 1984-88 period
Source: Green Paper/Postal administration

INDUSTRY PROFILE

Description of the sector

NACE 790 includes all units exclusively or primarily engaged in transmitting sounds, images, documents and packages for the benefit of the general public. Apart from postal and express services this NACE heading includes telephone, telegraph, telephotography and telex services.

In this monograph the postal and express services are dealt with in more detail. In particular it concerns the activities of Postal Administrations of Member Countries and private operators. Postal Administrations are also involved in financial services like postal giro offices (NACE 812) and post office savings bank branches (NACE 813.1).

Essentially the market for postal services consists of three segments: letters, parcels and express. The distinction between letter services and parcel services is either determined by weight (e.g. above 2 kilos is a parcel) or by contents (letters carry 'communication'; parcels carry 'goods'). Express services include express letters (documents) and express parcels (packages).

Letter services can be categorised in three main areas:

- Standard letter services for letters, post-cards, printed papers and small packets with or without priority delivery;
- Subsidiary letter services, which include registered letters, recorded letters, certificate of posting/advice of delivery, special delivery, direct bags ("M-bags"), post office boxes and post restante;
- New letter services, such as postal electronic mail, document exchange, remail, "hand delivery", "city mail" and unaddressed direct mail.

Postal administrations mainly provide letter services under a monopoly (reserved services). In general a concession is granted to the postal administrations, in which they have special and exclusive rights for offering these services. The provision of the service is then obligatory. Parcel and express services are offered in a free competition environment (non-reserved services), where postal administrations dominate in parcel services and private operators in express services. For some non-reserved services postal administrations have been charged to provide them also (obligatory non-reserved services).

In financial services postal administrations offer the following types:

- postal payment means (money orders, postal orders and cheques, "valeurs declarées");
- girobank operations (tele-payment, interior accounts/deposits/pay-out, foreign currency, mortgage);
- savings bank operations (home savings and common funds investment);
- other payments (pensions, welfare services, licences, taxation and public payments).

Main indicators

The largest postal administration in the EC is to be found in France. This administration accounts for 32% of total EC turnover in 1988. The German postal administration ranks second with ECU 9 billion, but may have become bigger now since the German unification.

Recent trends

Between 1985 and 1989, services provided by postal administrations (measured in number of items handled) grew by 6-8% annually in Italy, Portugal, United Kingdom and Spain. At the other end of the spectrum, Ireland, Greece, Denmark and Germany posted slow growth in the 2-3% region. For Japan volume growth between 1983 and 1987 amounted to some 4.6% on average.

Express services have grown much faster. The European market for express and courier services has been increasing at a rate of 30-40% a year in the last few years.

This caused a considerable shift in the market for postal services. The traditional carriers, the national postal administrations, have been confronted with increased competition in the non-reserved services from international operators aggressively moving into the market, especially in the field of parcels and express services.

International comparison

Comparing postal administrations in the EC with those in the USA and Japan reveals that the EC administrations with a total of some ECU 39 billion have the largest turnover. In the USA total turnover amounted to ECU 30 billion, whereas in Japan turnover was ECU 9.5 billion.

On average each EC citizen received 260 mail pieces in 1990 (243 in 1988). In the USA however, the number of mail pieces received annually by citizens is much higher: 650 pieces in particular due to high direct mailing activity. In Japan the average amounts to about 160 pieces.

Table 1: Postal and express services
Breakdown of production, 1988

	Turnover (billion ECU)	Volume (million items)	Employment (1000 units)
Postal administration			
- mail services	26	72575	1208
of which:			
letters	21	71313	N/A
parcels	3	1216	N/A
express	2	46	N/A
- financial services	13	3833	152
Private operators	20	3115 (1)	350
of which:			
letters	1	N/A	N/A
parcels	5	N/A	N/A
express	14	N/A	N/A
Total	59	79523	1710

(1) Sum of cheques and money orders in circulation
Source: Green Paper /Sofres/CEC-estimates/NEI-estimates

Within the EC there are large differences in the average number of mail items received. In Denmark and the Netherlands this number is the highest: over 400 items per year. On the other hand in Greece and Portugal the average is below 100 items annually. Figures for Japan reveal that in Tokyo mail received per capita amount to 388, whereas in some rural prefectures this is less than 60 pieces.

MARKET FORCES

Demand

Customers of postal services are either businesses and organisations or individuals. Some 80% of all mail originates from businesses and organisations, of which about 45% has the same group as destination. About half of the mail from individuals is destined for businesses and organisations. The other half goes to other individuals. For parcel services the distribution is slightly different. Businesses and organisations send about 85% of all parcel items, the bulk of which (70%) is received by individuals. About two thirds of parcels sent by individuals is destined for other individuals.

For postal administrations the market is rather evenly spread over various end users. An important outlet is the publishing industry sending periodicals to its readers by mail: it account for about one fifth of the shipments made. Other important segments are mail ordering and advertising (direct mail).

The largest users of services by private operators (mostly parcels and express shipments) are industry and mail ordering companies. Industry constitutes about a quarter of total shipments, whereas mail ordering takes another 20%.

During the seventies and eighties mail ordering has developed considerably into an important competitor of retailing. Postal services have benefited of this growth as they have been able to meet with requirements such as customer communication, catalogue distribution, statement sending and goods distribu-

Table 2: Postal and express services
Postal administrations

	Turnover in 1988 (million ECU)	%	Legal status in 1991
Belgique/België	773	2.0	Public enterprise
Danmark	1156	3.0	State administration
BR Deutschland	9180	23.6	Public enterprise
Hellas	136	0.4	Public enterprise
España	1180	3.0	State administration
France	12366	31.8	Public autonomous establishment
Ireland	247	0.6	Limited public company
Italia	4087	10.5	State administration
Luxembourg	53	0.1	State administration
Nederland	3098	8.0	Limited public company
Portugal	155	0.4	Public enterprise
United Kingdom	6426	16.5	Public enterprise
EC	38858	100.0	

Source: Green Paper/CEC-analysis/ERA

Table 3: Postal and express services
Major end-markets

(%)

Customer category	Postal administrations	Private operations
Mail order	15	20
Advertising	12	15
Press	20	5
Banking	10	14
Insurance	10	9
Public services (1)	10	N/A
Industry (2)	5	25
Rest	18	12
Total	100	100

(1) Public administrations use private operations, but this is likely to be of marginal proportions
(2) Principal industrial clients are the automobile, computer and pertol sector.
Source: Green Paper

tion. There is a tendency however, that private operators more and more take over this market from public administrations by providing better service quality and reliability.

Advertising by mail (direct mail) has also become of considerable importance for postal services over the years. An increasing share of advertisement budgets is spent on direct mailing activities. But in this market segment also, postal administrations seem to lose market shares to the private operators.

Distribution of publications by mail remains important for postal administrations. They can offer cheap mailing services at preferential tariffs. Private operators are not really able to compete with this low value mail services, unless other requirements become important (e.g. a guarantee to deliver the next day).

Industry has more and more demanded a high reliability of postal services. It is thus prepared to pay for service quality, a segment which has been picked up by private operators.

Supply and competition

Reliability and service quality have become the major factors for private operators to exist. Postal administrations with their monopolies on letter mail services seem to have neglected these factors in the past. This has allowed private operators to capture the market with high value added postal services,

Table 4: Postal and express services
Productivity, 1988

	Revenue per employee (ECU)	Items handled per employee (1000 units)
Mail services:		
Postal administrations	21500	62
Private operators	57150	9
Financial services:		
Postal administrations	83550	25 (1)

(1) Cheques and money orders in circulation per employee
Source: Green Paper/Sofres

whereas public administrations with their obligation to provide reserved services stuck to low value added postal services. Private operators account for about 45% of turnover in the market with only some 5% of total shipments.

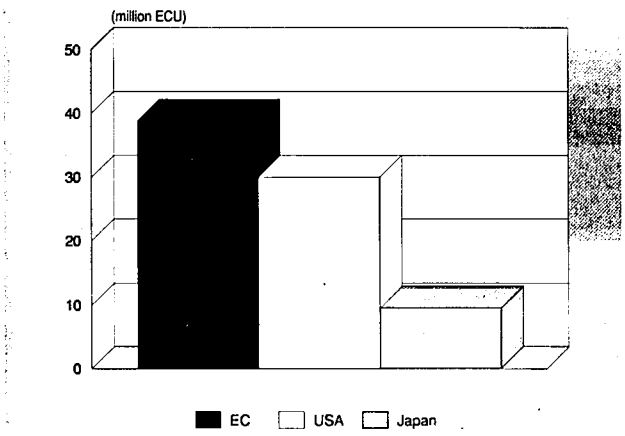
Large private operators have increasingly offered a range of services exceeding pure postal services. This change on the supply partly reflects changes in production management in the manufacturing industry, with increasing need of just in time deliveries and door to door transport. In addition, an enlarged range of services is also results from excess capacity. Having created networks with large (air freight) capacities to enable fast deliveries all over the world, private operators were hit by over-capacity as growth rates remained below expectations. Hence, companies being called 'integrators', started to extent their service package to transportation and distribution services. Some companies have even developed into suppliers of complete logistic chains for manufacturing companies which wanted to externalise their transport and distribution activities.

Production process

The production process of postal services can be divided in five stages: collection of mail, sorting for destinations, transportation, final sorting and delivery of mail. Mail delivery is the largest cost items with 60% of operational costs. Next comes transport and sorting for destination with a combined share of 25%. Mail collection makes some 10% of total operational costs, whereas the remainder (5%) goes to final sorting for delivery.

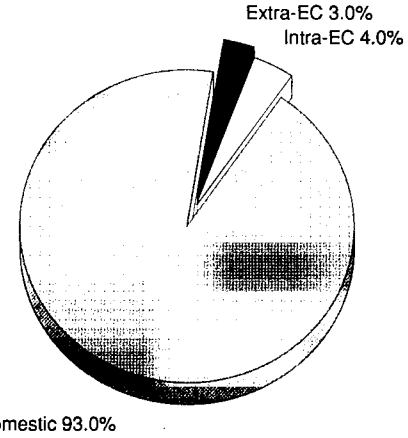
A good network is of crucial importance for postal services. The complexity of the interactions between all the different points in a network demand a good logistics chain. For in-

Figure 2: Postal and express services
Postal administrations - Turnover in EC, USA, Japan In 1988



Source: Green Paper

Figure 3: Postal and express services
Destination of mail 1988



Source: Green Paper

Table 5: Postal and express services
Major private operators, 1988

	Turnover (billion ECU)	of which in EC	Employment (1000 units)	of which in EC
DHL	2.0	0.5	25.0	8.5
Federal Express	7.0	1.5	94.0	5.5
TNT	3.0	1.0	50.0	18.5
UPS	12.1	0.6	275.0	12.7

Source: Green Paper/NEI

ternational mail the problem is even more complex, as domestic networks have to be matched. Essentially there are two network systems: the hub-and-spoke system, in which a region is serviced from a central "hub" via "spokes" with local centres; and the spider's web system, in which local centres interact directly with each other.

Productivity is very different between the postal administrations of the EC countries. On average postal administrations have a turnover per employee of 21 500 ECU. Private operators on the other hand show a turnover per employee of over 57 000 ECU. Differences highly depend on the type of services offered.

Network quality and productivity are among the factors that cause wide ranges in tariffs for what, apparently, are the same services. In 1990 the rate for sending a letter weighing up to 20 grams within the country was ECU 0.19 in Spain and ECU 0.57 in Ireland (adjusted for purchasing power differences). Sending a 100 grams letter cost only ECU 0.37 in Greece, but ECU 1.51 in Italy. Private operators demand far higher charges; customers pay for a higher service quality.

A good indicator for service quality in postal administrations is the percentage of domestic mail not delivered the day after collection. In small countries like Denmark, Netherlands and Luxembourg this rate is well below 5%. In Germany, a very large country relative to the previous ones, the Bundespost manages to limit the rate to 10%, which equals the set aim within the Conference of European Postal and Telecommunication Administrations (CEPT). In Italy however, more than 80% of mail is not delivered the day after collection. This testifies the notorious service quality of the Italian postal authority and may even explain the 40% deficit on mail service operations and the larger market share of private operators in Italy.

INDUSTRY STRUCTURE

Profile

Private operators can be classified into two categories: companies operating internationally, such as the big four 'integrators': DHL, Federal Express, TNT and United Parcel Services (UPS). They offer services which go beyond postal services and integrate various forms of transport and distribution. The second category consists of domestic companies, e.g. Kühne & Nagel (D), Jet Services (F), TAT Express (F) and Securicor (UK). On a local level small companies offer express services within city or conurbation areas.

The boosting market for express services has attracted companies active in other fields of transportation and forwarding. For example (scheduled) airline companies like KLM, Lufthansa, British Airways and Air France have attempted to enter this market by offering cheap -otherwise redundant- cargo space in their aircraft. But also freight forwarders and railroads have started express services. Postal administrations have set up their own international express service EMS in order to get some crumbs from this high value market.

Recently however, the large private operators were confronted with a tough year and have experienced a considerable setback

Table 6: Postal and express services
Postal administrations
Investments 1985-88

(million ECU)	1985	1986	1987	1988	as a share of revenue (%)
Belgique/België	23	26	34	23	3.4
Danmark	43	26	51	116	5.1
BR Deutschland	337	442	485	505	4.8
Hellas	8	6	1	2	3.2
España	30	62	N/A	22	3.1
France	319	N/A	134	717	2.8
Ireland	N/A	N/A	11	N/A	N/A
Italia	581	746	837	327	15.2
Luxembourg	N/A	N/A	N/A	10	N/A
Nederland	117	124	106	251	4.8
Portugal	13	16	14	15	9.4
United Kingdom	2 085	159	227	257	10.6
EC	3 547	1 605	1 899	2 245	6.1
USA	1 091	1 364	1 819	1 051	3.8

Source: Green Paper/Universal Postal Union (UPU), 1989

Table 7: Postal and express services
Postal administrations
Profitability, 1988

	Mail services		Financial services	
	Surplus million ECU	% of turnover	Surplus million ECU	% of turnover
Belgique/België (1)	-243	-48.3	-30	-10.9
Danmark	-35	-4.3	79	22.4
BR Deutschland	-1 210	-17.3	0	0.0
Hellas	-23	-23.1	6	16.0
España	-308	-44.4	188	38.5
France	-498	-6.8	645	12.8
Ireland	-1	-0.7	3	5.1
Italia	-1 058	-39.9	14	1.0
Luxembourg	-3	-6.4	2	23.1
Nederland	47	2.6	250	18.9
Portugal	-36	26.7	1	5.0
United Kingdom	159	3.4	99	5.6
EC	-3 208	-12.4	1 257	9.7

(1) Excluding subsidy of the central government of ECU 321 million in respect of loss-making services provided.
Source: Green Paper/Sofres

in activity due to recessionary tendencies. Rationalisations and closure of activities in certain areas even led to job losses.

Strategies

Postal administrations have been forced to commercialise in recent years. This was not only due to the competition with private operators, it was also initiated by the tendency to privatise public activities and a need for reducing budget shortages. Already in the United Kingdom and the Netherlands postal administrations proved that postal services can be a profitable operation: Royal Mail and PTT Post realise surpluses on mail services. Similarly, the Japanese Postal Service has been able to generate profits from 1981 onwards by improving services and operations efficiency and expanding business activities without resorting to postal rate increases.

In some countries, the profitability of financial services provided by postal administrations is high, sometimes well above 10% of the turnover in that sector. This enables a partial and sometimes full compensation of losses on postal services.

Apart from commercialisation on the demand side, public administrations have also tended to economise on the supply side. This has been done by way of large investments, especially in automatic sorting of mail in the sorting centres. Also the efficiency of operations in the network has been improved by a more cost-based attitude.

In the private sector market for intercontinental parcel and express shipment services there is only room for a limited number of operators. It is therefore likely that mergers and strategic alliances will take place in the medium term. These will involve integrators, carriers and forwarders, but also postal administrations.

Already one of these alliances has become effective: TNT together with five postal administrations in the Netherlands, Germany, France, Sweden and Canada started the joint venture GD Express Worldwide. In this joint venture the five administrations combine their EMS services with the international express network of TNT. Other postal administrations can joint in, but TNT will maintain its 50% share in the venture. This alliance is attractive for postal administrations as they do not have to depend any more on various bilateral agreements; TNT on the other hand benefits from the good sales and distribution networks of the postal administrations. Besides this TNT has already lost a competitor: Federal Express also uses TNT's network for its activities in Europe.

Table 8: Postal and express services
EC directives and proposals 1990-1991

Type	Reference	Concerning
Regulation (Council)	294/91/EEC	Air cargo services between EC-members
Regulation	1264/90 (amendment on Reg. No. 3179/80)	Postal charges to be taken into consideration when determining the the customs value of goods sent by post
Decision	90/456/CEE	Provisions in Spain of international express courier services
Communication	COM (90)447	Making payments in Internal Market
Directive (draft)	COM (90)314	Protection of individuals in relation to processing of personal data
Directive (draft)	COM (90)317	Aspects of working time organisation
Directive	90/504/CEE	Harmonization of procedures for the release of goods for free circulation

Source: Green Paper

REGULATIONS

In each country governments have arranged legislation in which postal administrations should provide universal postal service at affordable tariffs. Provision requirements differ from Member state to Member state. For example in Spain inter-city express services are reserved (intra-city and international services are not reserved).

In the non-reserved service the market should regulate itself. For reserved services however, some body should be responsible for regulating the market. In the past the regulator was also the operator: the postal authority. But nowadays Member states have separated the regulatory authority from the operational function by establishing a body under the responsible ministry.

In an international perspective, postal authorities cooperate in various organisations, such as the Universal Postal Union (UPU) of the United Nations and the Conference of European Postal and Telecommunications Administrations (CEPT). The former is a worldwide organisation providing the basic framework for international postal services. The latter includes not only the EC authorities, but also those from EFTA, Eastern Europe and Turkey. In CEPT various issues have been agreed (e.g. the 'péréquation tarifaire' which is the use of a standard tariff in domestic markets for letters below 20 grams irrespective of distance).

In view of the Internal Market the EC is developing a common policy for postal services throughout the Community. This will require a lot of policy harmonisation in the various Member states. Issues in this respect are the definition of reserved and non-reserved services, principles of cost-oriented tarification and competition. Ideas have been presented by the European Commission in its Green Paper.

Private operators will benefit from the lifting of custom barriers within the EC. It will reduce their operation costs and allow them to improve service quality. However, their position is highly dependent on the legislation currently in force and the envisaged legislation changes. For example changes in the definition of non-reserved services could harm them in the core of their activities. Currently the International Express Carriers' Conference submitted a complaint concerning a new system of terminal dues for international mail agreed between EC postal administrations. Another point of concern is the intended impediments on remail activities.

REMAIL

A special issue in postal services is the remail service. This is a cross-border mail service offered by private operators. The most common type of remailing is the A-B-C mail: a private operator collects international mail of a large customer in country A, transports it to country B from where it is posted for delivery in third countries C. A second type is A-B-B mail, in which the mail is posted by the private operator in country B for delivery in B. The third type is A-B-A, in which the private operator posts the mail for delivery in country A.

Remailing challenges the monopolies of the postal administrations, because services can compete with the postal administrations involved. Especially in the A-B-A case the monopoly of country A is challenged, as mail which is effectively domestic has become international mail. The postal administration in B however benefits as it will collect the full revenues leaving only the terminal dues for the postal administration in A.

The basis of remail has evolved from a market need for good quality services and the weaknesses of the terminal dues system for international mail agreed in the UPU. It started with the mailing of publications with an international distribution. In the 1970s the KLM airline initiated its Publications Distribution Service in cooperation with the Dutch postal administration. Express companies like TNT (Mailfast) and DHL (Worldmail) gave another impulse in remailing, as they had to find new and profitable freight next to their express shipments to have an optimal usage of their planes. Since then remail has developed into a service of wider scope, e.g. in international direct mail advertising and even in traditional letter services.

OUTLOOK

The outlook for postal services varies with the type of service offered. For traditional letter services the growth trend will be of a stagnant nature. This is due to competition from modern communication means such as facsimile, electronic mail and EDI. In parcels and express services growth is likely to be very high. The integration of the European market implies increased interaction (in terms of traffic and trade) between the Member States. This increased interaction will be mainly with industries requiring high quality services. Further there is a trend in industry to go back to the core business implying externalisation of transport and distribution to the benefit of the integrators.

Another strong growth market is likely to be with advertising (direct mail) and mail ordering. This will be a market with strong competition between postal administrations on one hand and private operators on the other.

Of crucial importance for the competitive position is the application of modern technologies. Private operators are already at a high level, but some postal administrations seem to be far behind and may need a large investment program to come at par level with the private sector.

Another important issue is the regulatory environment. A community policy for postal services will seek to reduce the present lack of harmonisation in legislation concerning reserved and non-reserved services, to introduce a more cost-oriented tarification system and to apply free market principles where possible.

In this respect the cross-subsidisation from financial services to postal services is likely to disappear. In the Netherlands this is already the case as Royal PTT Nederland NV has established PTT Post as a separate business unit, whereas financial services (the former Postgiro) has effectively become a private sector bank (Postbank). In addition, the post offices have been transferred into a separate business unit as well, in which the post office becomes more of a retail outlet for commercial and non-commercial services, rather than a place to buy stamps and send letters and parcels.

Table 9: Postal and express services
Expected annual growth in turnover

(%)	1992-93	1992-96
Letters	2.0	3.0
Parcels	4.0	7.0
Express	7.0	10.0

Source: NEI, based on Green Paper

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The industry is represented at the EC level by: The European Express Organisation (EEO). Address: Avenue L. Gribaumont 1, B-1150 Brussels; tel: (32 2) 772 1523; fax: (32 2) 772 1126.

Sea ports and other sea transport facilities
NACE 763

Supporting services to sea transportation are highly heterogeneous in nature. Services are provided by port authorities and private companies depending on the regulatory environment in the port and the extent of subsidisation in national port policies. Competition among ports is very severe and the only way to keep ahead of competing ports is to invest heavily in modern infrastructure, suprastructure and facilities. A Common Port Policy may change the competitive environment.

INDUSTRY PROFILE

Description of the sector

This group in the NACE classification includes all supporting services to sea transport and coastal shipping. In effect these are sea ports and other sea transport facilities. Examples of service types are tugs at sea, pilotage, lighthouse operations, buoys and other navigation facilities, stowing, stevedoring, loading and discharging of sea-going vessels, and operation and maintenance of sea harbours, piers and docks.

Main indicators

In the 118 major seaports in the EC, as defined in the MERC World Ports Database, a total traffic of about 2 000 million tonnes of cargo was handled in 1990. The largest volumes have been handled in the United Kingdom with some 408 million tonnes in 23 ports. The Netherlands ranks second with 358 million tonnes, of which the major part is handled in the world's largest port, Rotterdam (288 million tonnes).

Only limited information exists on the importance of ports for the national economies. For the port of Rotterdam, total value added in 1989 was estimated at 9.9 billion DFl., about 2.5% of Dutch GDP. Employment related to port activities was estimated at 290 000, of which 69 200 directly involved in port services. Total value added for the port of Antwerp in 1989 was estimated at about 188 billion Belgian francs., about 3.4% of Belgian GDP. Direct employment in the port of Antwerp amounted to some 64,000 people.

Recent trends

In 1988 and especially in 1989, growth figures for cargo handled were very high in some ports: Brugge-Zeebrugge had an increase of 28% in 1989, Calais handled 23% more cargo, Thessaloniki registered a strong recovery in 1989 (+30%) after a decline in 1988 (-12%). Other ports with strong growth in 1989 were Leixoes with 13% and Tarragona with 14%. Felixstowe had a very good year in 1988 (+33%), but experienced minor set backs in recent years.

Growth rates for 1990 are less pronounced due to the slackening growth in world trade. Some ports encountered serious reductions in activity, such as Livorno with a reduction of 20%, Dover with 25% and Southampton with 23%. The latter two ports were severely hit by recessionary tendencies in the UK economy. A port of particular interest is Rostock in former East Germany: cargo handled in 1990 in this port was 36% below 1989 tonnage.

Table 1: Sea ports and other sea transport facilities
Total traffic in EC ports, 1990

	No. of ports covered	Total traffic (million tonnes)
Belgique/België	5	162.6
Danmark	6	30.9
BR Deutschland	14	181.8
Hellas	2	24.5
España	21	217.3
France	18	290.3
Ireland	3	19.0
Italia	12	249.6
Luxembourg	-	-
Nederland	7	358.0
Portugal	7	56.3
United Kingdom	23	407.9
EC	118	1 998.2
Japan	48	1 936.4
USA	39	901.5

Source: MERC World Ports Database

International comparison

Whereas in the 1960s and 1970s European ports were among the largest ports in the world, in the 1980s ports in South East Asia and Japan have taken over positions in the world top 10 seaports. Japan in particular has entered the top 10 with ports like Kobe, Chiba, Nagoya and Yokohama. Singapore has reached second position with large volumes of general cargo (mainly in containers) and liquid bulk (mainly oil). There are presently no American ports among the world top 10.

Table 2: Sea ports and other sea transport facilities
Top 10 seaports in the world, 1990

(million tonnes)	Seaport	Total traffic	Breakdown traffic by type of goods: Dry bulk	Liquid bulk	General cargo
Nederland	Rotterdam	287.8	94.1	135.3	58.6
Singapore	Singapore	187.6	6.4	84.4	96.8
Japan	Kobe	171.5	N/A	N/A	N/A
Japan	Chiba	170.3	N/A	N/A	N/A
PR China	Shanghai	139.6	92.5	15.9	31.2
Japan	Nagoya	128.9	16.0	33.0	79.9
Japan	Yokohama	123.7	17.1	48.6	58.0
Japan	Kawasaki	105.0	44.3	60.5	0.2
Belgique/België	Anvers/Antwerpen	102.0	32.6	25.9	43.5
Japan	Osaka	97.3	N/A	N/A	N/A

Source: MERC World Ports Database

Table 3: Sea ports and other sea transport facilities
Top 10 seaports in the EC, 1990

Country	Seaport	Total traffic (million tonnes)	Index 1985=100	Breakdown traffic by type of goods: Oil	Oil prod.	Iron ore	Coal	Containers (net tons)
Nederland	Rotterdam	287.8	117.7	88.4	29.3	N/A	21.4	31.2
Belgique/België	Anvers/Antwerpen	102.0	118.3	5.9	18.0	N/A	9.4	15.9
France	Marseille	91.6	102.4	45.4	13.2	6.3	4.3	4.6
BR Deutschland	Hamburg	61.4	103.2	4.2	9.4	7.3	1.2	19.6 (2)
France	Le Havre	54.7	112.3	29.3	4.4	0.0	3.5	6.6
United Kingdom	London	53.9	116.0	11.0	14.3	0.5	3.5	3.3
Italia	Genova	42.7	101.9 (1)	N/A	27.3	N/A	N/A	3.0 (2)
United Kingdom	Tees-Hartlepool	39.7	131.4	16.5	N/A	6.1	3.0	1.8
United Kingdom	Grimsby-Immingham	37.6	111.2 (1)	8.3	10.6	5.2	2.2	N/A
France	Dunkerque	36.6	113.6	5.6	3.4	9.6	4.8	0.8 (2)

(1) 1988=100
(2) gross tonnage
Source: MERC World Ports Database / JMM

The only European port which was able to maintain its position in the world ranking was Rotterdam. In 1992 this port celebrated its thirtieth year as the world's largest port. Total traffic handled in Rotterdam amounted to 288 million tonnes, which is still about 100 million tonnes ahead of Singapore in second position. The majority of traffic handled through Rotterdam is liquid bulk (oil, oil products, chemicals, etc.) with some 135 million tonnes. Dry bulk comprises 94 million tonnes, mainly consisting of iron ore and coal for the German steel industry. In general cargo, Rotterdam has been the largest container port in the world for years, but has now given up this position to Singapore and Hong Kong.

Antwerp, the second largest European port, moved to the ninth position in the world's top 10. It has a growing share in container traffic, but is also strong in other types of general cargo handling. Antwerp is an important competitor for Rotterdam. The third largest European port is Marseilles with some 92 million tonnes in 1990. Traffic through this port consists mainly of oil.

The largest ports in the United States of America are Philadelphia, Corpus Christi and Houston. Their size is on the order of 60 to 70 million tonnes handled per year, which makes them of medium size in comparison with European and Japanese ports. The most important type of goods handled is liquid bulk, which is essentially oil and oil products.

MARKET FORCES

Demand

Demand for seaport facilities and services comes primarily from transportation activities. Transport companies are in need of such facilities in order to handle the goods from one transport mode to another. The demand for these companies (in effect the demand for transport services) comes from shippers wanting their goods to be transported and thus depends on the economic activity in the hinterland of the port.

Supply and competition

The variety in the supply of seaport facilities and services is very wide. It concerns not only the handling of cargo from one mode of transport into another, but also storage of goods, distribution facilities, customs clearing, towing and berthing of ships, food and fuel supply services, customs handling, etc.

During the 1980s there has been a tendency to incorporate the broad variety of services with the transportation services themselves. Hence, transport companies have changed into service providers offering the complete logistic chain from one door to another: the door-to-door concept. Due to automation and electronic data interchange techniques (e.g. INTIS in Rotterdam) transportation and handling processes have become highly efficient. This enables transport companies to meet with increasing demand for just-in-time delivery systems of industries.

INDUSTRY STRUCTURE

Port traffic

Most of the EC's largest ports can be characterised as importing ports as incoming traffic is much higher than outgoing. There are only few ports where exports exceed imports: Calais, Rouen, Algeciras-la-Linea and Tyne. Similar situations exist in the USA and Japan. In the USA, only Duluth is effectively an export harbour; in Japan, Tokyo can be characterised as such.

The breakdown by type of traffic in Table 4 shows which is the dominant traffic through the EC's ports. In each Member State, one or a few ports specialise in liquid bulk traffic. These are essentially the locations for import of oil and oil products. Examples are Le Havre and Marseilles in France, Wilhelmshafen in Germany, Trieste in Italy, Sines in Portugal and Southampton in the United Kingdom. Similarly, specialisations exist for dry bulk traffic. Ports like Bremerhaven and Lubeck in Germany and Limerick in Ireland handle practically only dry bulk goods. Finally some ports can be characterised as general cargo ports, such as Brugge-Zeebrugge, Calais, Dublin, Valencia and Felixstowe.

Strategies

The Port Authority of Rotterdam has presented large investment plans. Investments should enable the port to reach a volume of traffic handled of 400 million tons by 2010. Investments should be directed to attracting high value added services, for which high skilled workers and specialists will be needed. Total investment budget amounts to some 11 billion Dutch guilders, of which 7 billion will come from the central government. In addition, private companies will have to invest another 20 to 25 billion Dutch guilders in suprastructures and facilities. Among these plans are ideas to increase the number of container handlings in Rotterdam to 9 million TEU by the year 2010. This Delta 2000-8 plan is a joint initiative of the port authority and the largest container stevedore, ECT.

Table 4: Sea ports and other sea transport facilities
Traffic activity in largest ports, 1990

Country/Port	No. of ships handled	Cargo handled (million tonnes)	Incoming	Leaving	Breakdown (1) by Liquid bulk	Solid bulk	Other
Belgique/België							
Antwerp	16 764	102.0	62.3	39.7	25.9	32.6	43.5
Brugge-Zeebrugge	11 321	30.3	19.5	10.9	4.6	8.8	17.0
Danmark							
Aarhus	5 038	6.9	4.1	2.8	1.1	3.8	2.1
Copenhagen	18 443	9.5	7.1	2.4	2.6	2.3	4.6
BR Deutschland							
Bremerhaven	9 453	30.2	18.8	11.4	2.6	19.5	8.1
Hamburg	13 756	61.4	33.4	21.9	15.3	17.5	25.6
Lubeck	5 896	18.0	10.1	7.9	0.1	17.9	0.0
Rostock	2 862	13.2	7.5	5.7	2.0	7.0	4.2
Wilhelmshafen	884	13.9	15.6	0.4	13.9	2.0	0.1
Hellas							
Thessaloniki	(T) 3 076	15.1	9.8	5.3	8.9	2.3	3.8
España							
Algeciras-la-Linea	(T) 14 369	24.5	10.5	14.0	16.1	1.5	6.9
Barcelona	6 378	18.0	12.7	5.4	7.4	4.1	6.4
Bilbao	(T) 3 532	25.2	18.0	7.2	14.4	6.4	4.4
Tarragona	1 007	24.2	17.4	6.8	17.1	6.6	0.6
Valencia	(T) 4 747	12.0	7.1	4.9	2.1	3.3	6.5
France							
Bordeaux	1 609	9.6	6.0	3.6	5.1	3.8	0.8
Boulogne-sur-Mer	6 675	5.4	2.8	2.6	0.0	1.9	3.5
Calais	14 276	16.0	7.4	8.6	0.2	0.6	15.2
Dunkirk	5 396	36.6	27.0	9.5	10.2	18.9	7.4
Le Havre	7 769	54.7	42.6	11.4	35.9	6.4	11.7
Marseille	2 542	91.6	73.5	16.8	65.6	14.1	10.6
Nantes St. Nazaire	1 814	24.9	20.1	4.9	18.0	5.5	1.4
Rouen	3 268	22.3	8.5	13.9	8.0	12.1	2.3
Ireland							
Cork	3 193	6.0	3.7	2.0	3.0	1.7	1.0
Dublin	3 700	7.4	5.1	2.5	2.0	0.9	4.7
Limerick	(T) 452	5.9	5.0	0.9	1.1	4.8	0.0
Italia							
Genoa	6 114	42.7	38.6	4.1	28.1	7.9	6.6
Savona	1 590	12.8	11.8	1.0	7.5	3.8	1.6
Trieste	(T) 2 770	34.4	31.3	2.9	28.2	4.0	2.0
Venice	5 240	24.2	20.7	3.5	12.1	9.2	2.8
Nederland							
Amsterdam	4 676	31.3	22.2	9.1	15.0	13.7	2.7
Delfzijl/Eemshaven	1 400	5.6	0.7	2.5	0.2	2.2	0.8
Rotterdam	32 155	287.8	223.1	64.7	135.3	94.1	58.4
Portugal							
Leixoes	2 742	12.1	8.6	3.5	7.4	1.6	3.2
Lisbon	5 103	14.8	12.1	2.3	4.9	5.7	3.7
Sines	(T) 1 038	22.6	13.5	9.0	19.1	3.4	-
United Kingdom							
Belfast	4 905	8.9	6.8	2.1	2.5	2.8	3.6
Dover	26 151	10.1	6.3	3.8	N/A	N/A	N/A
Felixstowe	5 351	16.1	N/A	N/A	0.2	0.0	15.8
Grimsby-Immingham	4 333	37.6	26.4	11.2	20.7	9.8	7.1
Liverpool	(T) 3 440	23.1	17.9	5.1	14.1	4.7	4.1
London	14 973	53.9	44.9	9.0	26.1	18.3	9.5
Manchester	1 888	8.1	4.1	4.0	6.0	0.9	1.2
Milford Haven	4 020	32.3	18.8	13.5	31.9	0.1	0.3
Southampton Fawley	2 354	20.0	N/A	N/A	20.4	3.0	N/A
Tyne	(T) 2 144	5.1	1.7	3.4	1.0	3.8	0.4
USA							
Baltimore	(T) 2 293	22.7	11.6	11.1	2.3	23.7	4.3
Boston (1989)	548	20.2	N/A	N/A	N/A	N/A	N/A
Duluth	(T) 1 318	37.0	3.0	34.0	N/A	36.6	N/A
Houston	4 552	57.1	36.7	20.4	29.2	12.2	N/A
New York	5 230	49.7	42.4	7.3	N/A	N/A	N/A
Philadelphia	(T) 2 936	75.6	62.5	6.1	52.2	10.3	6.0
Tampa	4 333	47.1	25.8	21.3	19.0	33.1	N/A
Japan (2)							
Kobe	92 639	171.5	88.5	83.0	N/A	N/A	N/A
Nagoya	50 395	128.9	80.3	48.6	36.2	43.5	49.3
Osaka	73 883	97.4	63.9	33.5	N/A	N/A	N/A
Tokyo	55 436	79.3	23.9	45.6	7.7	1.1	70.8
Yokohama	61 736	123.9	68.7	55.2	48.7	17.1	58.1

(1) breakdown may not equal total of cargo handled
(2) freight tonnes
(T) total of ships entering and leaving
Sources: Lloyd's Ports of the World, 1992;
Journal de la Marine Marchande, Le trafic des ports du monde, 7.12.91

Other issues in the development of the port of Rotterdam are also relevant. Very important for Rotterdam will be the construction of the Betuwe-lijn, a freight-only railroad which should connect the port with Germany. Another issue is the opening of the Rhine-Main-Danube canal, enabling Rotterdam to extend its hinterland connections to the countries bordering the Danube and the Black Sea. Furthermore, the transformation of certain parts of the port area into specialised port locations are envisaged, (e.g. distribution centres ("Distriparks") and new installations for fruit and vegetable handling).

In Belgium, large investments are also envisaged. In Antwerp the Left Bank development will cost about 37 billion Belgian francs. Further plans exist to enlarge the container terminal costing about 13 billion Belgian francs, and to renovate docks and locks at another 13 billion Belgian francs. In addition the Belgian government wants to deepen the Westerschelde, Antwerp's seaway to the North Sea, and the Port of Zeebrugge at a total cost of 10 billion Belgian francs.

Europe's largest ports not only have investment plans. Smaller ports also want to improve their position by investing in infrastructure, suprastructures and operation facilities. An example is Bordeaux's study entitled Port Avenir 2000. Another example relates to Barcelona and Valencia. These ports have initiated major container terminal developments in view of attracting direct liner calls. The port of Piraeus also has ambitious plans: the current terminal facilities will evolve into a pure passenger and cruise terminal, whereas the cargo handling facilities will be relocated to a new area west of the city.

REGIONAL DISTRIBUTION

With Rotterdam, Antwerp, Hamburg and Le Havre, most of the EC's largest ports are to be found in the Le Havre-Hamburg range. These ports are the most important gateways to industrial and consumption areas on the European continent. This hinterland can be reached easily by way of a high standard infrastructure in terms of road, rail and inland waterways. The Rhine River is especially important for the port of Rotterdam. Without this connection and its good geographical location on the North Sea, Rotterdam may not have evolved into the world's largest port.

Ports in the United Kingdom and Ireland have the domestic market as their hinterland. Good connections exist from UK ports to the major industrial areas. These connections mainly consist of motorways and railways. Inland waterways have over the years become less important. Current plans exist for its revival. An important activity of UK ports (especially in Scotland) relates to the offshore activities on the North Sea. A port like Aberdeen, for example, highly depends on service provision to oil rigs in the North Sea and on oil handling coming from the North Sea oil wells.

In the Mediterranean, Marseilles and Genoa are important ports, especially for the import of oil and oil products. Their hinterlands can be found in the southern part of France (e.g. Lyon and surroundings) and the North Italian industrial areas (e.g. Milan and surroundings), respectively. Other goods handling activities are very dispersed over the broad variety of small ports along the coasts of the Mediterranean, Adriatic and Aegean Seas. Some ports are emerging though. Algeciras-la Linea in Spain, for example, has become far and away the leading container transhipment port in the Mediterranean and has ambitious development plans to maintain this position.

ENVIRONMENT

Port authorities are more and more concerned about environmental issues in their ports. Operators will have to comply with environmental legislation becoming stricter year by year. But this is not seen as a negative point. Shippers more and more want their products transported in an environmentally responsible way, as they do not want their names combined with negative publicity from environmental accidents. They even tend to demand transport facilities which are ahead of national legislation. This forces port operators to do heavy investments in environmentally sound handling facilities.

REGULATIONS

The supply of seaport facilities and services must be distinguished in the provision of infrastructural and suprastructural facilities and handling services. Facilities are generally managed by a port authority, whereas handling services are mostly in the hands of private companies. The situation however, differs very much from country to country. Port authorities and companies can be either publicly owned or privately owned (or a combination).

In general, three types can be distinguished concerning the principle of exploiting port facilities:

- fully centralised ports, where exploitation is in the hands of the port authority. This authority is a state body. It does not exclude collaboration with private companies, but decisions on investments are mainly with this body. Examples are most Spanish ports, Italian ports, some ports in France and Denmark.

- decentralised ports, where the port authority is a municipal or collective body. Examples can be found in Belgium, the Netherlands, Germany, the United Kingdom and Portugal.

- fully private ports, where the port authority is a private company. Examples can be found in the United Kingdom, where Associated British Ports is the owner of 21 ports throughout the country, in Germany (e.g. Wilhelmshafen), Greece and Spain.

A very difficult issue is port pricing. Various principles of port pricing are used and depend effectively on the extent of subsidisation defined in national port policies. An extreme principle is that port pricing should be such that all costs of the operations together with depreciation and financing costs of infrastructure and suprastructure have to be recovered. The other extreme is that port services are public services to be priced at marginal rates. Cost recovery is then made from subsidisation originating from public budgets.

In practice, port pricing is generally made on the idea that costs from operations and suprastructures should be recovered. Investments in infrastructure are generally subsidised by central or local governments. The deviations are however large, which causes onerous competition among ports.

The European Commission is currently developing guidelines for integrating ports into trans-European transportation networks. A Common Port Policy could complement maritime and infrastructure policies and harmonise the terms of competition among EC ports. In particular it may address the distortions from financial support by public authorities and the recovery of infrastructure costs from its users.

Another issue is cabotage. For the transport sector as a whole, cabotage will become important in the future. New regulation will allow domestic transport by operators from other Member States. This may cause shifts in transport flows throughout the EC and, as a consequence, shifts goods handling through EC ports. Some ports will benefit; others will be harmed. It is likely that small ports may encounter problems as traffic flows could concentrate in major hubs.

Table 5: Sea ports and other sea transport facilities
World container ports

Rank	Port	Country	1990 1000 TEU	1991 (1) 1000 TEU	1995 (1) 1000 TEU
1	Singapore	SIN	5 224	6 350	11 000
2	Hong Kong	HKG	5 102	6 200	10 000
3	Rotterdam	NL	3 666	3 800	4 500
4	Kaohsiung	TAI	3 495	3 913	4 750
5	Kobe	JAP	2 596	2 680	3 900
6	Busan	KOR	2 273	2 419	3 000
7	Los Angeles	USA	2 116	2 027	2 400
8	Hamburg	D	1 969	2 250	3 200
9	New York	USA	1 898	1 804	-
10	Keelung	TAI	1 807	1 825	2 250
11	Yokohama	JAP	1 648	1 820	-
12	Long Beach	USA	1 598	1 770	-
13	Tokyo	JAP	1 555	1 640	-
14	Antwerpen	B	1 549	1 816	2 300
15	Felixstowe	UK	1 436	1 440	-

(1) Forecasts by PDI
Source: Port Development International, Jan./Feb. 1992

PASSENGER TRANSPORT

In most ports in the European Community, passenger traffic is negligible or even non-existent. For some ports, however, it is the main activity. The ports along the Channel depend heavily on ferry traffic between the United Kingdom and France. The opening of the Channel Tunnel by 1993 is considered a major threat to the ferry operations on the Channel and as a consequence to the ports along the Channel.

Furthermore, some ports in the Mediterranean have important passenger facilities for ferry links. Important examples are in the south of Italy, where ferry connections exist with Greece and the countries in Northern Africa. Also, Greek ports generally have passenger facilities providing for domestic inter-island ferry links in the Aegean Sea.

Finally, mention should be made of the ports in Northern Germany and Denmark. From these ports, important ferry links exist with Sweden and Norway. Copenhagen is currently building a new passenger terminal due for 1994 enabling the handling of 10 vessels simultaneously.

An important issue in passenger transportation is the existence of duty and tax free sales on ferry boats and in passenger terminals. The European Commission is inclined to abolish these sales on ferry links between Member States. This would harm the passenger transportation sector severely as a substantial share of their revenues are from sales of duty-free goods. Abolition has now been postponed until 1999.

CONTAINER TRANSPORT

Container traffic emerged from the need to unitise general cargo items into manageable units of equivalent size. For this purpose the twenty-foot container was developed which could be easily filled with general cargo for transportation and easily stripped when reaching its destination. During its development, containers of different size emerged, but the standard unit of measurement has remained the twenty-foot container. Traffic flows are thus expressed in Twenty-foot Equivalent Units (TEUs).

In 1991, total container handling in ports throughout the world amounted to some 90.7 billion TEU (86.1 billion in 1990: +5.3%). Expectations by the Japanese Container Association indicate a further growth to about 115 billion TEU in 1995, an annual growth of about 6% on average.

The largest container ports are currently Singapore and Hong Kong, handling over 6 million TEU in 1991. These ports have been able to become major hubs in the Southeast Asian region for container traffic flows, where the large container line companies are calling. In 1991, both ports show growth rates of over 20%. Japanese ports, however, show relatively low 1991 growth rates in container handling, varying from only 3% for Kobe to some 10% for Yokohama. In the USA, the ports of New York and Los Angeles encountered reductions of about 5%, whereas Long Beach realised an increase of some 10%.

Looking at the ports in the Le Havre-Hamburg range also relatively low growth rates are shown. Rotterdam is clearly losing market share to the benefit of Hamburg and Antwerp. In 1991, the volume of containers handled in Rotterdam increased by only 3.6%, whereas in Hamburg and Antwerp this volume increased by 14.3% and 17.2%, respectively. This shows the severe competition among ports in this range to attract container traffic and become the major hub in Western Europe.

Port authorities and container handling companies make heavy investments to create an attractive infrastructure where containers and container ships can be handled as fast and as reliably as possible. Modern container terminals operate with highly automated container location and tracing systems. An example is the Maasvlakte-terminal of ECT in Rotterdam, where modern straddle carriers can trace containers automatically. Large gantry cranes also need to comply with the increasing ship size: the largest ships (of so called 'post panamax size') carry up to 4500 TEUs.

OUTLOOK

The outlook for cargo handling depends heavily on the prospects for world trade and world shipping. As world shipping is fairly depressed, especially in bulk transportation, the future for cargo handling is bleak. In the short term, growth in European ports may amount to about 1.5%, whereas in the medium term annual growth rates may not exceed 2.5%.

The outlook for container handling in ports is more optimistic. It is expected that general cargo growth will be above the

Table 6: Ports
Expected annual growth rates

(%)	1992-93	1992-96
Cargo handling	1.5	2.5
Container handling	4.0	6.0

Source: NEI

total cargo average. Furthermore, within general cargo substitution from ordinary cargo to containerised cargo is likely to proceed. Container handling growth rates are thus expected to amount to about 6% on average. Some ports, however, will be able to establish higher growth rates. This will depend on the increasing tendency to create large trunk lines between major hubs in various regions throughout the world. From these hubs, feeder lines will service container traffic demand in other ports in the region.

Written by: Netherlands Economic Institute

Airports and other air transport facilities
NACE 764

The airports throughout the EC heavily compete to become major hubs for international and intercontinental flights for both passengers and freight. Capacity problems disturb the competition process. The timing of investments in capacity extension will influence the competitive advantage of an airport. In view of the future liberalisation of the EC aviation market a shake-out of airline companies can occur. Some large companies will remain each deciding on which airport is going to be its home base or major hub.

INDUSTRY PROFILE

Description of the sector

Supporting services to transport (airports and airfields) includes units exclusively or primarily engaged in the activities essential to air transport, without transporting passengers or goods themselves. Classified in this group, are units exclusively or primarily engaged in the operation of civil airports and airfields (public and private), radio beacons and radar stations. Also included are units taking care of air routes and air traffic control. This monograph deals with airports only, for which limited statistical information exists.

Main indicators

SRI measured employment in total aviation related activities in 1988 at 426 000 people. Excluding aviation employment, total non-airline employment in the EC can be roughly estimated at some 115 000 people, 27% of total aviation related employment.

Looking at passenger transportation by air to and from the major EC cities, growth rates average at 6.8% per annum between 1983 and 1990. The largest growth was observed for Stockholm's airport Arlanda (9.2%) and for London Gatwick (7.7%). Relatively slow increases were measured for Paris-Orly, the Rome airports, Athens, Luxembourg, Palma Majorca, Zurich and Copenhagen.

Freight handled at airports in the major EC cities increased by 6.6% on average during 1983 and 1990. Strong growth with percentages above 10% per annum were recorded by the airports of Maastricht (24.2%), Manchester (17.2%), Cologne (16.9%), Brussels (12.7%), Luxembourg (12.6%) and London Gatwick (10.5%). Minimal growth (below 4%) occurred in Athens, Paris-Charles de Gaulle and Copenhagen.

On average passengers handled on airports in the main European cities in 1991 diminished by 5.2%, following the effects of the Gulf war. The most serious reduction occurred for the Stockholm Arlanda airport (-13.9%). Other airports with considerable reductions were those of Rome, London Gatwick (also due to a change in the London Traffic Distribution Rules) and Copenhagen. Amsterdam was the only airport which was able to maintain the number of passengers handled.

For freight the drop in activity in 1991 was less dramatic. Total tonnage handled at the airports was reduced by 1.8%. Differences between airports are however large. Strong declines were observed for Madrid (-15.9%), Frankfurt (-5.3%) and the London airports (-5.5%). On the other hand, Brussels and Cologne airports show increases above 12%, for Luxembourg growth amounted to 7.5%, Amsterdam was able to increase the volume handled by 4.2%.

International comparison

The world's largest airport city is New York. At its three airports nearly 75 million people have been handled throughout 1990. About 40% goes through the J. F. Kennedy airport, which handles most international traffic. New York is also the most important freight centre in the world with 1.7 million tonnes.

In South East Asia the largest airport city is Tokyo handling some 60 million passengers and 1.4 million tonnes of freight in 1990. Its major airport for international flights and freighting is Narita, which was newly built some years ago.

When comparing volumes of passengers and freight handled in the three world regions, the USA clearly takes the largest share (about 60% in passengers and about 45% in freight). In this country aviation has developed into the major transportation industry for domestic connections. The bulk of passenger and freight flows through USA airports are movements within the country. For freight, developments are particularly influenced by express freight services.

Table 1: Airports
Passengers handled at major airports in Europe

(1000, transit-direct counted once)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (6)	Average growth rate (%) 1983-90
London (1)	40 057	44 153	47 219	48 715	55 407	59 827	62 576	65 457	61 040	67 840	7.3
Paris (2)	30 137	31 336	32 871	33 525	37 048	40 701	44 958	46 836	45 296	46 500	6.5
Frankfurt	17 757	19 008	20 250	20 478	23 245	25 172	26 670	28 875	27 317	28 400	7.2
Rome (3)	12 929	13 523	14 033	12 855	14 599	15 540	16 526	18 442	16 969	17 600	5.2
Amsterdam	9 961	10 869	11 711	12 010	13 628	14 989	15 668	16 471	16 542	17 100	7.5
Madrid	10 477	10 607	11 015	11 193	12 184	13 661	14 534	16 368	16 292	16 900	6.6
Stockholm (4)	8 061	9 445	10 058	11 765	13 237	13 337	14 277	14 947	12 868	13 800	9.2
Zurich	8 601	9 038	9 480	9 597	10 615	11 227	12 151	12 695	12 150	12 700	5.7
Milan (5)	7 370	7 811	8 273	8 652	9 706	10 230	10 516	11 798	11 450	12 780	7.0
Copenhagen	8 710	9 259	9 755	10 330	11 154	11 647	12 029	12 122	11 383	11 700	4.8

(1) Heathrow, Gatwick and Stansted
(2) Orly, Charles de Gaulle and Le Bourget
(3) Fiumicino and Ciampino
(4) Arlanda and Bromma
(5) Linate and Malpensa
(6) NEI estimate
Source: SAA/ICAA

Table 2: Airports
Freight handled at major airports in Europe

(1000 tonnes, excluding trucking)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 (4)	Average growth rate (%) 1983-90
Frankfurt	649	732	768	823	907	1 003	1 079	1 106	1 047	1 075	7.9
London (1)	597	696	697	720	787	863	932	951	898	925	6.9
Paris (2)	662	680	693	713	764	812	833	872	853	875	4.0
Amsterdam	370	438	436	451	514	575	583	605	630	650	7.3
Brussel	122	143	166	192	210	244	279	282	317	350	12.7
Zurich	180	205	211	221	230	242	258	256	249	260	5.2
Rome (3)	162	177	180	191	202	205	231	243	240	250	6.0
Madrid	154	164	171	170	160	179	208	226	191	200	5.7
Cologne	55	52	76	96	111	108	149	163	183	200	16.9
Luxembourg	62	74	69	78	97	113	127	143	153	165	12.6

(1) Heathrow, Gatwick and Stansted
(2) Orly, Charles de Gaulle and Le Bourget
(3) Fiumicino and Ciampino
(4) NEI estimate
Source: SAA/ICAA

The share of EC airports amounts to some 30% in both passengers and freight. A major part of this concerns intra-EC or intra-European traffic.

The large South East Asian airports handle about 10% of passengers and 25% of freight. In Japan, traffic is dispersed among a lot of regional airports due to capacity problems. In the future some may become major hubs for both intra-regional and intercontinental traffic. Freight handling at Asian airports is particularly relevant for high value electronics shipped to the European and American markets.

MARKET FORCES

Demand

The strong growth in demand for passenger air transport is mainly due to the increasing globalisation of trade and the growing internationalisation of companies. This has led to an increasing demand for fast and reliable air transport for business people. The growth in freight also relates to the growing need for express freight services. This is particularly the case for high value goods (of limited weight) like electronic products, and goods for which fast transport is crucial (e.g. perishable goods and urgency goods).

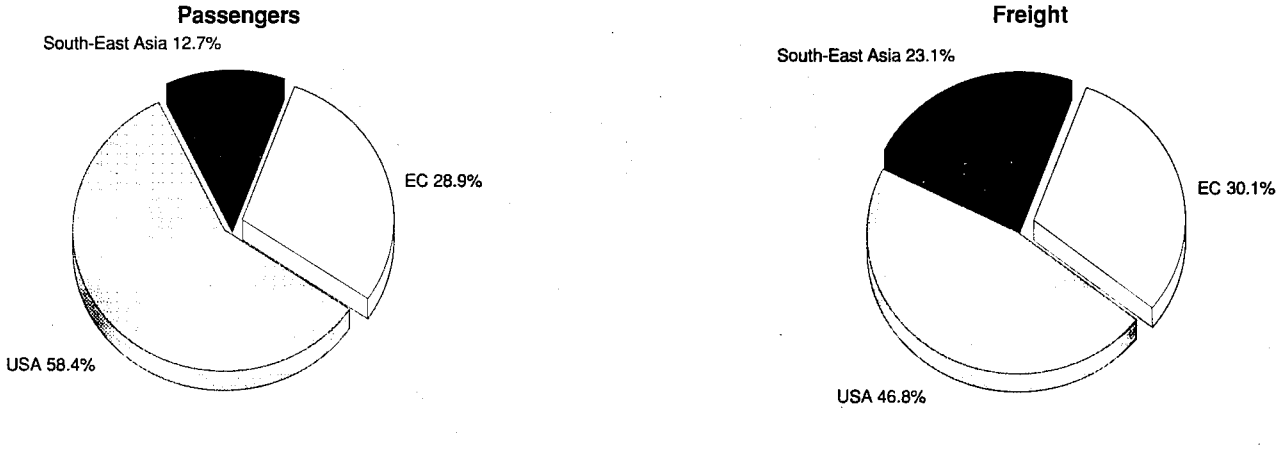
Especially airports in Portugal, Spain and Greece heavily depend on charter flight handling. In Northern Europe some airports specialise in charter flights (e.g. Manchester, Maastricht). However, these specialisations are often due to other reasons than business policies. For example, until 1991, charter flights from London were deliberately assigned to Gatwick in order to alleviate capacity problems at Heathrow.

Supply and competition

Airport capacity is determined by several factors, such as runway layout, number of runways and gates at the terminal and number of positions on the apron. Also, within the terminal the check-in capacity depends on the access to the airport, the number of check-in counters, the capacity of the baggage handling system and the use of modern electronics. Further, juridical conditions are of relevance, such as restrictions on night flights, customs control capacity, etc.

Most EC major and medium-sized airports operate just under or even at capacity levels. For some airports, such as Barcelona, Milan Linate and Rome Fiumicino, capacity problems are really severe. To get over the critical state of the present situation at Milan Linate enlargement works are expected to increase capacity by about 30%.

Figure 1: Airports
Passengers and freight handled at major airports in the EC, USA and South East Asia, 1990



Source: ICAA

Table 3: Airports
Traffic at major airports in the USA and South East Asia, 1990 (1)

USA	Total passenger handled (millions)	of which international (millions)	Freight handled (thousand tonnes)
New York (3)	74.8	22.6	1 721
-JFK (1989)	30.3	18.0	1 259
Chicago (2)	68.5	4.9	761
-O'Hare (1989)	59.1	4.4	750
Los Angeles (2)	51.2	9.8	1 239
- LA International (1989)	45.0	9.3	998
Dallas	48.5	2.4	402
Atlanta	48.0	1.7	432
Total USA (30)	674.6	73.8	8 476
South East Asia			
Tokyo (2)	59.4	19.1	1 424
- Narita (1989)	17.0	16.1	1 329
Hong Kong	18.7	18.7	802
Seoul	16.9	8.5	681
Singapore	14.4	14.4	624
Bangkok	14.3	10.9	404
Osaka	23.5	5.5	236
Total (7)	147.2	77.1	4 171

(1) Airports with a total of passengers handled above 10 million.
Figures between brackets in the table refer to the number of airports.
Source: ICAA/ICAO

Production process

The services provided at airports form part of logistic chains. Passengers travel from one location to the other using air transport as a part of their total routing. Air transport involves adequate connections with other transport modes, lounges for waiting passengers, customs facilities for international flights. Further the passenger wants sufficient facilities such as bars, restaurants and shops in order to while away necessary waiting time.

Airlines also require services: they need weather forecasting services, fuel provision, flight catering services, maintenance facilities. In particular they need an adequate check-in procedure in which the passenger and its accompanying luggage is well administered and allocated to the correct flights. Of particular relevance is security services. Adequate security monitoring of passengers and their luggage has become extremely important.

Finally, government requirements need to be mentioned. These relate to facilities enabling law enforcement, customs control and air traffic control.

Similar requirements exist for freight forwarding at airports. Services also form part of logistic chains in particular for industries. These more and more require modern logistic concepts like Just-In-Time and Door-to-Door transportation. Such facilities are comparable to those for sea ports.

INDUSTRY STRUCTURE

Profile

Europe's busiest airport is London-Heathrow. With a total number of passengers handled of some 40.2 million in 1991. The second busiest is Frankfurt with 27.3 million, followed by Paris-Orly (23.3 million), Paris-Charles de Gaulle (22.0 million), London Gatwick (19.0 million), and Amsterdam and Rome (both 16.5 million).

In terms of freight handling the largest airport in Europe is Frankfurt with over 1 million tonnes in 1991. Next come -in descending order- London-Heathrow (660 000 tonnes), Amsterdam (630 000 tonnes), Paris-Charles de Gaulle (590 000 tonnes) and Brussels (315 000 tonnes).

When looking at the number of aircraft movements the same airports occur. London-Heathrow ranks first with 360 000 movements in 1991. Next is Frankfurt with 312 000, followed by Paris-Charles de Gaulle at 250 000. Stockholm and Amsterdam are in fourth and fifth position with 223 000 and 206 000 movements respectively.

Strategies

Capacity problems are the main current concern in airport strategies. Capacity problems especially occurred on air routes and in air traffic control and the number of aircraft that can be handled simultaneously at the airfields.

Another issue of strategic importance is 'safety first'. Terrorism has forced airport authorities to considerably improve safety facilities. Further, as 70% of airline accidents occur during take off and landing, high standard safety conditions are required in air traffic control on the airfields.

Capacity problems and safety provisions together with the need to keep ahead of competition forced airport authorities to invest heavily in new facilities and service improvement. They try to attract new traffic by offering high quality services to all users of the airport. They also try, in cooperation with regional authorities, to attract economic activity. For example there is good cooperation between regional authorities in the Ile de France region and Aéroports de Paris. Another example is Amsterdam-Schiphol. Together with regional and local bodies this airport drafted a strategic plan until 2000 for the development of both the airport and the region into a main port similar to the port of Rotterdam.

To mention a few of the investment initiatives by airports, the Italian Ministry of Transport has made a national airport

Table 4: Airports
Expected annual growth rates

(%)	1992-93	1992-96
Passengers	4.0	5.0
Freight	3.0	4.0
Employment	2.0	2.0

Source: NEI

plan for the development of its airports. This plan not only envisages to invest in the large airports in Rome and Milan, but also in the small regional airfields. The Airport Authority of Copenhagen is drawing up a master plan for a substantial enlargement of facilities including a second terminal due for 1997. Munich has recently started operations at a completely new airport abandoning the old one near Riem. Athens has resumed plans for a new airport at Spata. Lisbon's terminal expansion is nearing completion.

ENVIRONMENT

Environmental issues are of major concern for airports. Restrictions have been imposed on noise levels of planes taking off and landing.

Other ecological issues have also the attention of airport authorities. Restrictions exist for operations during the night. Some airports even do not allow night flying. Further, restrictions are imposed on emissions of aircraft engines. Finally, various airport services become more and more aware of their ecological responsibility. This relates for example to maintenance and repair services for aircraft, fuel provision services and catering services.

REGULATIONS

In the EC, the legal structure of airport authorities varies widely from one Member State to another. There are six main types of airport statutes:

- public establishments (e.g. Aéroports de Paris, Copenhagen Airport Authority);
- airports owned and managed by joint stock companies (e.g. Frankfurt: 31.7% Federal Government, 42.5% State of Hessen, 25.8% City of Frankfurt; Amsterdam-Schiphol: 76% State Government, 20% City of Amsterdam, 4% City of Rotterdam);
- public airports managed as concessions by public institutions (Marseille, Nice);
- public airports managed as concessions by private companies (e.g. Aeroporti di Roma SpA in which Alitalia has a 51% stake);
- airports owned and managed by a private company (e.g. British Airport Authority plc managing the three London airports plus Southampton and three Scottish airports);
- state operated airports under a national airport authority (e.g. in Spain, Greece, Belgium, Portugal and Ireland).

In order to implement an EC airport policy the Commission has made a categorisation of airports throughout the Community. Category 1 airports are the major hubs or capital airports such as London, Paris, Frankfurt and Amsterdam. Category 2 covers the larger regional airports, such as the airports of Marseilles, Hamburg, Shannon, Luxembourg, Barcelona and Manchester. Finally the category 3 airports are those remaining offering international services. Airfields for domestic services only will not be subject to EC policy.

DUTY AND TAX FREE SALES

Duty and tax free (DTF) sales have become highly important for airports as a source of revenues. Passengers want to benefit from low priced alcoholic and tobacco products available in the DTF shops on the airports. NEI estimated total DTF-sales on EC airports at about 1.3 billion ECU in 1988, of which 56% relates to passengers travelling within the EC. DTF-shops operate under concession agreements with the airport authorities. Income for airports from these agreements amounted to about 480 million ECU in 1988.

The European Commission envisages to abolish DTF-allowances for passengers travelling within the EC. To overcome the loss of concession income, landing and passenger charges would have to rise by 13 to 25%. Airlines will have to pass these higher charges to the traveller by increasing their fares, possibly causing a negative effect on traffic demand especially in the market for Inclusive Tours.

The effects may aggravate due to related developments. Firstly, airline companies, especially charter airlines, will lose revenues from on-board DTF-sales. They, on their turn, will also cause a cost push on fares to overcome this. Secondly, the European Commission wants to impose value added tax on fares and excise duties on fuel for flights within the EC. The combined result may be that fares increase to such an extent, that substantial reductions in demand occur. These problems have led to a postponement of abolishing DTF-allowances within the EC until the 1st July 1999. In the meantime the DTF-industry will develop a system of vendor control, in which the vendor will check compliance with DTF-allowances. This system is necessary as customs control for travelling within the EC will disappear.

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Financial services

NACE 81, 82, part of 83

Throughout the world, banks and financial institutions face a complete upheaval in their industry and professional practice, as a result of deregulation, changing professional demarcation and globalisation. The development of information and communications technologies is a major force for change. The 1980s saw the emergence and continuation of many aspects of this transformation. The 1990s will be the decade in which to adapt to them.

INDUSTRY PROFILE

Description of the sector

The financial sector was traditionally split up into various activities which the authorities kept strictly separated, prohibiting diversification. However, distinctions between commercial banks (the role of which is the financing of industry and the granting of consumer credit), investment banks (which concentrate on the top line of enterprise), and brokerage houses were largely removed. Progressive liberalisation of the financial professions within the EC has allowed banks to play a direct role in the sale of shares and bonds, as well as in related activities. At the same time, links between the banking and insurance professions have grown. Some insurance companies now offer credit services and payment facilities, while banks offer insurance products.

Main indicators

In the twelve countries of the EC, the importance of the financial sector in terms of value added grew markedly, reaching 6.83% in 1988, an increase of more than 1% from 1985.

The United Kingdom and Luxembourg are particularly important in the financial sector, which represented 16.21% and 17.80% of national added value respectively in those countries in 1988. This can be partially explained by the relative importance of national markets established in those countries. The relative importance of the assets of the financial sector also accounts for the greater size of the Luxembourg and UK markets.

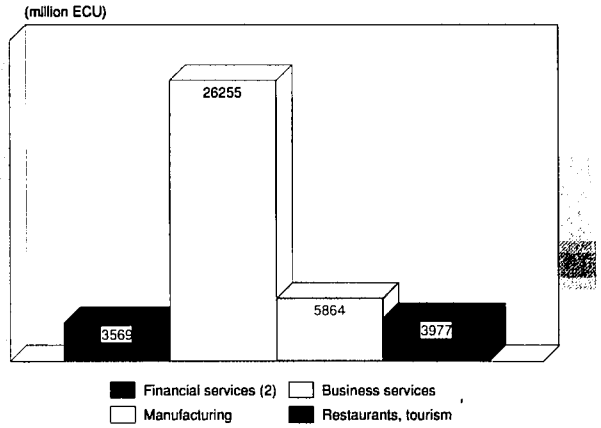
Growth of the financial sector does not, however, imply proportional growth in employment. Financial institutions generally have too many employees, inasmuch as productivity grows steadily.

International comparison

In total balance sheet terms, the three main banks in the world in 1990 were Japanese. These Japanese banks were followed by ten European banks and three American banks in the top 20. The domination of the Japanese banks is a result of their strategy of increasing assets to the detriment of profitability and personal resources. The comparatively poor performance of US banks is the result of restrictive regulation which limits the field of activity of the banks both geographically and commercially. The US banking system is extremely fragmented and poorly diversified.

European financial markets are of such size as to compete with both the USA and Japan. Bank deposits in the EC were 1.5 times those of the USA and three-quarters those of Japan. Market capitalisation of domestic shares on European financial markets accounts for one-fifth of the global total and two-thirds of New York capitalisation.

Figure 1: Financial services
Employment compared to selected sectors, 1990 (1)



(1) Excluding Italia
(2) NACE 81 and 82
Source: Labour force surveys, Eurostat

Foreign trade

Growing internationalisation of banking services and activities linked to shares and bonds prompted a significant expansion of international financial services markets. Between the end of the 1960s and the beginning of the 1980s, there was particular growth in Euro-currency and Euro-credit operations (carried out directly by banking establishments of major stature), as well as traditional trade-linked operations and new forms of Eurobonds.

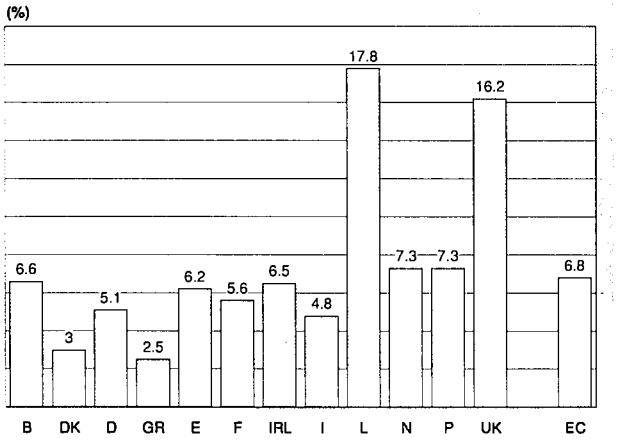
Since the beginning of the 1980s, there has been a reorientation towards basic share operations, especially the underwriting of international bonds and the provision of brokerage services linked to international transactions in nationally-quoted shares.

MARKET FORCES

Demand

Retail banking services, including savings services, savings and shares operations, consumer credit and mortgages, payment services and a wide range of advisory services, today

Figure 2: Financial services
Gross value added at market prices in % of total, 1988



Source: Eurostat

Table 1: Financial services
Chronology of principal financial innovations in Europe

Country	Reforms undertaken
United Kingdom	SICAV, deposit certificates
France	SICAV
Italia	creation of secondary market
	1979
United Kingdom	removal of exchange controls
France	creation of Joint Investment Funds
	1980
United Kingdom	creation of Unlisted Securities Market (USM)
	1982
United Kingdom	opening of futures (LIFFE) and options (LTOM) markets
Italia	issuance of deposit certificates
	creation of inter-bank market
	1983
France	creation of secondary market
Italia	lifting of credit controls
	1984
France	removal of framework credit restrictions
Italia	creation of variable capital investment funds
	1985
United Kingdom	interest-bearing current accounts
	1986
United Kingdom	Big Bang stock market reforms
	- system of brokerage commissions and rules relaxed
	- end of enforced separation of brokers and jobbers
	- deregulation of Stock Exchange membership
	- creation of international SEAQ and reform of state funds
	Issue of treasury bills in sterling
France	issue of negotiable credit notes (deposit certificates, treasury bills, negotiable treasury bonds)
	end to monopoly of brokers and the creation of stockbrokerage houses
	reform of the publicly-quoted stock market
	creation of a futures market (MATIF)
BR Deutschland	creation of a bond options market
	1987
United Kingdom	introduction of the Building Societies Act
France	creation of share options market (MONEP)
Italia	plan to reform the stock market:
	- computerisation and complete integration of the different functions
	- centralisation of all Stock trading
BR Deutschland	creation of a secondary market
	1988
France	opening of an options market in MATIF and a contract market on the CAC 40 index
Italia	Reform of the publicly-quoted stock market
BR Deutschland	creation of the DAX stock index
	1990
France and Italia	last phase of the removal of exchange controls
BR Deutschland	creation of DTB futures and options market
	1991
United Kingdom	launch of futures and options contracts on the FT-SE Eurotrack 100 index, measuring developments in the main European stock markets

Source: Eurostaf

constitute one of the most important branches of the financial services sector. Provision of banking services has grown considerably since the 1960s, with the result that many countries are reaching saturation point. Banks are often only able to secure new customers by directly luring them away from competitors.

In the case of financial services to industry, however, three main trends can be identified. The first is increased growth in demand for very specific services tailored to the management of assets and liabilities, based increasingly on computerisation, and working via a wider range of instruments, among them options and new fixed-term instruments. The supremacy of the banks has been challenged by large companies, with their own systems of financial management.

Secondly, intervention by the banks in the management of businesses, and the growth in demand for services offered by commercial banks for financial restructuring and reorganisation, mergers and acquisitions, take-overs and leveraged management buy-outs has been increasing.

In addition, small and medium-sized enterprises with a solid track record but which are unable to meet the criteria for an official market quote revived demand for risk capital companies, as well as the opening up of new segments of the official stock markets, such as secondary markets or unlisted securities.

Financial services linked to shares (especially the issuance of shares, brokerage services, share transactions and portfolio

management) have become the most important segment of financial markets since the beginning of the 1980s.

Around 1982, when balance sheets and capital were most exposed to liquidity and country debt risks, a clear reorganisation took place, oriented towards stock-market based operations, in particular underwriting international bond issues and international transaction brokerage. There was, in addition, an unprecedented development of new forms of off-balance-sheet operations, especially international issues on money markets, and exchange rate risk coverage instruments. However, this involved an increase in speculation.

Supply and competition

Whereas previously concerns about potential conflict of interest regulated policy, it is now considered necessary to move towards diversification by allowing financial institutions to work in a wider range of areas and with a wider range of products in order to promote competition and boost efficiency in the financial sector. Financial institutions, which were extremely specialised, therefore acquired more flexibility and incentive to exploit new possibilities which had opened up as a result of increased demand for financial services. Institutions still retained some of their tendency to specialise, however.

While competition in new products and, to a lesser extent, price competition, grew in importance, geographical competition - the traditional network of banking outlets - weakened for the most part from the end of the 1970s, as home banking and automated banking increased. Product competition became particularly intense in household savings, with the appearance of a greater number of more and more diversified players, both from within and without the banking system. These included credit institutions, insurance companies and co-operative investment organisations.

Diversification and intensification of competition were helped along by the deregulation which occurred in all European countries from the mid-1980s, specifically,

- an end to monopolies accompanied by free negotiation in brokerage, which led to a reduction in commissions;
- reorganisation of the market for treasury stocks, with the appearance of specialists in most countries whose role was to stimulate the market and assure its liquidity;
- creation of secondary markets;
- computerisation and the subsequent improvements in market liquidity and the precision and speed of information;
- creation of markets in ancillary products, notably the United Kingdom's LIFFE and France's MATIF, taking their respective places as fifth and sixth largest derivative markets in the world.

In addition, all countries undertook major reforms of their currency markets, including the issuing of credit notes negotiable on the market in national currency. Businesses can now finance their needs by issuing treasury bonds. Banks can also enlarge their field of operation with deposit certificates. National treasuries facilitate management of their debt by issuing negotiable gilts.

Changes that have taken place on money markets have prompted the appearance of instruments used to convert loans into negotiable debt certificates. This innovation, inspired by experience in the United Kingdom and the USA, is beginning to be implemented in France and does not yet exist in Italy and Germany.

For individuals, there has been a increase in co-operative management products and savings, especially in France. Total assets of investment funds in Europe rose from 196 billion ECU in 1985 to 518.2 billion ECU in 1989.

Production process

The decade of the 1980s was marked by the removal of intermediaries, and led to the development of markets and innovative new products. However, reduced activity on the part of intermediaries does not appear to be irreversible. A collapse of the stock markets could quickly turn the situation around. It would therefore be more useful to consider the emergence of greater competition between networks of intermediate financing and those of direct financing, with agents choosing between the two sources.

In the context of the development of new systems of financing, new regulation on the functioning of markets is essential to maintain the stability of the system and reinforce investor protection. The entire supervisory process with respect to capital markets has therefore been expanded. Monetary authorities have strengthened their prudential control on financial in-

Table 2: Financial services
Structure of global finance flows in non-financial instruments (as a percentage of total gross financing requirements)

(%)	1983	1984	1985	1986	1987	1988	1989
BR Deutschland							
bank credits (1)	65.9	62.9	54.9	50.2	58.1	61.2	56.7
direct financing (2)	19.9	21.0	27.4	43.0	33.7	27.0	19.1
other (3)	14.2	16.1	17.7	6.8	8.2	11.8	24.2
France							
bank credits (1)	72.0	63.0	56.8	38.0	52.4	64.5	48.8
direct financing (2)	25.8	34.7	39.6	50.0	24.7	27.3	35.3
other (3)	2.2	2.3	3.6	12.0	23.0	8.2	15.9
Italia							
bank credits (1)	27.9	35.4	31.9	22.1	19.4	29.2	31.9
direct financing (2)	59.8	53.2	57.8	66.5	54.9	50.1	40.2
other (3)	12.3	11.4	10.3	11.4	25.7	20.7	27.9
United Kingdom							
bank credits (1)	53.0	72.0	72.0	73.0	68.0	85.0	72.0
direct financing (2)	43.0	26.0	36.0	35.0	36.0	14.0	22.0
other (3)	5.0	2.0	8.0	8.0	4.0	1.0	6.0

(1) commercial credit, short and long-term credit
(2) money market paper, shares and bonds
(3) including external financing
Source: CSO, Bank of England, Banca d'Italia, Bundesbank, Banque de France

stitutions through the application of liquidity and solvency ratios and the elaboration of new international standards. The Cooke ratio will, as of 1993, oblige banks throughout the world to respect a proportion of 8% between assets, reserves and provisions and total commitments according to the nature of investment risk.

Deregulation led to an explosion in market activity and a proliferation of products, but an indispensable factor was the availability of enhanced computer technology and telecommunications, which allows instant access to movements on the global marketplace. The explosion in "remote banking" is itself a direct consequence of technology. The automation of transactions between bank and customer runs parallel to a general automation of transactional operations.

From the point of view of costs, computers as a mass processing tool permit significant increases in output. Productivity related to administrative functions is growing in the banking sector in the order of 5% to 7% a year. At the same time, by minimising manual intervention, using real time operations, keeping customer files up to the minute, reducing delays and making deadlines more reliable, computers are an important quality tool, as well.

The consequences of this change in organisation of work are to be found in the globalisation of tasks as opposed to compartmentalisation; in the overall responsibility of partners for good practice, reasonable costs and a satisfactory outcome of the operation; in the improvement of working conditions; and in the increase in the number of possibilities for employees to maintain direct contact with the customer.

New technologies presuppose new staff skills. Financial establishments which hired great numbers of untrained staff during the race for expansion in the 1960s and 1970s are now faced with major investments for training and for underwriting redundancies. In addition, the additional costs of investing in computerisation have a deleterious effect on profits of banks and insurers. Set against a background of growing competition, the way institutions handle such changes will be crucial in the years ahead.

INDUSTRY STRUCTURE

Companies

The traditional fragmentation of the European banking sector will result in the effects of competition being intensified, especially in the case of stockbrokers. The largest of the European banks still only represent about 2% of the market in terms of either credit, deposits or turnover. In comparison, major firms in manufacturing industry, hold market shares of between 15% and 45%.

In the insurance sector, the concentration is higher, with fewer than 600 companies accounting for 80% of premium income. There is however a movement towards mergers and acquisitions, both in banking and insurance, as geographical diversification is accepted as a prime means of moving outside saturated domestic markets. The principal obstacle to such mergers and acquisitions remains the regulatory climate applied by the authorities. Attempts to acquire foreign networks also run up against social and cultural obstacles. Consumers tend to prefer to put the management of their affairs into the hands of a local banker or insurer. Accordingly, the infrequency of mergers and acquisitions tends to push up costs - these can equate to 20 or 30 times annual profits - but such moves are necessary if banks and intermediaries are to bolster their asset position and solvency ratios.

Despite this, mergers and acquisitions in Europe have grown spectacularly the last five years. Between 1985 and 1989 the cross-holdings between banks have almost quadrupled, while those between insurers have doubled.

Table 3: Financial services
Mergers and acquisitions in the financial sector

(billion ECU)	International, EC	Total
1986	3.5	13.5
1987	3.7	22.3
1988	7.7	29.3
1989	12.0	38.0

Source: CEC

Strategies

Closer cooperation between banks and insurers has been the most notable strategic aspect of recent years, although these two sectors still account for a small proportion of all mergers and acquisitions. There are a number of potential advantages, including the improvement of client service and commercial efficiency with the extended range of products offered. Banks are able to make their cumbersome branch networks more profitable, and insurers avoid having recourse to independent agents and the expensive distribution networks they imply. Also, there are significant potential operational synergies, such as administrative and information technology savings, rationalisation of distribution, joint financial management and the use of complementary distribution networks. Institutions can also profit from increased financial strength, which allows entry into activities requiring greater capital resources. Banks can in fact increase their capital ratios by merging with insurers, which tend to have better ratios.

At an international level, the trend towards greater integration of financial systems takes the form of increased cross-border participation in other companies, as well as an expansion of international markets, especially Euro-currencies, Euro-bonds and Euro-stocks. The need for convergence is high, however, whether in market development, techniques and instruments or applicable codes of conduct. On a more technical level, the need for convergence is also apparent in payment systems and in information for clearing, regulation and current accounts.

REGIONAL DISTRIBUTION

In Europe, London remains the centre of the international financial marketplace, both in terms of stock market capitalisation and volume of transactions. London's pre-eminent position can be explained by the extent of deregulation and the role of the SEAQ international transaction system which deals with European shares.

UK experience has speeded up the pace of innovation in other European countries. New ideas spread rapidly to France as of the beginning of the 1980s, helping maintain the competitiveness of the French financial system. In some countries, like Italy, a growing burden of public debt made former financial market organisation systems obsolete. Improved liquidity in the publicly-quoted stock markets became an essential precondition for attracting foreign capital.

Germany only felt obliged to modernise its financial markets only comparatively recently; reforms there have to date been limited, because of a previously-relaxed system of regulation, and the existence of a decentralised network of regional stock markets which acted as a brake on the development of Frankfurt as the prime exchange.

REGULATIONS

The EC Second Banking Directive (89/646/EC) sets out the minimum conditions to be fulfilled to participate in banking

activities: minimum capital, professional competence, professional qualifications, share structure, and observance of a number of prudential ratios, notably the Cooke ratio.

The Council of Ministers has adopted a common position on a directive liberalising investment services in the securities field which is designed to give a European passport to financial intermediaries. This directive together with the accompanying directive on capital adequacy will enter into force on 31 December 1995.

In the field of insurance, two directives have been adopted, one on industrial risks and the other on life assurance.

OUTLOOK

Since the 1970s, competition has intensified considerably in the vast sector of financial services. Banks, stock brokerage houses and other providers of financial services have become highly competitive enterprises using modern management techniques and commercial strategies.

Market forces now play a decisive role in the functioning of financial systems which had for long been protected and subject to restrictive regulation.

Fundamental changes to supply and demand in financial services, the emergence of new information and communications technologies, increasing internationalisation and inter-penetration of national markets: all are factors which have served to intensify competition.

After 10 years of financial innovation, there are still imbalances in the reforms taking place across Europe.

For financial services and insurance, the Single Market remains a concept whose impact will probably not be felt until around 1995 at the earliest. In fact, savings, financial services and insurance are already global areas for major firms. Individuals, meanwhile, tend to remain attached to locally-available services provided by local companies.

Written by: Eurostaf

Credit institutions
NACE 81

Banking deregulation and progress towards the creation of a pan-European banking sector have reinforced competition and changed the face of wholesale banking as margins on credit to large businesses tighten. The effect of this competition is all the more pronounced in that banking in Europe is lightly concentrated, with mergers and partnerships increasing. Banks have also had to face changes in demand structure towards a series of high value-added products. As a result, maintenance of prices and margins is now dependent on more than innovation and improvement of product quality. Quality of service is the factor that now creates the crucial difference between different networks.

INDUSTRY PROFILE

Description of the sector

Banking is a sector which has traditionally been sheltered by national authorities. In essence, it serves the two functions of accepting deposits and translating them into loans to the enterprises, to the public authorities and to consumers, into investments, and of managing payment mechanisms to serve economic growth. The special nature of banks, however, is being eroded by the trend towards deregulation: some banks' activities are becoming increasingly similar to some of the activities of the other financial institutions with which they compete. More than 150 different activities can now be identified in the banking sector as banks increasingly diversify into share activity and strengthening links with the securities and life insurance sector.

Recent trends

On the whole, 1990 saw annual results plummet throughout the banking sector worldwide. Among those hardest hit were the three leading Japanese banks - DKB, Sumitomo Bank and Fuji Bank. Each was heavily committed to collapsing stock and property markets. In Europe, UK banks were hard-hit by the recession, with 1990 results down by 13.2% at Midland Bank and 11.2% at National Westminster. The German banking sector was the only one to remain healthy due to an explosion in credit demand caused by the reunification. Dresdner Bank results were up 30%.

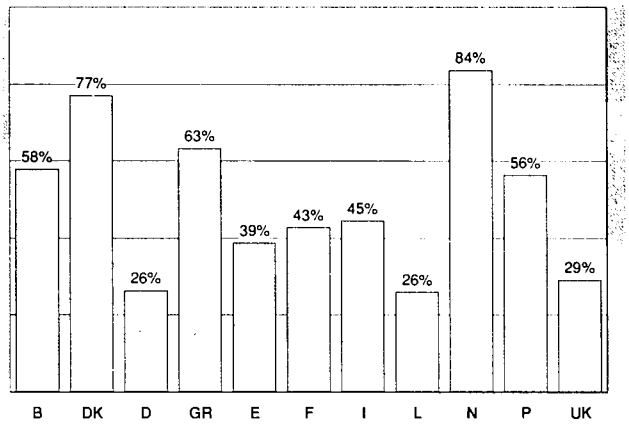
International comparison

Japanese banks dominate the world market in terms of reserves, with six Japanese banks in the world top ten (see Table 5). This is the result of a decade of exceptional growth during which Japan's banks pursued an aggressive policy of market share expansion that culminated in their moving into first place worldwide in terms of deposits. Aggregate deposits held by European banks are equivalent to no more than three-quarters of deposits in Japan, although European deposits are 1.5 times higher than in the USA. Japan's growth aspirations in this sector have suffered a setback, however, in the wake of the current severe economic crisis which has depressed solvency ratios in particular.

Foreign trade

Internationalisation of credit institution activity is a function of balance sheet totals and the proportion of worldwide commitments. Overall, this has grown in relative terms over recent years. Belgium, the United Kingdom and France are the countries most open to the rest of the world. Meanwhile, Japanese banks have pursued a strategy of establishment in Europe along the lines of their successful strategy in the USA, where they account for some 15% of bank assets.

Figure 1: Credit institutions
Market share of 5 largest banks by Member State, 1989



Source: CEC

MARKET FORCES

Demand

European banks began a process of profound change in the 1980s. By the end of the 1980s, however, demand for credit slowed in a low-growth recessionary climate and earlier trends towards an increased number of bank outlets were radically curtailed. At the same time, banking density reached record levels in most European countries (around 90% on average): France, with 2.5 bank accounts per person, is the most densely banked country in Europe.

This is paralleled by the current phenomenon of structural marketplace simplification which has impacted on credit as well as savings. Between 1986 and 1990, the market for commercial paper more than doubled, from 367.9 billion USD to 866.9 billion USD.

The growth of share activity allows businesses to go directly to market for their cash-flow needs. Elsewhere, the pattern of savings is changing; the development of UCITS, co-operative savings banks offering high interest rates on short-term deposits, etc. has resulted in savings being diverted from the banks. Attitudes towards saving differ widely between Member States. Italians set aside 20% of their income for savings on average, whereas the percentage is only 4% in the United Kingdom. Inversely, the rate of consumer indebtedness is 2.5% in Italy and 14% in Germany.

Two major trends are apparent in the sector: stagnation at the level of bank deposits and sustained growth in savings and credit. This twin movement is linked to high levels of bank penetration, now running at 90% for Europe as a whole. The number of bank outlets per capita in Europe is the highest in the world. Belgium, Spain and France in particular have high rates.

Innovation is a prime factor in revitalising demand. Customer demand has moved towards high-quality service. Banks have responded with services such as increased flexible credit. Multi-option facilities targeting the corporate sector offer more flexible fund management via single credit contract, foreign currency financing or special drawing facilities. Both firms and individuals look to banks to provide guaranteed rates of interest and exchange rate; as a result, banks are developing more complex instruments to satisfy demand. The role of innovation in stimulating demand is illustrated by the success of rollover credits which offer clients permanent credit lines.

Table 1: Credit institutions
Banks' assets

(billion ECU)	1985	1986	1987	1988	1989	1990	1991 (II)
Belgique/België							
Commercial banks	172.5	187.5	200.0	219.5	243.2	252.8	N/A
Other monetary institutions	3.3	3.6	3.7	4.0	4.5	4.9	N/A
General savings funds (deposits)	12.5	13.1	13.2	15.2	17.7	N/A	N/A
Danmark							
Commercial banks	42.1	49.5	77.5(2)	85.0	95.2	99.3	106.2(4)
BR Deutschland							
Credit institutions	1 092.6	1 265.5	1 300.0	1 375.7	1 530.5	1 773.8	1 815.8
Building societies	67.1	69.2	68.0	64.4	65.8	68.2	68.9
Hellas							
Commercial banks	31.3	28.1	29.8	35.0	39.0	40.0	36.2(5)
Other banking institutions	15.6	14.3	15.1	16.5	19.4	17.6	16.6(5)
España							
Deposit money banks	231.3	251.2	284.1	339.9	396.2	431.6	470.5
Other banking institutions	26.6	26.3	27.8	32.4	35.1	38.9	43.0
France							
Banking institutions	856.8	926.7	1 016.6	1 112.4	1 222.3	1 364.2(1)	1 376.4(1)
Ireland							
Deposit money banks	12.7	13.9	14.6	16.5	20.0	21.7	22.8
Other banking institutions	9.5	10.1	10.9	11.8	13.8	17.1	18.7
Italia							
Deposit money banks (3)	440.9	487.8	483.6	517.1	587.1	635.8	622.8(1)
Specialized credit institutions	117.3	130.4	137.5	155.7	178.7	203.7	216.7(1)
Luxembourg							
Deposit money banks	152.7	166.5	180.5	206.3	239.6	269.3	290.0
Nederland							
Deposit money banks	225.1	248.0	259.9	317.1	353.1	373.4	387.9
Portugal							
Deposit money banks	30.2	30.8	32.0	37.3	46.3	55.1	64.0
United Kingdom							
Deposit money banks	958.5	969.7	1 220.5	1 470.0	1 739.4	1 695.3	1 834.7
EC (1)	4 290.5	4 740.6	4 992.7	5 618.3	6 307.6	N/A	N/A
USA							
Commercial banks	2 484.4	2 265.9	1 996.6	2 391.6	2531.0	2 288.3	2 648.1(1)
Other financial institutions	1 402.4	1 270.6	1 118.5	1 329.9	1 250.4	1 019.6	1 136.1
Japan							
Deposit money banks	2 248.3	2 615.1	3 111.6	3 827.1	3 702.7	3 801.5	4 205.1
Other banking institutions	1 813.9	2 113.9	2 472.4	2 979.3	3 100.4	2 696.2	3 165.4(1)

(1) Estimates
(2) From 1987 onwards accounts of non resident branches are excluded and only consolidated accounts are published instead of the separate accounts of the commercial banks and other monetary institutions
(3) Data exclude branches of foreign banks
(4) Includes Postal Cheque Office
(5) I / 91
Sources: IMF, International Financial Statistics

Table 2: Credit institutions
International positions by nationality of ownership

	1989 (1)		1990 (1)		1991 (1)	
	billion ECU	% of total	billion ECU	% of total	billion ECU	% of total
Belgique/België	80.6	2.2	87.6	2.4	99.8	2.5
Danmark	32.7	0.9	43.2	1.2	52.0	1.3
BR Deutschland	322.4	8.7	383.1	10.3	462.8	11.7
España	38.6	1.0	44.9	1.2	63.3	1.6
France	358.1	9.6	373.6	10.1	424.8	10.7
Italia	185.0	5.0	208.9	5.6	266.6	6.7
Luxembourg	20.5	0.6	25.4	0.7	28.3	0.7
Nederland	114.5	3.1	133.8	3.6	151.1	3.8
United Kingdom	229.1	6.2	211.4	5.6	222.7	5.6
EC 9	1 381.5	37.2	1 511.9	40.7	1 771.4	44.7
USA	619.7	16.7	558.2	15.0	579.4	14.6
Japan	1 708.5	46.1	1 643.8	44.3	1 614.3	40.7
Total	3 709.7	100.0	3 713.9	100.0	3 965.1	100.0

(1) March
Source: BIS, International Banking Developments, 8/91

Table 3: Credit institutions
Intra and extra-EC trade in banking services

(million ECU)	1988 Exports	1988 Imports	1988 Balance	1989 Exports	1989 Imports	1989 Balance
Belgique/Luxembourg	944	645	299	1 709	1140	569
Danmark	41	37	4	48	54	-6
BR Deutschland	634	103	531	647	182	465
Hellas	N/A	N/A	N/A	N/A	N/A	N/A
España	217	94	123	301	149	152
France	1 784	2 010	-226	3 676	3 482	196
Ireland	N/A	N/A	N/A	N/A	N/A	N/A
Italia	350	N/A	19	1 282	746	536
Nederland	280	161	119	215	192	23
Portugal	N/A	N/A	N/A	N/A	N/A	N/A
United Kingdom	3 451	0	3 451	3 668	0	3 668
EC	8 553	4 898	3 655	11 844	7 221	4 623
USA	3 240	1 400	1 840	4 548	1 808	2 740

Source: OECD

Table 4: Credit institutions
Market share of foreign institutions (1) in some EC countries

(as % of total assets)	1986	1987	1988	1989	1990
Belgique/België	46.00	47.00	47.00	47.00	N/A
BR Deutschland	4.27	4.21	4.39	4.61	3.92
España	9.12	9.69	9.00	9.68	9.97
France (2)	10.90	11.40	12.40	N/A	N/A
Italia	2.45	2.91	2.79	2.90	N/A
Portugal	3.10	4.06	4.17	4.73	5.16
United Kingdom (3)	62.24	61.63	60.77	59.14	57.20

(1) Includes banks incorporated under domestic law but controlled by foreigners.
(2) Banks registered under domestic law but belonging to foreigners plus branches of foreign banks.
(3) United Kingdom: does not include building societies.
Source: Central Banks and other national sources

Supply and competition

Overcapacity, allied to deregulation and weak economic growth, has led to strong competition among European banks. The generalised deregulation has removed many traditional barriers between the different financial sectors, both in the European and in the world markets. The almost complete abolition of exchange controls has led towards a simplification of currency transactions by way of the disappearance of geographical borders. The decompartmentalisation of the various money markets has culminated in the establishment of conditions conducive to a genuinely global money market.

One consequence of deregulation has been the development of intermediary products which permit non-bank investors and borrowers to complete transactions without going through financial institutions, previously mainly the banks. In concrete terms, large volumes are now moved about without involving the banks.

Banks have also had to face greater competition in their efforts to attract funds which would otherwise head towards the markets. The boom of high interest-bearing current accounts in Europe and in the USA - and in France of a particular type of UCITS like the SICAVs - has resulted in increases in the cost of bank funds. While European countries were going through a deflationary phase, real interest rates were being maintained. As a result of this increased competition bank margins have been squeezed, particularly in the case of major corporate clients.

Another consequence of deregulation and tougher competition has been an increase in risk. Arguably, the first sign of trouble came with the crisis of the major Latin American countries in the early 1980s. The USA was the hardest-hit, as evidenced by a string of bank failures, which has continued in the late 1980s and early 1990s because of the collapse of certain economic sectors like the property market and the textile industry, and the general recession. In Europe, the result was not major bankruptcies, but increases in debt provision which squeezed margins further. Provision for country risk cover varies widely from country to country.

More recently, the 1990 crash in the property market following a wave of speculation has also played a part in the increase in bank bad debt provisions also in Europe and in Japan. The Midland Bank closed its property department at the beginning of 1991.

In general, the slowdown in growth has hurt banks severely, all the more so since new competitive pressures have forced banks to undertake more risky transactions. The United Kingdom is one of the countries most affected. At the beginning of the 1990s, the number of company failures hit a record level, and banks had to increase their bad debt provisions. Faced with growing risks, bank supervisory authorities have been obliged to find new ways of dealing with risk in order to maintain the solvency of the banking system. The most important weapon at their disposal is known as the "Cooke Ratio", which corresponds grosso modo to the EC solvency ratio, which has become mandatory as from the 1st January 1993. This obliges every bank to maintain a balance between the total of its own funds and the total of its risk assets weighted according to the riskiness of each category of assets. In this way, both internal and external growth depends on a bank's ability to boost its reserves. The Cooke Ratio was adopted in July 1988 and was fixed at 8% applicable as of the end of 1992, also the Community solvency ratio was fixed at 8%. Overall, European banks are in a better position than their Japanese and American counterparts who have been involved in recent years in a balance sheet race which has seen commitments increase at the cost of solvency.

The changing economic climate has checked growth in the banking system and has brought to light structural weaknesses. Principal among these is an inflation in general costs which, together with declining net banking product, have reduced operating profits. In most European banking groups, investment in information technology is growing between 15% and 20%, but this has not been completely offset by workforce cutbacks. With the increased use of home banking, automatic teller machines and telebanking, it is essential that banks continue to prune the excessive staff. Redundancy strategies are being adopted, but these are often difficult to implement given the important role of collective labour agreements in the banking sector and the sizeable share of banking in total employment.

Overall, European banks exhibit poor levels of profitability. Mediation margins in the EC have dropped by more than 30% over the last three years, to the lowest in the world after Japan.

In total balance sheet terms, the Japanese banks maintain their position at the top, but the European and American banks have recovered part of their lost positions.

Production process

Technology and computerisation are of crucial importance for banking productivity and the development of new activities. The growth in market activity in this sector must be attributed mainly to technological progress which has resulted in instant access to information for operation. The development of home banking is a direct consequence of technology. As of the beginning of the 1980s, banking entered the computer age, with marketing of specific services such as long-distance banking by computer. A high degree of interbank compatibility has resulted in France developing one of the largest automatic teller networks in the world, with one machine for every 1 500 customers. On the other hand, customers are now familiarised with card services, and expect something new, such as genuine one-stop agencies featuring automated disc-storage, cheque printing, information and advice. Apart from automatic cash dispenser, telebanking now includes a variety of video text services. There is a definite trend towards total transaction automation between bank and customer.

Computerisation is a processing tool that can produce major productivity gains. Estimates show that administrative productivity is growing annually at about 5% to 7%. However, investment in computerisation represents a heavy financial burden. In the decade 1980-1990, bank spending for computers rose by nearly 30%.

In addition, banks show an increasing tendency to centralise their technological resources, concentrating their information technology system in a limited number of centres, typically on a group or regional level.

The cost of acquiring a new customer is very high, at around 1 156 ECU high according to a recent study. Adding one point of market share is estimated to cost between 1 billion and 2 billion ECU in investment.

INDUSTRY STRUCTURE

Companies

The banking sector in Europe is not concentrated. The larger European banks do not represent each more than 5% of the market in terms of credit, deposits or balance sheet total, compared to market share of up to 45% for manufacturing industry leaders in the EC.

Strategies

Banks are developing along pan-European lines, but their impact is still marginal.

European groups are developing two broad lines of strategy, often in tandem. The first line lies in diversification, whether in the sale of insurance products, acquiring shares in manufacturing industry (as German banks are doing), offering a

Table 5: Credit institutions
Nationality of world's largest banks by size of capital, 1989

Top ten	
Japan	6
United Kingdom	2
BR Deutschland	1
France	1
Top 100	
EC	40
of which:	
BR Deutschland	9
Italia	8
France	7
United Kingdom	7
España	4
Nederland	4
Belgique/België	1
Japan	25
USA	14
Canada	5
Switzerland	3
Sweden	3
Others	10

Top 500	
EC	160
of which:	
Italia	43
BR Deutschland	40
United Kingdom	16
España	15
France	12
Danmark	9
Belgique/België	9
Nederland	5
Luxembourg	4
Hellas	3
Portugal	2
Ireland	2
USA	94
Japan	92
Switzerland	11
Austria	8
Canada	7
Sweden	7
Others	121

Source: The Banker, July 1990

wider range of various financial services (leasing, factoring, forfeiting, etc.) or dealing in securities both on the stock exchange and over the counter. The most notable development over the past few years has been the emergence of "bancassurance". This has led to numerous agreements between banks and insurance companies - in Germany, between Allianz (Europe's premier insurer) and Dresdner Bank; in the United Kingdom, between Commercial Union and Midland Bank; in France, an entity run by Groupe des Assurances Nationales (GAN) which brings together the Crédit Industriel et Commercial (CIC) and the Banque de l'Union Européenne (BUE); and, in the Netherlands, the NMB-Postbank and Nationale Nederlanden merger.

The second strategy is the creation of mergers or alliances between banks. As mentioned above, through its German operation, Barclays Bank has shown itself to be one of the most aggressive institutions on the European scene. In Italy, the adoption of the Amato Law in 1990 paved the way for major restructuring and modernisation, exemplified by the Cassa di Risparmio di Roma acquisition of Banco di Santo Spirito, and of 65% of Banco di Roma. Increased concentration in the banking sector can be anticipated across the board, but a distinction should be made as to the impact of concentration on large networked banks. In effect, the large banks serve a mass market where productivity gains can be registered, whereas smaller merchant banks specialise in asset management and engage in activities with less of a need for economies of scale. There is, as well, a proliferation of strategic alliances at the European level. BNP, Dresdner Bank, Credito Romagnolo, Commerzbank and the Banco Bilbao Vizcaya have signed partnership cross-holding agreements similar to the strategic alliance already in place involving Crédit Lyonnais, Commerzbank and Banco di Roma.

Table 6: Credit institutions
Top ten Community credit institutions ranked by capital, 1990

(million ECU)	Country	Capital	Assets	Pre-tax profits
Crédit Agricole	France	9 672	222 242	1 013
Barclays Bank	United Kingdom	8 746	190 749	1 075
National Westminster Bank	United Kingdom	7 849	171 252	713
Deutsche Bank	BR Deutschland	7 638	196 363	1 196
Crédit Lyonnais	France	7 128	209 226	1 110
BNP	France	6 872	212 534	442
ABN-AMRO Bank	Nederland	6 575	170 684	816
Compagnie Financière de Paribas	France	6 394	135 137	805
Rabobank	Nederland	5 209	87 632	605
Groupe des Caisses d'Epargne Ecureuil	France	5 092	127 653	529

Source: The Banker, July 1990

Table 7: Credit institutions
European commercial banks, 1990

	Number of banks	Banking outlets (million ECU)	Total assets (million ECU)	Population/ outlet (million ECU)	Deposits/ outlet	Deposits/ employee
Belgique/België	86	3 592	296 100	2 769	28.51	1.98
Danmark	124	2 884	142 300	1 781	23.16	1.35
BR Deutschland	338	6 890	674 000	9 097	39.48	1.29
Hellas	35	1 885	54 950	5 329	23.67	0.99
España	154	16 835	332 750	2 312	11.53	1.23
France	419	10 330	962 000	5 451	18.90	0.91
Ireland	33	696	42 590	5 038	25.91	0.89
Italia	272	11 179	598 890	5 150	28.25	1.31
Luxembourg	177	300	295 800	1 261	396.33	7.28
Nederland	97	5 065	391 200	2 940	39.98	1.75
Portugal	33	1 991	63 030	5 192	22.10	0.74
United Kingdom	530	14 300	1 789 100	4 015	85.74	2.67
EC	2 298	75 947	5 642 710	4 307	36.87	1.70

Source: European Banking Federation, Eurostat

The move towards concentration in the European banking sector mirrors a similar trend in the USA and Japan. In Germany, the eight major banks control half of all banking assets; in Japan, the half-share is accounted for by 12 banks and in the USA, by 35. Despite the fact that US banks are still subject to legislation which compartmentalises banking activity and erects geographical barriers to expansion, one quarter of the 12 500 existing banks should disappear by the year 2000, with the loss of some 250 000 jobs. Concentration will take longer to achieve than in Europe, but it will come. In Japan, the banking sector is already very concentrated, with three of the top twelve banks ranking high in world ratings in terms of balance sheet total. Nevertheless, concentration is likely to become even more pronounced, and the number of national banks could drop from ten to eight, four of the top ten having already merged between themselves into two new banks, with regional banks declining from 145 to 100. Previously, Japanese banking strategy consisted in cultivating strong asset growth; today, the accent is on profitability through concentration and growth of own resources.

REGIONAL DISTRIBUTION

French banks dominate this sector in terms of total balance sheet and asset base, although their performance in terms of Net Banking Products (NBP) and growth are only average. Three German banks appear on the list of Europe's top 10 banks in terms of balance sheet total, and Germany has as well a fast-growing network of medium-sized banks. UK banks have all the features of mature enterprises: they are large, well capitalised, but with static turnover, NBP and asset growth. Few Italian banks figure among Europe's largest banks. Capitalisation and NBP are average but NBPs and reserves are exhibiting strong growth, although volume is growing rather less rapidly than in Spain. Spanish banks lead the field in terms of growth rates but at the expense of their profitability. The banks themselves are still of modest size, but growth potential in terms of reserves and NBPs is significant. Banks in southern Europe are increasing in both size and dynamism. In terms of total balance sheet growth, three out of Spain's four top banks are in the European top 20.

Europe has high levels of banking activity, with the number of outlets per capita the highest in the world, outpacing Japan and North America. Belgium, France and Spain exhibit rates higher than the European average. Italy has less than 1 000 banks with a total of more than 15 000 branches, but has one of the lowest rates of density in Europe.

REGULATIONS

There are practically no barriers left to entry in each Member State, in accordance with the provisions of the Second Banking Directive (89/646/EC). This imposes a minimum capitalisation of 5 million ECU and provides that the status and integrity of managers and shareholders be vetted by national authorities. Holdings in non-financial companies cannot exceed 15% of the company's capital. Banks have to abide for a wide set of harmonised rules like the solvency ratio, the limits to the large exposures, the consolidated supervision, etc. Some barriers may be laid down against third countries' banks, but all the treatment of the latter is now discussed in the framework of the GATT negotiations.

Unlike US legislation (the MacFadden Act), most European countries apply no restrictions on mergers, with the exception of Greece and Portugal. Italy, in its Amato Law of 20 November 1990, eased restrictions on groupings and banking concentration, but maintained some limits to the acquisition of public banks. However, the measures taken in 1992 concerning the privatisation of the public sector, have repealed most of these limits.

The solvency of credit institutions is an important aspect of banking law. The Second Banking Directive invokes a solvency ratio (to reserves) of 8%, echoing the Cooke Ratio introduced by the Bank for International Settlements for all of the world's banks. On the other hand, the EC Directive limits banks' diversification into areas outside finance.

In almost all European countries, financial intermediaries are now empowered to set their own terms for remuneration of deposits and charges for banking services. Only in France there are statutory restrictions on terms of remuneration for current accounts.

OUTLOOK

The bank/customer relationship is changing. Clients now expect from their banker the widest possible range of financial services, and banks have to position themselves to provide

Table 8: Credit institutions
Number of credit institutions by type by Member State

	1980	1986	1989
Belgique/België			
COMMERCIAL BANKS	83	88	85
Of which:			
Incorporated under Belgian law	58	59	53
Incorporated under foreign law	25	29	32
PRIVATE SAVINGS BANKS	30	34	29
OTHER INSTITUTIONS	N/A	53	43
Of which:			
Public law credit	6	6	6
Others	N/A	47	37
TOTAL	N/A	175	157
Danmark			
COMMERCIAL BANKS	74	79	76
Of which:			
Incorporated under Danish law	74	73	53
Incorporated under foreign law	0	6	32
SAVINGS BANKS	164	147	131
COOPERATIVE CREDIT INST.	N/A	N/A	34
OTHER INSTITUTIONS	N/A	18	23
Of which:			
Mortgage credit	6	6	5
Others	N/A	12	18
TOTAL	N/A	244	264
BR Deutschland			
COMMERCIAL BANKS	243	N/A	299
Of which:			
Incorporated under German law	N/A	N/A	237
Incorporated under foreign law	N/A	N/A	62
SAVINGS BANKS	611	N/A	603
COOPERATIVE BANKS	4 237	N/A	3 214
OTHER INSTITUTIONS	221	N/A	79
Of which:			
Mortgage (incl. building soc.)	69	N/A	66
Others	152	N/A	13
TOTAL	5 312	N/A	4 195

	1980	1986	1989
Hellas			
COMMERCIAL BANKS	28	35	34
Of which:			
Incorporated under Greek law	N/A	16	15
Incorporated under foreign law	N/A	19	19
SAVINGS BANKS	0	0	0
COOPERATIVE BANKS	0	0	0
OTHER BANKS	6	9	2
TOTAL	34	44	36
España			
COMMERCIAL BANKS		135	142
Of which:			
Incorporated under Spanish law		97	100
Incorporated under foreign law		38	42
SAVINGS BANKS		79	79
COOPERATIVE BANKS		142	110
OTHER BANKS		260	401
Of which:			
Mortgage credit institutions		24	32
Official credit institutions		4	5
Finance houses		232	230
Leasing companies and others			134
TOTAL		616	732
France			
COMMERCIAL BANKS	387	386	404
Of which:			
Incorporated under French law	N/A	330	335
Incorporated under foreign law	N/A	56	69
SAVINGS BANKS	480	422	245
COOPERATIVE BANKS	190	192	176
OTHER BANKS	N/A	1 080	1 092
Of which:			
Finance companies	N/A	1 049	1 060
Specialized financial institutions	N/A	31	32
TOTAL	N/A	2 080	1 917

Source: CEC

these services. In the course of this transformation, there has been protracted debate on the respective merits of two kinds of bank: on the one hand, the so-called "universal" or "one-stop" bank which purports to meet the totality of client needs; and, on the other, the "niche" institutions which specialise in a particular segment of the market. These two types of financial institution should coexist in Europe in the years ahead, with the number of universal banks increasing at a slow pace. Few banks at the present time offer the entire range of banking services to its clientele.

In addition, growth in Europe's banking sector will come about through a commitment to higher added value, with quality of service constituting the key difference between one network bank and the next. For the time being, strategic alliances and mergers and acquisitions involving banks from different EC Member States are the exception rather than the rule. In future, however, one can anticipate accelerated moves to bring banks from different European countries together.

Table 8 (continued): Credit institutions
Number of credit institutions by type by Member State (continued)

	1980	1986	1989
Ireland			
COMMERCIAL BANKS	40	39	33
Of which:			
Incorporated under Irish law	N/A	33	28
Incorporated under foreign law	N/A	6	5
SAVINGS BANKS	4	-	2
COOPERATIVE BANKS	N/A	16	0
OTHER INSTITUTIONS	2	2	11
TOTAL	N/A	57	46
Italia			
COMMERCIAL BANKS	314	268	267
Of which:			
Incorporated under Italian law	289	229	231
Incorporated under foreign law	25	39	36
SAVINGS BANKS	89	90	84
COOPERATIVE BANKS	653	717	729
OTHER INSTITUTIONS	99	96	96
Of which:			
Specialized financial institutions	87	89	89
Other	12	7	7
TOTAL	1 155	1 172	1 176
Luxembourg			
COMMERCIAL BANKS	115	115	160
Of which:			
Incorporated under Lux. law	N/A	98	136
Incorporated under foreign law	N/A	17	24
COOPERATIVE BANKS	70	58	49
OTHER BANKS	N/A	28	29
Of which:			
Mortgage credit	N/A	3	3
Others	20	25	26
TOTAL	N/A	201	238
Nederland			
COMMERCIAL BANKS	82	82	88
Of which:			
Incorporated under Dutch law	63	64	69
Incorporated under foreign law	19	19	19
SAVINGS BANKS	62	N/A	52
COOPERATIVE BANKS	1	1	1
OTHER BANKS	N/A	29	29
Of which:			
Mortgage credit institutions	7	8	8
Other capital market inst.	N/A	2	1
Other (mainly intermediaries in securities market)	21	18	20
TOTAL	N/A	175	170
Portugal			
COMMERCIAL BANKS	12	21	22
Of which:			
Incorporated under Port. law	9	12	15
Incorporated under foreign law	3	9	7
SAVINGS BANKS	4	4	1
COOPERATIVE BANKS	145	202	0
OTHER BANKS	18	13	3
Of which:			
Investment banks	1	2	2
Other	17	11	1
TOTAL	179	240	26
United Kingdom			
AUTHORIZED BANKS	330	588	556
Of which:			
Incorporated under French law	N/A	334	302
Incorporated under foreign law	N/A	254	254
SAVINGS BANKS	17	N/A	N/A
COOPERATIVE BANKS	1	N/A	N/A
OTHER BANKS	312	N/A	N/A
Of which:			
Building societies	273	164	163
Finance houses	38	N/A	N/A
National Girobank	1	-	-
TOTAL	660	N/A	N/A

Source: CEC

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Insurance
NACE 82

The insurance sector in Europe is characterised by strong overall expansion, although growth appears to be slowing somewhat in the countries of northern Europe. Markets are moving slowly towards deregulation, although obstacles remain at the national level. This deregulation extends beyond insurance itself and into the sector of global financial services, notably in the form of "bancassurance" which, as the term implies, is a mix of traditional insurance services and banking. The sector as a whole is still oriented towards domestic markets, but it is becoming progressively international.

INDUSTRY PROFILE

Description of the sector

The NACE classification defines the insurance industry as embracing all units "exclusively or primarily engaged in insurance", i.e. converting individual risks into collective risks. Compulsory social security is not included.

Insurance is thus defined in terms of the economic function of converting and mutualising risks. NACE 82 distinguishes three classes of insurance according to the type of risk:

- units engaged in several types of insurance (composites), comprising the following two types of risk;
- units engaged in life insurance, where the risk covered relates to eventualities linked with the duration of human life;
- health, casualty, injury and accident insurance (or non-life insurance), where the risk covered is defined in opposition to the previous category.

Reinsurance is not regarded as a separate category: it is assigned to one of the above three classes according to the type of risk reinsured. Not all countries allow composite insurance undertakings and the creation of new ones has been banned under Community rules for a number of years. The breakdown is thus confined in some instances to two classes: life insurance and non-life insurance.

Much of the analysis in this report is drawn from the report "European insurance and the single market", published by Eurostat in 1992.

Main indicators

Total gross premiums written in the Community were 275 billion ECU in 1990, of which 132 billion were in life insurance and 143 billion in non-life insurance.

The three leading European countries in terms of both overall premium income and premium income by sector (life and non-life) are Germany, the United Kingdom and France. The immense size of the insurance market in the United Kingdom (larger than its counterparts in France and Germany) is somewhat offset in qualitative terms by the lesser degree of protection it affords in terms of social and retirement protection.

The non-life insurance sector represents around 56% of European gross premium income from all sources, compared with 44% for life insurance. The life insurance sector, however, is growing at a faster pace than the non-life sector in all EC Member States (in 1985 the relative share was only 37% for life insurance and 63% for non-life insurance).

Although reinsurance is not considered as a specific activity by the NACE classification, its market share and the proportion of premiums retained by national insurers are essential indicators of insurance activity. They are evaluated from the rate of accepted reinsurance and the premium retention ratio.

The rate of accepted reinsurance measures the proportion of gross premiums written which is accounted for by reinsurance. The few existing data suggest a low rate of reinsurance, generally less than 5% in life insurance and a higher one (though again very variable according to the different countries: it can vary from 3% in Portugal to 19% in the United Kingdom), in non-life insurance.

The premium retention ratio expresses the percentage of total gross premiums written which is retained by the insurers: the remainder represents premiums ceded or retroceded. The retention ratio is very high in life insurance, where reinsurance is fairly rare: for the EC as a whole, it stands at around 96%. In non-life insurance, however, it is lower (about 80%).

Recent trends

The life insurance sector is experiencing strong growth. Even in mature markets such as the United Kingdom and Germany, life insurance business is growing at a rate of two to three times GNP growth. Insurance markets in Italy, Spain and Portugal are less developed, but are also expanding at annual rates in excess of GNP growth. By way of example, life insurance premiums in Spain represented 1.27% of GNP in 1987 and 3.4% of GNP in 1990.

Table 1: Insurance
Premium income by Member State, 1990

	(million ECU)	Life (%)	Non-life (%)	Premiums as % of GNP
United Kingdom	74 440	64	36	9.6
BR Deutschland	70 614	41	59	6.0
France	58 926	51	49	6.3
Italia	22 615	25	75	2.6
Nederland (1)	17 563	52	48	8.0
España	13 393	28	72	3.4
Belgique/België	7 259	34	66	4.7
Danmark	4 498	42	58	4.5
Ireland	3 027	60	40	10.1
Portugal	1 605	24	76	3.4
Hellas	844	41	59	1.8
Luxembourg (1)	329	33	67	4.7

(1) Premiums as % of GDP
Source: Comité Européen des Assurances

Table 2: Insurance
European market share by national firms

(%)	Life		Non-life	
	1990	1995(1)	1990	1995(1)
Belgique/België	37	10	37	10
Danmark	91	78	84	69
BR Deutschland	88	85	86	81
España	59	41	45	31
France	80	60	79	72
Ireland	48	58	25	20
Italia	81	70	69	61
Nederland	81	72	77	69
Portugal	56	42	73	59
United Kingdom	81	74	80	50

(1) Forecast
Source: Arthur Andersen, "Insurance in a Changing Europe"

Overall, non-life business is expanding more slowly than life insurance, but it has also attained growth rates in excess of annual GNP growth.

Despite growing competitive pressures, however, the European insurance industry as a whole has achieved high growth margins. This is confirmed among other things by statistics on density of insurance. In 1989, average EC density of insurance was below 891 USD, i.e. less than half that of the USA and one third that of Japan. There is considerable north/south disparity within the Member States. Density of insurance is modest in Spain, Portugal, Italy and Greece (averaging below 406 USD). The north is dominated by the United Kingdom, the Netherlands and Germany, where density levels are in excess of 1 200 USD.

International comparison

Compared with its two main competitors, the EC insurance market is slightly larger than that of Japan (238 billion ECU in 1988) but far smaller than that of the USA (456 billion ECU in 1988) which remains the world's biggest market. In terms of market share, in 1988 the USA had 42% of the world market (thought to be some 1 090 billion ECU), whilst the EC and Japan had 23% and 22% respectively.

Each of these three markets is also very differently structured. Whereas the American market is still largely dominated by the non-life sector (some 64% of all operations), the Japanese market is very much dominated by life insurance which accounts for nearly 75% of all business. The structure of the EC market is thus somewhere between these two patterns, but the trend is clear: European insurance is moving further and further away from the American model and closer to the Japanese one.

Foreign trade

In the non-life sector, some 40% of insurance companies derive more than 5% of their premium income via foreign branch activities while, in the life insurance sector, only 25% of companies report similar penetration. In both sectors, these percentages are expected to increase in the years ahead.

The share of foreign-source premium income remains modest in most EC Member States. The exception is the United Kingdom, which is the leading exporter of insurance services in the EC: 44% of UK non-life business and 16% of UK life insurance business derives from non-domestic sources. Lloyds of London (an £11 billion insurance market) derives two-thirds of its premium income from non-domestic sources. The UK insurance sector is traditionally oriented towards the USA and former British colonies, with its continental European business being more restricted. In continental Europe, Switzerland is a very strong presence in the insurance sector. France has also expanded its non-domestic business throughout the EC and has consistently increased its market share in the Member States.

Although they maintain a European presence, neither US nor Japanese insurance groups seem poised to acquire a substantial share of European insurance business in the short term. They are only active to any significant degree in the United Kingdom.

MARKET FORCES

Demand

In the insurance sector, consumer behaviour differs radically depending on whether the policy concerned relates to life or non-life business.

As far as the life sector is concerned, the ageing of Europe's population has played a decisive role in the growth of premium volume. The need for comprehensive insurance coverage increases with advancing years, especially when social security benefits relating to pensions and medical treatment appear progressively inadequate. The Italian and Spanish pension systems (and to a lesser degree the French system) are verging on bankruptcy. In an effort to compensate for the erosion of state benefits, the public is turning increasingly towards life insurance-related products.

Greater life expectancy and a lowering of the legal retirement age have had the combined effect of increasing the average length of retirement to a period equivalent to a quarter or one fifth of human life. The legal or accepted retirement age in every European country is now between 60 and 65 years (except Denmark, with a retirement age of 67 years). The effective retirement age now tends to be the same throughout the EC and is below the age prescribed. In addition, there is a growing propensity on the part of retirees to insure themselves more comprehensively. Incomes of elderly persons measured in units of consumption now exceed the average income of the working population in certain Member States.

Further, the proportion of the working population in all the EC Member States has declined as a result of major pressures on the labour market. In effect, these pressures have encouraged older workers to stop work earlier and delayed the entry of younger workers into the job market.

Improvements in living standards emerge as an essential factor in the shifting patterns of non-life insurance consumption. The population insures not only itself but also its growing number of possessions. In this respect, it is worth noting that the number of cars in the United Kingdom increased from

5.6 to 22 million units between 1960 and 1990. For the EC, demand for passenger cars increased from 3 million units in 1960 to more than 12 million units in 1989. There are also now 150 million homes. Non-life insurance is coming to be regarded as a commonplace product. Here, a distinction has to be made between mandatory insurance coverage on the one hand (car insurance, workplace accident insurance, and so on) and other categories of insurance (life, health, etc.) which are currently marketed. It is above all in the former category that price sensitivity plays a key role. Financial considerations are thus major determinants of consumer choice in both the life and non-life sectors.

Supply and competition

The European market can by divided roughly into two different structures. The continental European market is more highly regulated, less innovative, and characterised by exclusive brokers. The authorities not only exert financial control over the sector but also apply a priori hands-on regulation. These highly-regulated systems are found above all in Belgium and Germany and, to a lesser degree, in Italy and France.

New players have entered the insurance sector - the most significant competitive challenge coming from the banking community. The countries which pioneered "bancassurance" are the United Kingdom, France and Spain; in other European jurisdictions, banks are only now beginning to enter the insurance marketplace. While the banks insurance market share to date is insignificant, the growth potential is very high. It is estimated that by 1995, the share of banks in individual life insurance business will be around 10% of the market in terms of insurance proper and a further 10% as distributors of insurance. In France, 70% of new business written in 1989 was sold via banks or other financial institutions. In Germany, the Deutsche Bank recently set up its own insurance company.

By contrast, non-life business appears less vulnerable at present to the influence of banks entering the marketplace, primarily because non-life business presupposes specialist knowledge and a large distribution network.

Freedom of establishment has not only facilitated market entry on the part of domestic groups, it has also boosted the presence of foreign insurers. The advent of foreign institutions has had the effect of further stimulating competition in national markets. While banks are comparatively inexperienced in matters of insurance; foreign insurers are fully conversant with every aspect of the marketplace, both in terms of innovative products and competitive pricing.

In the wake of heightened competition and a progressively more exigent marketplace, insurers have been forced to become more innovative in terms of the products and services they offer. Overall, the tendency has been towards the development of insurance coverage that is increasingly flexible in character. As an illustration of this, classic (fixed premium) life coverage has been losing ground to policies based on a unit-linked life approach, where the policyholder opts for premium payments which suit his budget and, as required, revises premium instalment levels during the subsequent life of the policy. Such policies continue to offer a guaranteed fixed amount payable on maturity. In some countries, however, there are already variants which offer life insurance linked to investment - implying a financial as well as a technical risk. In such cases, no fixed amount is guaranteed at maturity. In addition, if the investment portfolio underperforms, the implications for the insured party can be serious.

The success of such products will depend on the overall economic climate, the performance of the stock markets and the willingness or ability of insurers to assume this additional risk. It is estimated that unit-linked policies will grow at the rate of 15% on a yearly basis; this compares with annual growth for other categories of insurance products of between 5% and 9%.

The years ahead will see the emergence of completely new insurance products. As a case in point, environment-related coverage is expected to experience fast growth in the order of 10% to 14% annually. Experience in the USA has demonstrated that penalties for environmental infringement can be vary significantly, hence the need for innovative insurance coverage.

Production process

In a unified and deregulated market, tariff structures increasingly reflect management and distribution costs. Management costs and tax prepayments can represent substantially increased insurance premiums. Keeping these costs down necessarily entails the introduction and development of administrative procedures which are as cost-efficient as possible. The various approaches open to them include:

- agents: independent professionals who represent one or more insurance companies and who are remunerated on a commission basis;
- brokers: independents mandated by the client and without any link to an individual insurer; remunerated on a commission basis;
- salaried employees (particularly in the life sector);
- independents: mandated by an individual insurer and remunerated on a commission basis.

The preferred strategy varies from one country to the next. Agents and brokers dominate the market in continental Europe. In Germany, for example, they are responsible for more than 75% of policies sold, whereas the corresponding figure for Italy is closer to 80%. Until now, the use of intermediaries (agents, brokers, independents) has tended to be the rule, but costs are high as a result of the generous commissions paid.

As far as operational costs are concerned, marketing and distribution costs rank immediately after policy payments in terms of size. At Generali, for example, distribution costs represent more than double administrative overheads. Not surprisingly, new and less expensive modes of distribution are being explored, among them: retail chain store sales, including sales desks set up in supermarkets; and sale by correspondence (typically by direct mail or telemarketing).

INDUSTRY STRUCTURE

Companies

In 1988 there were about 4 800 insurance companies in the EC, 2 850 of which operating non-life insurance, some 780 operating life insurance and 350 composites.

The average size of insurance companies is measured in terms of gross premiums divided by the number of undertakings. In the EC, the average size of life insurance companies in 1988, in terms of premium written, was nearly 100 million ECU, that is more than twice that of the non-life insurance undertakings (about 45 million ECU).

This is slightly larger for life insurance than the average size of American companies (85 million ECU), but far smaller for non-life insurance (120 million ECU). Japan is altogether a special case: it has only a hundred or so companies for a market comparable to that of the EC. Japanese companies thus achieve an enormous average size of 4.3 billion ECU for life insurance and over 1 billion ECU for non-life insurance.

In 1988 almost 790 000 people were employed in the insurance industry in the EC. This figure applies to the insurance industry in the strictest sense, excluding the intermediaries - brokers and agents - who are sometimes added.

Most of the leading groups in Europe have a total premium income in the range of 3.5 billion to 7 billion ECU.

Table 3: Insurance
European market leaders in terms of gross premium business, 1990 (million ECU)

Group	Country	Estimated premium income
Allianz	D	18 680
UAP	F	14 280
Nationale Nederlanden	NL	10 303
Prudential	UK	9 257
Generali	I	8 885
Victoire	F	8 427
Royal Insurance	UK	7 406
AXA	F	6 955
AGF	F	6 638
Munich Reinsurance	D	6 145

Source: Eurostaf

Table 4: Insurance
Approximate share of 10 largest companies expressed as % of global insurance market, 1990

	Share in %	Approx. number of companies
United Kingdom	Over 70	700
Nederland	61 to 70	470
France	51 to 60	600
BR Deutschland	41 to 50	800
Italia	41 to 50	260
España	Below 40	450

Sources: GDV, ABI, FFSA, ANIA, VVN, OFAP, UNESPA

With the exception of the Spanish group Euroseguros, the number one insurer in each country is also among the leading insurance companies at European level. Despite the merger of UAP (F), Victoire (F) and part of BNP (F) in 1990, and Nationale Nederlanden's (NL) merger with NMB (D), Allianz (D) remains the undisputed market leader in Europe.

In most European countries, the state holds equity in the major insurers. In effect, it is extremely difficult for the state to disengage from the insurance sector which has an important influence on financial markets. In certain countries, including France, the state views the insurance sector as an instrument of investment policy and formally accords insurers the status of "institutional investors".

Strategies

Insurers have recognised the importance of internationalising to better spread risks and to grow in a saturated marketplace. Since 1987, there have been a number of cross-frontier take-over actions, and more are expected.

In the course of the next five years, the market share of national insurance companies should decrease across the board. In southern Europe, this process should be rapid to the extent that domestic insurance companies have adapted only slowly to the pan-European marketplace and are expected to service no more than 50% of their home markets by 1995. With the exception of Assicurazioni Generali, Italian insurers are very reliant on their home market and are not expected to play a major role in other European markets. The same holds true for Belgium. Insurance companies in France, Germany, Switzerland and the United Kingdom have proved to be extremely aggressive in their take-over strategies; a substantial portion of European premium income is now destined for those countries.

Table 5: Insurance
Total consolidated premium income

(billion ECU)	Number of companies	% of total number of companies
Less than 3.5	6	19.4
3.5 - 7	17	54.8
7 - 11	6	19.4
11 - 14.5	1	3.2
Over 14.5	1	3.2

Source: Eurostaf

The process of "internationalisation" is largely underpinned by strategic alliances, mergers and take-overs - hostile or otherwise. In the insurance sector - and, more especially, in life insurance - setting-up a new network in a foreign context is extremely difficult. Insurance is a product which is sold rather than bought, and the consumer usually prefers to deal with a local/national entity which he knows and trusts. Decades are required to build brand loyalty. The mergers and acquisitions strategy is fundamental to attaining the critical mass that is vital in a progressively competitive marketplace characterised by spiralling overheads.

Bancassurance represents another strategic route which relies heavily on mergers and acquisitions. For the insurers, tying into the banking community is advantageous in terms of volume of customers accessed through banking networks. This marks a radical departure, to the extent that the insurance industry has traditionally operated through independent agents rather than interfacing directly with its customers. Accessing the ready-made sales/distribution network offered by the banks is also less expensive than operating via intermediaries to whom a more generous commission structure applies.

Over the course of the last few years, a number of major links were forged. As of 1986, Allianz had diversified geographically by linking with VIA (F), RAS (I), Bizrosito (H) and Fireman (USA). In addition, Allianz has taken a position in Dresdner Bank, the country's second-largest bank, which now markets Allianz products in the five Länder of the former German Democratic Republic. In July 1989, Victoire acquired Colonia, the number two non-life insurer in Germany. This enabled Victoire to double its critical mass (turnover went up by 196%), to secure geographical diversification, and to reinforce its position in both insurance and reinsurance. UAP and the BNP have signed an agreement which provides for reciprocal marketing. In the agreement, each acquired 10% of the equity of the other. In addition, UAP is present in Belgium (Royale Belge), in Spain (GESA) and in the United Kingdom (Sun Life). Nationale Nederlanden's merger with NMB Postbank has not only reinforced its financial position, it has also created substantial synergy.

These and similar moves have increased the financial muscle of the companies involved but they have also cut into the financial resources of the acquiring company resulting in a dilution of equity for the shareholders in cases where the operation in question has entailed fresh capital. It is for this reason, perhaps, that strategic alliances are preferable to take-overs. A case in point involves AMB (D), Fondiaria (I) and Royal Insurance (UK). The three companies have co-operated for many years and have now grouped their European interests. In 1992, they created the European Partners for Insurance Cooperation, bringing into being a holding company which

Table 6: Insurance
Number of insurance companies representing 80% of premium income by country

	Life		Non-life	
	1990	1995 (1)	1990	1995 (1)
Belgique/België	6	5	25	7
Danmark	8	6	8	5
BR Deutschland	40	36	39	31
España	8	13	77	41
France	18	12	19	11
Ireland	7	6	11	6
Italia	12	16	42	31
Nederland	9	8	51	40
Portugal	8	11	13	13
United Kingdom	50	29	24	18

(1) Projection
Source: Eurostat

groups the European operations of the three outside their respective national territories.

It might be expected that the prospects offered by the Single European Market would tempt Japanese and US insurers. Both groups, however, have proved to be sufficiently preoccupied with their own domestic and highly-protected markets. Neither seems poised to launch a programme of international expansion in the immediate future.

REGIONAL DISTRIBUTION

Within the Community three countries dominate the market: the United Kingdom (74 billion ECU in 1990), Germany (71 billion ECU) and France (59 billion ECU). These three account for 74% of total operations within the EC.

These three markets remain dominated by non-life insurance but to differing extents: Germany is closer to an American-type market, very much dominated by non-life insurance (60%). Non-life insurance is less preponderant in the United Kingdom (52%), while France is somewhere in between (55%).

Just two Member States have an insurance market which is dominated by life insurance: Spain (63%) and Ireland (58%). But many other markets are still characterised by a strong prevalence of non-life insurance: Portugal (over 80%), Italy and Luxembourg (both almost 75%) and, to a lesser degreè, Belgium, Denmark and Greece.

In the industrialised nations of northern Europe (the United Kingdom, Germany and the Netherlands), premium income corresponds to 5% or more of national wealth. In southern European countries (Portugal, Spain, Greece) this percentage is much lower.

Further, insurance products differ widely in the various EC Member States in terms of category and distribution. These differences can be explained in terms of disparate fiscal treatment and the level of state involvement in the industry. Some countries - such as Belgium, Italy and Portugal - impose mandatory tariffs for automotive insurance, for example, whereas others (such as Spain, Ireland or the Netherlands) maintain an infrastructure that is more open and competitive.

REGULATIONS

The insurance business is traditionally subject to stricter regulation than that which applies to banking or other financial services. Most regulations require policy clauses to be standard and, in certain sectors of the industry, prices are predetermined.

Regulations also provide for prudent management of resources invested by the insurer on behalf of its customer base. Exercising due control over investments emerges as one of the main priorities of regulatory control. Specifically, the following principles are evoked:

Table 7: Insurance
Tax treatment of insurance premiums in European jurisdictions, 1989

(%)	Automotive	Fire	Sickness	Life
Belgique/België	9.3	9.3	9.3	4.4
Danmark	0.5	0.0	0.0	0.0
BR Deutschland	7.0	7.0	0.0	0.0
Hellas	10.0	20.0	10.0	0 - 4
España	0.0	0.0	0.0	0.0
France	18.0	7.3	9.0	0.0
Ireland	0.0	0.0	0.0	3.0
Italia	12.5	21.5	2.5	2.5
Luxembourg	5.0	4.0	5.0	2.0
Nederland	7.0	7.0	0.0	0.0
Portugal	10.8	10.8	10.8	1.3
United Kingdom	0.0	0.0	0.0	0.0

Source: Fédération Française des Sociétés d'Assurances

- congruence: commitments denominated in a particular currency must be covered by assets denominated in that currency;
- localisation: commitments and risks must be balanced on a country-by-country basis;
- liquidity: insurers must at all times be in a position to honour their financial commitments to their policyholders;
- yield: over time, returns on investment must match the yield specified in the policy issued.

Certain countries have introduced specific measures to encourage the consumption of life insurance products. In Germany, for example, 80% of life policies are on a tax-deductible guaranteed-yield basis (as opposed to 20% which are unit-linked). In other countries, life insurance premiums are still taxable (Belgium, Italy, Portugal). In Europe as a whole, premiums paid are as a rule deductible in part for purposes of income tax; exceptions to this rule are found in Denmark and the United Kingdom. Added value is generally exempt, except in Spain and Norway. As a rule of thumb, it can be said that life insurance business is comparatively modest in those countries where premiums are taxed.

At Community level the process of completing the single insurance market is already well under way. This process is based on a series of directives aimed at harmonising national laws (on authorisation, the establishment of subsidiaries and branches, supervision, or technical reserves), and securing the freedom for EC companies to establish themselves in another Member State: all this has already been achieved (the so-called "first generation" directives).

The "second generation" directives try to secure the freedom to provide services, whereby an EC company may conclude a contract with a client based in another Member State when the company itself has no base there. Progress towards the freedom to provide services varies at present according to the class of insurance and type of risk: it already exists in non-life insurance for large risks (essentially industrial risks excluding the private market), while it has been approved but is not yet effective in life insurance.

A future series of "third generation" directives will introduce a single licence for insurance undertakings in the EC, which will signal the completion of the single market in this sector.

The process of deregulation described above must necessarily be accompanied by measures to promote fiscal harmonisation. Failing this, deregulation could result in an exodus of insurance companies - or their financial resources - in favour of jurisdictions with a more favourable tax climate.

OUTLOOK

The insurance landscape has changed since 1990. In essence, the following factors are expected to irrevocably transform operations of the 4 600 insurers scattered throughout the EC:

- auto insurance promises to develop in Europe along the lines identified in the USA. Today, it accounts for 35% of commercial risk, but this figure should reach 50% by 1995;
- the Single European Market for insurance is still a concept rather than a reality. Its full impact is predicted to be felt no earlier than 1995;
- by 1995, banks will capture in excess of 10% of life business within the EC and be responsible for a further 10% in terms of marketing and distribution;
- cross-frontier activity will grow in the course of 1993, primarily in the form of European insurers penetrating the potentially-lucrative markets of southern Europe;
- competition will increase as will demand/price elasticity. Niche opportunities will emerge in the non-life sector. Environmental coverage policies will grow at the rate of 10% to 14% annually. In the life sector, unit-linked and investment-linked policies are expected to grow by 15% annually (as compared with 5% to 9% yearly growth for other categories);
- market concentration will increase, notably in the life insurance sector in the United Kingdom and the non-life sector in Spain. Within the next decade, Europe will be dominated by a small number of large pan-European groupings (Allianz, UAP, Winterthur), with a number of parallel groups continuing to be active as specialists in niche markets;
- key parameters for success will be quality of service, application of information technologies, quality of management and on-the-job training.

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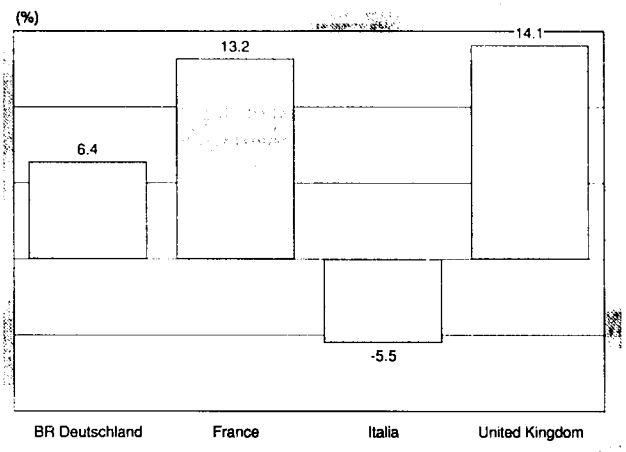
Financial intermediaries
NACE 831, 832

European financial marketplaces have gone through a period of change since the beginning of the 1980s. Technological innovation, notably in terms of computerisation and modernised communications, has gradually given rise to a global marketplace operating 24 hours a day across the three main trading zones comprised of the USA, Japan and Europe. Deregulation of European financial markets has also boosted competition and resulted in improved price structures and resource allocation systems. These progressively deregulated markets have inevitably been characterised by increasing internationalisation. The planned single European financial market, able to compete with the US and Japanese markets, is rapidly becoming a reality.

Figure 1: Financial intermediaries
Stock market performance, 1991



Source: Morgan Stanley Capital Investment

INDUSTRY PROFILE

Description of the sector

The term "intermediaries" is applied to those operators who act as go-betweens for lenders in the first instance and borrowers in the second. Their role consists in transforming the funds made available by the lender into the form sought by the borrower.

Intermediaries thus contribute to a better allocation of resources, help ensure stock market liquidity of stocks and enhance negotiability. Intermediaries bring greater efficiency to the financial system by stimulating competition and reinforcing market mechanisms, in particular by: increasing the number of competing enterprises in the various financial markets; extending consumer and borrower choice both nationally and internationally by launching a wide variety of new financial instruments; exploiting improved information technology to impart increased market transparency; upgrading overall financial system efficiency by exploiting deregulatory measures; attracting foreign borrowers and investors; introducing efficient new technological infrastructures (such as new systems for payments, information transfers, negotiation and clearing); strengthening links with other international markets; contributing to market security and stability; and boosting price competitiveness.

The end of the monopoly of brokers gave rise to the creation of sizeable financial intermediary groups. These groups operate in corporate finance, in stock markets and in collective savings management. Banks also have a major presence on these markets. The progressive liberalisation of financial services in the EC has afforded them the possibility of intervening directly in the stock market as well as in related markets.

Main indicators

In every country, progressive changes in financing techniques have gone hand in hand with rapidly increasing capitalisation. London has retained its supremacy because its market capitalisation is the equivalent of that of continental European markets combined. The Milan stock exchange trails behind the main European exchanges (United Kingdom, Germany, France), with capitalisation equivalent to a mere 10% of that of Paris. Growth in transaction volume testifies to expanding markets and increasing professionalism.

Recent trends

The proportion of stock market holdings to gross domestic product more than doubled in the German and UK markets between 1982 and 1989. In Paris, the ratio increased from 5% to 33.2%. The Paris Bourse exhibited the strongest growth between 1982 and 1989, rising to a level approaching that of Germany. London, however, still holds the dominant position.

Growth in the bond market, while less spectacular than in the stock market, remains significant. Its weighting by reference to GDP doubled in France in the period 1982-1989, but grew only by 8% in the United Kingdom, which was hit particularly hard by the crash of 1987.

Growth in market capitalisation does not offer a clear indication of market development, however, since it is in part due to a nominal factor: asset valorisation. To arrive at a clear picture, stock market indices have to be taken into account. Nevertheless, real growth in stock market capitalisation is impressive, doubling in Germany and the United Kingdom and increasing fourfold in France over the period 1982-1989.

Table 1: Financial intermediaries
Stock market capitalisation (1)

	1982			1986			1989		
(billion)	National currency	USD	% of GDP	National currency	USD	% of GDP	National currency	USD	% of GDP
BR Deutschland	163.9	67.5	10	480.2	221.1	25	563.9	299.4	24.9
France	199.4	30.3	5	990.3	143.0	20	1 700.0	266.9	33.1
United Kingdom	121.6	212.2	44	320.7	370.2	85	480.0	786.9	90.0

(1) December 31st
Source: OECD

Table 2: Financial intermediaries
Growth in real capital (with stock index deflator)

	1982		1986		1989	
	Index	Real capitalisation	Index	Real capitalisation	Index	Real capitalisation
BR Deutschland (Commerzbank)	763.4	163.9	2 046.4	204.9	1 826.6	335.9
France (CAC)	100.2	199.4	397.8	398.6	489.2	923.2
United Kingdom (FT-SE 30)	596.7	121.6	1 308.6	176.3	1781.4	238.3

Source: OECD

International comparison

In 1991, US financial markets had the strongest performance. The Dow Jones index rose by 10.2% over the year as a whole, despite a cooling of the economy. This was due to US monetary policy, which held interest rates down over the period and bolstered investor confidence with low inflation rates. The Japanese market went in the opposite direction, with a dramatic fall in 1991, as Japan showed the worst reaction to the recession. The reaction in European markets was somewhere between these two extremes. Despite German reunification, Europe was hard-hit by the recession and interest rates were maintained at a high level.

Foreign trade

Internationalisation is a by-product of deregulation and the revolution in communication technology. The resulting interdependence among markets has had two results: issuers have increasing recourse to foreign markets to raise capital, while investors have tended to internationalise their portfolios.

Over the last decade, there has also been significant growth in currency investments. Germany, the Netherlands and the United Kingdom, traditionally more liberal on exchange controls, lead the field in this respect.

The volume of transactions in foreign shares slipped back in all markets in 1991, dropping by a factor of two within the EC as a whole. In Tokyo, 1991 transaction volume represented only one-third of the 1990 total.

MARKET FORCES

Demand

The 1970s were marked by major shifts in the economic system, including the abandonment of fixed exchange rates and the emergence of current account imbalances consequent upon successive oil price shocks. The 1980s saw the development of capital markets organised along both national and international lines. The explosive growth in stock market activity was particularly pronounced between 1982 and 1989, with real capitalisation (deflated by the stock index) doubling in Germany and the United Kingdom and increasing fourfold in France. Against this background, the role of financial intermediaries became progressively important, their principal role being to ensure market liquidity and spread. Financial intermediaries have to be responsive to the demands of both investors and borrowers: investors are anxious to secure optimal placement of their funds, namely placement which offers best yields at least risk. On the other hand, borrowers are anxious to secure capital at optimal (i.e. lowest) cost.

The problems are currently exacerbated by an economic climate characterised by very high real interest rates. In addition, increased interest rate volatility and the progressively international character of currency exchange flows have intensified the need to protect against interest and exchange rate exposure risks.

There has also been an increase in the demand for services involving management of corporate assets and liabilities. This demand has increased above all in situations involving financial and corporate restructuring, notably in the wake of mergers and acquisitions or management buy-outs.

Supply and competition

The emergence of new types of demand has stimulated financial innovation and spawned new high-yield investment products across the full spectrum of money management markets. Innovation in the US served as a model for changes instigated in Europe since the end of the 1970s. London has proved to be the European market most affected by the wave of reforms, followed by France and Italy - where market reforms were initiated and supported by the public authorities. Germany was only slightly influenced, and reform there is still in its early stages.

Reforms of money, stock and auxiliary markets in the United Kingdom, France, Italy and Germany have seen expansion in savings, stock market quotation and the reinforcement of regulatory provisions. Hand in hand with these reforms came the gradual removal of exchange controls, an essential precondition for the modernisation and internationalisation of

Table 3: Financial intermediaries
Mandatory capitalisation

	1982			1986			1989		
(billion)	National currency	USD	% of GDP	National currency	USD	% of GDP	National currency	USD	% of GDP
BR Deutschland	N/A	N/A	N/A	N/A	N/A	N/A	955.0	508.0	42.0
France	779.2	118.6	21.0	1 870.6	270.0	37.0	2 353.0	369.4	45.9
United Kingdom	144.7	252.5	52.0	303.4	444.9	80.0	310.0	508.2	60.0

(1) December 31st
Source: OECD

Table 4: Financial intermediaries
Evolution of net assets of investment funds

(billion ECU)	1985	1987	1989
BR Deutschland	23.0	32.4	52.3
France	96.8	157.4	247.7
Italy	13.3	39.0	32.6
United Kingdom	32.9	52.0	79.8
Other EC countries	30.0	47.9	105.8
EC	196.0	328.7	518.2

Source: ASFI

European financial markets. Since 1985, the various European stock markets have undergone a major reorganisation, the main aim of which was to improve efficiency while ensuring stability and investor protection. Key trends include:

- an end to brokers' monopoly and freeing of commissions. France and Italy saw a crumbling of stockbrokers' monopoly and the creation of investment houses;
- a reorganisation of the market for treasury stocks, with the consequent adaptation of a secondary market in such stocks to reflect the needs of investors;
- the creation of secondary listing in Italy (1978), the United Kingdom (1980), France (1983) and Germany (1987), allowing medium-sized businesses unable to meet the conditions for full listing to improve their access to capital;
- the computerisation of stock markets and market operations in all European exchanges as of 1986. This technical innovation has boosted market liquidity by making information more rapid and more precise.

Stock market efficiency was improved by the creation of new futures and options markets such as LIFFE and LTOM in London as of 1982, MATIF and MONEP in Paris as of 1986 and 1987, and DTB in Germany as of 1990 - all of them influenced by the Treasury Bond Futures Market in Chicago. The aim of these markets is to afford investors some protection against fluctuations in interest rates, exchange rates and stock market prices. They have experienced rapid growth in terms of transaction volume.

In addition, there have been major (albeit less so in Germany) reforms with the issue of negotiable debt stocks on national currency markets and, on occasion, denominated in foreign currency. Collective management products appeared in Europe towards the end of the 1970s and grew rapidly in those countries with low rates of return on savings accounts.

Developments on money markets have led to the emergence of new instruments designed to allow the transformation of loans into negotiable debt stocks. This innovation, based on experiences in the USA and the United Kingdom, is new to France and still unknown in Italy and Germany. It offers financial institutions a more flexible means of managing their assets.

The trend towards financial innovation over the past decade has brought about a fundamental change in the structure of international financing. The growth of capital markets has brought greater diversity to financing and challenged the quasi-monopoly of the banking system. Equally, between 1983 to 1986, there has been a general reduction in financial intermediary charges (other than in the United Kingdom). Since 1989, only Italy has been immune to this trend, which is attributable to the increasing appeal of the financial markets. It is a trend that could reverse itself, however, in the event of a stock market decline.

The trend towards capital market deregulation goes hand in hand with increased competition between the different exchanges. Key competitive elements in modern capital markets are stock exchange transaction taxes, brokers' fees and the delivery-clearing system. In the case of Paris, stock exchange taxes have had the effect of restricting liquidity, mainly because they make transfers and receipts from abroad more expensive. Paris is seriously threatened by the prospect of its European competitors moving towards abolition of such taxes. Some countries, including Spain, abolished such taxes in 1989 and 1990, following London's lead in 1986. Germany is soon to do away with stamp duty.

In 1991, financial intermediaries suffered overall as a result of decelerating growth which brought a fall in the number of transactions on European exchanges. This is evidenced in gross issue volumes which reflect market liquidity. From 1985 to 1987, share issues grew on average 65% in Germany, 40% in France and 110% in the United Kingdom, but this trend was reversed after 1988, following the 1987 crash and the subsequent depressed state of the market. In 1991, this pessimism was fuelled mainly by the Gulf War, the coup in the Soviet Union and a recessionary US economy. In France, for example, the number of transactions fell by 6.5%, prompting a decrease in tariffs: average transaction charges fell by 9% in France.

Table 5: Financial intermediaries
Transfer transaction costs (taxes, stamp duties and commissions), 1991

Belgique/België	N/A (stamp duty 0.35 to 0.70%)
BR Deutschland	2.20 to 2.70% (title transfer tax 1.5%)
España	0.85 to 0.9%
France	1.15 to 1.84% (stamp duty on shares and bonds 0.15 to 0.3%)
Italia	1.02 to 1.68% (stamp duty)
Nederland	1.34 to 3.24%
United Kingdom	1.075 to 3.95% (stamp duty on shares and options 0.5%)

Source: FIBV

Table 6: Financial intermediares
Share delivery times

BR Deutschland	2 days
España	Friday of same week
France	End of market month or immediately (1% commission)
Italia	End of month
Netherlands	10 working days
United Kingdom	10 working days

Source: FIBV

Production process

Competitive advantages differ at the level of European exchanges and financial intermediaries as a result of two main factors: the time taken to transmit information (i.e. the status of information technology modernisation); and the delay in clearing. Shorter clearing times would result from a switch from paper-based clearing to electronic systems - a process that is far from complete. Paradoxically, the London exchange, which brings together all the international markets, is the least advanced in this respect.

The efficiency of inter-exchange communication is another competitive advantage: London's Reuter information system competes with NASDAQ of the USA.

There are currently two kinds of financial intermediary: the market-maker, predominant in London, who ensures market liquidity by operating against the posted price; and the intermediary who contributes to the establishment of a median price by centralising orders.

The progressive institutionalisation of share dealing suggests a shift towards two distinct market structures in future: a decentralised system of market-making (as in London), or a centralised system based on specialists (as in Paris).

Part of the intermediary's role, other than generating liquidity, is to ensure market transparency. This can be achieved by adherence to formal rules of conduct, based on six principles. The financial intermediary must:

- have the resources necessary to provide the service offered to the client; this implies competent and informed partners and adequate internal organisation for originating, transmitting and executing orders;
- be able to provide information commensurate with his clients' needs;
- make every effort to carry out his clients' instructions to the best of his ability and with due despatch. In addition, in the case of limited offers, he must ensure a fair distribution among his clients;
- respect market rules of transparency and security;
- set up a system to monitor all in-house dealings;
- anticipate possible conflicts of interest and resolve them fairly if and when they arise.

INDUSTRY STRUCTURE

Companies

The end of broker monopoly resulted in the establishment of major groups of financial intermediaries which operate in corporate finance and markets or collective savings management. Such diversification can give rise to conflicts of interest between the different services offered and, in particular, can be conducive to risks of insider trading. As a result, monitoring the major groups is a difficult matter. Most European countries have drawn up lines of demarcation between the various activities in the sector. For example, Italy's Amato law requires such activities to be farmed out to subsidiaries. Reforms across Europe have opened up financial markets to new players. The major banks have strengthened their positions in every market - either directly, as in Germany, or by participation in quoted companies, as in France, Spain and Italy.

Strategies

The increase in collectively managed savings in Europe as a whole is evidence of the growing importance of the banks. Consistent growth in the sums managed suggests that Europe could soon emerge as the global market leader in this respect. Within Europe, France takes the lead, accounting for about half the sums managed in this method. Italy is one of the few EC countries to have seen the amounts managed fall over the last four years.

The second major change in capital markets took place against the background of worldwide internationalisation, which forced financial centres to modernise. In this respect, the benefits of an integrated European market have not gone unnoticed. A benchmark report prepared by Paolo Cecchini for the European Commission shows that potential gains could reach 22 billion ECU. More and more, investors would pay less for an increased volume of services, and companies would be able to access lower-cost capital, thus enhancing their competitive position against their non-European rivals.

The trend towards a financial Europe is justified by the increasing financial needs of European businesses which cannot be met within the limited scope of their domestic capital markets. Meanwhile, savings trends are changing: since 1987, most European countries have experienced a revival in savings rates. The creation of a single financial market could result in three different scenarios, each of which would offer new development opportunities to European financial intermediaries.

First would be a strategy which breaks down barriers to market-makers in different markets. This route could be of interest to the most important of these firms, opening up all the exchanges to them and allowing them to develop off-market transactions. Some national authorities are opposed to this idea, however.

Second, there could be mutual recognition of nationally-organised markets, while nevertheless maintaining their specific national character and organisation.

Finally, European integration into a single market for the main traded stocks could complement the second strategy, allowing the creation of a market of 200 to 300 key European stocks of international standing while respecting the specificities of each national exchange.

The Euroquote plan for a European exchange has been under review since January 1991; this should permit Europe to play a key role as the third time zone between the USA and Japan. Eurolist will comprise 300 major European stocks chosen by reference to market capitalisation; these will be traded simultaneously in national currency on the various national exchanges. At the same time, a European share index will be calculated.

National exchanges are now experiencing growth in demand for ECU-denominated products. Italy, France and the United Kingdom have developed ECU-denominated lending over recent years and an increase in ECU derivatives is anticipated. ECU futures have been traded on MATIF as of October 1990 and LIFFE as of March 1991. Internationalisation and institutionalisation of ECU-denominated portfolios appears to have a bright future.

REGIONAL DISTRIBUTION

In Europe, London remains the hub of international financial market activity, both in terms of market capitalisation - about

715 billion ECU in 1989 - and the monthly volume of trading (50 billion ECU in 1989). Paris is the second financial centre in Europe, albeit far behind London, but with capitalisation of 242 billion ECU and a monthly traded volume of 2.2 billion ECU in 1989. Paris modernised when broker monopoly ended in January 1992. The Japanese investment house Nomura, Morgan Stanley of the USA and UK broker Kleinwort Benson decided in April 1992 to set up on the Paris market as a means of developing their trade in shares and options.

The relative weight and wealth of stock markets as a proportion of GDP also points up London's dominance (90% in 1989) ahead of Paris (33% in 1989). London's position in Europe is partly due to the SEAQ system launched in 1985, which covers 340 important stocks on twelve exchanges as traded by 53 market-makers. 85% of transactions on this international market relate to European shares. Thus, London accounted for 50% of trading in the ten most active stocks going through the Paris monthly clearing market. Similar phenomena are seen throughout the EC. Italy has started to modernise its market. On the other hand, the Netherlands, which maintains close contacts with London, has been hard hit by competition from the SEAQ.

REGULATIONS

Financial intermediaries face an additional challenge as a result of market modernisation. It is generally accepted that this challenge consists in four areas of risk: interest rates; exchange rates; trading; and technical risks connected to telematics or computers.

The emergence of new and sophisticated financial products and increasing market volatility have resulted in increased risk. Deregulation and professional restructuring represent an additional risk arising out of the multiple roles of market operators. The various authorities have had to reinforce their supervision of the markets. COB in France, CONSOB in Italy, CNMV in Spain, the Belgian Banking Commission and the VvdE in the Netherlands have all had their powers extended in recent years. On the other hand, Germany and the United Kingdom appear to be more attached to a system of self-regulation by professional associations operating in the sector. The UK Financial Services Act provides "self-regulatory organisations" with the requisite authority to carry out monitoring and control. Control is an essential element in ensuring the credibility of a financial marketplace. In the United Kingdom, the system of market supervision is highly decentralised, with each professional organisation responsible for the conduct of its own members. In Germany, there is no real supervisory authority; instead, stock markets are controlled by the Länder. This structure has come about largely due to the position of the banks in the German financial sector. In Spain, the National Committee of Stock Exchanges assumes responsibility for the supervision and inspection of the four exchanges (Madrid, Barcelona, Valencia and Bilbao). Unlike the rest of Europe, the Spanish Central Bank carries out supervision of operators.

OUTLOOK

In 1991, European stock exchanges were affected by the upheavals of the Gulf war, the Soviet coup attempt and recession in the USA. At the same time, the recession which hit Europe as of 1991 provoked pessimism on financial markets. Forecasts for 1992 do not suggest any improvement, with growth projected at 1.5% overall and slightly above that figure in the principal European financial centres. Even the prospects of European monetary union and a consequent rise in savings and trade are still not enough to stimulate market activity. Several years of high interest rates are still expected.

Generally speaking, a decade of financial innovation has resulted in an imbalance in the level of financial market reforms across Europe. Although changes have contributed to a process of internationalisation of capital markets to the benefit of every country, increased fluidity has only been obtained at the cost of high real interest rates.

Written by: Eurostaf

Real estate
NACE 833, 834, 835

The property markets of Europe are facing vacant office blocks, falling rents, structural overcapacity, and investor uncertainty. The virtual disappearance of some investors, such as the Japanese and the Swedes, has put a burden on the rest of the market. Only Germany appears to be moving forward.

INDUSTRY PROFILE

Description of the sector

The various professions active within the property sector attest to the dual nature of the industry implicit in its primary and secondary markets. Certain activities relate to primary demand and the completion of property development, whereas others are exercised by intermediaries or financial advisers who ease the functioning of the secondary market. In the first category are builders/developers, together with consultants specialising in feasibility studies. Real estate agents form part of the secondary market, with their expertise in surveying and valuation of properties, and role in sales transactions and estate management.

In addition, the property sector may be divided into two separate compartments: residential property and commercial property, whereby the latter includes offices, shops and factories.

Recent trends

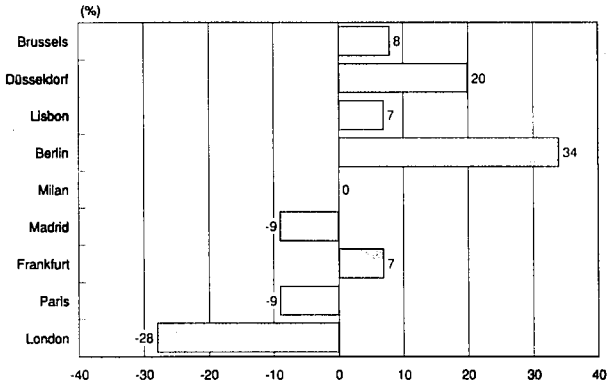
Following spectacular expansion at the end of the 1980s, the property sector experienced a substantial downturn in 1990, with the exception of Germany, where highly speculative market conditions fuelled strong growth. London experienced the worst fall in rents, primarily as a result of high vacancy levels in the City. In Belgium and the Netherlands the market remained stable, with rents increasing particularly in Brussels and Amsterdam. Brussels is particularly attractive to many companies anxious to benefit from proximity to developments within the EC and its institutions. Markets in Spain and Portugal continue to expand, especially in the case of Barcelona.

All of Europe's capitals have gone through an adjustment phase, however, and prices everywhere have stopped rising. Cyclical developments in the various cities are not always concurrent. It is estimated that by the end of the first quarter of 1992, London had almost completed its cyclical adjustment, whereas significant drops in prices are still anticipated for Paris, Madrid and Lisbon.

International comparison

The transactional value of the US market is estimated at some 1 000 billion USD a year - nearly 7.5% of GNP - with almost half of this accounted for by new construction. This translates into total cumulative value (1990) of an estimated 8 770 billion USD. The US real estate market, however, is less dynamic than the European market due to structural oversupply. In 1989, despite large reductions in construction, vacancy rates rose 9% to 19.5%. During that same year, growth in construction in Europe had no effect on vacancy rates, which remained at an average of 2.5%. The US market has been in the throes of a major recession for several years, with some real estate prices plummeting by 50% over a four-year period. By contrast, the Japanese market, confronted by problems of over-population and over-concentration of activities in certain areas, is approaching saturation point - and prices continue to rise.

Figure 1: Real estate
Growth of office rents in business districts (prestige developments), 1990-91



(1) prestige developments
Source: ICPA

Foreign trade

The proportion of international investment in the property market continues to increase. It is estimated that, by 1995, foreign investments flowing into Europe will grow to 12.5 billion USD annually. The share of investment in Germany is growing, although the main target market remains the United Kingdom. The London and Paris markets were both buoyed between 1988 and 1990 by Japanese, German and Scandinavian (especially Swedish) investors. The subsequent recession in the property market coincided with a withdrawal of foreign investment and a process of retrenchment into national markets.

Japanese real estate investments overseas were estimated to average 2 billion USD a year in the early 1990s, compared to 11 million USD in 1985. At the end of the decade 1980s, 75% of Japanese property investments were in office blocks, commercial properties and hotels. The remaining 25% was invested in golf courses, apartments and private hotels. Total EC real estate investment was evenly distributed between Germany, France and the United Kingdom.

MARKET FORCES

Demand

The property sector in Europe comprises several markets: office properties; commercial properties; industrial properties; and domestic properties.

Table 1: Real estate
City comparison: office rents, 1991

(ECU per m2 per year)

City of London	770
Paris Golden Triangle	650
Madrid	520
Frankfurt	520
Milan	490
Berlin	470
Munich	410
Barcelona	400
Hamburg	260
Düsseldorf	260
Brussels	210
Amsterdam	190

Source: Jones Lang Wootton

Table 2: Real estate
City comparison: capital values, 1991 (1)

(ECU/m2)	Offices	Industrial
City of London	12 900	1 460
Paris Golden Triangle	12 400	900
Frankfurt	11 400	1 140
Milan	9 800	N/A
Berlin	9 800	N/A
Munich	9 400	1 100
Madrid	9 000	1 230
Barcelona	6 600	1 170
Hamburg	5 700	1 080
Düsseldorf	5 500	1 120
Brussels	3 400	830
Amsterdam	3 200	730

(1) Prime capital value based on net prime rents and prime yields
Source: Jones Lang Wootton

In general, the health of the property market is closely linked to economic conditions. A slowdown has the direct effect of bringing down demand both for rented and bought office properties. That said, the rental market is less dependent on economic fluctuations. Unlike the real estate sales market, it is not bound by investment logic: whereas purchase is an investment, rental is the consumption of real estate. Therefore, interest rates are a crucial factor in the development of the property market, but less so in the rental market.

Property is taxed at three levels: transfer duties; various local taxes; and land revenue taxes.

Transfer duties are levied at the time of sale of a property. At present, France has the highest such taxes in the world, at almost 18% in Paris, compared to between 6% and 12% in most other European capitals. London and Frankfurt are the exception, with transfer duties of 1% and 2%, respectively. In Germany, land taxes are treated as business revenues and are correspondingly highly competitive.

The level of infrastructure provision and planning also influences demand. The three regions of Greater London, the Rhine-Ruhr and Ile-de-France comprise the principal focuses of wealth of the EC. These are the three vertices of the "Golden Triangle". Paris and London are among the best provided-for regions of Europe in terms of services, and have the best infrastructure. The airports of London and Paris respectively deal with 40 and 31 million passengers a year.

Certain factors have a particular effect on the different property markets. In the office property market, the shift in business demographics towards the services sector puts pressure on commercial properties to the detriment of industrial sites. In addition, the demand for offices is becoming more sophisticated, with the development of large luxurious American-style complexes, such as the Quartier de la Défense in Paris.

The domestic property market, on the other hand, is still a sector which appears resistant to the kind of factors noted above. In this case, other, sometimes less pragmatic and more personal, factors are at work.

Supply and competition

With the slowdown in economic growth and rising interest rates, Europe is presently experiencing a reduction in demand. Portugal and Spain saw growth rates respectively of 3.9% and 3.5% in 1990, whereas growth slowed in other continental European countries and stood at 1.6% in the United Kingdom. Reunified Germany was an exception, with a growth rate of 4.2%.

Currently, the matching of property sector supply to demand has slowed. This can be explained by the length of the production cycle: it takes several years to construct a building. There is now Europe-wide overcapacity, and there has been an increase in vacancy rates everywhere other than in central Paris and Berlin. Outside the centre of Paris, there is again a situation of oversupply, with 60 million m2 of property standing empty in the suburbs, while Berlin is a highly speculative market, where reunification has brought about an increase in demand.

Overcapacity in property has been even more pronounced to the extent that foreign investors, notably from Japan and Sweden, have suddenly pulled out. Japanese investors, concerned at their rates of return -especially the Cooke ratio - have pulled out, and the Swedes had to weather a domestic stock market crash.

Sales agents were the first to be hit by the property recession. Having been drawn in by seven years of market growth, they counted on the rapid and highly profitable turnover of properties and borrowed, in some cases up to 100%, from the banks. The recession brought major losses, aggravated by the withdrawal of the banks.

1991 was marked by lower economic growth and by uncertainty linked to the Gulf War; the year saw a drop in profitability in the property market.

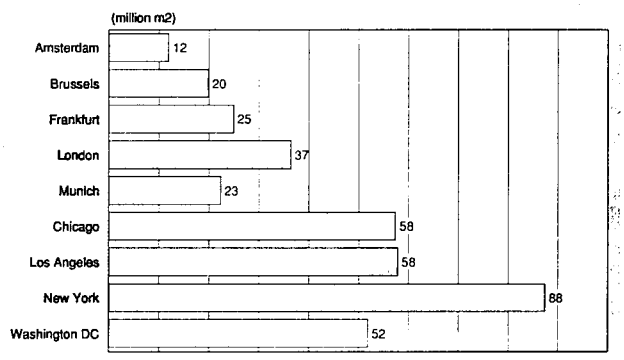
In general, it is necessary to make a distinction between central business districts and outlying areas. In central business districts, lower demand has enabled structural shortages to be reduced and, as a result, rent growth is stable, although at lower rates than during the 1980s. London is an exception: the number of vacant office properties there is very high, in contrast to other business centres in European capitals.

Outlying areas, on the other hand, are experiencing a more severe recession. These areas are more high-risk, with construction anticipating demand. Examples are the Paris suburbs and the outlying areas of Madrid.

The property investment market has gone through the same sort of change, but in a more pronounced way. Investors have preferred to postpone their activities while markets are gripped by uncertainty. The degree of speculation which has characterised the investment climate over recent years brought about a severance of the link between supply and demand, exacerbating the current recession.

In 1990, the domestic property market saw an average growth in rents of 11%. In the longer term, however, this market

Figure 2: Real estate
Total office space by city, 1989



Source: RERC

Table 3: Real estate
Office vacancy rates by city, 1989

(% total office space)

Amsterdam	9.0
Brussels	3.0
Frankfurt	2.0
London	2.5
Munich	1.0
Chicago	17.5
Los Angeles	20.0
New York	15.5
Washington DC	17.5
Total EC	2.5
Total USA	20.0

Source: Jones Lang Wootton

was the least profitable. Since 1985, rents have gone up by 14% a year on average, although Lisbon was an extreme case with a rise of 233%. The commercial property market saw rent rises of 10% in 1990, compared with a previous growth rate since 1985 of 22% annually. The industrial property market was more dynamic in growth terms than the rental market, with growth rates of 13% in 1990 and 16% in the period since 1985. In this area, the best performers were Spain and Portugal, following their entry into the EC.

OFFICE VACANCY RATES BY CITY, 1989

Production process

Supply of offices is fed simultaneously by the arrival on the market of new buildings (60 to 65% of supply) and the recycling of older ones. Few markets have a primary sector coexisting with a secondary sector to such a degree. This secondary market allows property to be used as an investment base, as it guarantees a measure of liquidity. This role as an investment base is more pronounced in office property than residential property. The latter has more of a community character, and is often the subject of regulation designed to preserve its social utility. This in turn holds down yields on capital investment. This closed-circle structure accords particular importance to the role of intermediaries. They exist to facilitate transactions (and ensure market liquidity), performing an essential role in affording investors continuity between primary and secondary sectors. Another consequence of this special configuration is that the various players in the marketplace can either simultaneously or successively adopt opposing roles: buyer and seller, provider and consumer.

Satisfying end-user demands presupposes activity on the part of developers, investors, financial backers and consultants. Each is in competition with the next - both over the character of the product and the means whereby it is acquired, i.e., purchase, rental, or leasing. Professional competence in this sector takes a number of forms:

- local market knowledge: the ability to put a precise value on a site and its possibilities, and to define a product suited to the needs of the end-user. This factor can only be provided by local experts, and has acted as a brake on internationalisation of the sector as a whole;
- manpower resource deployment: this activity is an integral feature of the sector. It should be pointed out that high levels of productivity are present: consultants achieve rates of 150 million ECU per employee in the larger firms within this sector, a productivity level comparable to that recorded in heavy industry. In terms of sales, volume exceeds 350 billion ECU at the level of 300 employees and above;
- financial expertise: the professions in the property market are closely linked to the world of finance, which explains the presence of banks in the sector. Financing of the product, in addition to production and sale, presupposes management.

As in every service activity, communication capacity plays a major role. The profession is able to intervene rapidly, which is a key element for success. This is seen, for example, in the auction process, where investor reaction must be immediate. In such conditions, the larger institutions, with their hierarchical structure and their prudential constraints, are at a disadvantage in the race to obtain business.

INDUSTRY STRUCTURE

Companies

Within the EC, property professionals represent a workforce of around 120 000 authorised practitioners. Most agencies are small in size and operate at a local level.

There are two categories within the property profession: developers who construct buildings on land which they already own with a view to their sale or rental, and intermediaries who make markets in the product and counsel those involved.

There are four types of developer: independent developers (who make up only a small part of the sector); subsidiaries of banking or financial groups, almost all of which have in-house development divisions which act both as a channel for the distribution of credit and a profitable activity in themselves; subsidiaries of public works and construction authorities. Again, all of the majors these days have development arms; and institutional developers, an example being the association of around 15 insurers and bankers in the Société Française d'Investissements Immobiliers.

At the intermediary level, the approach to the market is characterised by an increasing professionalism at the level of estate agents, an increasing role for consultants and a progressively

Table 4: Real estate
Profitability of property investment by sector,1991

(%)	Residential	Industrial	Commercial	Offices
Berlin	15.8-17.2	N/A	N/A	N/A
Madrid	4	5	7	7
Dublin	N/A	11	6	7
Milan	4	8	7	N/A
Luxembourg	5	N/A	9.5	N/A
Amsterdam	9	10	9	8

Source: FIABCI

national/international structure. In this context, three types of intermediary can be identified:

- estate agents and administrators specialised in marketing and renting to end users, (as opposed to developers targeting institutional investors);
- consultants, whose number and importance increases as products become more sophisticated and the sector more international. These usually take the form of small, independent practices. Their role is important because, as we have seen, decisions on development, investment and acquisition are wholly dependent on market conditions
- market-makers who buy in order to resell. These are the speculators who exploit market imbalances to their own advantage, notably in the form of undervalued purchase prices. In addition, however, they also act as a buffer, mitigating the impact of major differences between supply and demand. Their ability to play this role depends on their capacity to carry a property over a period.

Strategies

One striking characteristic at the present time is the emergence of widely divergent strategies on the part of developers. Until recently, developers tended to adopt similar strategies; they were typically small-scale and unambitious, finding it difficult to operate on an international level in such a conservative profession. The current trend, however, is towards the integration of upstream and downstream activities: development proper upstream, and commercialisation downstream.

One can also identify a growing tendency to extend the range of products offered in an attempt to reduce dependence on the vagaries of a single market sector, a case in point being developers originally specialised in housing who reposition for profit deriving from the boom in office property.

Two major strategic groups of developers can thus be identified. Some have elected to diversify into complementing development activities such as administration, hotel chain management or even insurance, which do not share the cyclic nature of property development. Others have opted to remain specialised, but have diversified their product portfolio and attempted to become more international in scope.

For several years now, intermediaries have tended towards the Anglo-Saxon model of consultancy. This strategic transformation, which sees an increased presence of banks in the marketplace, has facilitated globalisation of the property market. The main consultancy offices assume the role of go-between by opening up their domestic marketplace to foreign partners. This development also admits a larger volume of transactions, regardless of the size of the market. In fact, while the office markets in London and Paris are more or less the same by volume, there may be (depending on the period in question) between ten and twenty times more transactions in London than in Paris.

As far as estate agents are concerned, the present recession in property has pointed up their inadequate financial resources. Developing these resources has emerged as a priority objective, and agents are working more closely with the banks to permit themselves to work on projects for which no immediate client has necessarily been identified.

Despite growing globalisation of the property market and the increasing sophistication of products - both of which developments aim at responding to demand increasingly along the lines of the Anglo-Saxon model - consumers tend to remain more attached to traditional national models. In general, the prestige properties offered by major public works groups serve more as a shop-window for their skills than as merchandisable products aimed at the consumer of the future.

REGIONAL DISTRIBUTION

Most real estate activity is concentrated in northern Europe, in an area which is bounded by Paris, London and Frankfurt and which includes the Brussels area. London and Paris have the greatest number of offices in Europe, with a total surface area of around 32 million m^2. Other European capitals typically average around 5 to 6 million m^2. The greater part of Europe's wealth is concentrated in Paris and the Ile de France, Greater London and the Rhine-Ruhr region. Economic growth in these focal points - against a background of almost stable employment - depends on a major increase in value added per capita. And that increase, in turn, depends on development of the services sector as a replacement for manufacturing industry within the economy.

In this respect, London is the most service-oriented market, with services accounting for 69% of value added, although Paris is close on London's heels. Germany's regions, on the other hand, have a less-developed service sector; an exception to this is perhaps Düsseldorf, where a number of Japanese companies are based. Value added in Germany is generally attributable to the manufacturing sector.

The main cities in southern Europe reveal expanding property markets, as economic growth prospects outpace the existing property market. Italy is a special case, in the sense that foreigners have great difficulty in penetrating that country's property market. In fact, data which would permit a determination of real property values in Italy are practically non-existent.

REGULATIONS

The regulatory provisions which attach to the real estate profession vary widely from country to country within the EC. Generally speaking, regulatory provisions apply mainly to estate agents. Certain countries - Denmark, Spain, France and Italy - have erected major barriers to entry into the profession; elsewhere, professionals are subject to the provisions of common law.

With the exception of Greece, Portugal and Denmark, each EC jurisdiction has a professional charter. Harmonisation of regulations on a European level is pending.

OUTLOOK

In 1991, the repercussions of the Gulf War, together with other political and economic uncertainties, had an adverse effect on the property sector, resulting in a general stagnation or decrease in prices and transactions. Germany, largely due to reunification, seems the only country to have emerged from this situation with increased demand and prices - but there remains a risk of over-heating in the market.

In the medium term, if economic upturn is achieved as forecast, there should be a turnaround in currently reduced demand. Growth rates promise nevertheless to be slower than in the 1980s, with marked differences applying between central business districts and outlying areas for which development prospects appear less promising.

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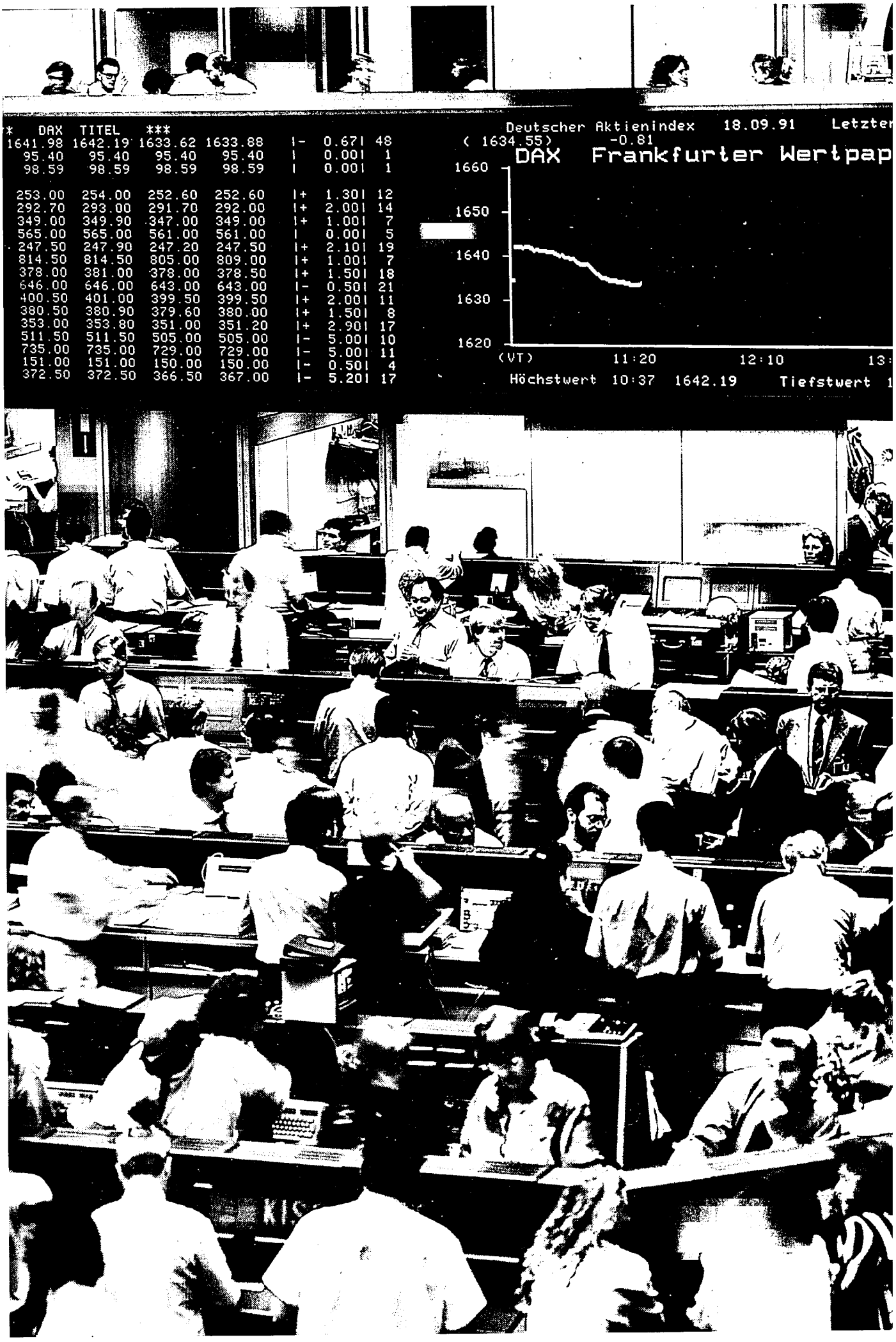
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Business services
NACE 83

Business services is a fast growing sector whose demand is fostered by technological change as well as by a trend towards increasing externalisation of some activities in industry. Though the sector is not concentrated, M&A activity recently accelerated in anticipation of the Internal Market. The sector's prospects are good and the Internal Market should boost cross border activities which remain very limited so far.

INDUSTRY PROFILE

Description of the sector

Business services are defined as those intermediate services which are used during the production and the preparation for distribution processes and are supplied by specialised firms to other enterprises in order to increase efficiency, productivity and competitiveness. Therefore, inhouse supplied services are out of the scope of this study. Services such as trade, transport and telecommunications are covered in separate chapters.

Business services can be classified in subsectors on the basis of several criteria. The most widespread classification, and probably the most useful one, is based on the function performed for the account of the customer firms. Business services substitute functions (activities) of the production process which otherwise would have been performed by the customer firm in its premises, usually in a specialised department (accountancy, technical services, marketing services etc.).

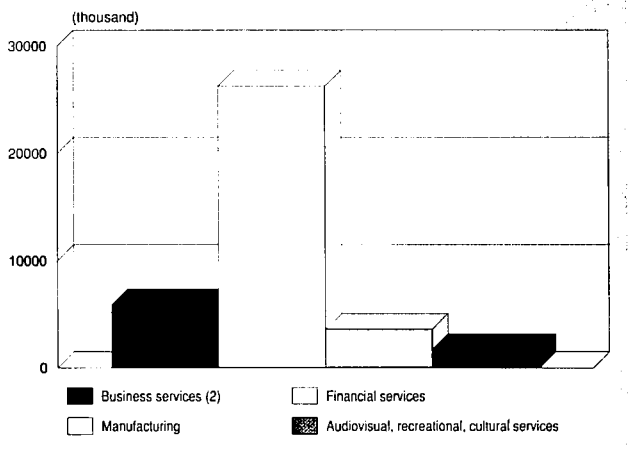
According to this classification, business services can be grouped as:

- management and administration services (management consultancy, legal services, accounting, fiscal advise etc.);
- production services (architectural, engineering, operational leasing, repair and maintenance, packaging, quality control etc.);
- research related services (contract research, etc.);
- personnel related services (vocational training, labour recruitment, supply of temporary labour, etc.);
- information and communication services (data banks, software services, technical computer services, advanced telecommunications services, express mailing, etc.);
- marketing services (advertising, sales promotion, market research, direct marketing, public relations, export promotion, fairs and exhibitions, etc.);
- operational services (industrial cleaning, security services, linguistic services, etc.).

Main indicators

From the most recent available data it is estimated that the sector's turnover represents about 6% of the European Community's GNP. More specifically, from data supplied by professional associations, it is estimated that, in 1990, business services in the EC achieved a turnover of 236 billion ECU. Yet, although these figures come from a reliable source, they should be interpreted with some caution. On the one hand professional associations don't cover all the firms operating in the sector, and on the other, it is not unusual for individual firms to subscribe to several professional associations as many firms are engaged in a wide range of service activities.

Figure 1: Business services
Employment compared to selected sectors, 1990



(1) Excluding Italia
(2) NACE 83 and 84
Source: Labour force surveys, Eurostat

Business services constitute one of the fastest growing sectors of the European economy. Indicative of this dynamism is that during the 1980-85 period, the sector achieved faster annual growth (14.6%) than the average for goods and services (10%). Moreover, this growth was the fastest among all market services. Growth differs between individual Member States, reflecting, mainly, differences in industrial market organisation. With this respect Italy posts the most rapid expansion and France the slowest. The sector's fast growth over the 1980s resulted in a considerable improvement of its share of total market services from 12.2% in 1980 to 13.9% in 1985.

It is estimated, that within European Community, 5.5 million people are employed in business services, a figure which represents 5% of the total EC employment. Even during the recession periods after 1973, when the employment situation in the EC considerably worsened for all services, and despite the sensitivity of these services to recessions, business services exhibited exceptional employment growth in comparison to the service sector as a whole. The sector's rapid rise in employment over the 1980s is explained by the externalisation process, innovations in service management and increased demand due to expanding economic activity.

Foreign trade

The analysis of trade in services is generally somewhat limited by lack of data. A few comments can nevertheless be made on international trade in business services. The relative share of the sector in total trade in services is growing over time. Intra- EC trade remains limited so far but is expected to grow considerably in the future. The EC shows a positive trade balance, a factor which suggests that it is internationally competitive in this sector. However, imports are rising faster than exports.

MARKET FORCES

The fast growth of demand for business services observed during the past two decade can basically be explained by the process of externalisation of economic activities, in combination with technological changes. These developments, in turn, are attributed to the ever increasing complexity of the production and distribution systems and the widespread adoption of information related functions by the firms.

Table 1: Business services
Composition of the sector

Sector	Employment (thousand)	Turnover (billion ECU)	Past growth (1) (%)	Future growth (2) (%)
Management consultancy	50	3.6		5.4
Legal services	675	15.0		
Accountancy	265			
Public relations	2	0.3		++
Language services	200	8.0		++
Inspection etc.	222	11.0		
Industrial engineering	240	23.0		
Engineering consultancy	350	21.0		2.5
Software	287	22.7	36.0	6.8
On-line database	50	2.4		7.2
Courier	8	0.6		9.0
Contract R&D	20	0.9		+
Vocational training	1 150	50.0		++
Temporary staff	856	12.5	7.9	5.4
Advertising	37	4.7		3.6
Market research	23	1.7	4.3	3.6
Sales promotion		31.0	6.1	++
Direct marketing	27	12.0		++
Trade fairs and shows	60	12.0		++
Cleaning	689	12.0		+
Security	290	3.3	2.9	
Total	5 500	235.7		

(1) Average annual growth in turnover over the past 3 years
(2) Average annual growth in turnover forecast for the next 3 years
Source: Professional Associations - Sectoral studies

The technologydriven changes required new skills, which small and medium sized firms could not easily afford. Hence, the necessity to meet the challenges of new technologies have resulted either in a continuously increasing externalisation of functions previously performed internally, a tendency witnessed, in particular, in the small to medium sized firms, or in the internal development of the necessary capabilities exploiting thus the resulting economies of scale and scope mainly by large firms.

This was, in fact, the situation encountered after 1973, when the introduction of information technology in the organisational structure of all economic sectors drew heavily on services provided by specialised business services firms, in particular software houses, management consultancy and marketing. This tendency was most pronounced in US compared with Europe.

INDUSTRY STRUCTURE

The sector is composed of a large number of small companies and, at the same time, a limited number of very big, mainly international, firms. In general, firm size tends to be small for most business services for which quality and specialisation are overwhelmingly important and for which few scale economies can be identified. sub sectors in which a large number of firms employ more then 50 employees are consulting engineering, accountancy, market research, testing, inspection, quality control and some operational services.

Though the sector is not very concentrated, a number of mergers and acquisitions have been occurring recently as firms aim at improving their competitive positioning in anticipation of the completion of the Internal Market. Small local or national firms are thus linking up with similar parties in other Member States, in order to increase their pan-EC presence. This tendency is expected to accelerate in the future, under the impetus of deregulation and the emergence of a dynamic information sector.

OUTLOOK

A common market in services is one of the most important prerequisites for the creation of a fully integrated European market. Yet, markets for business services are among the least integrated in the Community, even though the Rome Treaty guarantees the freedom to provide services.

Although free movement of services is facilitated and accelerated by the development of international information and communication networks, service markets remain primarily national markets. Indicative of this phenomenon is the fact that, in a sector as apparently internationalised as computer services, revenues from other Member States on average only account for about 5% of turnover. The situation is even worse for other business services sub-sectors.

The White Paper on the Integration of the Internal Market proposes general initiatives to cope with the situation. These strategy guidelines remain to be translated into detailed measures. However, implementation obstacles remain, stemming from differences in national legislation and national attitudes.

In general, we can say that although many problems remain to be solved the internal market is expected to have a positive impact on business services through increased demand, more competitive supply and additional employment. At the same time some negative effects through a greater concentration of supply and distortions of competition cannot ruled out.

It is expected, that the measures taken in the framework of the Internal Market will affect positively growth in business services. At the same time, the moderate overall economic expansion expected in the coming years will affect negatively the sector. In total, it is estimated that these two factors will cancel each other and that the performance of the sector will be similar to that of the past years, that is, an annual rate of growth, in the area of 10-15% and an increase in employment in the area of 2-4% depending on the sector and the country.

Written by: Panayota VORLOOU, Commission of the EC, DG III

Advertising, direct marketing and public relations

NACE 838

Advertising, marketing and public relations services experienced considerable growth and development during the 1980s. The market has been powered by greater awareness of the benefits of advertising and by the availability of effective new direct marketing techniques. Some market momentum was lost towards the end of 1990. This was, in part, a result of slowing economies and financial recession. The success of direct marketing helped combat the slow decline among more traditional advertising services, including above-the-line advertising.

INDUSTRY PROFILE

Description of the sector

At approximately 70 billion ECU turnover in 1990, this services sector is among the most important in the EC services market. Advertising accounted for approximately 64% of turnover, direct marketing 35%, and PR services the remaining 1% in 1990. The sector is engaged in communication services that promote an idea, product or service. Effective communication of information requires creative thought, idea development and focus on a given universe of people (the prospective customer group could be the public or a subgroup). Advertising agencies, direct marketers and public relations specialists all have one thing in common: an ability to deliver vital information effectively.

Advertising

In advertising, it is important to give the advertised product extra value over alternate products. Slogans and branding are aimed at lifting the product's image. This allows the marketer to maintain a higher price than private label products can carry, and to pay for the advertising from that margin. Advertisements are placed where they will be seen. People assimilate advertising messages in the same way as other information, partially consciously and partially subconsciously. The main media include: television; radio; cinema; newspapers; magazines; periodicals; and posters.

Direct marketing

Direct marketing is aimed at reaching people directly, as the name implies. It often involves delivering a personalised advertising message to individuals. Unlike advertising, the effectiveness of direct marketing can be measured. This allows for some experimental and exploratory mailings to be made to small numbers of people to discover the efficiency and effectiveness of an idea. An important advantage of direct marketing is that advertisers can select specific groups of people from established lists. Mail order catalogue companies were among the first to develop direct marketing technology. The number of users has since expanded horizontally and vertically throughout industry and among such diverse groups as public services and politicians. Business to business requires specialised media including trade journals and trade fairs. Direct mail can be particularly successful for business to business promotion.

Public relations

Public Relations (PR) agencies are used by companies mainly to deliver sensitive information to the public or other interested parties, including the press. They are also used to lobby institutions to achieve policy changes. Owing to the diversity of businesses with which most agencies deal, agents are generally knowledgeable of common business problems. They can also help their clients to adapt to a rapidly changing regulatory and marketing environment.

Main indicators and recent trends

Provisional estimates for 1991 anticipate that the billings turnover for 1991 will be only marginally higher than 1990's approximately 70 billion ECU (not including more than 30 million ECU for mail-order sales). Added value was just over 10 billion ECU, and the services employed roughly 155 000 people in 1991.

Advertising

Advertising agencies define turnover or "billings" in terms of the amount of money they spend with the media on their clients' behalf. Gross earnings are a fixed percentage, normally 15%, of billings.

Advertising services require between 0.4 and 1 million ECU of billings per employee. This provides roughly 60 000 ECU

Table 1: Advertising
Advertising expenditure as percentage of GDP (at market prices)

(%)	1980	1985	1990	1991
Belgique/België/Luxembourg	0.48	0.49	0.62	0.65
Danmark	0.95	1.24	1.33	0.81
BR Deutschland	0.88	0.83	0.83	1.04
España	0.63	0.86	1.52	1.57
France	0.48	0.57	0.76	0.81
Hellas	0.30	0.41	0.91	0.81
Ireland	0.78	0.67	0.99	1.09
Italia	0.37	0.49	0.61	0.67
Nederland	1.01	0.83	0.94	1.12
Portugal	0.22	0.34	0.81	0.85
United Kingdom	1.11	1.11	1.16	1.23
EC	0.73	0.77	0.94	0.98
USA	1.32	1.45	1.39	1.39
Japan	0.73	0.78	0.88	0.95

Source: EAAA

Table 2: Advertising
Employment in major agencies, 1991

Belgique/België/Luxembourg	Top 26	1 449
Danmark	Top 90	2 000
BR Deutschland	Top 50	9 901
España	Top 10	1 486
France	Top 30	4 878
Hellas	Top 20	850
Ireland	Top 38	850
Italia	Top 67	4 357
Nederland	Top 35	2 229
Portugal	Top 62	1 128
United Kingdom	13 000	

Source: EAAA

to 150 000 ECU of gross fee income per employee. Production centres and media in the advertising industry engage approximately 500 000 full-time equivalent salaried and wage earning personnel. However, most of these are double-counted from other monographs. About 10% (50 000) are exclusively included in this sector. In advertising, roughly 10% to 15% of the total workforce is self-employed. These are mainly photographers, illustrators, designers, copywriters, and translators.

It is not possible to accurately separate the number of people involved in advertising from the number in direct marketing. Advertising has a higher average wage cost than direct marketing because of the amount of highly specialised work involved. Direct marketing workers have by comparison low wages, except for specialist consultants.

Direct marketing

The European Direct Marketing Association (EDMA) has divided direct marketing into three sectors: print direct marketing; telemarketing; and new technologies (include interactive telecommunication channels).

Interactive telecommunication expenditure is small in relation to direct mail and telemarketing, but as more Europeans use personal computers and gain increased access to E-mail, Teletext, Minitel and other telecommunication systems, the market will expand. Direct response advertising through media, such as television broadcasts, newspapers and magazines is included in advertising media expenditure.

In direct marketing the emphasis is on keeping the cost per operation as low as possible to make the service attractive to companies. Mechanisation has helped to make processes more efficient. It is therefore possible to keep work force costs at less than 5% of the turnover of total billings. On this basis, it is estimated that direct marketing services in the EC employ about 40 000 full-time equivalent persons for the service (value added) aspect of the business.

The proportion of expenditure on advertising and marketing are changing considerably. A great amount of direct marketing business is now in the advertising and marketing expenditure system, often it replaces more costly salesperson promotion.

Public relations

According to CERP's 1991 European Public Relations Survey, there are some 44 900 public relations professionals in the EC and 52 760 in Europe. EC spending on public relations services reached an estimated 6.3 billion ECU in 1991.

Public relations professionals are divided between those who are employed by and handle the public relations programmes of a company, organisation or public institution, and those who are employed by an PR agency or consulting firm and offer their services to a variety of clients. Agencies only account for between 5% and 10% of the total PR carried out in the EC. Many companies are starting to use professional PR consultants rather than in-house resources. For some, this is the first time they have used a specialist, having previously relied on a member of their own management team to do the PR work.

Table 3: Public relations
Public relation professionals, 1991

	Consultants	PR officers	Total
Belgique/België	220	480	700
Danmark	225	575	800
BR Deutschland	2 850	7 350	10 200
España	225	1 025	1 250
France	3 375	4 125	7 500
Hellas	60	360	420
Italia	2 465	2 785	5 250
Ireland	225	75	300
Luxembourg	N/A	N/A	60
Nederland	1 053	2 847	3 900
Portugal	185	1 035	1 220
United Kingdom	5 450	7 850	13 300
EC	16 333	28 507	44 900
Austria	N/A	N/A	250
Cyprus	N/A	N/A	60
Finland	350	1 600	1 950
Sweden	1 440	2 160	3 600
Switzerland	600	1 400	2 000
Other Europe	2 390	5 160	7 860
Total	18 723	33 667	52 760

Source: CERP

Table 4: Advertising
Advertising expenditure at current prices

(million ECU)	1981	1991
Belgique/België/Luxembourg	400	1 083
Danmark	428	865
BR Deutschland	5 334	13 180
España	974	6 675
France	2 857	7 868
Hellas	105	445
Ireland	137	382
Italia	1 446	6 227
Nederland	1 157	2 591
Portugal	59	475
United Kingdom	5 024	10 023
EC	17 921	49 814
USA	35 625	62 127
Japan	8 477	25 875

Source: EAAA

International comparison

Advertising expenditure in the USA over the last decade has been far greater than in Europe. Since 1984, Europe has been catching up, largely due to exchange rate variations. The Gulf War and the recession have affected US turnover since 1990. Expenditure for 1991 was estimated at 120 billion ECU.

Similarly, the advertising expenditure in Japan has been affected by currency exchange rates. It dropped in ECU terms during 1990, but otherwise showed a fourfold increase over the past 10 years. 1991 turnover was an estimated 10 billion ECU.

There are no official figures on the market size for PR in either USA or Japan. Estimates suggest they are in the order of two to 14 billion ECU in the United States and about thirty times less than that amount in Japan.

MARKET FORCES

Demand

Advertising

The major products advertised are commodities. Major products include: alcoholic drinks; baby care products; food and beverages; non-prescription drugs (OTC); perfumes; cosmetic products; sanitary products; toiletry products; toothpaste; motor vehicles; tyres; tobacco products; financial services (banks, insurance); public services; pet foods; pharmaceutical products; and fund-raising.

Besides having their own advertising department, major international companies usually use advertising agencies. Large commodities companies tend to be the major investors in advertising services. Owing to an expansion of private label business (a store's own brand), by large chain-stores, marketers of leading brands have been obliged to increase advertising expenditure to position their brands as highly competitive products. A concentration of vendors has resulted from an increase in the proportion of larger stores compared to small shops. This has tended to work against the commodities marketing corporations.

Small and medium sized enterprises are often unable to maintain their own advertising departments or hire an advertising agency to conduct advertising campaigns. Many use below-the-line advertising (without an expensive creative element) and direct mail.

Direct marketing

Direct marketing is replacing a considerable portion of company representatives' time because it is so much less expensive. Whereas a company sales representative can only visit a few clients, averaging less than a dozen per day, direct marketing can reach numbers far in excess of this. Whereas in the 1970s companies concentrated on the visit approach in the 1990s it is increasingly carried out at a distance. Direct marketing services' demand is increasing because they are so cost effective.

Supply and competition

There are no regulatory barriers to starting an advertising agency in any EC country. However, it is not an easy field

Table 5: Advertising
Distribution of total advertising expenditure by media, 1991

(%)	Press		TV	Radio	Cinema	Outdoor
	Newspaper	Magazines				
Belgique/België/Luxembourg	34.2	20.0	26.6	3.0	1.2	15.0
Danmark	64.2	16.5	17.3	(1)	(1)	2.0
BR Deutschland	48.7	22.8	18.5	4.6	1.2	4.2
España	36.2	14.4	31.1	10.8	1.1	6.4
France	16.0	35.3	28.0	6.4	0.7	13.6
Hellas	19.5	20.7	51.9	3.6	N/A	4.3
Ireland	60.8	4.4	21.5	7.6	N/A	5.7
Italia	25.7	22.3	46.6	1.4	N/A	4.0
Nederland	51.4	25.9	12.6	2.2	0.3	7.6
Portugal	23.5	20.3	41.3	6.1	N/A	8.8
United Kingdom	42.8	17.9	32.8	2.1	0.6	3.8
EC	37.5	22.4	28.5	4.6	0.7	6.3
USA	41.1	8.8	37.1	11.5	N/A	1.5
Japan	31.2	9.0	39.0	5.6	N/A	15.2

(1) Included in TV
Source: EAAA

Table 6: Advertising
Top advertising agencies in the EC, 1991

(million ECU)	Billings by equity	Gross income by equity
Euro RSCG	4 551	676
Publicis-FCB	2 715	406
Saatchi & Saatchi Advertising	2 117	309
Young & Rubicam	2 163	307
McCann-Erickson Worldwide	1 949	292
Ogilvy & Mather Worldwide	1 828	263
Lintas: Worldwide	1 667	250
Backer Spiolvogel Bates	1 671	250
J. Walter Thompson Co.	1 735	248
DDB Needham Worldwide	1 521	228
Grey Advertising	1 533	223
D'Arey Masius Benton & Bowies	1 441	189
BBDO Worldwide	1 161	166
BDDP Worldwide	997	166

Source: Advertising Age

to penetrate. Securing the main accounts of new clients is an obvious but very difficult means of expansion.

Client loyalty is indeed a major barrier to new entrants. Large corporations frequently retain the same advertising agency for periods of more than a decade. The reasons for this include the use of clients' sensitive commercial information by the agency. Other reasons are the understandings that exist between senior managers and their agency counterparts and the time-scale that creative campaigns take to prove successful.

Major commodity companies often offer competitions when they wish to change their main account. The headquarters of international companies often choose only one agency for their global business strategy. The marketing subsidiaries in the various regions are required to use the services of the local office of this agency. Often creative services are supplied by the agency's main creative centre and only copy-writing and media campaigns are handled by the local office.

Profit margins in above-the-line advertising are maintained by the agency fee as a percentage of billings system. However, many small agents who do below-the-line work can choose lower margins to be more competitive. In direct marketing, competitive pricing forces are also at work, although the main emphasis is on obtaining a high percentage yield in sales.

High volume printing is tending to go to countries with the lowest production costs. There is also a trend of direct mail being mailed from countries with the lowest tariffs. Freight and courier companies have been bidding for a part in the postal services market by undercutting the prices of public postal services.

Production process

In the print medium, newspapers and news journals can now publish simultaneously in several countries using electronic printing methods. Major newspapers and magazines are increasingly targeting larger international audiences.

The mode of direct mail communication (or "admail") is either via telecommunication channels or by post. Mailings often involve use of computer-assisted mail-merge technology. Modern computer technology has provided marketers with the possibility to automate the direct marketing process, and to achieve very low promotion costs in comparison to other techniques. Print as circulars or inserts, leaflets, flyers, catalogues, and direct response advertisements placed in newspapers and magazines are the main forms of direct marketing. In order to maximise the chances of a successful campaign, the marketing company follows a specific process. First, potential consumers must be identified. This often involves finding databases containing lists of people that fit the consumer profile. Then, a message that will capture the interest of those readers must be developed.

INDUSTRY STRUCTURE

Companies

Forced restructuring in the early 1990s has caused some major advertising agencies to expand into new areas such as direct marketing and promotional services, increasing the overall competitive strength of these companies.

Many major advertising companies have invested heavily in the emerging direct marketing business. There are a few thousand companies including SMEs, and on top of that many self-employed, which number about 20 000. There are more than 1 000 telemarketing service companies, most of which are SMEs.

In advertising, the list of major companies does not change much from year to year. Companies wishing to achieve a position in the top ten would find it easier through acquisitions

Table 7: Public relations
Public relations agencies and PR consultancy firms

	Agencies	PR consultancy firms	Total
Belgique/België	45	60	105
Danmark	15	30	45
BR Deutschland	40	1 100	1 140
España	25	120	145
France	N/A	N/A	420
Hellas	10	N/A	10
Italia	45	500	545
Ireland	N/A	N/A	45
Luxembourg	N/A	N/A	N/A
Nederland	50	180	230
Portugal	10	40	50
United Kingdom	70	1 900	1 970
EC	310	3 930	4 240

Source: CERP

of other agencies rather than by organic growth. Euro RSCG moved into first place by acquiring stock in other companies. The top 25 agency networks accounted for a little less than half all sales in 1991 according to the trade journal Advertising Age.

There are some 4 705 public relations agencies or consulting firms in the EC. A PR agency is normally registered by law and handles only public relations assignments for its clients. A PR consulting firm is usually not registered and may specialise in other related services such as media relation, public affairs, and sponsorship.

The size of PR agencies is usually small. There are only eight PR agencies that have more than 100 employees each, most of which are UK-based.

Strategies

Major advertising companies are often involved the formulation of the strategic plan of a client. Several major advertising agencies have chosen to expand into direct marketing and promotional services because their clients are increasingly seeking promotional methods which can be better focused and therefore more effective and often less expensive. Often they acquire established direct marketing concerns rather than attempting to build their own services. They are then able to expand the direct marketing service to their existing clients as well as serve the customer base of the acquired company.

Advertising does not have to be capital intensive. An agency can start up using funds provided by its clients. The main investment of many advertising companies is its creative teams. When it comes to direct marketing considerable investment is needed for the automated processes and computer technology.

REGULATIONS

Regulations affect advertising and direct marketing to an important extent. Advertising standards have been applied in some countries, and consumer watchdog institutes act as Ombudsmen for the public. Advertising companies are obliged to work within the national advertising Code of Conduct.

Government regulations have a strong influence on the business in some commodity sectors. Regulations vary from country to country. They concern mainly methods of advertising, the amount of media advertising and the promotion of certain products. Tobacco advertising is affected by a considerable amount of regulation. Direct marketing and promotion expenditure is affected by government regulations in Germany and the Netherlands

The 1980 EC Directive concerning Television Without Frontiers established a framework for European distribution of TV and radio. TV broadcasting has been deregulated, leading to an increase in TV advertising expenditure in some countries. The removal of trade barriers was the prime reason for the change, but contributory factors were the latest technological developments in cable and satellite transmission. Some stations under government control are now allowed advertising, e.g. RTBF in Belgium.

The French television broadcasting industry has undergone major changes in recent years as a result of new regulations. There are now seven companies attracting significant advertising revenues. They comprise TF1 (previously state-owned), A2 and FR3 (both public stations funded by a mixture of licence fees and advertising) and three new commercial channels, Canal Plus, TV5 and M6. Italy may need regulation to limit the number of TV stations. Besides the state-owned channels RAI, Canale 5, Italia 1 and Rete 4 there are 900 local TV stations of variable quality funded by local businesses using advertising time. In the other direction, very significant developments have taken place in the United Kingdom, where some independent local broadcasting companies will not have their broadcasting license renewed because another company has been chosen in their broadcasting area.

Direct marketing may be affected by an EC Directive which concerns the freedom of information and right to use direct marketing methods to promote products. There are concerns about the control of personal information and its potential misuse by public or private organisations. The lobby groups for the direct marketing industry also have the same concerns. Special lists (Robinson lists) containing the names of those people who do not wish to receive direct marketing are used in most countries to stop unwanted mailing and codes of ethics already exist in the industry. The EDMA, FEDIM and EAT are trying to have modifications made to the draft directive since in its present form it could prove to have a damaging effect on industry.

OUTLOOK

A contraction of companies in some industry sectors resulting from the Single European Market dynamics, should not have a negative influence on advertising expenditure. On the contrary, bigger players should mean more advertising will be used.

Advances in computing technology will continue to have a great impact on advertising, and direct marketing. The evolving interactive systems such as personal computer electronic mail and Teletext should replace in part or supplement traditional advertising and direct marketing methods. A caveat to consider is new legislation in this area concerning circulation of computerised information.

Direct marketing costs are increasingly becoming attractive to many companies implying greater shares of gross national products to be spent on advertising and promotion services. Barring an EC Directive limiting direct marketing, this activity should be the major promotion tool of the sector within five years. The ease with which information can be transplanted makes this a highly effective means of reaching potential customers.

Written by Campbell Management Consultants
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European Association of Advertising Agencies (EAAA). Address: Avenue du Barbeau 28, B-1060 Brussels; tel: (32 2) 672 4336-4560; fax: (32 2) 672 0014; and,
European Direct Marketing Association (EDMA). Address: Rue du Gouvernement Provisoire 36; B-1000 Brussels; tel: (32 2) 217 6309; fax: (32 2) 217 6985.

Legal services
NACE 835

In 1991, legal professionals accounted for 63% of the 500 000 employed in this sector. The fee income of the sector was estimated at approximately 40 billion ECU. Legal services are continuing to expand into corporate business affairs, especially concerning activities associated with mergers and acquisitions, competition law and the internal market. Because the legal profession has developed independently in each Member State, its organisation differs from country to country.

INDUSTRY PROFILE

Description of the sector

The sector covers all professional and support staff working in the liberal legal profession in the EC Member States. The description and statistical details which follow do not relate to those employed in the public sector, i.e. commerce and industry and central and local government, including the prosecution service, nor does it include the judiciary.

Legal service providers include legal counsels, lawyers, public notaries, professionals specialised in business matters, patent agents and bailiffs. Directive 77/249 of March 1977 on the freedom of lawyers to provide services lists a general designation of persons described under the term lawyer. Fiscal advisers also give legal advice in some countries, although it is the exclusive province of members of the legal profession in Denmark, Spain, Greece and Germany.

The services of lawyers fall very broadly into four areas: negotiation; preparation of documents; legal advice; representation before the Courts, Tribunals and administrative bodies.

Not all lawyers operate in the same manner throughout Europe, however, and spheres of activity vary considerably. Work includes:

- court practice (civil and criminal), including preparatory advice and investigation;
- preparation and negotiation of contracts;
- purchase and sale of property (domestic and commercial);
- company law including mergers and acquisitions;
- intellectual property law;
- consumer and social security law;
- preparation of wills and winding up of estates of deceased persons;
- tax planning and investments.
- Notaries deal mainly with the preparation of deeds and legal documents. Their work includes:
- purchase and sale of property (domestic and commercial);
- company formation and changes to statutes;
- preparing contracts (including those of marriages);
- making translations of legal documents;
- preparing documents for the sale of motor vehicles;
- preparing wills;
- preparing other legal documents.

Sheriff officers and judicial officers (bailiffs) have the job of executing judgements concerning property and financial matters. Duties range from debt collection and property recovery to delivering legal documents and auctioning property in cases of bankruptcy. In some countries, huissiers (highly

Table 1: Legal services
Registered lawyers and structure of practice, 1992 (1)

	Number of registered lawyers		Number of groups of lawyers (2)	Average number of professionals per group	Individual practice	Average number of employees per lawyer
Belgique/België	1 225	(Notaries)	approx.	22	5 300	1
	9 595	(Lawyers)	160 groups (3)			
Danmark	3 714	(Lawyers)	741	2.2	1 138	3
BR Deutschland (4)	63 876	(Lawyers)	over 8 000	2.8	approx. 11 000	N/A
Hellas	23 000	(Lawyers)	N/A	N/A	19 000	N/A
España	57 706	(Lawyers)	approx. 100 (5)	N/A	Vast majority	1
France	23 239	(Lawyers)	approx. 1 690	4	9 655	0.9
Ireland	3 600	(Solicitors)	650	3 - 4	850	1
	860	(Barristers)	not permitted730	2.1		
Italia	59 700	(Lawyers)	N/A	N/A	Vast majority	N/A
Luxembourg	455	(Lawyers)	46	N/A	55	1 - 2
	32	(Notaries)				
	19	(Bailiffs)				
Nederland	6 854	(Lawyers)	1137	6 - 7	950	1 - 2
Portugal	10 312	(Lawyers)	34 civil firms	4	8 800	1
	500	(Solicitors)				
United Kingdom	58 010	(Solicitors)	7 992	6.9	3 906	2.6
	7 713	(Barristers)	N/A			

(1) Latest available data
(2) Firms, group practice, Sozietät, etc.
(3) Grouping 3 500 lawyers
(4) Includes the former East Germany
(5) Group practice limited to a maximum of 20 by law
Source: National CCBE delegations

qualified bailiffs) are involved in managing property, selling insurance and offering legal advice.

Main indicators

The sums of money passing through lawyers, notaries and bailiffs accounts are far greater than their fee incomes because they handle money matters for clients. It is therefore not of great value to know the turnover of the sector.

Official fee income data does not exist for every country in the EC, so the estimate of 40 billion ECU comprises both local estimates and official Eurostat data. It allows a comparison of the value of legal services with other service sectors. No major fee income study has been done for the EC, so the figure could be lacking accuracy.

Average annual fee income per fully employed professional varies a great deal in the EC. The ratio from the highest to the lowest band is roughly 5:1 (not including individual high and low extremes). The differing rates depend on several factors. Two important factors are the cost of living (particularly general office expenses), and the ratio of demand to supply. Overall the Latin notaries have the highest fee incomes, lawyers are second, and bailiffs are last.

It is estimated that a legal services office needs at least 40 000 ECU fee income per legal professional per annum to be viable in most countries of the EC. In the southern European countries the annual fee income can be lower. There are significant variations in earnings within countries. Fee income of lawyers in major cities are greater than those of practices in smaller towns. For example, the rate in London per solicitor is £128 000 (approximately 183 000 ECU). In the north of England the average rate drops to £74 000 (approximately 106 000 ECU) per solicitor according to the Law Society statistics for 1989-90. The figures mentioned are gross fee income.

Estimates show that lawyers in the United Kingdom (mainly in the London area) have by far the highest average fee income of lawyers in the EC. The southern European countries have the lowest income per fully employed professional, and many lawyers are unemployed, particularly in Spain and Greece. There is no numerus clausus to contain the number of people studying to become lawyers. In the more lucrative Latin notary profession there is a numerus clausus.

Lawyers have three ways of billing clients: remuneration by the hour, as a percentage of the value of the case (not permitted by law in some countries), and by service. The method of payment chosen often depends on the sum of money involved in a case. For example, it would be unlikely for many commercial companies to accept to pay 10% of a very large sum of money under dispute. Percentage fees charged by lawyers normally reduce as the case amount increases. A percentage banding method applies. For example, a case amount below 3 500 ECU might be charged at 10%, between 3 500 and 7 000 ECU might be charged at 8% and so on. Unless a code exists which involves only one billing mechanism, lawyers must inform their clients which system applies in the calculation of fees. For hourly rates, unless the lawyer has informed the client and obtained an agreement of the rate before starting the work, the national bar's guideline rate applies. It is also usual for many lawyers to modify their fees according to the economic means of clients.

In case of dispute over a fee, the national bars assess the hours of work chargeable by the lawyer. Lawyers must provide proof of work done. The problem of disputed fees mainly concerns the Belgian and Dutch bars. In time this should diminish as these lawyers become more professional in the billing aspect of their business. Many national bars are trying to help their members to improve their business organisation.

The major achievements of national bars of lawyers have been in tidying up billing practices by developing codes of conduct. In Belgium some bars have accepted a fee code recently formulated by the national order of advocates. The code suggests that hourly rates should be BF 3 000 per hour, not including expenses (just over 72 ECU), for 1 200 chargeable hours per annum (300 days at 4 hours per day). Lawyers do not have to follow the rate formula, however. Many lawyers charge less, especially those practising outside Brussels. Many also work more than eight hours per day. Moreover, most would not apply this rate for tasks such as letter writing.

A relatively high fee rate charged per hour does not necessarily mean a high income. In the Netherlands, the suggested rate for a lawyer by the local bar in The Hague was 265 guilder (118 ECU) in 1992. However, lawyers practising in the Netherlands generally do not earn more than those in Belgium, though their basic hourly rate is higher per capita, and the Belgian lawyers outweigh them significantly in number (Belgium has almost one lawyer per 1 000 people whereas the Netherlands has 0.65 per 1 000). The Dutch lawyers do not take as many cases to court as their counterparts in Belgium, and they rely on a large amount of legal aid assignments. The same applies to lawyers in other countries which have a code of ethics which avoid court action whenever possible.

Many trainee lawyers do not become lawyers at the end of their training period, but go into other occupations (such as banking and commerce), where they can apply their knowledge of the legal system. Trainees receive pay in every country of the EC, compared to trainees in countries such as Austria who must work without pay (earnings go into the lawyers' pension fund).

MARKET FORCES

Demand

The economic recession of the early 1990s had varying effects on the legal profession from country to country. In the United Kingdom, lawyers concentrating on conveyance were badly hit by Britain's property market slump, while in Belgium, lawyers' activity increased.

Bailiff activity can also be affected conversely during recessions as the number of bad debtors increases during these times. Payment difficulties often place small firms in the hands of receivers. Bailiffs then become involved in the liquidation procedures. Bankruptcies have increased in many countries in recent years, and there are concerns that the post-1992 EC market trends will lead to higher levels of SMEs failing. Unemployment has also affected the ability of private citizens to pay mortgage and other debt. Another major activity of bailiffs is delivering legal notices. Their involvement in the legal process increases with the number of cases that go through the legal system.

The notaries sector did well while property markets grew faster than inflation due to speculation. Property sales slumps have negatively affected income from this activity.

Supply and competition

Numerus clausus' limit the number of notaries in all Latin notary countries, as well as the number of huissiers, bailiff officers and their assistants. There is a small notary body in London with only 25 members. In the rest of the United Kingdom solicitors perform notary functions. Notary acts are covered in a solicitors education in the United Kingdom and Ireland. Lawyers have no numerus clausus. Legal services market conditions de facto regulate the number of lawyers in most EC countries.

REGIONAL DISTRIBUTION

The activities of lawyers and notaries vary significantly from country to country. In the United Kingdom, Ireland and Denmark, lawyers do notary work. In the southern European countries and in Germany, the notary is a professional and public

Table 2: Legal services
Top 15 law firms in Europe, 1992

	Number of fee earners
Clifford Chance	1 122
Linklaters & Paines	692
Lovell White Durrant	599
FreshFields	556
Slaughter And May	542
Allen & Overy	516
Herbert Smith	445
Simmons & Simmons	444
Norton Rose	430
Denton Hall Burgin & Warrens	407
Nabarro Nathanson	407
Mckenna & Co.	324
Richards Butler	294
Dibb Lupton Broomhead	285
Nauta Dutilh	270

Source: Law Firms in Europe and Legal Business (April 1991)

legal official appointed by the state. Duties include bringing together disputing parties in an attempt at reconciliation and supervising any agreements which they reach. In "written law" countries (not including Denmark and Portugal) where notaries are public civil servants, they have the statutory power to authenticate various legal documents. German notaries' functions differ by Länder. The notary will be either a simple notary (Nur Notar), a notary-solicitor/advocate (Anwaltsnotar), or a notary-civil servant (Richternotar). In most countries of the EC, bailiffs are liberal professionals. Germany, Denmark and Italy are exceptions. There the function is carried out by state and commune employees. The Union Internationale des Huissiers de Justice et Officiers Judiciaires (International Association of Sheriff Officers and Judicial Officers) is working towards greater harmonisation of this part of the legal services profession.

Belgium

The civil law structure of the Belgian legal system has a relatively high number of lawyers, notaries and huissiers per capita. Most are in small practices or are sole agents, although there is a shift towards the establishment of larger groups. There are 29 separate, autonomous bars of lawyers throughout the country.

There are 520 bailiffs in Belgium (required training: law degree) which are divided across 27 jurisdictions. These bailiffs are ministerial or public officers and their duties range from the preparation of incident reports, the serving of writs, the execution of legal judgements and the collection of debts.

Denmark

Denmark is the one Member State with only one type of legal professional providing private legal services. There are 3 714 lawyers working in a centralised legal system. The size of practices of Danish lawyers is similar to those of Belgium, with many single practitioner and small firms. Legislation now allows corporate practices. A small minority of Danish law firms practise abroad. The number of other EC national lawyers practising in Denmark is insignificant. All lawyers practising in Denmark are members of the "Dansk Advokatsamfund" which has statutory powers of regulation. Danish court judges perform many acts carried out by notaries in the Civil Law countries.

France

The decentralised French lawyers' system has more than 180 autonomous bars throughout the country. On January 1, 1992, the profession of "conseil juridique" was fused with the profession of "avocat", under the title of "avocat". The "conseil juridique" had formerly been unregulated and embodied about 4 900 members, many employed in large units. The number of avocats now exceeds 23 000. A small group of avocats have a monopoly of practice before the Conseil d'Etat and the Cour de Cassation.

Notaries in France number about 7 500. They fulfil the classic role of the Latin notary, and some general advisory work. The bulk of their work is property transfer, similar to notaries in Belgium. In some parts of France notaries also act as estate agents. A separate profession of "avoué", with about 350 members, provides a legal appeal service in France.

There are nearly 3 000 bailiffs in France which collect approximately 40 billion French francs annually. To enter the profession, candidates must have a law degree and pass a special exam.

Germany

The main legal profession in Germany is the "Rechtsanwalt", which numbers nearly 65 000 lawyers (including the former East Germany). A part of German notaries are only notaries, not exercising the profession of the solicitor/barrister (Nur-Notar). In some former Prussian Länder, lawyers are also appointed to notary tasks (Rechtsanwaltsnotare). In Baden-Wurttemberg the Notar is employed in the civil service and performs notary services and probate (hereditary) services. Specialised legal experts also exist. These include patent attorneys (Patentanwalt), tax advisors (Steuerberater) and auditors (Wirtschaftsprüfer). Multidisciplinary partnerships between Rechtsanwälte, Steuerberater and Wirtschaftsprüfer are possible.

Greece

German law influenced Greek civil law. There are about 23 000 lawyers, or "dikigoro". There are about 60 bars, but Athens, Thessaloniki and Piraeus bars account for about three-quarters of all lawyers practising in Greece. Greece has a relatively high number of notaries, 25 000, in comparison to all other EC countries. Notary duties in Greece are mainly state controlled.

Ireland and the United Kingdom

Ireland has a legal system similar to that of the United Kingdom (other than Scotland). The legal profession consists of two branches, namely barristers, who represent clients on the instruction of solicitors, in Court proceedings, and solicitors, who provide a wide range of legal advice and services (including a right to represent clients in Court), in addition to offering services similar to those provided by notaries. There are 860 practising barristers and 3 600 practising solicitors in Ireland. Solicitors admitted to practise in Ireland may be admitted to practise in England/Wales and Northern Ireland without the necessity of passing an aptitude test or completing an adaptation period under the EC Diplomas Directive. Similar provisions apply to solicitors admitted to practise in England and Wales and Northern Ireland to practise in Ireland. There are also reciprocal arrangements for barristers with the bars of England/Wales and Northern Ireland.

Italy

In Italy there are approximately 59 700 lawyers (avvocato) and trainees (procuratore). There is a six-year period where a new lawyer has the title of procuratore. There are proposals to place all lawyers under one title, avvocato. There are 160 bars all of which are autonomous and self-regulatory. Italy's 5 000 notaries have functions which are civil and commercial in nature. A large amount of legal work of a commercial and taxation nature is carried out in Italy by "commercialisti" or "ragioneri" (accountants).

Luxembourg

Out of the total 434 lawyers on the Roll for the legal year 1991-92, 60 or 15% were from other Member States. Law in Luxembourg is basically influenced by France and Belgium therefore law students pass their degrees mainly in France and Belgium.. The new law regulating the profession of avocat which goes back to 10 August 1991, granted the profession a quasi-monopoly of law practice for both Court activities and non-Court activities.

There 32 notaries and 19 bailiffs in Luxembourg. No partnerships between lawyers and notaries are allowed. The law also prohibits MDP's between lawyers and other professionals.

Netherlands

There are approximately 6 854 lawyers in the Netherlands. Partnerships between notaries and lawyers can exist in the Netherlands. Many law firms in the Netherlands are accordingly combined practices of advocaten and notarissen. There are approximately 1 000 notaries in the Netherlands and about 7 000 assistant notaries and support staff. Tax advisers (belasingsadviseurs) are also able to practise with lawyers. The "Nederlandse Orde van Advocaten" has statutory powers of regulation. There are 19 local bodies under this umbrella organisation. Lawyers in the Netherlands can advertise their services.

The "deurwaarder", of which there are 220 not including an additional 200 deputies, is more or less the equivalent of the bailiff in France and Belgium. In the Netherlands, these bailiffs represent creditors before the "kantongerecht", or district court, for sums of money up to 5 000 florins and are specialised in the collection of debts before legal proceedings begin.

Portugal

In Portugal, only the 10 312 lawyers, or "advogados", can give legal advice and practise at the courts. The "Ordem dos Advogados" is the national bar. "Solicitadores", which number about 900, practise in fields such as registrations and as "avogados" auxiliary. There are 384 notaries employed by the Portuguese state.

Spain

Spain has approximately 58 000 lawyers (abogado), a high number per capita. although many do not have a practice law full-time. Numbers have fallen in recent years. Regulations have limited the size of Spanish practices to 20 professionals. There are approximately 6 000 "procuradores" for procedural representation before the Spanish courts. These may merge with "abogados" in the future. There are only 2 000 notaries in Spain.

United Kingdom

In the United Kingdom overall, there are 65 803 lawyers of which most are solicitors (58 010). Almost 90% of these lawyers practise in England and Wales where there are 7 160 barristers and 51 000 solicitors. In Scotland there are 283 advocates and 5 773 solicitors while in Northern Ireland there are 350 barristers and 1 237 solicitors.

INDUSTRY STRUCTURE

Some English and Dutch law firms employ hundreds of lawyers, whereas in other EC countries such developments are forbidden, or have never developed due to fragmented bar structures and protection of the profession. The largest firms of solicitors are in London. These firms tend to be very active internationally in Europe and throughout much of the world. Solicitors in the United Kingdom can now practise in limited liability companies.

Foreign lawyers can also compete for business in the United Kingdom, and London has attracted many foreign law firms. From 1 January 1992, these lawyers could enter partnerships with English solicitors.

Belgian lawyers' firms have yet to establish themselves internationally, but Brussels, as the main seat of the EC institutions, has attracted lawyers from other parts of the EC. These do not usually practice in the Belgian courts, but are engaged mainly in EC law.

The German system was the first to open its doors completely to competition. Lawyers wanting to set up practices have relatively easy access to the German bars formerly closed to outsiders, but very few lawyers have exploited this development. Many foreign lawyers entering the German legal system work at building up clients in the commercial enterprise sector. In 1987, regulations changed to allow for larger firms of lawyers to develop.

France has attracted several foreign legal firms, but the French have been slow about penetrating the systems of non-French speaking countries. Some larger firms of avocats are developing, but most firms are still small practices.

In Italy large legal firms are emerging in major cities such as Milan and Rome. There are few solo foreign lawyers practising in Italy.

Most Greek lawyers practise either alone or in small units; partnerships between lawyers were forbidden until recently, which has prevented the growth of practices. The Greek shipping industry has attracted a few foreign lawyers.

REGULATIONS

Currently there are no regulatory structures for the legal profession at EC level, but the CCBE is working to achieve change. Its principal aim is harmonisation of the legal profession within the EC. A CCBE council for advice and arbitration exists to settle disputes between lawyers or between bars and Law Societies throughout the EC. It will act as the joint body within the EC to supervise international practice of the profession throughout the EC. To promote the study of all questions affecting the profession of the law and to develop solutions designed to coordinate and harmonise the practice of the profession. The CCBE has already produced a Common Code of Conduct applicable throughout the EC.

Each member state governs its legal profession under its own statutes. Legal professionals must consider their role as one of providing services of a very specialised nature to clients. The legal systems of the EC countries are of three types: a Scandinavian system (only Denmark), a Common Law system (United Kingdom and Ireland) and a Civil Law system in continental countries of the EC.

Lawyers have had to fight to establish the right to practise throughout the EC. Initially, some legal professionals argued that the Treaty of Rome did not concern legal services. A series of cases has modified the European Court's and other bars' points of view. Currently the only Directive dealing with lawyers' freedom to provide services is the Directive of 22 March 1977. This is a limited measure to cover temporary provision of services. A new EC Directive on establishment being drafted should be in force soon. At a CCBE plenary session held in Dublin in May 1991, most legal representatives for EC countries accepted the new draft Directive. Those representing France, Spain and Luxembourg opposed some of the draft document's contents. A new draft has since been prepared. The CCBE and the Commission of the EC have informally discussed the draft Directive. The Commission will undertake work on proposals only if a larger majority of the delegations represented by national bodies support them, if governments do not object, and if proposals are progressive concerning mobility in the EC.

On December 21, 1988, the EC Council adopted a Directive concerning the recognition of Higher Education Diplomas. This allows lawyers to have their qualifications recognised in all EC countries. Aptitude tests are helping to assess the level of migrants' qualifications.

There is much debate within the profession about various aspects of European integration and the evolution of a "European bar". In practical terms the integration of the legal professions in Europe is still at a very early stage.

OUTLOOK

There will be greater movement of lawyers within the Single Market, but it will probably be limited because of language barriers. Aptitude tests help assess the level of competence of legal professionals wishing to practise outside the country in which they received their professional training. However, the establishment of multi-national practices (MNPs) is beginning to increase. This growth in MNPs should follow a similar pattern of development as the accountancy services sector where international companies have large numbers of professional partners. A future challenge for the legal profession will be to bring legal systems in each country of the EC closer on common nomenclature for legal terms and to standardise legal practices across the EC. This will be a difficult task, as the practices have sometimes been used for centuries

Legal professionals, qualified to work throughout Europe, must learn the deontology and legal language of the professional services in other countries. The smaller countries of the EC may eventually have more of their legal professionals prepared to work in other countries because they tend to have most multilingual professionals. This includes cross border assignments and relocation.

In the EC, overall income from legal services increases between 5% and 10% annually, and all indications suggest that this growth will continue in the long-term. Growth areas include divorce settlements, the commercial sector, legal aid, the environment, the health care sector, accident litigation (large scale disasters), and legal advice. One area that could provide major growth for legal services is the medical profession. Before the 1990s, many medical professionals in the EC did not have to worry about malpractice suits, but this is changing, and could offer significant opportunities for legal professionals.

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Accountancy services
NACE 836

A small number of multi-partner international firms, which serve mainly large corporations, provide accountancy services to large international corporations and financial institutions. A plenitude of small practices supply accountancy, tax, and bookkeeping services to small businesses, and occasionally to subsidiaries of large corporations.
Six major accountancy firms make a very important part of this sector's turnover. Combined turnover has grown faster than inflation over the past decade. This reflects growth in EC economies, and an increase in revenues generated by accountancy firms from tax and management consulting services. The estimated turnover for accountancy services was roughly 40 billion ECU in 1991. More than half a million persons are employed full-time in the sector. A little more than one fifth of these are professionally qualified accountants, and are members of professional organisations represented in the Fédération des Experts Comptables Européens (FEE).

INDUSTRY PROFILE

Description of the sector

Accountancy services are offered by accountants and accountancy firms to commercial companies, associations, non-profit organisations, public bodies and private individuals. In the Panorama of EC industry 1991-1992 the accountancy services monograph referred only to professional accountants. Data included statistics for accountants working as company employees (not considered accountancy services) and qualified accountants who have continued their membership of professional organisations, but carry on non-accountancy activities. The 1993 edition covers all personnel, including professional accountants and support staff, working in accountancy firms or independently.

In order to offer certain accountancy services, it is often a legal requirement that the provider holds a professional qualification and belongs to a recognised accountancy body. Table 1, below, lists such professional bodies in the EC.

Eurostat data exists for accountancy services. However, these data contain an element of management consultancy services provided by members of the accountancy profession. Specialised trade journals provide some data braking down fee income by category of activity. There are no official data for the number of firms offering accountancy services in the EC. It is estimated that there are tens of thousands of such firms in the EC. The majority are very small practices which consist of one to five persons. The range of services offered by each of the small firms generally tends to be limited, but the range of services provided by small firms as a whole is large. There is a large group of firms, numbering thousands, which have more than five persons but less than 100 persons. There are relatively fewer accountancy service firms with above 100 persons in the EC. Many of these latter firms were formed by grouping smaller practices together.

The largest firms, known as the "Big Six", each have very large numbers of people working for them. The largest accountancy service firm in the world, KPMG, has reached worldwide employment levels above 75 000. A large proportion of these, 34 200, work in Europe. These firms have personnel located throughout the world in hundreds of offices, each of which has partners, professional accountants, technical and other support staff. The "Big Six" firm with the smallest number of offices in Europe is Arthur Andersen. KPMG has the largest number of European offices, 401 in 1992. Thus, the major firms are an aggregation of many small practices.

Table 1: Accountancy services
Accountancy bodies in the EC

Belgique/België	Institut des Réviseurs d'Entreprises (I.R.E.)
& Luxembourg	Institut des Experts-Comptables (I.E.C.)
Danmark	Foreningen of Statsautoriserede Revisorer (F.S.R.)
	Foreningen of Registrerede Revisorer (F.R.R.)
BR Deutschland	Wirtschaftsprüferkammer (W.P.K.)
	Steuerberaterkammer (S.B.K.)
	Institut der Wirtschaftsprüfer in Deutschland
Hellas	Soma Orkoton Logiston (S.O.L.)
	Association of Certified Accountants an Auditors of Greece (S.E.L.E.)
España	Instituto de Auditores-Censores Jurados de Cuentas de España (I.C.J.C.E.)
	Consejo General de Colegios de Titulares Mercantiles (C.G.C.T.M.)
	Instituto de Contabilidad y Auditoria de Cuentas (I.C.A.C.)
France	Ordre des Experts-Comptables et des Comptables agréés (O.E.C.C.A.)
	Compagnie Nationale des Commissaires aux Comptes (C.N.C.C.)
Italia	Consiglio Nazionale dei Dottori Commercialisti (C.N.D.C.)
	Consiglio Nazionale dei Ragionieri e Periti Commerciali (C.N.R.P.C.)
	Società di Revisione
Nederland	Nederlands Instituut Van Registeraccountants (N.I.V.R.A.)
	Nederlandse Orde Van Accountants-Administratieconsulenten (N.O.V.A.A.)
Portugal	Camara dos Revisores Oficiais de Contas (C.R.O.C.)
United Kingdom	Institute of Chartered Accountants in England and Wales (I.C.A.E.W.)
& Ireland	Institute of Chartered Accountants of Scotland (I.C.A.S.)
	Institute of Chartered Accountants in Ireland (I.C.A.I.)
	Chartered Association of Certified Accountants (A.C.C.A.)
	Chartered Institute of Management Accountants (C.I.M.A.)
	Chartered Institute of Public Finance and Accountancy (C.I.P.F.A.)
	Association of Authorised Public Accountants (A.A.P.A.)
	Institute of Certified Public Accountants in Ireland (I.C.P.A.I.)

Source: FEE

Table 2: Accountancy services
Income by major branch, 1991

(%)	Audit	Tax	Consultancy	Other	Total
Belgique/België	50	23	14	13	100
Danmark	59	12	22	7	100
BR Deutschland	51	21	27	1	100
España	54	21	22	3	100
France	58	10	18	14	100
Nederland	58	17	16	9	100
Portugal	49	13	36	2	100
United Kingdom	43	23	21	13	100

Source: European Accounting Focus

Some are newly established offices and others were previously independent practices which were acquired or merged, and thereby integrated into a group.

Although self-employed accountants can and do work internationally, this activity tends to increase as the size of the firm increases. Larger firms also have greater scope than small firms to offer a wider range of services. They often have several highly specialised niche services within their overall structures. As in other sectors, small firms tend to concentrate on a limited number of market segments, whereas large firms can offer a more comprehensive , full service approach. However, the small firm section as a whole coverts the full spectrum of services offered. Irrespective of their size, accountancy firms do not necessarily provide all of the accountancy services required by each of their clients, even though they may offer an extensive range of services.

A sub-professional level of accountancy services exists. It consists of firms which do not employ professional accountants and only offer services such as bookkeeping, data processing and payroll services. The overlap between such services and human resources services was taken into account when calculating employment and turnover data. Care was taken to adjust the estimates accordingly.

Activities of the accountancy service firms include services such as: accounting; statutory audits; merger audits; contribution audits; public sector audits; insolvency practice; legal advice/expert witness; representation of clients; investment services (including advice); tax advice; and consulting (marketing, strategy, information technology, etc.).

The type of services provided by an accountancy firm to each of its clients varies. Legal requirements sometimes require the involvement of professional accountants or firms, whereas other services are not subject to such requirements. Such requirements vary from country to country and/or as a result of the legal form of the client. Some companies are exempt from the audit requirement if their turnover is below certain thresholds, or if they have certain legal form. Cooperatives, private limited liability companies, partnerships and associations are often exempt from many of the accounting and auditing obligations imposed on publicly quoted companies.

Services other than those required by law have been an important source of growth for the accountancy services sector. In some countries, accountants act in a fiduciary capacity for clients, handling investments and similar financial matters. In recent years management consultancy has been one of the sector's major growth areas. Management consultancy is covered in a separate monograph in this chapter.

In several countries, some of the bigger firms derive less than half of their income from accountancy and auditing. The situation differs significantly from one country to another, largely due to the differing legal requirements imposed by Member States in relation to auditing, as well as because of market developments. Services other than accounting, auditing and tax advice are becoming of increasing importance.

Main indicators

At one end of the scale, the bigger firms are expanding their services to provide more global advice in areas such as strategy, marketing and research. At the other extreme, many of the smaller practices concentrate almost totally on traditional accountancy services. In their case, management consultancy, marketing and research services account for less than 5% of total fee income.

It is not easy to separate the value of non-accountancy services from others, because data is not available for every firm in every country. However, some "fee split" data is available from professional associations and specialist publishers. Specialist publications include "European Accounting Focus", published by Intellectual Property Publishing, and "Accountancy" the journal of the Institute of Chartered Accountants in England and Wales.

The research carried out by the specialist press into fee structure and income often covers little more than the "Big Six", and never more than fifty firms.

Germany, France and the United Kingdom account for about three-quarters of the EC market for accountancy services. The southern European countries have the greatest growth potential.

Accounting and auditing services form the core of the firms' activities. These two services, which are often combined into a single service category, account for about two-thirds of turnover. Tax advice is the next most important service, accounting for about one-fifth of the turnover. Management consultancy generally accounts for between 10% and 15%. Lastly, legal advice services often relate to matters such as transfer pricing, corporate legal structure, insolvency, and occasionally debt collection and factoring.

International comparison

The "Big Six" firms head the league tables in practically every country in Europe. Of the EC countries, Greece is the only country where one of the "Big Six" is not in first place. This is because the State body, Soma Orkoton Logiston (Institute of Public Accountants), until recently enjoyed a monopoly to practise all regulated activities reserved to the accountancy profession, including accounting and statutory audit. This will change in March/April 1993 as a result of a presidential decree of July 1992. The biggest accountancy service firms in EC are in the United Kingdom. The operations in the United Kingdom of Coopers & Lybrand and KPMG each employ almost seven thousand staff. A dozen firms each have more than one thousand staff. This contrasts significantly with the other three of the largest EC countries.

In France KPMG has a twenty-seven office operation which is only fractionally smaller than its practice in the United Kingdom. There is a big drop down to Arthur Andersen's French based firm, which has only a little more than two thousand persons. Another three firms each have over one thousand staff.

In the Italian market Arthur Andersen is the biggest firm with a relatively small staff of just over six hundred people. The "Big Six" head the field, and below them is Ria & Mazars which has only just over one hundred staff.

According to the tables published in European Accounting Focus, the major accountancy firms in Germany are not as big as those in the United Kingdom and France. KPMG heads the accountancy league table in Germany, well ahead of the other "Big Six" firms.

The US market is roughly the same size as the EC market despite having slightly fewer inhabitants. Fee rates are somewhat higher, even with a weak dollar. In the mid-1980s the US market was significantly larger in ECU terms because of the exchange rate at that time.

In Japan, the development of the accountancy profession has taken place during the last hundred years. The "Big Six" accountancy firms have achieved a strong position in the Japanese market through acquisition and mergers with local firms and through organic growth. The largest Japanese accountancy firm, Tohmatsu, became part of the Deloitte Ross Tohmatsu network. The top four firms in Japan are associated with the "Big Six". There is a reluctance among many major Japanese companies to use services provided by accountancy firms, especially consultancy: instead they tend to use employees.

MARKET FORCES

Demand

The range of services provided by accountancy firms is changing from being largely accounting and auditing to a much broader spectrum, including management consultancy. This includes investment planning and corporate strategy. Nonetheless, auditing has been an area of major development. Since the 1980s there has been significant demand for acquisition studies and merger audits.

Legal requirements oblige many companies to have their annual financial statements audited. A properly approved auditor or firm of auditors must state whether the financial statements they have audited give a "true and fair view" of the results of the company's activities and its financial position, and whether accounts comply with the relevant legal provisions.

The purpose of the independent external audit is to lend credibility to financial information, thereby enhancing the effectiveness of economic decisions made on the basis of it. In addition, many companies and other entities not subject to the statutory audit requirement voluntarily request contractual audits, in view of the benefits that accrue from this service. Finally, there is growing demand for audit-related services, which involve the issuance of special-purpose reports and opinions of the application of certain defined procedures.

Tax advice services include tax planning or tax compliance. The former consists of advice on the application of taxation law. Tax compliance relates to the preparation and presentation of the various returns and declarations required by law, and assistance to clients in their dealings with the relevant authorities.

In the past, many small companies, self-employed people and small shops are unable to do any part of their own accounting and bookkeeping and therefore depended on the services of accountants. However, because computer hardware and accountancy software programmes have fallen so much in price, nearly every business can afford the investment required. Nonetheless, many businesses continue to use accountancy service firms in order to make better use of their own resources and to have access to specialist expertise.

Professional accountants are either the leading, or significant, providers of insolvency services in those countries where they may act in this capacity. Their role may be that of liquidator, receiver, or administrator. Clients may also turn to accountants for strategy advice before a critical or unredeemable stage is reached in its financial position. For this reason, the service provided is often known as "insolvency and corporate recovery."

Supply and competition

In every EC country, the profession is organised in one or more bodies (see table 1), which enjoy a degree of autonomy from the State which varies from country to country. Self-regulation has nevertheless always been a key factor in the organisation of the profession. In Greece, where regulated accountancy services were provided until recently by a civil service agency, the introduction of EC directives is leading to the creation of an independent body similar to those in other Member States in 1993. In some countries there are several organisations of which an accountant may be a member and which award professional qualifications. Not all organisations represent properly qualified professional accountants.

The process of qualifying as a professional accountant is a long one, requiring both theoretical knowledge and practical experience. The entire process can last from six to seven years, or even up to ten or fifteen years in some countries. Many of those working in lower positions in accountancy firms are doing so to gain the practical experience necessary to qualify as a professional accountant. Most people working in the accountancy services sector are not professional accountants. They include support staff and technical staff as well as trainee accountants.

In the EC approximately 300 000 persons are members of professional organisations belonging to the Fédération des Experts Comptables Européens (FEE). About one-third of these persons work in the accountancy services sector. Most of the remaining 200 000 members of professional bodies represented in FEE, are employed as accountants in industry, commerce, education and public sector. Some retain their membership of professional accountancy bodies even when they carry out different functions.

There are several associations representing accounting technicians having lower qualifications. At present, these exist at national level only. The remainder of those who work in the accountancy services sector, numbering hundreds of thousands, do not belong to any organised body. In some countries, only those accountants or auditors working in public practice may be members of the relevant professional bodies. In others, all those having the appropriate qualification, be they in public practice, in industry, commerce, education, the public sector, unemployed or retired, or working abroad, can retain their membership of the professional bodies. There is a trend towards more accountants becoming members of organised bodies.

When a person becomes a professionally qualified accountant, this often marks an important point in his or her career: he or she may become eligible to move into jobs requiring higher qualifications. Some opt to stay with the company they trained in, others open their own practices, and some use the qualification to move into other senior management positions. There are no restrictions on the number of accountancy firms which may be established in EC countries, nor is there any limit or numerus clausus restricting the number of professional accountants. The number of accountancy firms in the EC has increased throughout the 1980s. The larger firms have tended to decrease in number because of mergers and acquisitions.

Table 3: Accountancy services
Top 20 firms by fee income, 1991

(million ECU)

Coopers & Lybrand	826
KPMG Peat Marwick	708
Price Waterhouse	573
Ernst & Young	571
Touche Ross	500
Arthur Andersen	473
Grant Thornton	169
BDO Binder Hamlyn	164
Pannell Kerr Forster	123
Stoy Hayward	98
Kidsons Impey	86
Clark Whitehill	77
Robson Rhodes	53
Moore Stephens	51
Neville Russell	48
Moores Rowland	44
Baker Tilly	37
Haines Watts	29
Saffery Champness	24
Finnies	20

Source: KPMG, European Accounting Focus and Accounting

The largest firms have many office locations and their staff generally serve clients within close proximity of their offices. Large international accountancy service firms often have separate offices to deal with international clients and, in addition, a centrally coordinated team acts as a consolidator of information. With many offices spread throughout most countries, these firms are also able to assist clients who have multiple business units spread throughout a country.

The bigger the accountancy firms are better equipped to provide international accountancy services to major international companies. Differences between countries as regards legal requirements and other regulations tend to create problems. The assistance which accountancy service firms can provide in coping with these differences makes them extremely valuable to multinational corporations.

INDUSTRY STRUCTURE

Companies

The large accounting firms have thousands of partners, and their full-time employees normally amount to about ten times the number of partners. Accountancy service firms have a high ratio of staff to partners in comparison to other businesses and many professions. The "Big Six" accountancy firms have roughly 9 000 partners between them in Europe. Their total staff numbered 142 300 in 1992 according to European Accounting Focus. Smaller firms of professionally qualified accountants generally have a higher ratio of qualified staff to support staff. Many accountancy firms have grown considerably in size as a result of mergers with other major firms and acquisitions. Beneath these six firms there are fourteen accountancy firms which had more than 20 million ECU of fee income in 1991 (Table 3).

Strategies

The major accountancy firms have many partners partly because their networks in Europe are made up of independent locally established firms with locally qualified accountants. Partnerships are offered to people who join the firm bringing with them clients, or to personnel whose careers develop within the firm. Acquisition of smaller firms is a quick way of gaining clients. The acquired firms benefit from being part of a large international group. In some smaller countries many major accountancy firms have chosen not to get involved with local firms. Portugal is a good example; several international firms developed Portuguese practices from scratch.

One of the "Big Six", Arthur Andersen, has been in the forefront in developing the non-accountancy services area of activity. In some countries more than half its turnover comes from management consultancy services. Its success in this sector has not escaped the attention of other firms, many of which are now trying to increase their share in consultancy services.

Accountants practising alone and very small partnership firms often concentrate on smaller, often private, companies, sole traders, clubs, associations and individuals. This constitutes a large proportion of total demand for accountancy service. Local offices of large firms and small firms can also opt to specialise in niche practices or develop broad range service structures.

REGULATIONS

Accounting and auditing services are highly regulated in the EC. Regulations are both numerous and complex and vary from one country to another, despite the attempts made at Community level to bring them closer together. These regulations fall into two main categories:

- Regulation of the services themselves including rules governing the manner in which the services should be provided;
- Regulation of the accountancy profession and of its members working in this sector.

Regulation of services

Many of the services provided by the accountancy profession have been regulated for a long time in most European countries, often in different ways. These services include statutory audit, accounting, public sector audit, contribution audit, insolvency practice, etc. National regulations define the type of work to be carried out, when, under which conditions and by whom.

Statutory audit is the only service provided by the accountancy profession which is regulated in all EC countries in the same way. It is also the only service which has been subject to specific EC directives. As a result, all companies above certain minimum thresholds must now prepare and file financial statements audited by an independent expert. All the other services have, until now, kept their own national specificities. Certain services are regulated in some countries, but not in others; some services are reserved to one profession in certain countries but are shared between several professions in other countries, or even forbidden to the accountancy profession in others. Consequently, the range of services provided by the profession varies significantly within the EC as does the degree of competition which exists in each of these markets between the accountancy profession and other professions.

Regulation of the profession

In addition to the services it provides, the accountancy profession itself has been regulated for a long time in European countries. Because the economies of the Member States developed in different ways, the regulation of the profession differs from one country to another. The degree of self-regulation, which historically has been very significant in the profession in many countries, has decreased in the recent past, mostly as a result of the implementation of EC directives.

In a majority of Member States, the profession has been created and organised by law or by public authorities. Even in those countries where the profession has been privately organised, it enjoys official recognition by the State, which entitles its members to carry out regulated activities. Regulation, be it public or private, applies to a number of areas such as the definition of professional titles, protection of the titles, membership requirements, minimum levels of education and train-

ing, continuing education, ethical standards or codes of conduct, technical standards, additional licensing requirements for specialised areas of practice, rules for establishment of professional firms, etc.

In the EC, only limited attempts have been made to harmonise these rules. This has resulted in the Eighth Company Law directive on "the approval of persons responsible for carrying out statutory audits of accounting documents". The directive established minimum education and training requirements for statutory auditors, be they individual or firms. However, Member States remained free to impose more demanding requirements, and many did.

Another directive applying to the accountancy profession is the First Mutual Recognition directive which, when implemented, allows professionals from other Member States to seek recognition of their qualifications so as to be able to carry out regulated activities without having to requalify. In the case of the accountancy profession, Member States can require migrants to pass an aptitude test on local laws and ethical requirements. Although such a regime previously existed in some countries such as Belgium, France, Ireland, Luxembourg and the United Kingdom, it is new for others. This new system should have come into force early in 1991, but its implementation has been delayed in a number of countries. However, it is already obvious that it will not generate significant flows of accountants across EC internal borders. Despite making it easier for professional accountants to establish themselves abroad, differences remain between national laws and regulations with which accountants must be familiar. These differences will continue to restrict the free movement of accountants within the EC.

OUTLOOK

Future prospects are excellent for the accountancy services sector. It is likely that regulations will lead to a tightening up of accountancy practice and the raising of standards. The accounting-related company law directives have already led to an increase in demand for accountancy services in many EC countries. They have also improved the comparability of published financial reports. To a large extent growth in the accountancy services sector will depend on growth of the economies within the EC Member States.

Small accountancy firms that have offices in only one or a few EC Member States may benefit from legislation to facilitate the cross-border provision of services. However, it is considered that this will not have a significant impact before the end of the century.

Developments in Central and Eastern Europe have also brought increased demand of accountancy services. Accounting and the accountancy profession are essential elements of the infrastructure of market economies. As the countries in Central and Eastern Europe undergo a process of transition towards market economies, they need the services of professional accountants from the EC and other market economy countries. Initial demand is for services including advice on changes in the regulatory environment, privatising state-owned enterprises and attracting foreign investments.

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Market research
NACE 839.1

The EC accounts for 42% of the world market for market research. Eight of the world's top 10 market research companies have their headquarters in the EC. There are more than 1500 companies and consultancies in the EC offering market research services. They employ more than 30 thousand permanent employees and 100 thousand freelance interviewers, researchers, self-employed consultants and sub-contractors. In 1990, the market research market amounted to more than 2.2 billion ECU in the EC.

INDUSTRY PROFILE

Description of the sector

Market research analyses the markets for all kinds of products and services, and provides a link between consumers, customers, the general public and the market. It is used by marketers to: identify and define opportunities, threats and problems; initiate, modify and evaluate marketing activity; and improve understanding of marketing processes.

According to a study made by ESOMAR, 52% of all EC market research is commissioned by manufacturing companies, 14% by companies in the services sector, 9% by government bodies, 5% by wholesale and retail organisations, 5% by advertising agencies, 4% by research organisations and the remaining 10% by others. The purpose of market research is to understand consumer demand. Attitude surveys provide suppliers of goods and services and potential suppliers with information about what people want and why they want it.

Market research enhances economic efficiency by enabling companies and other organisations to provide the goods and services that customers want by investigating their needs, beliefs and behaviour. This helps companies to avoid wasting resources in developing and producing undesirable products, or to avoid communicating the benefits of their goods and services inadequately.

Market research specifies the information required to address these issues; designs the method for collecting the information; manages and implements the data collection process; analyses the results; and, communicates the findings and their applications.

Main indicators

The total European market accounts for 46% of worldwide expenditures on market research: 42% in the EC and 4% in other European countries. This compares with a share of 36% for the USA and of 7% for Japan in 1990.

Within the EC, nearly two thirds of the total market research expenditure is accounted for by three countries: France, the United Kingdom and Germany. The first two account for 24% of the European market each, and Germany accounts for another 22%. The contribution of former East Germany, which is for the first time included in the German figure, is estimated at approximately 5% of the total German expenditure. Spain continues its rapid upward movement and replaces The Netherlands in fifth place. In broad terms, the most rapid growth continues to be seen in Southern Europe, particularly Spain and Portugal.

Despite the growing internationalisation of markets, about 88% of EC market research is still conducted for national clients although many of these may be subsidiaries of multinational corporations domiciled elsewhere. Sub-contracting to foreign research organisations when coordinating international studies accounts for around 5% of research companies' business. About two thirds of this is accounted for by two countries: the United Kingdom (39%) and France (25%). There are no hard data on the source of foreign clients or the destination of sub-contracted revenues. However, industry reports suggest that the proportion of intra-Community research is increasing.

Recent trends

The market research market grew rapidly between the 1950s and the 1980s. Growth is currently slowing due to the worldwide recession. Although it is difficult to find accurate data on market research turnover figures, since the distinction between market research information, market consultancies and related disciplines is sometimes difficult to make, it is estimated that the real annual growth rate of this sector over the past five years was in excess of 10%.

Table 1: Market research
World top 10 market research companies, 1990

	Turnover (million ECU) (1)	Countries with office (2)	Head office	Ownership
1. A.C. Nielsen	866	27	USA	Dun & Bradstreet, USA
2. IMS	339	62	UK	Dun & Bradstreet, USA
3. AGB	200 (3)	21	UK	Maxwell Foundation, USA
4. Arbitron	147	1	USA	Control Data Corp., USA
5. IRI	131	4	USA	Public Company, USA
6. GfK	128	25	D	Public Association, D
7. Research International	95	29	UK	WPP Group, UK
8. Walsh	79 (4)	12	UK	Private, USA
9. MRB	76	8	UK	WPP Group, UK
10. Infratest Burke	72	8	D	Private, D
11. MAI	72	4	UK	Public Company, UK

(1) Excluding associates
(2) Including associates
(3) 1989
(4) Includes some non-research revenues
Source: Main research companies, Marketing News, ESOMAR estimates

Table 2: Market research
Sources of market research revenues, 1990

(%)	Manufacturing	Services	Advertising agencies	(Semi) governm.	Wholesale/ retail	Research organi-sations	Others
Belgique/België	35	20	10	10	10	15	0
Danmark	20	10	15	15	10	20	10
BR Deutschland	61	9	5	13	4	4	4
Hellas	64	7	9	4	2	7	7
España	51	8	11	9	7	6	8 (1)
France	50	19	4	11	6	4	6 (1)
Ireland	40	35	5	8	5	5	2
Italia	61	9	5	7	3	3	12
Luxembourg	3	20	10	30	10	27	0
Nederland	40	23	3	15	10	9	0 (1)
Portugal	48	5	19	6	4	13	5
United Kingdom	50	16	4	4	3	N/A	23
EC	52	14	5	9	5	4	10

(1) Estimate based on average of comparable countries
Sources: Trade associations and ESOMAR estimates; other countries' data not available

The 1991 ESOMAR study on the size of the research industry in 1990 showed an 11% growth in the size of the market within the EC, from 185 billion ECU in 1989 to 224 billion ECU in 1990. The ESOMAR study covers 20 European countries and uses data and estimates provided by national market research societies, trade associations, expert industry watchers, and the world's major research groups and chains. These turnover totals exclude market research conducted "in-house" by marketing companies, advertising agencies, governmental organisations, academic institutions and other organisations conducting "in-house" market research.

MARKET FORCES

Demand

Traditionally, manufacturers of packaged consumer goods were the main users of market research. Companies which market services (finance, leisure etc.) have become a sector of growing importance to market research suppliers. The increasing pace of development in technology, growth in the information industry, diversification of life-styles, and proliferation of media has made marketing research ever more necessary to monitor changes in the market place. In recent years, thus, a much wider range of business and non-commercial organisations (including public sector and government) have used market research to aid their planning, decision making and policy formation.

Research can be categorised by type of product or subject, by frequency of research (ad hoc versus continuous research), by type of research (qualitative versus quantitative), or by mode of information collection (telephone interviews with questionnaire, one-on-one face to face interviews, focus group discussions, desk research, mail survey and so on). Face-to-face interviews clearly account for the majority of quantitative research expenditure in the EC: 72% compared to 20% telephone interview studies and 8% mailed questionnaire studies.

Almost three-quarters (73%) of market research studies are related to consumer products and services. Ad hoc research

Table 3: Market research
Top 10 market research companies in the EC, 1990

Research company	EC market research turnover (million ECU)	EC countries with office (inc. associates)	Current ownership/Acquired /Merged with
1. A.C. Nielsen (1)	293	11	Dun & Bradstreet, USA (acquired 1984)
2. IMS (1)	135	11	Dun & Bradstreet, USA (acquired 1988)
3. GfK	118	7	Public association, D
4. AGB (1) AGB Research, 1988) Went private 1990	113	10	Maxwell Foundation, UK (acquired
5. Research International	68	10	WPP Group, UK (acquired 1989)
6. Infratest Burke (acquired Burke in Europe, 1980)	63	5	Infratest, Private corporation, D
7. SOFRES	58	5	SEMA Group, F
8. Cecodis	54	3	Closely held corporation, F
9. MAI	52	3	MAI, UK (acquired NOP & MIL, 1989)
10.Millward Brown	31	2	WPP Group, UK (acquired 1989)

(1) 1989 figures
Sources: Major research companies, ESOMAR estimates

Table 4: Market research
Breakdown by Member State, 1990

(%)	Market research expenditure	Advertising expenditure	Gross Domestic Product	Population
France	24	17	21	17
United Kingdom	24	21	16	18
BR Deutschland	22 (3)	23 (3)	26 (3)	19 (4)
Italia	11	12	17	18
España	6	15 (2)	7	12
Nederland	6	5	5	5
Belgique/België	3	2 (2)	3	3
Danmark	1	3 (2)	2	2
Ireland	1	1	1	1
Portugal	1	1	1	3
Hellas	1	1	1	3
Luxembourg	(1)	N/A	(1)	(1)
Total EC	100	100	100	100

(1) Less than 0.5%
(2) 1989 statistics were used
(3) Including East Germany
(4) Excluding East Germany
Sources: ESOMAR, The European advertising & media forecast, Eurostat

outweighs continuous research by 56% to 44%. Most of the latter is panel research (74% of continuous research and 34% of the total). The other 26% of continuous research is split evenly between omnibus research and other continuous research. About 80% of market research expenditure in the EC is from quantitative research, 15% from qualitative research and 4% from desk research and secondary activities.

Relatively small countries with a highly developed infrastructure tend to favour telephone questionnaire studies (Denmark) or mail studies (Netherlands). For qualitative research, focus group discussions clearly account for the majority of the research expenditure in the EC (approximately 59%) compared to 41% for in-depths interviews, with variations between countries due to cultural factors.

Supply and competition

The structure of the market research industry is remarkably similar across the EC Member States. Generally, the market can be split into three parts: media market measurement: audit shops and scanning (the analysis of consumption from computerised tickets shops); specialised market research by multinational research companies and local unaffiliated companies. These latter include specialised quantitative research, ad hoc research and qualitative research.

The evolutionary process in the market research market indicates that when a national research market first develops, it relies heavily on omnibus studies, brand barometers, qualitative and small-scale quantitative research. Subsequently, there is a major leap in development in which a retail audit and/or consumer panel (together with media research services - especially television audience measurement) is established. These syndicated continuous services, generally offered by one or two dominant suppliers, then claim a significant proportion of spending on market research. This leaves relatively little for the ad hoc research sector, which is more geared to problem solving and the identification of opportunities.

When a market reaches a certain size and stage of maturity, an equilibrium is established, in which continuous research captures about one-third of total expenditure. Other regular services (e.g. advertising tracking, quality of service monitoring) add a further semi-contractual sector, partly substituting for ad hoc studies and partly reflecting overall growth in the information market.

Other geographic variations stem from broader economic and market influences. In smaller countries, less research on new product development is undertaken as the major R&D activities and corporate headquarters are often located elsewhere. This leads to more research involving the screening of concepts, products or communications approaches that have been developed and more thoroughly researched in the larger EC markets.

Market research has developed from consumer marketing origins and tends to be relatively less widely used in those countries where the emphasis is more on industrial products. There have also been different patterns in the post-war evolution of markets and of marketing. Furthermore, restrictions on television advertising (and hence, related research) in a number of countries have contributed to this differential use of market research across the Community, as have the varying levels of retail trade concentration (broadly, more concentration in the north than in the south). The overall effect of these, and other, factors is that compared with the level of economic activity in the country, the market research market is particularly well developed in the United Kingdom and the Netherlands and somewhat less so in Germany and France. The exceptional British results during the last few years may be explained by two factors: a long tradition in market research and a universal language.

There are considerable differences in costs and prices across the EC countries, largely reflecting differences in salaries and social costs. Other factors explaining these cost and price differences include: the degree of competition in the local market; the enhanced efficiency that comes with greater experience in certain types of research; a mix of research and data collection methods; and the geographic dispersion of population

In an ESOMAR survey designed to discover how research prices vary from one country to another, research institutes were sent detailed specifications for six different surveys and asked to state what price they would quote to a client for carrying out each of these six studies. Averaging across all six projects, France and Italy emerged as the most expensive

Table 5: Market research
EC and other market research markets, 1990 (1) (2)

(million ECU)	Turnover	%
France	540	24
United Kingdom	539	24
BR Deutschland	490	22
Italia	254	11
España	136	6
Nederland	123	6
Belgique/België	71	3
Danmark	27	1
Ireland	25	1
Portugal	16	1
Hellas	14	1
Luxembourg	1	(3)
EC	2 236	100
EC	2 236	42
Other Europe	238	4
Total Europe (4)	2 474	46
USA	1 916	36
Japan	358	7
Other (5)	610	11
Total World	5 358	100

(1) Excludes market research conducted 'in-house' by marketing companies, advertising agencies, governmental organisations, academic institutions etc.
(2) Average calender year 1990 exchange rates used throughout this report (ECU = US $1,27)
(3) Less than 0.5%
(4) Excluding Poland, Bulgaria, Hungary, Albania, Romania
(5) Estimate based on 1989 statistics
Sources: ESOMAR, trade associations and estimates, Advertising Age, Context

countries, and Belgium, Greece, Portugal as the least expensive. In 1991, the rank order in terms of average research costs from the most to the least expensive was as follows: France, Italy, Germany, Ireland, United Kingdom, Denmark, Spain, the Netherlands, Belgium, Greece, and finally Portugal.

Investments

In a predominantly people business, capital investment has historically been a relatively insignificant component, apart from in the continuous research sector. However, the advent of the micro-computer has revolutionised market research and the level of necessary investment. Changes in data collection methods have increased investment needs. Computer-aided interviewing especially by telephone has involved the commitment of substantial sums to the installation of facilities typically comprising 20 to 100 telephone booths with appropriate telecommunication and computing equipment.

In the continuous research sector, single-source data from panels that record product purchase and media exposure have required considerable investment in developing and placing scanning devices, "people meters" to record television viewing and other high-cost electronics. Data derived in this way, as well as data from other sources, increasingly form part of computerised databases for marketing management information systems (decision support systems).

Over the past decade, more EC research companies in the ad hoc sector have begun to emulate US research firms in the standardising and branding of research products. This, too, involves investment, although typically in the time of first-rate research technologists and innovators. Significant investment in designing, testing and validating new research techniques, and subsequent marketing investment in communicating the benefits of these techniques to customers is only possible if the costs can be amortised by the application of the same technique across many countries and over time.

INDUSTRY STRUCTURE

Companies

Eight of the top 10 world market research companies and two of the world's three major market research chains (networks of independent companies) have their headquarters in Europe.

The industry is characterised by considerable fragmentation and intense competition. Barriers to entry are low except in the high-tech high-investment areas of market and media measurement (around 35% of total market research expenditure).

Pre-tax margins have historically averaged 5% to 6% of turnover for ad hoc research organisations. This is considered to have risen a little higher in recent years. Substantially higher margins are made by research companies with multiclient services and a contractual customer base.

Strategies

Several companies have restructured their services to survive in the rapidly changing market. A number of mergers and acquisitions have taken place often as part of the creation of major marketing services corporations. This has led to a reduction in the level of American ownership of EC market research businesses. Another effect has been to increase industry concentration and to produce eight major research holding companies in the EC.

The other major structural change process is horizontal specialisation. Increasingly, market research organisations throughout the EC are setting up specialist divisions or operating subsidiaries that concentrate on key business sectors (e.g. media, health care, automotive, travel, finance) or research specialisations/problem areas (e.g. qualitative, advertising, customer care).

Vertical integration has always been a feature of the European market research industry. All but the smallest companies have combined a client service function with a data handling facility (data collection, preparation, processing and printing). However, there are signs that this vertical integration is beginning to be questioned by some companies, especially where personal interviewing fieldwork is concerned. The USA market for instance has long been characterised by an ownership separation of research companies from fieldwork suppliers.

REGULATIONS

Market research is, like many service industries, dependent on self-regulation. For instance, the ICC/ESOMAR International Code of Marketing and Social Practice is applied by all ESOMAR members and by the national marketing research societies in all the EC Member States. This Code, which guarantees the respondent's anonymity, specifies responsibilities towards respondents, the rights of respondents, relations with the general public, the mutual responsibilities of clients and researchers, and reporting standards. The Code is particularly relevant in the light of EC proposals for data privacy legislation. For the time being, such restrictions can vary from one EC Member State to another, with many countries offering an exemption to market research in recognition of the fact that it deals with aggregated and anonymised data and not with personalised data.

Other restrictions which vary from country to country can affect the right to conduct and publish public opinion polls, particularly in the run-up to government election. Although political opinion-polling constitutes only about 2% of the entire market research industry and actual pre-election polling ac-

counts for less than 0.3% of the total market research turnover, it naturally attracts a lot of media and public attention.

Another regulation which may affect the market research industry is the proposed EC Directive on Temporary Employment. This directive would affect most freelance interviewers, and may ultimately drive up market research prices. Indeed, at present, legislation on social security and benefits still varies widely between EC Member States.

OUTLOOK

With the proliferation of sources for marketing data, companies will have smaller market research departments, if any at all. It will, however, be increasingly necessary for researchers to provide an interpretative service to help marketers understand the implications of market research data for marketing strategy. This trend is already evident with the increasing number of researchers acting as consultants to companies.

Parallel to this is the growth in automation and technological developments within the market research sector - an unstoppable trend which means that market research companies will need greater capitalisation to be able to invest the necessary funds in the latest technology to remain competitive. This is evidenced by innovations such as television audience meters and scanners developed by the largest research chains. This trend, together with the increased need for international research, has led to the growth of international research chains and the possibility for buyers to go to one head office to commission a research project in several countries or regions.

Growing areas for research are customer satisfaction, branding and research into corporate image, business to business, finance, retail and utility sectors and legal research - sectors that have only recently started using market research systematically. Studies suggest that expenditure on most types of market research is likely to increase rather than decline over the next five years. This will be markedly so in the case of main areas of research activity such as usership and attitude studies, product testing, advertising and concept development and evaluation, and advertising campaign tracking, particularly with the proliferation of different types of media, new publications and TV stations.

The opening of new markets such as Eastern Europe means that large research chains must also have available funding to set up offices in regions where facilities such as faxes and computers cannot always be taken for granted. In the short-term, demand for market research in Eastern Europe is not expected to increase significantly. However, as the demand for market research is related to the productive investment rate, the potential demand is significant in the longer term. The growth of demand will also depend on variables such as qualification standards, and will be strongest in countries where the labour force is most qualified.

The completion of the Single Market will lead to an increased and new type of demand for market research services, but will also mean a need for a greater harmonisation of statistics across the Community in order to improve the comparability of survey findings.

Finally, the client-research company relationship is likely to be affected by Total Quality Management (TQM) and Service Quality demands. Many companies are adopting TQM and cultivating service quality, and so research organisations must also expect to do the same to offer consistently high and reliable quality in their services.

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Management consultancy

NACE 839.1

Management consultancy has shown vigorous growth during the 1980s. The Gulf War and recent slowdown in growth in the industrialised countries, however, have sent many service sector industries tumbling. Management consulting has not been immune as many companies cut-back on external services. Full employment in the sector fell by approximately 5 000 full-time persons over the past two years to its present level of 50 000. Turnover for the sector is estimated at 7.5 billion ECU for 1991.

INDUSTRY PROFILE

Description of the sector

Management consulting consists of providing information, advice and expertise on a whole range of specialised management functions in an independent, objective manner. Services are performed by specialised personnel with considerable experience in the specific branches in which they work. Consultants include people with backgrounds in banking, computing, economics, general management, accounting, law, management communications, management planning, marketing and sales, market research, personnel selection, quality assurance and control, stock markets, and technology transfer.

The services provided by management consultants include: corporate strategy and development of organisations; administrative and financial systems; management of human resources (including recruitment of executives and temporary managerial staff); management of production and services (including technology, organisational support management, research and development and quality control); marketing and corporate advertising and promotion; information and management technologies and systems; project management; and economic and environmental impact studies.

The development and installation of information and management systems forms an important part of management consultancy activities (approximately 35%). This service is very similar to the computer-based management schemes developed by computer software houses. Management consultancy firms are increasingly involved in helping companies to develop information technology and apply computer tools.

Management consultancy services also often overlap with services covered by other monographs in this publication. A main area of overlap is contract research, particularly ad hoc market studies which often form part of strategic analysis projects. Accountancy companies offer management consultancy services in the European market, and many US ones are among the major suppliers of this service.

This overlap occurs to a lesser extent with consulting engineering firms, and concerns production, or computer-based production, organisational support, project and programme management, and also economic and environmental impact studies.

In the absence of any reliable national, Community or professional statistics, the data supplied by the association FEACO characterises the trends taking place within the sector. FEACO figures represent between 40% and 70% of the activities of the sector.

Main indicators

Technology and market globalisation are high on the list of factors affecting an increased demand in management consultancy in the 1980s. No complete data exists for this profession. However, the consolidated turnover of FEACO members was approximately 3.42 billion ECU in 1991. The membership's turnover has fallen in straight years since 1989, when it was 3.53 billion ECU. Prior to that, growth in turnover was between 10% and 20% annually.

MARKET FORCES

Demand

Private industry is the main user of management consultancy, according to FEACO. Private industry accounts for more than

Table 1: Management consultancy
Turnover and number of enterprises for Members of FEACO and for the global market

	Number of enterprises		Turnover (million ECU)		Turnover: % of global market
Members of FEACO:	1989 (1)	1990	1989 (1)	1990	
Belgique/België	24	21	112	129	85
Danmark	50	46	42	71	40
BR Deutschland	270	310	1 400	1 550	36
España	35	29	385	224	20
France	40	48	323	432	60
Ireland	15	15	N/A	47	80
Italia	48	55	300	320	50
Nederland	30	27	151	172	65
Portugal	19	19	N/A	70	90
United Kingdom	31	32	980	1 170	54
EC 10	562	602	3 693 (2)	4 185	43 (1)
Global market:	N/A	7730	N/A	9 603 (3)	100

(1) Revised figures
(2) EC 8
(3) Estimation
Source: FEACO

60% of its member's commissions. The private business services sector accounts for roughly 20% to 25%, and trade, between 5% and 10%. The public sector is very small (civil services, public authorities, and governments) although the importance of public authorities as buyers of management consulting services is higher on average in France and the Netherlands. There is also growing demand for consultancy by certain public services (in particular, health, education, and transport).

The development and introduction of information and management systems remains the main area of activity. Strategy definition is a very commonplace management consultancy activity. An important part of strategy studies recently have focused on the single European market. Others concern strategies for developing business in the Eastern European countries, or the wider global market.

For some specialised markets experts from outside of the EC might be used. Exports (5% to 25% according to country) are mainly to developing countries.

Three trends are predominant within the management consultancy sector:

- recourse to management consultancy is becoming increasingly common practice, at least among companies with more than 500 employees;
- the use of strategy or systems consultancy is becoming increasingly recognised as an intangible/strategic corporate investment;
- consultants who formerly intervened from time to time concerning improvements of performance, productivity, are being used to promote quality and the optimisation of resources in all corporate functions, key factors in finding the competitive edge.

The break-up of the Soviet Union has had an important affect on the development of Eastern European business consultancy. These include political risk studies, industrial infrastructure analyses, legal system assessments, investment analyses and market analysis. A smaller market exists for consultants to work directly for Eastern European authorities. The former East Germany currently provides about 15% of the turnover of German consultancy firms. To a large extent this growth has compensated for cutbacks in consultancy assignments in the United Kingdom which has been in recession.

Supply

The majority of management consultancy in the European Community is carried out by local consultants. When contracts are offered to non-EC consultants by foreign companies they often use the services of EC based consultants to provide them with information rather than hiring consultants from their own locality.

The level of remuneration (consultancy fees) for consultants is 500 ECU to 1 500 ECU per day. Government bodies awarding contracts to consultants often pay around the 500 ECU per day mark. For large specialist firms fees asked can be more than 2 000 ECU per day. The higher rate is justified by the wealth of experience in those practice.

INDUSTRY STRUCTURE

Companies

The majority of consultancy companies are small practices. They are often partnerships of specialist consultants. A large volume of consultancy is undertaken by larger firms, particularly audit companies. The amalgamation phenomenon is continuing with large practices growing more quickly than medium-sized ones. In the top auditing consultancy practices, KPMG, Price Waterhouse, and Arthur Andersen in particular, have strengthened their market positions by developing management consultancy services.

Strategies

Many companies (US/UK auditing and strategy consultancy practices) have trading partnerships and loose arrangements with other consultants who work for them in specialised areas. The idea of developing multidisciplinary professions to be more competitive is increasing in the larger firms. Medium-sized national firms, on the other hand, are looking to strengthen their alliances with consultants in other countries to help cope with the competition from large networks. Following a spate of activity in the late-1980s, mergers and acquisitions within this sector have declined.

REGULATIONS

There are no regulations specifically affecting management consultancy, or regulating the type of persons engaged in the profession. There is also no requirement for consultants to

Table 2: Management consultancy Employment by Member State

Members of FEACO:	Number of consultants 1989 (1)	Number of consultants 1990	Turnover per consultant (in ECU) 1990
Belgique/België	853	877	91 220
Danmark	344	386	183 938
BR Deutschland	7 000	7 000	221 429
España	1 300	1 900	117 895
France	1 990	2 000	216 000
Ireland	369	316	148 734
Italia	2 310	2 400	133 333
Nederland	1 323	1 450	118 621
Portugal	733	733	95 498
United Kingdom	6 760	7 265	161 046
EC 10	22 982	24 327	170 017
Global market (2):	N/A	87 360	110 588

(1) Revised figures
(2) Estimation
Source: FEACO

Table 3: Management consultancy
Fields of activity

(%)	B (1)	DK (1)	D (1)	E (2)	F (1)	IRL (2)	I (2)	NL (2)	P (2)	UK (2)
Administrative information management	12	N/A	15	5	15	12	13	12	9	10
Information systems	21	N/A	34	15	15	20	18	27	17	13
Financial consultancy	8	8	3	5	5	7	3	N/A	12	10
General management	12	N/A	12	12	15	8	11	24	2	6
Government administration	10	18	7	5	15	N/A	6	N/A	2	31
Executive search	7	N/A	5	20	5	N/A	4	11	6	3
Human resources	9	14	4	15	10	21	15	N/A	15	8
Manufacturing	8	11	5	8	15	16	21	N/A	23	10
Marketing	7	8	3	6	2	11	5	2	9	4
Procurement	6	N/A	2	4	2	N/A	N/A	N/A	2	2
Research & Development	N/A	N/A	3	3	5	N/A	3	4	2	2
Specialised services	1	N/A	7	2	1	5	1	21	1	1

(1) 1989
(2) 1990
Source: FEACO

be a member of any professional association. In fact the EC market is currently open to all consultants wishing to work internationally. The only force stopping non-EC consultants from carrying out assignments in Europe would be their failure to gain travel visas.

A move towards certification is in the pipe-line. This is seen as being important where public authorities are concerned. Consultancy firms invest frequently in the training of consultants, but there are some public courses. Qualification and certification procedures are being developed especially in France, the United Kingdom, the Netherlands, Denmark and Italy. The attempts to comply with international standards (ISO) confirm the way in which the sector is maturing.

OUTLOOK

Since mid-1990 market growth has weakened reflecting the economic downturn. However, the development of market economies in Eastern European countries following the virtual collapse of communism will present further opportunity for new growth. This will need to be largely supported by International finance from developed market economies before EC consultants will be affordable to developing businesses in those countries in the short-term. The slowing down of demand and the maturity of the EC sector in the medium-term should lead to more competition and possibly further mergers and alliances between the major consultancies.

Owing to the nature of this service sector it is not possible to predict growth rate values for the next five year period. A great deal of management consultancy is ad hoc and often cannot be planned for until firm contracts are made. Nevertheless, many management consultancy practices have been increasing staff levels in the third quarter of 1992, which comes from more than just optimism. Most already have a clear idea of what lies ahead of them in the next year. Some that are retained for a range of management services including financial auditing have written management consultancy into the budgets.

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Table 4: Management consultancy
Leading consultancy firms within the EC (1)

BR Deutschland	España	Italia	France	Nederland	United Kingdom
Roland Berger	Andersen Consulting	Ambrosetti Consulenza	Arthur Andersen	Berenschot	Coopers & Lybrand
MC Kinsey	Price Waterhouse	Andersen Consulting	Bossard	Twijnstra Gudde	PA
Kienbaum	CP	Mc Kinsey	Cegos	KPMG	Andersen Consulting
Treuarbeit	Mc Kinsey	Coopers & Lybrand	Sema Group	Ernst and Young	Price Waterhouse
Deloitte	KPMG	Cueno & Associati	Euroquip	Deloitte	KPMG
Arthur Andersen	Mac Group	Galgano & Associati	Algoe	GITP	PE Inbucon
Wibera	Bedaux	Hay	Eurosept	Andersen	Ernst and Young + Braxton
A.T. Kearney	Bossard	KPMG	O & A	Coopers & Lybrand	Touche Ross
KPMG	Coopers & Lybrand	Orga	Bernard JulhietBain		
BCGPraxi	GammaADL				
Telos Consulting					

(1) For information purposes: approximate classification by turnover of management consultancy activity, excluding computing
Source: FEACO

Architects and construction economists
NACE 837

In general, the denomination of "architect" applies to persons who are working in construction. Besides this type of architects, there are specialists such as interior architects, landscape architects and town planners. Although the importance of these, especially of town planners and landscape architects, is increasing in most EC countries, they are not considered in this chapter. This chapter deals only with architects working in construction projects and construction economists.

INDUSTRY PROFILE

Description of the sector

Architects and construction economists are classified under section 837 of NACE, called technical services. Both are working with and within the construction industry.

The functions of architects and construction economists are to design building, including the elaboration of construction programmes, to use their specific knowledge concerning building techniques and physics, and to use their awareness and utilisation of general as well as project-specific official rules and regulations in the context of a construction project.

Architects influence the economic scope of a construction project. They are, however, also responsible for the aesthetics and the quality of the buildings.

Some of these aspects also characterise the profession of construction economists although the weighting of the aspects differs. The profession of construction economists has a tradition of more than one hundred years in France, Ireland and the United Kingdom and somewhat less in Spain and Portugal. The role and services of the construction economist varies from country to country according to domestic tradition and education systems. In France, Ireland and the United Kingdom, construction economists are educated as quantity surveyors while in Spain and Portugal, they are trained as technical architects.

In Belgium, Denmark, Germany, Greece and the Netherlands, services within construction economists traditionally have been rendered by architects and sometimes by structural engineers. As a response to the market, professionals specialising in construction economics in countries without a surveyor education have established their own professional societies or divisions. In Belgium and Denmark, applicants must participate in post-graduate training programmes before they are accepted by the professional society as construction economists.

The profession of construction economist, also known as quantity surveyors, developed with the increasing demand for construction. The profession is a speciality within the construction sector. Quantity surveyors are working in various fields including building construction, civil and structural engineering, mechanical building and engineering services, petrochemicals, cost and production engineering, planning and urban development, landscaping and interior design. The difference between their work and that of architects is that they mainly deal with the costs and valuation of projects and not with the physical part of the building construction. Their tasks include project and quality management, risk management within construction, feasibility studies and investment appraisal, cost information, calculation and control, bills of quantity and specifications, contracts between clients and contractors, time scale, monitoring progress, payment and accounting as well as managing the facilities and maintenance.

Other services provided by architects and construction economists include giving expert evidence in arbitrations and disputes, preparing statements of expenditure for tax and accounting purposes and assessing the replacement value of construction projects for insurance purposes.

Main indicators

For both professions there are no data available about turnover and value added. The activity in this sector, however, mainly follows general economic developments, and in particular developments in the construction sector.

Table 1 : Architects and construction economists
Number of architects and students (1)

	1983		1989		1990		1991 (2)
	Architects	Students	Architects	Students	Architects	Students	Architects
Belgique/België	5 940	3 400	6 500	3 400	8 761	N/A	9 100
Danmark	4 900	2 270	N/A	N/A	5 700 (4)	650	6 000
BR Deutschland (3)	60 424	29 823	N/A	48 000	67 533 (4)	39 057	67 770
Hellas	9 500	1 000	N/A	N/A	12 240 (4)	1 821	13 000
España	10 391	13 856	11 000 (4)	14 000	19 243 (4)	16 253	20 600
France	20 081	16 200	28 850	13 000	25 746 (4)	13 635 (6)	27 200
Ireland	1 200	475	N/A	N/A	1 300 (5)	500	1 350
Italia	65 000	66 000	N/A	N/A	53 300 (5)	90 000	50 000
Luxembourg	125	50	200 (4)	75	265 (5)	44	290
Nederland	2 500	3 000	5 000 (4)	2 500	4 665 (4)	3 040	4 900
Portugal	N/A	N/A	N/A	N/A	4 198 (4)	2 696	4 260
United Kingdom	27 575	7 259	31 000	7 200	31 000 (4)	7 600	33 000
EC	N/A	N/A	N/A	N/A	233 951	175 296	237 470

(1) For 1991, data on students not available
(2) Estimate
(3) Excluding East Germany
(4) Self-employed and employed architects on national registers
(5) 1988/89
(6) 1989/90, excluding the students of the Ecole Speciale d'Architecture de Paris and of the Ecole Superieur des Arts et Industrie de Strasbourg
Source: ACE

Table 2: Architects and construction economists
Number of construction economists, 1989 (1)

Belgique/België	100
Danmark	68
España	15 000
France	6 100
Ireland	810
Nederland	750
Portugal	2 000
United Kingdom	23 789

(1) Estimates
Source: CEEC

The total number of construction economists registered in the national professional associations within the EC was around 48 000 in 1988. In 1990, there were about 237 000 architects registered in the national professional registers. The total number of architects within the EC has increased since 1983.

Germany (West) is the country with the highest number of registered architects among the Member States. It is followed by Italy, the United Kingdom and France. Greece has the highest number of architects per million inhabitants, at more than 1200, followed by Denmark and Germany (West) respectively with a little more than 1100 architects. The proportion of registered architects between the EC and the USA is approximately 1.7:1.

In contrast, most construction economists in the EC are registered in the United Kingdom and Spain. These two countries account for more than 80% of all registered construction economists within the EC.

MARKET FORCES

Demand

Both architects and construction economists work for the construction industry. Demand for this type of service thus comes both from the public sector and from private enterprises. The major public clients are central governments, local authorities and nationalised industries. Private clients are private developers and owners of commissioned private housing estates, commercial offices, shops and industrial estates. Independent architects or small architectural enterprises are also hired by private households for the planning and construction of residential buildings. Both the public clients and the clients from private industry mainly cooperate with larger architectural offices and construction economist businesses.

The demand for construction activity is influenced by income, interest rates, prices, employment and public expenditure. Especially in the private residential building sector, factors such as personal disposable income and mortgage rates can limit building activities. In contrast, public sector construction activity is mainly constrained by the need to balance government budgets. Finally, the demand for architectural and construction economist's services by the private non-residential building sector depends upon the trends in interest rates. In the second half of the last decade, the growth in private non-residential building largely compensated the decrease in public non-residential building activity. This largely contributed to the growth in the services of construction economists.

Considering the shortage of dwellings in almost all EC countries, the market for architectural services is still far from saturated. Moreover, expenditures on total repair and maintenance are expected to continue increasing, because it is necessary to improve the quality of the old stock of houses and flats.

The prospects for public sector related construction activity are dimmer, however, given the need for most EC countries to reduce their budget deficits. High interest rates also restrict demand for construction in the private sector.

Supply and competition

The number of architects varies a lot from country to country. The range is from around 300 per million inhabitants in Spain to more than 1000 in Denmark, Germany and Greece. The same (but with a smaller range) holds for construction economists. Although the ranges are quite large, there does not seem to be inadequacies between the supply and demand for architectural and construction economists' services in the EC Member States.

The variability in the number of architects and construction economists across countries reflects the fact that the rules for the construction of buildings vary across EC countries. There are also a few countries, in which less qualified professionals are able to do more demanding services than in other countries. This, however, may change once the services directive takes effect. This directive allows every professional to offer his services in a foreign EC country. But the regulations for charges are not included in this directive, such that the national regulations sometimes still apply. This gives a competitive edge to the countries with lower labour costs. The directive also stipulates that public procurement contracts in the building sector above 5 million ECU can be awarded only after an open or limited tender. This will increase the awareness of the costs and benefits in terms of quality of services as well as the need for a transparent basis of agreement, especially when dealing with cross border business.

INDUSTRY STRUCTURE

Companies

A characteristic of both professions is the huge number of small independent firms with less than 10 employees. The United Kingdom is the only EC Member State in which the average number of employees per firm is more than 10. The same applies to the structure of the market for architects. In Germany and the Netherlands, about 90% of the architectural enterprises have less than 10 employees.

Strategies

The growing competition between Member States will influence the strategies of both professions. Small enterprises which only supply part of the services required by the clients are already facing strong competition from firms, such as large building firms with their own planning offices and firms which offer the complete management and coordination of projects. This means that the smaller firms and the independents have to specialise in fields where the larger enterprises are not working, or cooperate more with the larger enterprises than was the case in the past. The completion of the Single European Market will provide new opportunities for cooperation. In cases where foreign enterprises are commissioned with work abroad, they will need local experts who know the specifics of the national construction markets and their regulations.

Another reason for the foundation of big enterprises is the liability. A lot of projects are of such a size that it is necessary for the planners to spread their liability risks. Then, it is reasonable to found enterprises in forms of private or financial companies, if that is allowed by local laws.

The relatively old stock of residential and non-residential buildings and the old structure of the major EC city centres opens another possibility for architects and construction economists to expand their services in the sectors of rehabilitation, maintenance and inner city regeneration. A third part of the professions' strategies could be to work in new fields. In this context, construction economists are starting to offer their work in the sectors of civil, heavy and process engineering.

Table 3: Architects and construction economists Independent private practice of construction economists, 1989 (1)

	Total number of firms	Average size
Belgique/België	10	5.0
Danmark	58	5.0
España	3 000	5.0
France	1 500	3.5
Ireland	110	8.0
Nederland	200	5.0
United Kingdom	2 226	20.0

(1) Estimates
Source: CEEC

REGIONAL DISTRIBUTION

The location of the offices of architects and construction economists does not necessarily depend on the demand for their services. But it is an advantage for both professions to have offices in the regions and cities where their services are needed. Especially the larger firms who are mainly working for the non-residential building sector tend to locate in areas and cities where high demand is expected, i.e. in large agglomerations with a fast rate of economic development. This development is further encouraged by the fact that it is in these regions that one usually finds the appropriate infrastructure for industry. In general, however, both professions are able to react quickly to changes in demand, as it is easy for them to open branch offices in regions where this seems to be necessary.

ENVIRONMENT

A big challenge for both architects and construction economists is the already damaged environment. New forms of energy saving and emission reduction are necessary in the construction sector. New materials are being developed, and some are still being discovered. Architects and construction economists can play an important role in this area in convincing their clients of the advantages of more environmental friendly construction. This stretches from the explanation of long term cost advantages to the use of new materials. Some efforts in this direction are currently being made, especially by architects who are planning houses with winter gardens, suburban and rural settlements with their own heating system, or with new systems for producing electricity such as wind power stations.

REGULATIONS

Architects qualifications are defined by the EC Directive 384 of 1985. The professional training for architects varies from country to country. Starting with the decision for the EC directive on architects in 1985, college diplomas and certificates from each Member State are recognised in other Member States on a reciprocal basis. Therefore, at least four years of study at university level are required. This directive has produced the basic preconditions for all architects to set up business in the EC country of their choice and exercise their profession.

Since the only countries which offer a specific professional education in construction economics at university level are Ireland, Portugal, Spain and the United Kingdom, no real regulations for construction economists exist at the EC level. In most of the other Member States, both architects and engineers to some extent deal with construction economics. The regulations for the profession of the construction economists are based on the directive on Mutual Recognition of Diplomas.

But, for both professions, the services directive is important. This directive opens the market for services within the EC and frees competition across national borders. The aim of this directive is to promote price competition on the markets for services.

In addition to the directive for services, the directives for the allocation and liability for services are worth mentioning. The first one allows juridical persons to participate in public tenders which are subject to open bidding procedures. However, the public authorities are able to plan their own building projects. The directive for liability if forced upon the construction industry, represents an increased financial burden for the construction sector. According to that directive, liability will be 20 years. The result of such a directive would be an increase in costs and less construction. For these reasons the construction industry would prefer a directive specifically dealing with liability in construction including adequate consumer protection.

The work of architects and construction economists will also be affected by the construction products directive, though to another extent. This directive provides for the harmonisation of the entire set of technical rules in the building and construction industry. Accordingly, there is a guarantee of free trade and unrestricted use of products within the European Single Market. The product's conformity with harmonised specifications should protect the consumer. In accordance with the building coordination directive, public orders from a threshold value of over 5 million ECU must be subject to open bidding procedures throughout the EC.

OUTLOOK

The development of both sectors is dictated by future trends in construction activity within the Member States. With the start of the Single Market in 1993, the prospects for the professions of architects and construction economists are in general positive. Both professions will, however, face increased competition in the coming years, which will influence the structure of each branch.

The independent architects for instance will face keen competition from foreign enterprises in their own countries. Public sector related work can only be realised in cooperation with engineers, or undertaken by large enterprises in which architects work together with engineers and construction economists. This tendency is supported by the building coordination directive which makes it possible to award both planning and building work to a single contractor. This favours non-specialist firms like general contractors which are already well known in Denmark and the United Kingdom. In general, it is possible that the allocation of contracts by public authorities to architects will decrease in the next few years. The small independent architectural enterprises may thus start to work more and more as sub-contractors to large private companies. For projects in foreign countries, cooperation with national enterprises will be necessary and new international relations will need to be established. In general, thus, one can expect to see a growing tendency to form partnerships with financial and private companies, to limit the risks of independent architects and construction economists. Concerning the scope of the work of construction economists, the latter are likely to continue to expand their activities into civil and heavy engineering.

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Engineering services
NACE 837

In 1988, EC engineering services accounted for approximately 400 000 jobs and a turnover of 20 billion ECU. However, given that engineering services frequently determine the choice of material and equipment to be used in a project, the strategic importance of the sector exceeds by far its small share of the construction industry.
During most of the 1980s, the sector was severely hit by the decline of its traditional export market, namely developing countries. However, in the late 1980s, this decline was offset by renewed Western demand and the emergence of intra-EC trade.
Prospects for the 1990s look rather bright thanks to stricter environmental regulations, the development of Eastern Europe, technological change and the building up of European transport networks.

INDUSTRY PROFILE

Description of the sector

Engineering services are defined as the intellectual services, which aim at optimising investment projects in industry, construction and infrastructure, at all stages of a project from its conception to its actual functioning. These services are provided by individual consulting engineers, design consultants, or by engineers employed by constructing firms, design firms, or public agencies. Their main objective is to optimise investment projects by proposing the lowest cost - highest productivity engineering solutions, consistent with the particularities of the specific markets. The consulting engineer studies the feasibility of projects, conceives the designs, executes the designs in detail, procures contractors and suppliers, administers contracts and supervises constructions and/or installations.

Engineering services embody two main categories: engineering design services and construction services. Engineering design services are defined as the essential intellectual activities needed to optimise the whole investment project. Construction services are defined as the essential intellectual activities required for the optimal management of the construction phase of a project and are also labelled construction management.

In turn-key projects, services offered include the construction itself and the final inspection of the project.

Engineering services apply to residential buildings i.e. office and commercial buildings, hospitals, schools and universities, retail facilities, leisure facilities, or non-residential buildings, i.e. utility facilities such as transmission lines, power plants, transportation facilities (roads, bridges, airports, etc.), public work facilities such as water and sewer systems, industrial plants such as refineries, processing and manufacturing facilities, other projects (e.g. mining).

Main indicators

The size of the sector is somewhat difficult to estimate because engineering services are generally not reported separately from the construction industry as a whole. Table 1 shows employment and turnover for the members of the EFCA professional associations. In 1991, affiliated firms employed 187 000 persons and their turnover totalled 13.3 billion ECU: Estimates for the sector as a whole point to 450 000 jobs and sales worth approximately 30 billion ECU.

Engineering services thus represent less then 5% of the construction industry but the economic significance of the sector is far more important. These services indeed play a crucial role in the process of investment and tend to forge forward and backwards linkages in national economies. As they set the techno-economic specifications of investment projects and determine both the civil engineering part as well as the materials and equipment to be used, engineering services fix the technology dimension of the investment. They thus play a vital role in the diffusion of new processes, materials and technologies throughout the economy and constitute an important link between R&D and production. Engineering services are a crucial determining factor for efficiency, productivity and competitiveness. They also constitute an important source of demand for equipment and materials. It is estimated, that out of the total contract value of industrial projects, 60-70% account for the equipment and material purchases, whereas the bulk of total cost for infrastructure projects account for civil works.

Table 1: Engineering services (1)
Main indicators, consulting engineering , 1991

	No. of firms	No. of employees	Turnover (million ECU)	Exports (million ECU)	Exports as share of turnover (%)	Average no. of employees per firm	Turnover per employee
Belgique/België	109	5 070	283	66	23	47	69 758
Danmark	314	9 535	611	92	15	30	53 058
BR Deutschland	2 539	50 065	3 062	627	20	20	64 420
Hellas	150	4 200	75	7	9	28	26 000
España	114	11 505	846	85	10	101	60 425
France	866	27 960	3 420	961	28	32	76 341
Ireland	86	630	21	N/A	N/A	7	32 209
Italia	170	21 500	1 760	792	45	126	60 463
Luxembourg	21	400	23	2	9	19	70 248
Nederland	220	10 000	625	188	30	45	64 306
Portugal	38	1 960	59	15	25	52	24 000
United Kingdom	877	44 085	2 574	757	29	50	50 202
Total	5 504	186 910	13 359	3 592	27	34	59 737

(1) Only EFCA members
Source: EFCA

Table 2: Engineering services EC trade balance, 1991

(million ECU)

Domestic market	9 800
Intra-EC trade	400
Exports	3 600
Total turnover	13 500

Source: EFCA

The links between engineering services and demand for material and equipment are particularly important for the balance of payments of exporting countries. Unlike other services, exports of engineering services generate a demand for equipment and materials, which tend to be purchased from the contractor's country of origin. This can be attributed to the fact that engineering services firms tend to influence the selection of the contractors and the sourcing of the machinery equipment. In the case of France, it is estimated that exports of capital equipment linked with foreign contracts for the provision of engineering services are several times greater than the fees earned for the provision of the engineering services. For the US, a survey conducted by the National Contractors Association in 1975 came up with a fifty per cent estimate of foreign contract value flowing back into the US economy. These export benefits are particularly strong in the case of engineering contractors, who assume full responsibility for the project, i.e. design, construction management and construction itself.

Historical trends

Engineering services, as part of the services supplied to the manufacturing sector, can be traced back in the 18th century when they first emerged in the UK as a result of the separation of design from construction.

The international market of engineering consultancy led primarily by British engineers, developed considerably during the first half of the twentieth century.

After world war II, the international market for the engineering services was dominated by US firms. However, European engineering design and construction firms were alongside steadily expanding their international activities.

In the sixties and early seventies, international aid programs, massive foreign direct investment and heavy public infrastructure spending in third world countries created a significant export market for engineering services in the developed countries. The general expansion of the international construction market, experienced during the seventies, allowed some developing countries, e.g. India, Brazil Yugoslavia etc., to start building up national capabilities of engineering services and to emerge as competitors in the international markets.

The steep oil price increase in 1973 and the resulting accumulation in oil revenues, opened new markets for huge infrastructure and industrial projects and hence for engineering services. The major oil producing countries, particularly those of Middle East, initiated large scale development programs, including highways, housing, military facilities and industrial plants.

The picture changed markedly in the early eighties. The engineering services sector entered into a prolonged period of declining demand, with the US. steadily loosing ground in the international market, in favour of Europe and Japan. The worldwide recession, sustained inflation and high interest rates slowed down world investment. In addition oil exporting countries, witnessing considerable decline in their oil revenue as of 1986, curtailed sharply their investment programs. The situation further worsened when the backlog of accumulated debt of less developed countries reached a critical level, forcing these countries to further squeeze their new construction projects.

A marked demand recovery, which started in 1987, in combination with positive business prospects opened in Eastern European markets, and the anticipated increasing demand related to the rebuilding of war-torn infrastructure and oil installations in Iraq, Kuwait and Iran, raised market expectations in 1992.

Foreign trade

The bulk of trade in engineering services until 1986 has been a one way flow from developed to less developed countries. More specifically, in 1986 the less developed countries accounted for 87% of total imports of design services and for 76% of foreign contract awards. Moreover, these percentages showed remarkably small changes over the 1980-86 period. On the other hand, trade between developed countries was very limited. However, since 1987, a North to North trade has been developing, which gains ground continuously, increasing its share from 13% in foreign design and 24% for contract awards to 44% for both activities. This is to a large extent attributed to the intraEC trade, which increased from 6% in 1982 to 16% in 1989 for design services and from 15% to 23% for foreign contract awards.

The increased intraEC trade of the past years, indicates that there has been forces at work leading to an increased mobility of designers and contractors across the borders. These forces are related to the prospects and expectations created by the steps towards the completion of the Internal Market, the opening of the Eastern European markets, and the decision for the construction of a number of large infrastructure projects in the EC.

The decline in export towards less developed countries was offset by an increase of demand in the developed countries so that a recovery in overall export activity is clearly observed with an average annual rate of increase of around 16% in nominal terms (according to an IDOM study of September 1992) during 1986-89.

In conclusion, the international demand for engineering services has been declining throughout most of the 80's, whereas a recovery characterises the last years of the decade. However, this recovery is mainly due to the emergence of a European and North American market for these services. More precisely, Europe and North America displaced MiddleEast and Africa and became, together with Asia, the leading markets. A special feature of these new developments is that, whereas Asia is a stagnant market, North America is particularly fast growing. Since 1990-91 and especially 1992, the market in Europe has been stagnant with declines in northern Europe due to the recession.

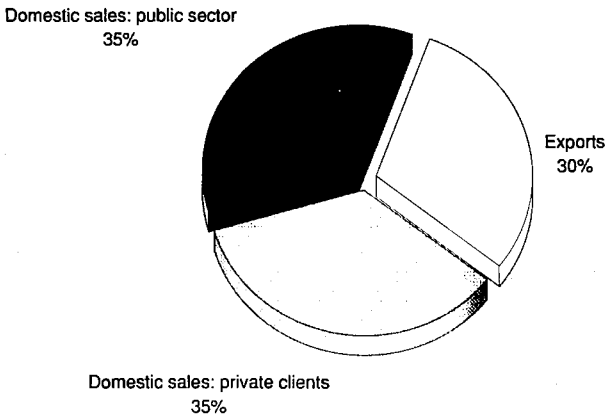
MARKET FORCES

Demand for engineering services is closely related to three main factors: public and private investment, technological progress and the availability of finance. All these factors, however, are connected with the general economic activity.

Based on EFCA data and Engineering News Record (ENR) data, several features of demand for engineering services may be singled out.

The EC engineering consultancy firms derive 70% of their turnover domestically and 30% from foreign countries, especially from the less developed countries. The intra-European trade was limited until 1987 when non-EC engineering consultancy firms, mostly USA firms, were more active in the (across the border) European consultancy market than the EC engineering consultancy firms themselves. However, intra EC

Figure 1: Engineering services
EC sales by major end market, 1988



Source: CEBI/CEDIC

trade seems, however, to have increased over the past several years.

From the domestically generated turnover 50% is derived from private clients and 50% from the public sector. What is more interesting is that, on the average, public authorities and entities in the EC Member States cover 70% of their needs in engineering services by in-house production and only 30% is assigned to consultancy firms. The externalisation of these services could prove decisive factor for the development of EC engineering services sector.

If we take the large EC firms represented in the Top 200 International of design firms (Engineering News Record), the share of total production exported range from 63% to 72%, which means that the large EC designers are highly export oriented.

INDUSTRY STRUCTURE

In the 1960's, engineering design services were closely related to trade in engineering equipment. In West Germany some 80% of projects were awarded to West German suppliers of equipment. For Japan the corresponding proportion was 63%, for France and Italy 50%. However, due to an externalisation process, engineering design firms entered into a dynamic process towards their independent operation. Thus, it has become a sector in its own right. The driving force towards this development was the need for unbiased independent information. However, there is evidence that this externalisation process has not weakened the derived demand link between engineering services and exports of materials and equipment.

Concerning the size distribution, the sector is highly concentrated, due to the existence of some giant integrated engineer constructors. The largest engineering firms in the world are Canadian and American. European firms, however, are more numerous in the list of the Top 200 International. In 1989 out of the 200 largest design firms, 94 were European and from these, 71 were domiciled in the European Community. The same is also true for international contractors. Out of 250 leading international contractors, 115 were European and from these 84 ere located in the EC.

Large firms coexist with a large number of small specialised design and construction firms (even traditional one-man firms), which, in most cases, only operate on the domestic market.

OUTLOOK

The expected global economic recovery in the course of 1993, which will affect, more or less evenly, all the regions of the world, combined with technological progress, which will mark the decade of the 1990's, offer a good probability for growing exports of European engineering services.

In short and medium term, there are some significant factors at work which are expected to fuel more design billings and contract awards throughout the decade. These factors are:

- emergence of large scale construction markets around the world due to increased industrialisation in Asia, Africa and Latin America;
- harmonisation of environmental regulations and stricter environmental control in industrialised Europe and USA;
- huge needs of Central and Eastern European countries for reconstruction of their economies and for environmental projects;
- the completion of the European internal Market which will necessitate the building up of a Europe wide transport network and will initiate numerous projects within the framework of the EC structural funds;
- the technological change, which creates the market for technologically advanced projects increasing, the engineering services content of investment.

Projecting the past trends into the future, the probability is very high that EC's leadership position in the world market for engineering services will continue in the coming decade. The US, the only rival which could challenge the leading position of the EC, has been systematically loosing ground over the past years.

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Geodetic surveying
NACE 74.2

There were close to 65 000 individuals working in the geodetic surveying profession in 1991, of which more than half were in France and Germany. The long-term prospects for geodetic surveying are promising. A trend towards larger companies offering a more diverse range of services will heighten competition for smaller-sized operations which must continue to innovate and adapt to hold onto their share of the market.

INDUSTRY PROFILE

Description of the sector

Geodetic surveyors measure the size, position and three-dimensional shape of the earth's surface, sub-surface and sub-marine features. Measurement systems can be land-, sea-, air- or space-borne. Much of the geodetic surveyor's work is in the management, analysis and structuring of acquired data. The trend towards an automated and computer-based approach will allow easy assimilation of results into the client's database.

The following areas of expertise come within this broad description: national and international mapping; large and small scale mapping; measured building surveys; tunnelling and mining surveys; measurement and location of underground structures and services; cadastral and boundary surveys; industrial and engineering surveys; setting out for construction; monitoring and deformation surveys; land and geographic information systems, cartography; ocean bed, coastal and river surveys; measurement of marine resources; maps, plans and navigation charts; surveying services.

In many Member States, urban and regional planning, land and building valuation, soil testing, land management, and management of development can also come within the scope of the geodetic surveyor, although not necessarily as part of a traditional definition of his activities.

Main indicators and recent trends

Just over half of the total employees in geodetic surveying work in the public sector, although individual states come between the two extremes of Germany (West) (80% public sector employees) and Belgium and Denmark (both 80% private sector employees).

Between 1980 and 1990 there has been a 130% increase in the numbers employed within the industry in the countries where comparative figures are available.

The United Kingdom has seen 25% of turnover being generated outside of the EC in recent years with a strong position in Middle Eastern markets but this is probably an overestimate now following political troubles in the region. With the exception of the Netherlands and Belgium, no other Member States have a significant market outside of the EC.

MARKET FORCES

Demand

Geodetic surveyors provide a service to developers, builders and contractors, architects, planners, lawyers, engineers, geophysicists and oil companies. The list is a growing one as more people in earth sciences, for instance, start to benefit from the services and skills of the profession start. Satellite positioning systems have opened new markets where conventional techniques would not have been considered due to cost. However the apparent ease of operation of such systems means that often for low precision work the geodesist is involved more in the role of a consultant than a practitioner.

Table 1: Geodetic surveying
Number of individuals working in the profession (1)

	1990	1991
Belgique/België	1 201	2 500
Danmark	1 987	1 800
BR Deutschland	15 000	15 000
Hellas	3 300	4 300
España (2)	1 500	1 750
France	19 090	19 090
Ireland	N/A	460
Italia	7 000	7 000
Luxembourg	245	275
Nederland	6 000	7 500
Portugal	2 008	2 008
United Kingdom	3 150	3 505
EC	60 481 (3)	64 988

(1) Estimates
(2) Does not include technician grade
(3) Excluding Ireland
Source: Comité de Liaison des Géomètres-Experts Européens

Marked differences exist between Member States in the amount of workload derived from the private and public sectors. Belgium, Denmark, France, Greece and the United Kingdom have a larger proportion in the former and Italy, Luxembourg, Germany, the Netherlands, Portugal and Spain a larger proportion in the latter. Cadastral surveys and other public sector works show a fall in demand balanced by an increase in engineering and industrial surveys and large scale mapping. By contrast, expertise in geographic information systems and database management is more and more sought after.

Supply and competition

There is widespread market saturation. Luxembourg has not quite reached this position but Spain stands alone in having too few qualified surveyors to meet demand. The institution of a new degree course, mentioned elsewhere, is aimed at filling this gap.

Within each country, profit margins have been reduced considerably and in the expanding areas of land and geographic information systems computer software companies are competing for work. They are also competing in the labour market for well qualified geodesists at a time when most predictions

Table 2: Geodetic surveying
Turnover (1)

(million ECU)	1990	1991
Belgique/België	N/A	35.5
Danmark	62.9	59.2
BR Deutschland	N/A	N/A
Hellas	13.4	14.2
España	N/A	N/A
France	391.3	500.0
Ireland	N/A	3.9
Italia	N/A	N/A
Luxembourg	4.7	N/A
Nederland	73.5	129.0
Portugal	N/A	N/A
United Kingdom	350.6	396.7

(1) Estimates
Source: Comité de Liaison des Géomètres-Experts Européens

are of a shortage of suitable personnel. Member States at present face little competition either from other member states or from outside the EC. One exception to this is the United Kingdom where American companies have been involved in recent takeovers. Spain and, to a lesser extent, Luxembourg and Portugal meet competition in their home markets. The competitor's strengths are often a larger company structure and computer-based technological advantages.

The main disadvantages for outside competitors are the regulations necessitating membership of professional bodies (which still pertain in many countries) and the language barrier.

INDUSTRY STRUCTURE

Companies

It is not possible to rank with any certainty the largest companies operating in this sector because individual turnover figures are so hard to come by and staff figures have changed dramatically amongst some of the larger companies. However, the following companies (in no particular order) are amongst the largest operating in the EC: Racal Surveys (UK), Engineering Surveys/Clyde Surveys (UK), B.K.S. Surveys (UK), Mason Land Surveys (UK), Hansa Luftbild (D), Starkstrom Anlage Gesellschaft (D), Egle Vermessungsbüro (D), Grontmij (NL), Inpark (NL), Oranjewoud (NL), and Eurosense (B).

There are roughly 6000 separate enterprises operating in the industry. Approximately 90% of these employ less than 10 geodesists. Belgium, Germany, Denmark, Greece and Ireland all have a high proportion of very small companies and in Belgium self-employed status is the normal situation. The United Kingdom and the Netherlands have a more equitable spread of company sizes. Larger companies are generally either specialised, for example in aerial photogrammetry and remote sensing (Hansa Luftbild) or part of a bigger field such as civil engineering, offering geodetic surveying within their operations (Oranjewoud). Some large companies, however, do offer a range of services purely within geodetic surveying (Engineering Surveys/Clyde Surveys).

Strategies

The most general strategies are towards diversification of services offered, collaboration with associated professionals particularly in the field of information technology and an attempt to keep abreast of the latest technological developments. It is only the last of these which has progressed to any large extent.

Lesser themes include efforts to achieve quality accreditation and a change in personnel structure towards less qualified field operatives and more qualified staff at a managerial level.

REGIONAL DISTRIBUTION

Although regional differences occur in the nature of the work undertaken, the distribution of geodesists is highly correlated with the population distribution overall. The service provided is still strongly tied to the land itself and hence the industry polarises where land is being exchanged, monitored or developed. As the emphasis moves towards providing expertise with land information systems, more freedom of location and other factors will emerge.

ENVIRONMENT

Geodetic surveying places little burden on the environment although many of the industries which it serves do, and these industries come under increasing regulatory pressure as a result. An example of this is the restriction of activity in mineral exploration in Ireland. There is a trend towards the use of computer-based mapping and design packages for environmental purposes but these are often used by people outside the geodetic surveying community.

Areas of activity where geodetic surveyors capitalise on an ecological or environmental market include, nearshore and inland hydrography for waste sedimentation studies, photogrammetry to aid the restoration of historic monuments, photogrammetry and remote sensing for landscape vitality measures (e.g. crop health) and global environmental monitoring (e.g. heat emission) and digital mapping for visual impact analysis.

It should be noted that many of these areas are beyond the scope of the average geodetic surveying company and are normally the province of government departments and specialist organisations.

REGULATIONS

The most important regulations are those concerning cadastre. Some countries such as the United Kingdom and Ireland have an essentially descriptive system of land registration and the geodesists role is a minor one. Elsewhere, the law recognises boundaries based on survey measurements. These measurements are carried out by a specialist organisation (e.g. the Administration du Cadastre et de la Topographie in Luxembourg) by public servants (cadastral surveyors) or by licensed geodetic surveyors. In the last case, this work will often form a substantial part of a geodesist's activities. The differences in cadastral law between countries (and also between regions within one country such as exist in Germany) mean that this sector of the market sees little competition across borders.

EC regulations concerning recognition of qualifications for migrant workers are being addressed by the Comité de Liaison des Géomètres-Experts Européens (CLGEE). A detailed report of education for geodetic surveyors within the EC was published in 1988 since when both Belgium (4 year courses at the University of Gent and at the University of Liège) and Spain (approval of a 5 year high degree course) have implemented changes towards compatibility with other Member States. The CLGEE is striving to harmonise qualification standards and achieve mutual recognition of diplomas. Some cross-border commissions have already resulted from these initiatives. EC directives concerning public service contracts have had no significant effect to date.

In Denmark, Germany, France and Italy the profession is afforded legal protection. In Belgium, the Netherlands, Ireland and the United Kingdom no such legislation exists. Elsewhere there is a position between these extremes.

OUTLOOK

The outlook in the short term is hard to forecast and is strongly linked to a widespread economic uncertainty. German unification and the inherited cadastral system in eastern Germany are handicaps to economic development and serve to increase the uncertainty there. Ireland's small economy and large national debt is unlikely to see rapid growth.

The long term future for geodetic surveyors is good and will rest largely with their ability to adapt to change. Many of the traditional skills in data acquisition are becoming less relevant with the advance of automated systems. However the processing, structuring and manipulation of these data within land and geographic information systems for resource management, planning and other projects is becoming increasingly important. Geodetic surveyors will need to capitalise on their strengths in this area.

Collaboration with information technologists and moves to fewer and larger companies offering a more diverse service will increase although there is a place also for small sized companies who invest and can offer a state-of-the-art product.

Early experience in Eastern Europe suggests that much work will be available for people who can offer professional expertise as an entry into the market but they will have to rely on a large degree of personal resourcefulness and management skill in order to be successful.

Industrial metrology is a growth area where the surveyor's measurement skills are competing with long established methods. It is to be expected that some surveyors will choose to specialise here and increase their market share.

The fortunes of the geodetic surveying industry will always be closely tied to activity in the construction industry.

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Linguistic services
NACE 839.3, NACE 935

Linguistic services include translation services, interpretation and the teaching of foreign languages. These services have been in high demand in recent years due to the growing internationalisation of the world economies. There were approximately 11 500 persons employed in this sector and registered in one of the EC's key national professional associations in 1991, but the actual number of individuals exercising this profession is much greater. The provision of translation, interpretation and language teaching services in the EC is not yet regulated, and in many countries there is no specific criterion to have access to this profession. The coming years will see major changes in the structure of demand for linguistic services, with greater needs for technical expertise and increased demand for the "non-traditional" languages.

INDUSTRY PROFILE

Description of the sector

Translation and interpretation services, as well as language teaching services, are part of the linguistic services sector. Translators and interpreters are included in NACE 839.3. Language teachers are part of NACE 935, called "private tuition".

The translator has the duty to translate texts from one language to another. Translation covers an extremely diversified market. In all realms of human activity translation is required. These range from commercial and industrial affairs, scientific matters, legislative, press and audio-visual subjects to literary works. There are two basic types of translators: the literary translator, who only translates literary texts, and the techno-scientific translator who undertakes all other required forms of translation. A third, more limited category comprises conference translators who - sometimes also belonging to one or both of the above types - are engaged temporarily by intergovernmental organisations to translate conference documents as they are produced.

Interpretation services also cover a wide range of areas. Interpreters directly translate spoken words from one language into another. There are three different types of interpretation services. The first is simultaneous interpretation, such as that which is done during international conferences with the help of modern communication technologies. The second is whispered interpretation. In this case, the interpreter whispers the translations into the ear of his client. This form of interpretation is normally used if somebody is making a speech which needs to be directly translated for another person. The third form of interpretation services is consecutive interpreting. In this case, the speaker stops talking after a few sentences to let the interpreter translate, and then resumes his conversation and stops again after another few sentences. This form of translation is mainly used in bilateral talks.

Language teaching covers all language courses which are organised by public institutions, private enterprises and individual teachers. Besides the normal language education that is given during school time, there are private language schools which organise language courses for advanced vocational training.

In all three professions, (translation, interpretation and teaching) the professionals generally work either as independents, or are public sector employees. Only very few are employed on a full-time basis by private sector enterprises or intergovernmental organisations.

Main indicators

The total number of translators and interpreters registered in the national professional associations of the major EC countries was around 11 500 in 1991 (Table 1). Most of these work as free-lance translators. For example, the share of free-lance translators and interpretation is almost 100% in France, about 90% in the United Kingdom and about 85% in Belgium. It is mainly in Germany and Italy that one finds a greater share of employed translators, at around 50% in Germany and 40% in Italy. The national professional associations, however, estimate that only a quarter of all persons working as translators are registered as members of their association. The reason is that most of these national associations have only existed since the mid-eighties. In all reporting countries, however, the number of registered translators increases year by year.

The average yearly turnover of a translator who is working full-time is between 35 and 50 thousand ECU. The salary range is quite large because translators are paid per line translated. Another reason is that the price of translation per line varies from country to country. A third reason is that the level of experience of the translator can vary. More experienced translators are able to translate faster than beginners. Since there are no figures available relative to the number of interpreters and language teachers, one can only estimate the average yearly turnover of a full-time working interpreter and a full-time working language teacher. This is estimated to be between 55 and 90 thousand ECU for a free-lance interpreter, and between 30 and 65 thousand ECU for a free-lance language teacher.

International comparison

Germany is the country with the highest number of registered professionals of all Member States, followed by the United Kingdom and the Netherlands (Table 1). The total estimated turnover of translation and interpretation services in the EC is much higher than in Japan and the USA, due to the variety of languages that exist within Europe and the close relationships between countries in Europe. As a result of its close export relations with the EC, translation is also important in Japan (Table 2).

MARKET FORCES

Demand

In general, demand for linguistic services has grown with the globalisation of industry and the closer cooperation of national governments in international organisations like the EC, the OECD, the United Nations bodies and others. But even private undertakings with international relations need the services of translators and interpreters from time to time.

At present, more than 50% of the demand for translation services come from the commercial and industrial sector, about 20% correspond to demand for scientific translation and less than 30% correspond to legislative and other translation, including press, audio-visual and literary translations. During the eighties, the demand for literary translation was decreasing or stagnant in a few EC Member States (Table 2).

Interpretation services are mainly used during international conferences or gatherings, and can be contracted both by the public sector and by private enterprises. Given that these conferences are not scheduled on a regular basis, and can take place in various locations, the interpreters must be very flexible. This is the reason why most of the users of such services do not have in-house staff of interpreters. This is also the reason why most of the interpreters are independent workers.

The structure of demand for language teachers is very different. Large enterprises of the business sector and the national and international institutions need language teachers for vocational training purposes. Some have their own teachers for in-house tuition. Smaller companies, however, tend to use private lan-

Table 1: Linguistic services
Number of translators (1)

	1986	1987	1988	1989	1990	1991
Belgique/België	N/A	N/A	249	243	243	281
BR Deutschland	3 135 (2)(3)	3 386 (2)(3)	3 525 (2)(3)	4 067 (3)	4 146 (3)	4 300 (3)
España	N/A	N/A	N/A	N/A	N/A	800 (3)
France	N/A	300 (4)	350 (4)	400 (4)	450 (4)	1 400 (3)
Italia	N/A	N/A	600	700	950	1 300
Nederland	N/A	N/A	N/A	N/A	N/A	1 440 (3)
United Kingdom	510 (2)	889 (2)	998 (2)	1 260 (2)	1 397 (2)	2 019

(1) Registered members of professional associations, including interpreters and literary translators
(2) Excluding literary translators
(3) Excluding interpreters
(4) Only literary translators
Source: National professional associations, F.I.T.

guage schools. Demand for independent language teachers thus mainly comes from small businesses or private persons who need to learn a foreign language in a short period of time.

The demand for linguistic services is, in principle, not related to the general economic development of a country. However, private enterprises tend to reduce their in-house staff when the economic situation deteriorates. When this happens, there are more possibilities for independent translators and interpreters to get free-lance work awarded by large public or private enterprises. The same phenomenon is observed in intergovernmental organisations.

Supply and competition

As mentioned above, there are two types of translators, interpreters and language teachers: free-lance workers and salaried workers.

Traditionally, the free-lance translators are members of a professional association and work in their own premises. They deal either directly with the client, or through the intermediation of agencies or translation businesses. These agencies normally have no in-house translators, and subcontract free-lancers. Limited numbers of supernumerary in-house translators are recruited by United Nations bodies and other intergovernmental organisations based in Europe.

In recent years, government agencies and intergovernmental organisations have increasingly resorted to out-contracting of translation services to free-lance, due to an excess demand for such services and a need for specialised skills in translation (legal, financial or other) and because this is considered less costly than salaried employment. Salaried translators generally work for international institutions or large enterprises with international relations.

Most free-lance translators only work part-time. Nevertheless, there are still quite a few translators who are registered as unemployed in most EC countries. For example, more than one thousand unemployed translators were registered in Germany in 1991. But the number of unemployed translators has been decreasing in almost all EC countries since 1988.

Although the unemployment rate of translators is quite high, there is still not much competition between translators. Larger volumes of translation which require multilingual knowledge are mostly done by translation companies employing translators with different native languages. Free-lancers tend to specialise in non-traditional languages, work for smaller projects or in specific areas of expertise. Compared to in-house translation, free-lance translations are very competitive in most EC countries.

There is no real inadequacy between the demand and supply of interpreters within the EC. Even if more interpretation into English, French and German is required than into the

Table 2: Linguistic services
Translations by country of publication and by UDC classes

	1982	1983	1984	1985
Belgique/België	798	854	639	680
Danmark	1 387	1 503	1 639	1 610
BR Deutschland (1)	9 009	8 509	7 542	6 305
Hellas	N/A	N/A	N/A	181
España	7 381	7 447	7 741	7 944
France	1 894	3 436	3 821	4 679
Ireland	N/A	N/A	5	8
Italia	2 034	2 939	289	93
Luxembourg	N/A	5	N/A	N/A
Nederland	N/A	N/A	N/A	4 286
Portugal	949	794	738	729
United Kingdom	1 070	1 143	1 153	1 121
Japan	2 479	2 498	2 698	2 892
USA	1 319	969	828	21

(1) Including former East Germany
Source: UNESCO Statistical Yearbooks 1990 and 1991

other languages, there is also a greater number of interpreters which work in these three languages. Specialisation in certain sectors (especially in the technical field) and the knowledge of exotic languages can enable free-lancers to avoid competition. But, in general, the free-lance interpreter is always in competition with the in-house interpreting staff of public administrations, or international organisations such as the EC and the OECD.

Language teaching services are offered by individual professors, private schools of all sizes and free-lance teachers. Competitors for these services are enterprises which offer telephone tutorials or training programs such as books, videos, records, tapes and compact discs. This latter form of learning foreign languages is cheaper and offers more flexibility to the pupil than scheduled courses.

INDUSTRY STRUCTURE

Companies

Most of the persons working as translators, interpreters or language teachers are free-lance. The few full-time employed professionals that exist mainly work for large companies which have their own in-house translation, interpreting and language teaching services, for public administration or intergovernmental organisations.

Private translation, interpreting and language teaching companies are usually large companies. Most employ more than one hundred full-time translators and award contracts to independent free-lance professionals. The largest European companies in the translation sector are located in the United Kingdom. These are Interlingua T.T.I. Ltd., Randall-Woolcott Services Ltd. and the Longman Group UK Ltd.. In the language teaching sector, Linguarama Ltd., London and Elsevier Languages from the Netherlands are the largest European enterprises. Two other language schools are also important within the EC: Berlitz, which has its headquarters in Princeton (USA), and E.F. with their headquarters in Lund, Sweden.

Strategies

Considering the growing market for linguistic services, the free-lancers and the enterprises working in that business will tend to face stronger competition in the future. Stronger competition means shorter deadlines, more translation into new languages (such as those of eastern Europe), stricter quality requirements for technical translations, and more translation into specific software demanded by the clients.

These future demand trends will require an even greater flexibility and better training of the professionals. In particular, the technical standards of translators will have to increase. Computer assisted translation is already being used. This means that the translated texts are typed in specific software packages and provided on diskettes. The use of translation machines, working with systems provided by firms like Systran (used by the Commission of the EC), Siemens-Nixdorf, Rank Xerox or Intergraph, or the access to translation data bases such as "Eurodicatom" makes the work of the translators faster and more efficient. But the creation of such a modern infrastructure is expensive. Only the larger institutions and enterprises are able to afford such tools. Moreover, computer assisted translation is only possible if there is less emphasis on quality. This provides enough opportunities for free-lance translators who do high quality translations. Free-lance translators also have the possibility to specialise in certain areas. Since more specialist translators are required, and since there is a demand for a greater use of technology, the firms which have modern equipment tend to give short term contracts to the free-lance translators and ask them to work on their own premises.

REGIONAL DISTRIBUTION

The professionals who work in the linguistic service sector are concentrated in the regions where large enterprises or international organisations are located. The EC Commission and the OECD are the two international organisations in the EC which have the largest staff of translators and interpreters. This means that a great part of all employed translators and interpreters are working in Paris, Brussels, Luxembourg and Strasbourg. Since the EC and the OECD cannot translate everything in-house, many free-lance translators have their premises close to these institutions. The same holds for interpreters, who also tend to locate near the capital cities. There also tends to be a greater concentration of translators and interpreters in areas where the major international companies are located. This is the case for instance in Berlin, Hamburg, Düsseldorf, Frankfurt, Munich, Milan, Barcelona, Amsterdam and Rotterdam.

REGULATIONS

The role of translators and interpreters is recognised by two international documents:

- The UNESCO recommendation on the protection and improvement of the legal and social status of translations and translators, adopted in Nairobi in 1976.
- The relevant provisions and recommendations regarding translators and translations set forth in the Final Act of the Conference on Security and Co-operation in Europe, adopted in Helsinki in 1975.

Both these documents recognise the important role that translators and interpreters play in the promotion of cultural exchanges, international relationships and the furtherance of science, technology and economic progress. But they do not include any regulations for the professions nor the education process.

In most EC countries, there are either no or unsatisfactory regulations of the translators' and interpreters' legal status, apart from the international or national copyright laws that apply to translators. Only a few EC countries regulate admission to the practice of the profession of translator and interpreter. There is no official job profile. Professional training is not necessary. There is no protection of the title of "translator" and "interpreter", nor codification of the rights and duties of the profession, and there is often no law which regulates the practice of the profession of translator and interpreter.

In most EC countries, the legal situation is the same as in the United Kingdom: the civil law is decisive in such matters as negligence, libel and performance of contract. Some countries like Germany have already enacted legislative measures to regulate interpreting and translation in legal and administrative proceedings. But, in general, the public has no guarantee that a person offering his/her services as an independent interpreter and/or translator does in fact possess the requisite qualifications, although membership of one of the officially recognised international associations (see below) is considered to offer an assurance of quality. There are only a few EC countries in which the interpreters and translators registered in the national professional associations are required to have a university degree. But in some countries it is possible to pass an academic education which finishes with an academic, legally protected title. The existing EC Directive about the acknowledgement of academic education is the only regulation which would be valid for the profession of the interpreters and translators. It is not yet adopted as national law in all EC countries.

OUTLOOK

The demand for translation or interpretation services in the so-called "traditional languages" is almost satisfied within the EC, and has reached maturity. But there will be major changes in the structure of demand for translation, interpretation and teaching services in the coming years. The opening of eastern Europe offers new possibilities for the profession. For this, a good knowledge of east European languages is necessary. More professionalism and greater degrees of specialisation will be required by the sector's clients. The use of artificial intelligence is increasingly necessary. Free-lance translators and interpreters may then start to face increased competition from translation companies which are well equipped with computers and different in-house specialists. The market is, however, still large enough for free-lance translators and interpreters who are able to speak at least one exotic language and have special knowledge in a certain branch.

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Publishing services
NACE 839

The publishing services sector is growing very rapidly, influenced by the pace at which technology is advancing. The customer base of publishing services is broadening. They range from non commercial concerns such as hobby clubs to major international commercial enterprises. This sector overlaps into other service sectors, which include computer consultancy, below the line advertising consultancy, and secretarial support services. The estimated turnover of publishing service companies was roughly 5 billion ECU in 1992, and they employed almost 50 000 persons in total.

INDUSTRY PROFILE

Description of the sector

Publishing services vary considerably from one company to another. They range from the provision of consulting to offering desktop publishing services. Consultants help industry to integrate desktop publishing software and hardware into current processes for advertising and other document development.

Design engineering, press relations, management services, marketing, and advertising departments of many companies are currently using desktop publishing systems. Often they make the basic document electronically and pass the file to a publishing service company for improvements before printing.

Recent trends

Within the EC desktop publishing developed fastest in the United Kingdom. However, the availability of programs in other major national languages soon followed, and allowed France and Germany to catch up. Initially software programs were available in only a few European languages. This did not stop professionals in other countries from using them and producing documents in their native languages.

The major desktop publishing software producers now write programs in many national languages in a bid to increase their penetration of the global market. Following the collapse of communism in Eastern Europe Ventura has taken the initiative to produce Ventura Publisher in Polish, Czechoslovakian, and Cyrillic (for the Russian market). Ventura is also developing Ventura Publisher in Kanji for the Japanese market.

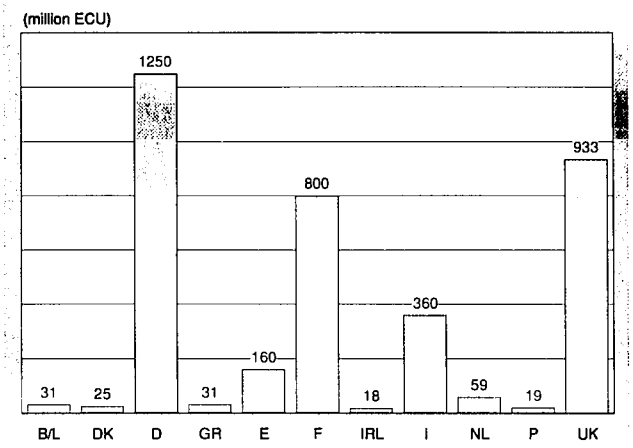
International comparison

It is difficult to estimate the size of non-EC markets for publishing services owing to a lack of statistics. The USA has a sophisticated publishing service market. The EC lags behind the USA in desktop publishing and design services. Japan despite being a developer of very high-tech equipment has delivered a good performance in computer design is trailing a long way behind the EC in the development of desktop publishing service companies.

Foreign trade

There is very little trade of publishing services. The service companies involved sometimes have production carried out in a country with lower costs, especially for regular large production volume publications. Extra EC imports and exports are very small, taking data for the whole printing sector these are less than 2% of the internal market turnover. Cross border business within the EC is also minor, amounting to less than 5% of the turnover of the sector.

Figure 1: Publishing services
Value added by Member State, 1991



Source: Eurostat

MARKET FORCES

Demand

Many printing press businesses have now computerised their production processes. Relatively inexpensive and more efficient computerised systems have helped many to make the decision to convert. There is a polarisation in the demand for final finish of documents.

For some customers printing on a laser printer (300 dots per inch) gives an acceptable quality. Often this demand comes from persons and companies not using this type of promotion or communication tool before.

Those professional customers converting from the older technology often require the best possible finish and have 2 540 dots per inch bromide films made before printing. Professionals also enhance pictures in documents, often to give them a crisper look, using specialised desktop publishing program extensions.

Customers often require using the flexibility of the electronic publishing system which allows documents made at the pre-printing stage in several formats so that they can choose the one they think is best. The text for a document, nearly always generated by word processor, is transferred to desktop publishing software to enhance the way it looks. Style sheets, automatically set, present information in a given style. Very few key strokes are necessary to change style sheets. In fine tuning a document font types and character sizes can change to achieve the most suitable result.

Supply and competition

There are no major pan-European desktop publishing service companies. Most companies in this relatively new market sector only serve a limited locality in their own country. Competition is slight. Although many can conduct direct marketing campaigns few are resorting to this to increase business. Many companies looking for a desktop publishing service would use "yellow pages" directories or similar business and service guides to find details of services available in their locality.

Companies offering a full professional service are fewer than those offering processing and production at 300 DPI. Increasingly the latter subcontract pre-printing to printing companies, if they have to produce a high quality document.

There is currently very little price competition mainly because the emphasis on the desktop publishing experts creating the document to the requirements of their clients within predefined budgets. However, prices have fallen on average by

Table 1: Publishing services
Turnover, 1992

(million ECU)	Desktop publishing	Photography and film	Other	Total
Belgique/België, Luxembourg	15	11	15	41
Danmark	10	10	14	34
BR Deutschland	800	200	550	1 550
Hellas	25	8	7	40
España	130	15	145	290
France	650	90	400	1 140
Ireland	5	4	25	34
Italia	300	75	125	500
Nederland	18	12	50	80
Portugal	12	7	8	27
United Kingdom	800	100	275	1 175
EC	2 765	532	1 614	4 911

Source: Campbell Management Consultants' estimates

more than 25% in real terms as the sector branch has gone through expansion.

Production process

Computer technology is rapidly replacing technologies involving manual techniques prevalent in the mid-1980s. Most of the companies in the sector are new. Many only started business in the mid-1980s. Some business service companies with longer histories have altered business plans to get into the flourishing desktop publishing services market. Many computer consultants have become more involved in desktop publishing than other activities.

Other professionals attracted to desktop publishing include those that previously involved in translating, printing, typing, word processing, copy-writing, and proof-reading. Publishing production professionals, photo composers, page layout specialists and photo engravers, have had to move with the times by making investments in electronic printing. In the last three years most converted from manual to computerised page layouts. These include: PC picture publishing, PC art, computer aided design (CAD), and desktop publishing.

Most desktop publishing companies are very small enterprises. Their main work is to layout documents from manuscript or electronic text using professional desktop publishing packages, and subcontract the production. Many use only four main tools: an Apple Macintosh, IBM compatible or other PC, a scanner, computer software including desktop publishing programmes, and a laser printer.

Some have made investments in higher or additional cost pre-printing equipment. This includes film making and bromide, and Cromalin proofing equipment. Often desktop publishing involves incorporating pictures, graphs and tables into a document, and this sometimes needs special scanning or filming equipment and software to create files in tagged image file format (TIFF).

PageMaker has offered colour picture desktop publishing software for several years. This has meant that Apple Macintosh has been the computer system chosen by many printing companies for desktop publishing. In 1991, Xerox's subsidiary Ventura launched some very professional colour printing products for its IBM compatible PC customer base.

Specialised computer programs are available for making multi-coloured pictures. These programs allow PC users to make colour separations and retouch images. Examples are Ventura Separator, Ventura Photo Touch and Ventura ColorPro.

Professional picture publishing programs and scanners are expensive. For example the normal retail price of Picture Publishing Plus software plus scanner is about 8 000 ECU in 1992. The unit price of some sophisticated drum and flat bed scanners is more than 20 000 ECU. Less effective hand held scanners, which cost less than 100 ECU per unit, serve the other end of the market.

Although scanning photographs or drawings has been the main method of making electronic pictures, programs now exist to make picture files from video films. "Multimedia" computer

Table 2: Publishing services
Trend in turnover

(million ECU)	1985	1986	1987	1988	1989	1990	1991	1992
Belgique/België, Luxembourg	29	30	32	33	37	39	40	41
Danmark	19	20	22	25	27	29	30	34
BR Deutschland	496	521	561	625	780	1 100	1 400	1 550
Hellas	14	16	17	20	25	31	38	40
España	115	122	137	150	160	210	255	290
France	448	480	580	750	880	990	1 120	1 140
Ireland	27	28	29	30	31	32	33	34
Italia	192	216	260	350	410	450	476	500
Nederland	54	55	56	66	59	66	72	80
Portugal	9	10	12	13	17	22	26	27
United Kingdom	350	455	715	1 235	1 470	1 560	1 380	1 175
EC	1 753	1 953	2 421	3 297	3 896	4 529	4 870	4 911

Source: Campbell Management Consultants' estimates

Table 3: Publishing services
Employment, 1992

(employees)	Desktop publishing	Photography and films	Other	Total
Belgique/België, Luxembourg	190	140	110	440
Danmark	100	70	80	250
BR Deutschland	8 500	1 400	3 200	13 100
Hellas	400	100	80	580
España	1 800	180	900	2 880
France	8 000	1 100	2 200	11 300
Ireland	50	50	150	250
Italia	4 000	900	800	5 700
Nederland	200	150	250	600
Portugal	200	80	50	330
United Kingdom	11 000	1 500	1 700	14 200
EC	34 440	5 670	9 520	49 630

Source: Campbell Management Consultants' estimates

programs provide pictures by the latter method. An editor can also buy picture files. Many electronic picture libraries and software companies sell electronic pictures. Documents containing line drawings, data tables and graphs must merge files or parts of files from other PC programmes.

Professional printing companies generally produce the final documents because they have the equipment for high resolution film or bromide production and large print-run capacity. Higher resolution desktop printers have recently become available. Eventually this may change things for small print-run printed matter, especially newsletters.

Moreover, even photocopy machine technology has developed to the extent that the newest generation of professional photocopiers integrate printing and binding of documents. This process involves a computer terminal linked to the photocopy machine.

There are many desktop publishing programs. They range from programs designed to make single page layouts to those for long documents. Printing professionals mostly use Ventura Publisher and PageMaker. Of the two, Ventura Publisher is the main desktop publishing software used in Europe.

Companies not requiring so much sophistication or text adjustment during the desktop publishing can use other programs. These programs include Timeworks Publisher, Express Publisher, Newsmaster, Avagio, Finesse, and Page Plus. Each of the major computer operating systems, DOS, Windows, UNIX, OS/2, and Macintosh requires separate desktop publishing programs.

IBM compatible computers are now becoming the standard for the computer industry and users are changing from DOS operating systems to Windows. Apple Macintosh was the major computer system for desktop publishing until just a few years ago.

PC art and picture publishing packages to create layouts are newer products for desktop publishers to work with. Some of them have existed for several years. PC art computer programs such as Art Works, Illustrator, FreeHand and CoralDRAW, all in second or third generation versions are relatively inexpensive (about 200 ECU per single user software in 1992). These programs help operators, lacking flair for drawing, to produce very professional drawings.

Printing companies that have resisted the conversation to the higher technology are unable to offer much flexibility or radical last minute changes. The desktop publishing market is growing organically as trade associations, clubs and various companies begin producing magazines, newsletters and other printed material for their members.

REGULATIONS

There are no EC regulations governing this sector. National regulations which concern the computer and printing industries apply to publishing services. Companies involved in desktop publishing must observe copyright and trademark laws.

OUTLOOK

Desktop publishing software has penetrated the professional publishing domain and the mass market. Picture publishing, although available to the public, is more for the desktop publishing professionals at 1992's prices. The data files of pictures are often very large - often more than 40 megabytes - which limits the amount of home-made picture files used to make professional quality printed matter at 2540 dots per inch (DPI).

Computer technologies under development will allow the replacement of internal hard disk stores (drives) by larger capacity portable storage devices. External hardcards and tapes allow transportation of very large files. Floppy disks currently restrict files to a maximum size of 1.2 megabytes. Electronic picture libraries are likely to grow in demand. However, there will always be a need for photography, especially for news media.

Desktop publishing is likely to go on expanding well into the next century. Industry forecasts the annual growth rate for this sector in double figures over the next five years. Growth is strong across the whole EC market.

There is a possibility that many companies currently using service companies could opt to use in-house resources for desktop publishing if hardware prices continue falling. Publishing service companies would then have to concentrate upon smaller businesses which are not able to allocate staff or justify the expense of under-utilised equipment.

Written by: Campbell Management Consultants

Temporary work services
NACE 839.3

Over the past four decades, temporary work services have progressively changed into a sophisticated, professional service industry providing instruments for labour management. The industry has turned itself not only into the main tool for helping businesses fill temporary shortages in their workforce, but also into personnel recruitment advisors since temporary workers often find permanent employment through their temporary assignment.

INDUSTRY PROFILE

Description of the sector

Temporary work companies hire temporary workers and put them at the disposal of a third party (i.e. triangular relationship). Key to this relationship is the fact that they receive their salary from the temporary work companies but their work-orders on assignments from the third party.

Client firms call upon the services of temporary work companies when they have temporary shortages of labour. The hourly cost of temporary labour may at times be higher than that of permanent workers, but since temporary labour is usually resorted to for short, well defined periods or for specific tasks, the cost is borne only for effectively supplied hours of labour. The alternatives of overtime or a permanent reserve of extra manpower would be more expensive. Temporary work companies bear the cost of recruitment, selection, payrolling, statutory social security insurance, etc.

For temporary workers, temporary work companies satisfy particular individual needs and preferences. However, a growing number of jobless workers also resort to temporary work companies to find a temporary occupation with the expectation of finding permanent positions at a later stage. It is now estimated that an average well over one-third of temporary workers find permanent jobs as a result of temporary contracts. The actual proportion varies widely between different EC countries.

The ageing European workforce and the increase of females in the workforce also have an effect on the temporary work services sector. These developments have been associated with a greater desire for more flexible and temporary working arrangements.

Main indicators

The importance of temporary work is shown by the number of people who are active in the sector each working day. The United Kingdom, France, (West) Germany and the Netherlands (in order of rank) are the largest employers of temporary workers in the EC.

Overall, it is estimated that well over a million persons a day in the EC work through temporary work companies. In the USA, a country with a comparable workforce, this figure is estimated to be somewhat lower. Market penetration in the USA is generally lower than in the EC, especially if one takes into account that the temporary work services sector is non-existent in Italy and Greece, and still not very developed in Luxembourg and Ireland.

International comparison

The temporary work services sector in general has shown double digit growth in past years. Most of the business in this sector is done in Belgium, France, Germany, the Netherlands and the United Kingdom (see Table 2). On average, it is estimated that growth has been approximately 15% per year in countries where temping is well developed, but even higher, around 20%, in countries where the sector is less developed. With the arrival of the current more or less recessionary period in many countries, growth has come to a halt, or at least slowed to a pace that corresponds to economic growth in general. The sector is still quickly growing in importance in Spain and Portugal. In these two countries, temporary work companies have only recently been legalised, or tolerated in the case of Spain (the temporary work services sector has not been officially legalised yet).

Total turnover in this sector was estimated at 17 billion ECU in the EC in 1991. Turnover for the USA, in comparison, is estimated at approximately 16 billion ECU for the same year. The world market is currently estimated at approximately 35

Table 1: Temporary work services
Employment through temporary work businesses in the EC, 1991

(thousand)	Employment per day	Total workforce	Employment as % of total workforce	1992 (1)
Belgique/België	32	4 054	1	=
Danmark	10	2 900	0	-
BR Deutschland	140	29 246	1	=
España	6	14 823	0	+
France	350 (2)	23 750	2	=
Nederland	128	6 623	2	=
Portugal	3	4 609	0	+
United Kingdom (5)	400 (3)	28 264	1	-
EC	1 070 (4)	140 369	1	N/A
USA (5)	850 (3)	123 869	1	N/A
EFTA	23 (3)	16 091	0	N/A

(1) For 1992, an estimate is given of the development of the employment figure; + when growth is expected, - when decline is expected, = when stabilisation is expected
(2) Data for 1990
(3) Data for 1988
(4) Excluding Luxembourg, Ireland, Italy and Spain
(5) Estimate
Source: CIETT, Bakkenist Management Consultants

Table 2: Temporary work services
Development of turnover in the EC

(million ECU)	1987	1988	1989	1989/88 (%)
Belgique/België	363	470	599	27.4
Danmark	N/A	60	N/A	N/A
BR Deutschland	1 100	1 450	1 810	24.8
France	3 820	4 530	5 700	25.8
Ireland	N/A	41	N/A	N/A
Nederland	1 150	1 644	1 955	18.9
United Kingdom	4 050	4 650	N/A	N/A
EC (1)	N/A	13 000	14 950	0.2
USA	10900	12600	13683	8.6

(1) Estimate
Source: CIETT, Bakkenist Management Consultants, Institut für Wirtschaftsforschung

billion ECU. These estimates are based on statements made by national federations, since no regular statistical surveys are held in this sector in the EC or other countries.

MARKET FORCES

Demand

Demand for temporary work services is, to a large degree, dependent on the general economic situation of a country. The enormous growth in recent years clearly stemmed from the growing need for more flexible labour contracts. The favourable economic climate, however, also helped to boost growth. The current situation is somewhat reversed: the more developed temporary work markets show saturation signs, and the stagnation of economic growth or even recession in some countries has also slowed growth to a minimum. Markets which are heavily effected by these trends are, for example, the United Kingdom and Denmark. It is expected that, in general, growth will slow to a pace more in line with general economic activity.

The fields in which temporary workers fulfil their assignments tend to differ between countries. In France and Germany, for example, the majority of temporary workers are blue-collar workers. In the United Kingdom and Portugal, temporary workers are primarily active in the administrative or commercial fields, as is the case in the USA. In some countries, such as Denmark, this is due to restrictive regulations. The differences are further illustrated by Table 3.

The length of the contract that is desired by clients varies. This length is usually dependent on the function which the temporary worker will fulfil for the client. If the temp is called to replace someone who is ill or on holiday, contracts are usually short: ranging from a day to several weeks. However, if a temp is called for because of an unfilled vacancy, or because the client is not certain whether the development of his business will allow him to hire an extra worker permanently, contracts can be extended to months or even a year or more. Contract duration is often limited by national regulations, but the maximum period varies per country.

Client companies often treat temping contracts as if they were trial contracts. They increasingly tend to offer a permanent contract to workers who have worked for them through a temporary work companies.

Temporary work is male-dominated in the EC: almost two-thirds of all temporary workers are male. The only countries known to deviate from this pattern are the United Kingdom and the Netherlands, where the proportion of male and female temporary workers are fairly equal. Figures for the USA show exactly the opposite: more than two-thirds of the temporary workers are female.

Temporary work tends to attract primarily those from a younger age group. In most countries, approximately two-thirds of the temps are under 30 years of age.

Supply and competition

Market coverage in terms of active population per establishment is highest in the Netherlands, the United Kingdom and France. In these countries, there is one office for every 4 000 to 5 000 potential temps. Differences in market coverage are large, as can be illustrated by comparing this last figure

Table 3: Temporary work services
Temporary workers by sector, 1992

(%)	DK (1)	D	E (1)	F	NL	P (1)	UK (1)	USA
Agriculture	-	-	N/A (2)	-	2	-	-	-
Industry	-	67	45	52	40	35	24	8
Construction	-	-	N/A (2)	22	4	2	24	8
Commercial services	100	20	40	23	35	53	50	60
Non-profit or government organisations	-	-	10	-	19	10	2	5
Medical services	-	-	-	-	-	-	-	10
Other	-	13	-	3	-	-	-	9
Total	100	100	100	100	100	100	100	100

(1) 1988 data
(2) Agriculture plus construction add up to 5%
Source: CIETT, Bakkenist Management Consultants

Table 4: Temporary work services
Data on enterprises, 1991

	Number of enterprises	Number of local offices	Offices per enterprise	Workforce in 1989 (x 1000)	Employment per office
Belgique/België	96	437	4.6	4 054	9 277
Danmark	75 (2)	100 (2)	1.3	2 900	29 000
BR Deutschland	1 802	2 480	1.4	29 246	11 793
España	N/A	200 (3)	N/A	14 823	74 115
France	1 146	5 011	4.4	23 750	4 740
Ireland	100 (2)	160 (2)	1.6	1 278	7 988
Nederland	271 (1)	1 650	6.1	6 623	4 014
Portugal	15 (4)	25 (4)	1.7	4 609	184 360
United Kingdom	2 500 (1,2)	6 000 (2)	2.4	28 264	4 711
USA	5 500	12 000	2.2	123 869	10 322
Japan	1 183 (2)	1 825 (2)	1.5	62 700	34 356

(1) Estimate
(2) 1988 data
(3) 1989 data
(4) Members of local branch federation only
Source: CIETT, Bakkenist Management Consultants

to that of Portugal or Spain: there the number of persons a branch office serves is much higher. These differences will diminish with the further development of the sector in these last two countries.

Naturally, market coverage figures also give an indication of the degree of competition in the different EC markets. In general, competition is fierce in well developed and/or stagnating markets (such as the United Kingdom) and moderate in less developed and/or growing markets (such as Portugal). The large differences in regulations provide a natural barrier to cross-border activities.

The degree of differentiation in supply varies from country to country, depending on market demand and regulations, but does not seem to differ very much within any particular country. An exception is a specialisation in client markets (intermediating for medical staff only, for example), which does appear regularly.

Prices and other terms offered being more or less the same, competition takes place through elements such as response time to a client request, distance between client office and temporary work companies, past performance of temps hired and other client services offered.

INDUSTRY STRUCTURE

Companies

Temporary work business is basically local business. Most companies operate through a network of local offices. Offices are located either near potential clients or near potential temps. This differs from country to country.

The six largest temporary work companies operating in Europe are (in alphabetical order): Adia (CH), Blue Arrow (UK), BIS (F), ECCO (F), Randstad (NL), and Vendex (NL). Their estimated total market share in the EC is 35%. In the USA it is estimated that the four largest companies hold 30% of the market. Temporary work companies of EC origin account for well over 80% of the EC market.

Many temporary work companies operate under more than one name in the same market. Some have the same management, others operate more or less independently. Franchising is known to be practised by, for example, Manpower and Adia.

The market leader differs per country; regularly, the leading position is held by a business with its home base in that country. Examples are Randstad in the Netherlands, ECCO in France and Interlabor in Belgium.

Basically, all temporary work companies operate on a local scale, whether they are a small, independent one-office company or an office of a larger (multi)national temporary work business enterprise.

A relatively new phenomenon is the emergence of costbased government temporary work companies, notably in Belgium (T Interim) and the Netherlands (START). They have gained a considerable share of the market. At the same time their operation has proven to be beneficial to the acceptance of organised temporary work in these countries, and thus to the market size.

Strategies

In past years temporary work companies (particularly the larger enterprises) have diversified into less related services such as security, contract cleaning and maintenance, language services, business information and financial services. The present trend is more focused on efficiency and upgrading, while expansion is strongly geared to services related to personnel management and internationalisation. In their efforts to improve the efficiency of their operations and the quality of their services, temporary work companies are investing heavily in computer systems and networks. The trend towards upgrading is illustrated by the fact that many temporary work companies are shifting towards temporary workers with higher educational qualifications and more experience.

The major temporary work companies are expanding their businesses internationally. Internationalisation not only takes place in EC countries (whether or not by acquisition) but also outside the EC, notably in the USA and East Asia (including Japan).

The expansion into personnel management areas is to be found in services such as personnel management for small and medium-sized enterprises, recruitment (including head-hunting) and training of personnel. This is triggered by the fact that the distinction between permanent and temporary employment is becoming less pronounced (the contract of well over one-third of temporary workers later results in a permanent contract for the employee).

In those countries with a liberal regulatory regime, a shortage of qualified temporary personnel is becoming a major obstacle to growth. This shows the importance of education and training now provided by an increasing number of temporary work

Table 5: Temporary work services
Degree of regulation in Member States, 1991

Liberal	Restricted	Prohibited
Belgique/België	BR Deutschland	Hellas
France	Danmark	Italia
Ireland		España
Luxembourg		
Nederland		
Portugal		
United Kingdom		

Source: CIETT, Bakkenist Management Consultants

companies. Typing courses, word-processing training and low-level technical courses are forms of training that figure regularly in their programme. Specific training tailored to the job or the individual is also common.

The issue of quality accreditation has also made its entrance into this sector. The countries in which the sector is well developed have started efforts in this direction recently. It is a result of a more competitive situation in these countries, combined with the trend in business towards a higher level of client service. Companies try to offer rapidly available and flexible services while still complying to the high quality standards demanded.

REGULATIONS

Organised temporary work is widely practised in the majority of the Member States. There are, however, considerable differences in regulation between EC countries. Two Member States, Greece and Italy, prohibit the operation of temporary work companies and the conclusion of temporary work contracts. In those countries where temporary work companies are forbidden, illegal practices are known to exist. Although temporary work companies are still officially forbidden in Spain, they are tolerated in practice. Regular discussions take place between the government and employers' organisations and trade unions about the possibility of legalising temporary work companies. There are two federations in Spain and the number of agencies is estimated to be over 200. In Portugal, regulations have been changed, resulting in a more liberal climate for temporary work companies. Several multinational temporary work companies have already opened offices in these two countries or are planning to do so.

Several countries restrict the use of temporary workers in one or more business sectors. For example, Denmark maintains a general prohibition except for the commerce and office sectors. The Netherlands and Germany prohibit temporary work in some areas (blue-collar workers) in the building and construction industry. Belgium prohibits temporary work in the construction industry as well as furniture removal and storage.

A number of other restrictions and requirements are common to most regulations in Member States, the most important being: registration of temporary work companies; limitations to the conditions under which temporary work is allowed; limitations to the duration of contracts (varying from 3 to 24 months or no restriction); and requirements for wage levels and social security conditions.

An indicative summary of the degree of regulation is shown in Table 5. It must be noted that the statements 'liberal' and 'restricted' should be seen relatively; the statements are meant to compare the EC countries to one another. If the USA were to be judged on this basis, the regulatory regime would be considered liberal.

OUTLOOK

The expectations for growth vary from country to country. Growth seems to be quickly slowing to a moderate (e.g. France), zero (e.g. the Netherlands) or sometimes even negative (e.g. the United Kingdom) figure. Economic recession and full employment both tend to reduce turnover. The sector seems to thrive best in a climate of moderate or brisk general economic activity.

In those countries where temporary work companies are well-developed, competition is strong; moderate growth sectors may still be found in high-tech industries such as robotics, informatics, bio-chemistry, etc.

In the countries where the sector is less developed, measures leading to a more liberal regulatory regime could still provide large growth impulses for the sector. Competition there is much weaker.

The large variety of national regulations within the EC have caused the Commission to examine possible harmonised regulatory schemes for the sector, in view of the increasing mobility of the labour force after 1992. It is not certain whether the Commission will submit EC-wide regulations upon the sector, or regulate cross-border activity only.

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Industrial cleaning services
NACE 923

The EC market for industrial cleaning services reached 18 billion ECU in 1991, a 5% increase in real terms over 1990. The three main end users of industrial cleaning services are government, private businesses and hospitals. The rate of penetration of industrial cleaning services is still fairly low at about 45%, indicating that the sector could continue to enjoy rapid growth in the coming years.
Like other EC markets, the industrial cleaning services sector is currently experiencing mounting competition and a progressive move towards internationalisation. Changes in the regulatory environment in Europe will also have a major impact on the future of this sector.

INDUSTRY PROFILE

Description of the sector

The service activity considered in the present chapter comprises the cleaning, by specialised firms, of buildings whether they are used for administrative, industrial or commercial ends. Services provided by cleaning contractors are the following: inside cleaning of buildings such as offices, factories and workshops, inside cleaning of means of transportation (buses, trains, planes, metros, trams, ships),tanks, and small building maintenance. The following activities may also be provided by cleaning firms, but are not covered in the present chapter: security services, waste management services, evacuation of asbestos, laundry, dry cleaning, and pressing.

In some EC Member States, chimney sweeping, facade cleaning (but not restoration), the maintenance of areas around buildings and general sanitation are also part of industrial cleaning services.

Main indicators

In 1991, overall turnover of cleaning contractors in the EC was about 18 billion ECU (see Table 1). In real terms, the sector grew by 5%.

The main reason for this rapid growth in industrial cleaning services is the rising market penetration of cleaning contractors. The degree of market penetration, extremely important for business services, measures the share of the total potential market that is actually sub-contracted to specialised service contractors. The rate of market penetration by cleaning contractors is calculated based on several estimates, among which the sales of cleaning products and materials. At present, the rate of penetration in Europe is estimated at roughly 45%, for a total market value for industrial cleaning services in Europe of close to 40 billions ECU.

The low rate of market penetration in Denmark and in the United Kingdom (see Table 2) explains the relatively low turnover achieved in those countries, compared to other countries with a similar level of development.

Market penetration is constantly increasing over time. The so-called "in-house" cleaning services represent the most important development opportunity for cleaning contractors. According to a British survey, the contracting-out of services formerly performed in-house represented, in 1990, more than 75% of the cleaning contractors' new markets, whereas the cleaning of new buildings only represented around 10% of market growth.

There is no sign of market saturation in the EC. The growth rate of this sector in countries with a high market penetration (Germany) s similar to those with an average (Belgium) or low (Denmark) rate of market penetration.

Table 2: Industrial cleaning services
Market penetration of cleaning subcontractors, 1991

	(%)
Belgique/België	55.0
Danmark	25.0
BR Deutschland	65.0
España	55.0
France	46.0
Italia	40.0
Luxembourg	60.0
Nederland	58.0
Portugal	45.0
United Kingdom	30.0
Total	44.8

Source: FENI

Table 1: Industrial cleaning services
Turnover (1)

(million ECU)	1987	1989	1990	1991	Potential market (1991)
Belgique/België	358	448	529	588	1 069
Danmark	333	385	401	442	1 768
BR Deutschland	2 442	2 634	2 930	3 313	5 097
España	1 825	2 076	2 230	2 430	4 418
France	2 181	2 693	3 065	3 304	7 182
Italia (2)	1 964	1 997	1 971	3 906	9 765
Luxembourg (2)	19	19	15	29	48
Nederland	721	917	1 146	1 396	2 407
Portugal	47	55	55	68	152
United Kingdom (2)	1 723	1 610	1 563	2 394	7 979
Total	11 614	12 836	13 906	17 870	39 885

(1) Current value
(2) Data prior to 1991 are undervalued
Source: FENI

Table 3: Industrial cleaning services
Public markets, 1991

	(million ECU)	Market penetration (%)
Belgique/België	235	65
Danmark (1)	126	80
BR Deutschland	N/A	N/A
España	1 305	70
France (1)	800	65
Italia	1 302	60
Luxembourg	7	25
Nederland	304	85
Portugal	33	42
United Kingdom	282	28
Total	4 395	N/A

(1) 1989
Source: FENI

Recent trends

In 1991, the public authorities contracted out the equivalent of 5 billion ECU of industrial cleaning services. This represents one third of the branch turnover (see Table 3). In the public sector, the rate of market penetration is systematically higher than in the private sector, with the exception of Luxembourg.

The public procurement of industrial cleaning services is increasing in the EC, especially in the United Kingdom where the government sector has changed its policy towards the contracting out of services to private firms.

Office cleaning is traditionally much more important, in terms of turnover, than other market segments. It is also the segment of the market in which in-house cleaning is estimated to be the most important, which indicates that the future growth potential of cleaning services to private firms is still very important. Many private or public companies indeed do not yet contract out the cleaning of their premises, except perhaps for some exceptional and/or unusual work (window cleaning, cleaning of carpets floors, etc.). In-house cleaning may, however, be limited certain segments of industry which have specialised facilities or controlled environments (nuclear power stations, agri-food industries, dust-controlled rooms, etc.).

Hospital cleaning, which represents between 3 and 6% of the market (except in Spain, where the figure is 20%) must be separated from the other market segments in so far as its features are very specific. It comprises, on the one hand, the cleaning of common spaces and the cleaning of rooms, with features quite similar to hotel cleaning (day-time work, full-time and with longer average working time) and, on the other hand, the disinfection of more sensitive areas such as operation rooms. This latter task generally requires specific techniques and skills.

In-house performance of cleaning services by private or public hospitals is estimated to be more important in the first sub-segment of the market than in the second. Rooms and public spaces are indeed often still cleaned by the hospital's own staff.

MARKET FORCES

Demand

Two trends recently appeared on the cleaning market: the demand for quality and a broader range of services. It is, however, still difficult to either quantify or measure their impact on the industry.

Quality requirements

Cleaning service customers are more and more demanding in terms of quality. These customers often ask that objective criteria be used to establish the price for a defined level of quality. This raises serious problems in the case of industrial cleaning services because of the high subjectivity attached to the concept of cleanliness. It is, indeed, extremely difficult to measure quality in the cleaning sector. Some projects towards the establishment of quality measuring systems have, however, been carried out. A Dutch cleaning institute (VSR) for instance has developed a relatively sophisticated system which can be applied to approximately 25% of the market in this country. It consists of a generating very precise list of criteria based on a range of errors established in advance with the client. The level of quality, according to this list, is controlled periodically. This statistical account is used to define what is an acceptable level of quality for the client and is registered with the contract. In France, the international technical centre for cleanliness (CTIP) is also trying to define a means of quantifying cleanliness and the technical means to achieve the desired results.

The clients' natural requirements for high quality are, however, in contradiction with a fairly wide-spread attitude which consists of systematically choosing the lowest-priced tenderer. The process "low price/poor service quality/dissatisfaction of the client" is thus engaged, seriously damaging both the quality of the services performed and the profession's image.

A first solution comes from the contractors themselves, who try to make their clients aware of the problem as the contracts are being drafted.

A second is provided by the professional organisations which, in addition to organising communication campaigns, have been promoting the setting up of minimal professional requirements necessary to have access to the market and exercise to the profession (see the section on the regulatory environment).

Supply of broader support services

Another trend that seems at present to be limited to the British market and, to a lesser extent, to the Dutch one, consists of the extension of the contractors' activities to the provision of broader support services that include, in addition to cleaning, security services, catering, the building maintenance, and the care of surrounding areas, etc. This trend is the consequence of the requirements expressed by some big clients, especially the British public sector, who are seeking to simplify sub-contracting by limiting the number of contractors.

It is, however, not yet possible to measure the impact of this trend on the market or on the profession. It is also impossible to appreciate whether it will extend significantly to other EC markets.

INDUSTRY STRUCTURE

Companies

The EC cleaning industry in 1991 was made up of more than 35 000 companies. This number is constantly increasing as a consequence of the dynamism of the branch.

Structurally, the sector is characterised by a large number of handicraft and small companies, employing less than 20 workers. Broadly speaking, more than 90% of the cleaning contractors in the EC employ less than 100 people, except in Germany where the market is more concentrated and where 15% of the companies employ more than 1000 workers. It must be noted however that the relatively low average working time in this country directly affects the level of employment.

Strategies

The trend towards a greater concentration of the market through mergers or acquisitions is evident in all EC countries.

Table 4: Industrial cleaning services
Number of enterprises

	1987	1989	1990	1991
Belgique/België	915	1 002	1 017	1 023
Danmark	2 598	2 598	2 300	2 300
BR Deutschland	2 700	3 227	3 349	3 432
España	3 900	5 200	5 500	5 100
France	6 774	7 232	7 831	8 000
Italia	5 500	5 500	5 500	6 500
Luxembourg	16	N/A	40	40
Nederland	2 100	2 400	2 540	2 924
Portugal	120	150	150	185
United Kingdom	3 840	4 500	5 345	5 345
Total	28 463	31 809	33 572	34 849

Source: FENI

It is, however, hard to put numbers beside this trend as the establishments often retain their previous name after the operation, which usually only affects the capital ownership.

On the other hand, more and more big groups are seeking to diversify their activities by entering the cleaning services market and taking over existing cleaning companies. This has been the case in particular of large temporary work service companies, and of companies such as the French Compagnie Générale des Eaux.

The big groups are also growing in importance in terms of employment and turnover. In France, more than half of the workers are employed by firms with more-than-500-employees (which represents less than 100 firms) and the 40 "over-1000" companies account for one third of the turnover of the sector.

REGIONAL DISTRIBUTION

Cleaning contractors are naturally located in industrial and urban areas, close to their clients. The industry is in effect characterised by the necessity for the contractor to be established very close to its clients. This results in a high fragmentation of the industry.

The firms which develop activities in several regions usually operate via a network of local agencies, linked to the mother company through regional or national subsidiaries.

Most of the big groups are established in several countries (EC and non-EC). The internationalisation of the groups, however, is hard to measure since, because of the proximity requirements, these large groups often enter new markets by taking over national companies. The latter thus remain essentially national establishments. The cross-border provision of cleaning services is quite rare and limited to neighbouring regions or to very specific contracts.

EMPLOYMENT

Recent trends

The cleaning industry is one of the EC's largest employers, with more than 1.8 billions of workers in 1991. Employment grew by more than 4.5% between 1990 and 1991.

Employment is traditionally made up of women and blue collar. It seems, however, that these two characteristics lost some of their importance in 1991, though it is still is too early to conclude that a trend has been established.

Non-EC migrant workers represent up to 48% of the workers in this sector in Belgium, and between 15 and 20% in Germany, France and the Netherlands. In the other countries, non-EC migrants represent less than 6% of the workforce.

Organisation of the work

The cleaning industry is characterised by the importance of part-time work. The average working time is quite low - be-

Table 5: Industrial cleaning services
Number of employees

	1987	1989	1990	1991
Belgique/België	25 800	30 000	42 000	58 000
Danmark	20 000	20 000	21 000	24 000
BR Deutschland	430 000	490 000	457 500	466 200
España	160 000	175 000	190 000	200 000
France	168 118	187 000	203 700	215 300
Italia	350 000	350 000	350 000	330 000
Luxembourg	N/A	1 500	1 700	1 960
Nederland	110 000	120 000	131 450	146 000
Portugal	12 000	13 000	13 000	14 850
United Kingdom	256 000	260 000	270 000	300 000
Total	1 531 918	1 646 500	1 680 350	1 756 310

Source: FENI

Table 6: Industrial cleaning services
Labour costs, 1991

(ECU/hour)	Wages (1)	Total cost of work
Belgique/België	6.5	12.3
Danmark	10.1	12.3
BR Deutschland	6.5	14.7
España	5.2	9.3
France	4.9	8.9
Italia	5.9	14.3
Luxembourg	5.1	6.4
Nederland	5.8	11.8
Portugal	1.7	2.8
United Kingdom (2)	3.9	5.4

(1) Minimum guaranteed wage - unskilled workers
(2) Minimum average wage - unskilled workers
Source: FENI

Table 7: Industrial cleaning services
Organisation of work, 1991

	Part-time work (as % of total)	Average working time (hour/day)
Belgique/België	83	3.5
Danmark	85	4.5
BR Deutschland	80	4.0
España	60	5.5
France	59	4.2
Italia	88	4.0
Luxembourg	89	3.5
Nederland	79	4.0
Portugal	72	3.0
United Kingdom	N/A	3.5

Source: FENI

tween 3 and 4 hours a day. Cleaning services are indeed performed outside of the usual working hours, when the clients' buildings are relatively unoccupied.

Contractors must therefore concentrate their workforce on two relatively short periods: in the morning and in the evening. Most of the workers (60%) are occupied in the evening. "Day-work" is limited to some specific situations (hotels and hospitals) and represents only 10 to 20 % of all cleaning activities. Night work is very limited in this sector.

Full-time work is quite atypical in the cleaning industry, as the "work day" is most frequently split into two non-consecutive periods: morning and evening.

Labour costs

The minimum hourly wage for unskilled workers in the cleaning industry (see Table 6) is quite homogeneous across countries in the EC. Wages are close to 5.5 ECU/hour except in Portugal and in the United Kingdom which are in fact estimates. The gross wage appears to be quite high in Denmark, but this results from the fact that the social contributions are distributed differently between employees and employers.

The total cost of labour, i.e. including both the wages and employer contributions, varies significantly from one country to the other. It ranges from 2.8 ECU/hour to 14.7 ECU/hour. This mainly reflects differences in national and professional (guaranteed by the collective agreements) social protection systems, which result in considerable variations in the share of employer contributions in gross wages across countries.

Work time and training

In order to promote greater professionalism in the cleaning industry, employers are aware of the necessity to increase work time. At the same time, they intend to develop vocational training initiatives especially for the lower levels of professional qualification.

Beyond its direct effects on the quality of the services, this strategy aims both at keeping workers in the company or, at least in the industry, and at stimulating their professional motivation by offering them the opportunity to have a professional career in this industry.

REGULATIONS

Social legislation

The cleaning industry is highly labour intensive, which makes labour-related costs an extremely important factor in the determination of the price of the service. Labour costs represent between 75 and 85% of the companies' turnover. Companies are therefore directly affected by social regulations. The organisation of work is, however, very peculiar to cleaning activities and often requires the adaptation of the social laws to its features. For instance, any regulation limiting part-time work would have a major impact on the cleaning service sector.

The social statute of workers in the cleaning industry is generally defined by sectoral collective agreements, at the national or regional level, except in the United Kingdom where agreements are made at the company level.

One of the most constraining social regulations for cleaning contractors is the obligation in most EC countries to keep all or part of the workers at a given site in the case of a change in the owner and contractor. The terms of this transfer of employment varies across the Member States. This principle however results in a strong reduction of competition as it considerably reduces the means of manoeuvre of the new contractor.

Professional regulation

Except in Germany, the access and the exercise of the profession are completely free in the EC Member States. Because the sector is a fairly dynamic one, many new cleaning companies are created every year. Most of them are small (less than 5 employees) and managed by people who neither have a basic knowledge of management rules nor basic professional skills. This makes the "life expectations" of these firms quite short, and many do not survive beyond one year.

A study carried out in Belgium in 1990 showed that, of the 1959 companies that were created between 1986 and 1990, only 1017 were still existing in 1990. Of these, 381 had been created more than 5 years before; 872 remained just one year in the market and then disappeared and 185 did not even survive a complete year. This phenomenon constitutes a major concern for the profession as it damages quite seriously both the market and the profession's image.

Most small companies have a tendency to tender at unrealistic prices (sometimes lower than the total cost of labour). Furthermore, they often do not have a sufficient financial capacity to be able to face the difference between the date at which they are paid by their clients and the monthly payment of their social obligations. This explains why so many companies become bankrupt after only a few months of existence.

Beyond its social consequences, this problem damages the whole profession and often results in a return to in-house cleaning by the client who initially out-contracted these services.

The profession has tried to react in most of the European countries, and national organisations of cleaning contractors are trying to impose minimum standards with which firms must comply to be allowed to enter the market.

The solutions adopted by the industry representatives differ from one country to the other, depending on the national legislative system and habits. These minimum standards for instance take the form of "quality labels" in France and in Germany (respectively "Marque professionnelle" and "Guterschutzgemeinschaft"), and are based on the commitment by contractors to respect minimal professional rules and to adopt certain codes of behaviour. These systems have been established by the profession itself but the labels are granted by independent authorities.

In Belgium, discussions are underway to establish a kind of "identity card" or professional label for companies in the industry.

French and Dutch organisations are also actively working on the definition of "quality insurance" systems adapted to cleaning features and based on ISO standards 9000.

OUTLOOK

From an economic point of view, the completion of the single European market offers good opportunities for the companies in this sector.

Beyond the opening up of public procurement of services, which should have favourable effects on the cleaning industry, and the complete liberalisation of services provision, which will facilitate the establishment of new firms in the sector and encourage the growing internationalisation of this industry, cleaning companies should benefit from the cooperation tools offered by EC law, especially the European Groups of Economic Interests.

The creation of a European company statute should also facilitate the internationalisation of cleaning companies in a near future.

One major concern must, however, be mentioned: the distortion of competition that can result from differences in labour costs. The current situation shows large differences in unit labour costs across countries. This may result in an artificial delocalisation of companies, eager to benefit from lower labour costs in certain regions. This could seriously damage the regional, economic and social landscape of these regions. However, because of the proximity requirements, this phenomenon would be limited to cross-border regions, and to a limited number of long distance or very specific contracts.

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Security services
NACE 839.3

The security services sector in Europe had a turnover of approximately 7 billion ECU in 1992 employing some 424 550 people of which some 314 410 persons were employed by the 4635 private security companies operating in the EC. About three-quarters of security activities are subcontracted with the remaining quarter handled by corporate security divisions.
Many Member States are working hard to improve the quality of the services provided. Some individual firms have already been certified in accordance with ISO standard 9001. Quality improvement in the education and training of employees has in some Member States resulted in forms of cooperation with the regular police in the field of preventive supervision. The growth potential of private security services is good, both in the conventional sector and in terms of diversification of the security services provided.

INDUSTRY PROFILE

Description of the sector

The term "security" comprises a variety of specialities within the sector. This monograph is mainly based on data concerning the "manned guarding" sector, but also provides some information on related and ancillary specialities.

The sector of the production of electronic and technical equipment, for example, manufactures detection systems offering a variety of possible security applications, as well as exchange units capable of handling many types of signals and forwarding these to central alarm stations via telephone or permanent lines.

We are witnessing the dawn of the "electronic age". Wireless transmission from detection systems to a central alarm station may mean lower installation costs and can in some cases positively affect the risks of sabotage etc.; it may also prove the best solution in case of objects needing temporary protection (as in the building sector).

Even the technical advantages of the space age are noticeable in the security services sector. Today, tracing systems are being applied which can, by using satellite communication, accurately trace any object on earth equipped with a signal code emitter to within a few metres. This represents a great step forward in combating crime, (e.g. in the case of VIPs taken hostage). Furthermore, this development can also play an exceptionally useful role in improving the security of, for example, shipping traffic after a calamity has occurred.

Satellite tracing systems also contribute to the improvement of efficiency in international land, sea and air transport by allowing continuous spotting of the transports. This helps to coordinate the deployment of materials and/or ensure proper monitoring.

As an extension of the production sector of security equipment, the technical installation sector constitutes a logical speciality. It ensures the installation of security equipment in buildings, on grounds and to an increasing degree in private homes. This sector is developing very fast.

In the construction of new office and industrial buildings, a clear increase of so-called "smart buildings" can be observed where building automation plays an essential part. Often the technical installation comprises not only the security equipment: elements like air-conditioning, automatic access control, lift service programs etc., are also included in the technical infrastructure.

Table 1: Security services
Main indicators, 1991

	Total number of security employees	Own security division	Private security companies	% subcontracted	Security guards per 100 000 inhabitants
EC	424 550	110 140	314 410	74.1	125
Belgique/België	10 000	3 000	7 000	70.0	100
Danmark	5 000	2 000	3 000	60.0	98
BR Deutschland	105 000	40 000	65 000	61.9	140
Hellas	2 000	600	1 400	70.0	20
España	60 750	1 300	59 450	97.9	157
France	70 000	11 000	59 000	84.3	123
Ireland	5 000	1 500	3 500	70.0	142
Italia	40 000	1 000	39 000	97.5	70
Luxembourg	800	240	560	70.0	200
Nederland	17 000	7 000	10 000	58.8	113
Portugal	15 000	4 500	10 500	70.0	146
United Kingdom	94 000	38 000	56 000	59.6	164
Non-EC countries	33 600	N/A	N/A	N/A	104
Austria	3 100	N/A	N/A	N/A	40
Finland	3 500	N/A	N/A	N/A	70
Norway	3 500	N/A	N/A	N/A	81
Sweden	16 000	N/A	N/A	N/A	186
Switzerland	7 500	N/A	N/A	N/A	110
Total	458 150	N/A	N/A	N/A	123

Source: CoESS

Table 2: Security services
Employees in private security companies, 1991

	Number of security companies	Number of security guards	Average number of employees per company
EC	4 365	314 410	72
Belgique/België	70	7 000	100
Danmark	40	3 000	75
BR Deutschland	800	65 000	81
Hellas	20	1 400	70
España	699	59 450	85
France	1 100	59 000	54
Ireland	150	3 500	23
Italia	729	39 000	53
Luxembourg	7	560	80
Nederland	130	10 000	77
Portugal	120	10 500	88
United Kingdom	500	56 000	112
Non-EC countries	457	33 600	74
Austria	42	3 100	74
Finland	110	3 500	32
Norway	55	3 500	64
Sweden	200	16 000	80
Switzerland	50	7 500	150

Source: CoESS

The central alarm station forms a vital link in the above-mentioned sectors. Equipped with state-of-the-art security equipment and usually manned by a team of at least two, it receives the signals from technical systems installed at the clients' premises and handles them according to a scenario agreed previously with the client. Depending on the type of occurrence, assistance is called in from the police, fire units, technical emergency services or the alert verification team of a private security organisation.

The central alarm station is also increasingly seen to give active response to certain signals because today's data network infrastructures allow remote control of technical processes. Systems can be switched on or off at a distance, the degree of distance being basically irrelevant. Visual images can also be transmitted via this method.

In the EC, over 1500 central alarm stations are operational with an estimated 4.5 million connected installations. This sector has considerable growth potential. It appears likely that middle-class households, too, will increasingly decide to purchase professional security equipment linked to a central alarm station. Considering technical developments, the purchase of "domestic equipment" will in principle suit all purses.

Transportation of cash and valuables is a specialised sector in which over 50 000 security employees, manning approximately 9 000 armoured vehicles, are employed by 180 special transportation firms. It is believed that the distribution of coin will be fully transferred to this sector, as well as the running, servicing and refilling of a number of cash dispensers.

MARKET FORCES

Demand for manned guarding services

All over Europe, the beginning of the nineteenth century saw the advent of night security services, usually on a small scale, active locally and often established in industrial areas. Not until after the Second World War did a substantial growth occur due to a number of factors: increasing industrialisation and the prosperity it brought, increased crime, weakened social supervision by the environment (family, church, etc.); increased awareness by entrepreneurs of the necessity of protecting their own belongings instead of considering the mere responsibility of the authorities or the police. Preventive security activities were carried out by security staff employed by the company itself as well as by employees of the contracted private security organisation.

The growth of the private sector was greatly enhanced because businesses frequently chose to concentrate on their own field and hive off disparate tasks. After industrial cleaning maintenance and catering, security activities were also increasingly subcontracted. Besides subcontracting, we find the birth of the "externalisation" concept meaning that "corporate" security guards are transferred to a security organisation specially selected for a particular purpose. In this new form, the existing security activities are continued on a contract basis. This tendency may be compared to the process of privatisation of government tasks.

Annual growth in the security services sector is 10% on average. This growth is occasionally the result of incidents, such as the Gulf War, when heightened threats of terrorism compelled entrepreneurs to take additional security measures.

The existence of an extremist terrorist group in a country can strongly affect the level of prevention within companies. But security is also seen to contribute to the continuity of the production or labour process and as such represents important support for a company's continuity criterion.

Preventive security has become a profession. The duties have grown more complex. Where in the past they were mostly concerned with porter services, mobile surveillance and the like, present-day security guards perform extremely useful and critical tasks within the framework of the total management of extensive projects involving a wide range of crucial security functions.

In large industrial plants and exhibition operations, security guards are in charge of not just access control but also fire

Table 3: Security services
Market leaders in security services, 1991

Country	Company
EC countries:	
Belgique/België	Group 4 Securitas SA, Intergarde Monitor Security SA, Garde Maritime Industrielle et Commerciale
Danmark	ISS Securitas A/S, Boligministeriet, Cerberus Group Denmark A/S
France	S.P.S., S.G.I., Adia-Protectas
BR Deutschland	Gesellschaft für Eigentuschutz GmbH, Niedersacksische Wach- und Schliessgesellschaft Eggeling & Schorling K.G., Wach- und Schutzdienst Fritz Kotter GmbH & Co
Ireland	Securicor, Group 4, ADT Security Systems
Italia	Cittadini dell Ordini, Vigilanza Mondialpol, Co. G.I.V.
Luxembourg	Securitas SA, Securicor SA, Securite Civile S.A.R.L.
Nederland	Nederlandse Vieligheidsdienst, Randon Beveiliging, VNV
Portugal	Securitas, Ronda, Grupo 8/Transegur
España	Prosegur, Prosesa, Esabe
United Kingdom	Security Guards, Group 4 Securitas, Securicor
Non-EC countries:	
Austria	Erste Wiener Wach- und Schliessgesellschaft A.G., Bewachungsgesellschaft der Industie, Österreichiser Wachdienst
Finland	Suomen Teollisuuden Vartiointi Oy, Servi Turvapalvelu Oy, Suomen Vartioimis ja Sulkemis Oy
Norway	Securitas A/S, Verdisikring A/S, Norsk Industrivakt A/S
Sweden	Securitas AB, ABAB, SSS
Switzerland	Securitas AG, Protectas SA, Wache AG

Source: CoESS

prevention and sometimes fire protection; they perform tasks in traffic control and parking supervision on the grounds and provide First Aid. For all these purposes, they man control rooms from where the security of the production process in the widest sense is monitored.

Another reason for the growth is the diversification of the security services sector. The uniforms (often an element of identification), recognisability, mobility and up-to-date communication equipment represent an infrastructure that allows private security organisations to explore new fields of activity such as operating bridges and locks in water-abundant areas, management of nature reserves or preventive supervision in the recreational sector (campsites, beaches). Other activities include environment-screening in cooperation with companies or public authorities.

In many countries there is some form of cooperation with public authorities. For example, budget inadequacies of the police have contributed to the development of cooperation in which the police play a supervisory role. A common example is the security check of passengers in many international airports where private security guards screen passengers under the supervision of the regular police force. Less familiar are forms of cooperation (e.g. the overseeing of detainees, traffic control, parking supervision in city centres and intendancy in public transport particularly in large cities) where drug abuse has especially caused criminal acts to multiply. Security guards are also used to protect military objects and perform preventive activities in prisons.

Supply and competition

In many EC countries, much is being done to improve the quality of the service. Quality is increasingly becoming a measurable element which relates to:

- quality/expertise of the company management;
- quality of the organisation, procedures, etc.
- quality of the performing staff (schooling/training);
- quality of the terms of delivery.

In the countries where relevant legislation exists these rules are often seen to contribute to the quality aspect. Indeed, competition among security firms is first of all a matter of quality aspects and much less a question of rates and on-charging. In those countries where competition has focused on the cost price of the service, we also find that this policy leaves no room for financial investments in quality improvement. Although no unequivocal standard has as yet been established, it seems likely that the international quality standard for services (ISO 9000) will be applied as a certificate of quality assurance.

Several security firms have so far been certified according to this standard and no doubt more companies will follow their path.

INDUSTRY STRUCTURE

A survey held in 1992 among the members of CoESS showed that this service sector employs 424 550 people.

The subcontracting percentage in the EC Member States averages 74% (314 410). The remainder (110 140) employed in a corporate situation. In the EC, an average 124.9 out of each 100 000 inhabitants work as a security employee. The turnover of the 4 365 private security firms in the EC amounts to 6 684 million ECU, with an average annual turnover of 21 259 ECU per employee.

There are 4 365 security firms in the EC. The average work force is 72 employees per firm. In non-EC European countries, the average company size is 74 employees in the 457 security firms established in these countries. An overview of the company size of security firms can be given for the following EC countries: United Kingdom, Germany, Spain, the Netherlands and Italy.

In addition, about 33 600 security employees are being employed in non-EC countries by a total of 457 security firms. Their total turnover is 1 014 million ECU which means an annual turnover per security employee of 30 164 ECU.

REGULATIONS

In various ways there are considerable dissimilarities in the laws and regulations. These laws and regulations are, of course, subject to change. The information supplied below was valid in late 1990 and early 1991. It describes a number of marked differences in laws and regulations.

Most European countries have some form or other of laws or regulations. One noticeable exception is the United Kingdom where no government rules exist whatsoever. Germany too, considering the extent of the sector there, takes a position of its own. This country does have some incorporated legislation but no specific legislation.

A number of duties are performed on a standard basis. In some countries the array of duties is quite wide. In Sweden, the tasks include the production of identity cards and assistance in fire-fighting. In Germany, a considerable amount of activities are connected with the maintenance of public order. In Spain, part of the duty is to pursue and arrest lawbreakers.

All European countries (excluding the UK) have mandatory licence and practical requirements which are generally the same. Although such harmonisation exists, a number countries enforce special requirements, including:

- Compulsory third-party liability insurance (Belgium, France, Portugal, Spain and Switzerland);
- Belgium and France apply restrictions for those who have previously been employed professionally in the police force or have been in the military. Italy and Spain, on the other hand, make it a requirement to have accomplished one's military service to be allowed to work as a security guard;
- In France it is not possible to enter the security services sector after a bankruptcy.

The requirements and the duration of the various types of schooling in Europe are quite diverse. In Germany there is no unified concept. In the Netherlands, however, schooling is organised quite thoroughly as compared to the other European countries.

Laws and regulations with regard to equipment (uniform, weapons, identification and the use of dogs) are on the whole similar in all countries. Wearing a uniform is compulsory in most countries, but is optional in four countries. The uniform shall not resemble the police uniform.

Carrying arms is permitted with the exception of Denmark, the United Kingdom, the Netherlands and Norway. In some countries, the laws and regulations with regard to arms are contained in the Fire Arms legislation of the country in question. In other countries, a separate article is included in the Security legislation.

In most countries employees in the private security services sector are obliged to carry an identity paper; Austria is an exception. In Spain security guards can easily be recognised by a badge that each guard is required to wear.

As for government supervision, Belgium, the Netherlands, Portugal and Spain stipulate annual reporting to the Ministry in charge. In Sweden and Norway, supervision is in the hands of the police.

The amount of possible sanctions varies widely. In the Netherlands there is only the possibility of withdrawing the licence. Belgium, Denmark, France, Norway, Portugal, Spain and Switzerland have, in addition to that sanction, the possibility of imposing fines and/or imprisonment.

Other noticeable clauses include:

- security firms are not to concern themselves with or intervene in political or labour conflicts (Belgium and France);
- In case a person resists against removal, a certain amount of violence may be used (Finland and Sweden);
- The wages of a security guard must not be lower than the starting salary of a police officer (Greece);
- In Austria, approval from the Prime Minister is required if someone wishes to exercise other activities simultaneously with security activities;
- In Spain, each private security organisation is assigned an exclusive number. This number must be mentioned on any document and in any publication the firm produces.

OUTLOOK

Growth in the private security sector appears encouraging. Quality control, increase of sub-contracting, diversification of the security sector and cooperation with public authorities will lead to greater expansion of private security companies in the EC.

Most of the growth, however, will be affected by well organised, large and mostly international operating security organisations, who are willing to invest in an adequate infrastructure of the organisation and quality control program, including the improvement of education and training of their security employees.

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Car rental
NACE 844

The West European car rental market had a value of 4.5 billion ECU in 1991. The largest market by far is Germany. The biggest car rental company in Western Europe is Avis, followed by Hertz, Europcar, Budget and Eurodollar. The evolution of the car rental market is closely correlated with a country's economic activity. There is generally extraordinarily strong price and service competition. The market potential is far from being exhausted. During the next few years an average annual growth rate of 5% is expected for the car rental market in Western Europe, with the business segment growing more slowly, and the leisure segment growing faster than average. The five big companies will be able to gain market share at the expense of the numerous small and medium-sized firms.

INDUSTRY PROFILE

Description of the sector

The car rental branch deals with the commercial rental of motor vehicles (passenger cars and trucks) without driver. Car rental with driver is not the subject of the following analysis; it is included, together with the taxi business, in NACE 722.

Commercial car rental is provided by companies either exclusively or in combination with other business activities. The majority of the big companies of the sector are in this business exclusively, in part also in combination with car leasing. The small and medium sized companies, however, combine the car rental business with other activities, especially with petrol stations, motor vehicle dealerships and garages. Mostly, the car rental business is then not the major activity.

Main indicators

The Budget Report estimates the total West European car rental market at a value of 4.5 billion ECU in 1991. Germany has by far the largest market in the EC, with 36.7% share over five countries for which data are available. The United Kingdom follows with 17.2%, France (14.1%), Italy (5.5%), and the Netherlands (2.3%).

The market of the six countries covered in the report (the five EC countries mentioned above and Sweden), is estimated to grow by 5% on average in nominal terms over the coming years. The German market, due primarily to reunification, grew by 27% in 1991. Excluding Germany, the market volume in the six major countries would have declined in 1991. The Gulf War and the economic slowdown, especially in the United Kingdom, must be seen as the causes of the decline. The entire fleet size increased by 13% in 1991.

MARKET FORCES

Demand

The three most important factors affecting the growth of the European car rental market are general economic growth, airline traffic growth, and customer attitudes. According to the "Budget Report on Car Rental in Europe", a 1% increase in disposable income leads to a more than proportional growth in demand for car rental, namely 1.8%. Due to the firm link between car rental demand and economic growth, the Budget Report considers car rentals to be a good indicator of economic activity. On the basis of the estimated growth rates of GNP in the countries under consideration, a real expansion of the car rental market of close to 5% is expected for the period 1991 to 1996.

20 to 30% of all car rentals are estimated to occur at airports. The International Air Transport Association (IATA) estimates that in the period 1991 to 1995 airline traffic in the countries covered (incl. Sweden) will grow by an annual average rate of 4%. The Budget Report expects the deregulation of the European airline industry to result in more air passengers and less service, especially in the leisure sector.

The Gulf War showed that many business trips are unnecessary, and effectively not begun, with extensive negative effects on the car rental industry. Business airline travel is therefore likely to grow more slowly in the future than assumed above. Above average will be the growth of the leisure market, induced by an increase in disposable income, deregulation, and lower prices. Furthermore, the European tourist is becoming increasingly independent and enterprising, a tendency which benefits the car rental industry. The greatest benefit will accrue to South and East European travel markets where transport systems have not been fully developed yet.

A clear pricing policy and a constant high level of service are becoming increasingly important, a trend which favours the big car rental companies with evenly high performance standards and large station networks. The big companies will therefore be able to gain market share at the expense of small and medium sized firms.

The rental time differs from country to country; it ranges from 2 to 3 days in France, Germany and the United Kingdom, to 3 to 4 days in Italy, and to 5 to 7 days in the Netherlands. Many renters have reduced the length of their trips, possibly because of deteriorating economic conditions. The average

Table 1: Car rental
Main indicators, 1991 (1)

	D	F	I	NL	UK	Total
Turnover, cars only (million ECU)	1 646	630	245	119	770	3 410
Number of companies	1 300	900	500	575	1 850	5 125
Employment	9 500	12 000	6 000	1 850	10 500	39 850
Cars in use	149 250	98 000	41 000	21 000	135 000	444 250
Cars/million people	1 913	1 746	713	1 416	2 357	8 145
Cars/billion ECU of GNP	277	241	116	218	411	1 263
Market leader	Europcar	Avis	Avis	Budget	Avis	-
Number of outlets	380	300	120	31	200	1 031
Number of cars	20 000	15 150	8 000	2 900	16 000	62 050

(1) Estimates
Source: The Budget Report on Car Rental in Europe

Table 2: Car rental
Car manufacturers shareholding in major car rental companies

	Ford	General Motors	Chrysler	Volkswagen	Volvo
Avis		X	X		
Hertz	X				X
Europcar				X	
Budget	X				
Eurodollar					

Source: Budget Report on Car Rental in Europe.

distance per hire remained the same, at 150 kilometres, with the exception of Italy where it is at 450 kilometres. The demand for oneway rentals varies substantially, from 33% of all rentals in France to 3% in Italy. Rental activity is strongest during the summer months (May to August), whereas it is markedly weaker in the winter months (January and February).

Supply and competition

There is generally extraordinarily strong price and service competition in the car rental industry. It is led by the big companies which court the business sector as well as the leisure sector with a most flexible pricing policy oriented on partial cost thinking. At the same time the performance standards (car plus service) are substantially expanded and improved. The Budget Report confirms that in the 6 countries under consideration average rental fees per day for a Ford Escort declined by 12% from 1988 to 1991. Comparing the cost of owning a car with the cost of renting one on weekends shows that up to a utilisation rate of 44 weekends per year renting the car is cheaper or at least not more expensive than owning the car. The Budget Report lists additional advantages of car renting, namely higher quality and reliability, time saving, petrol costs saving by using the shortest route, and adaptation of the rental car to special requirements.

The partial-cost oriented pricing policy of the big car rental companies is possible because of the effects of rationalisation and declining costs resulting from the size of the companies, and also and importantly because of the financial and/or contractual ties to the automobile industry. The sale of used cars, which are bought at large discounts, yields high profits and subsidises the rental business. Table 3 shows the share holding interests of motor car manufacturers in the major international car rental groups.

INDUSTRY STRUCTURE

Companies

The five big car rental companies in Europe are Avis, Budget, Eurodollar, Europcar and Hertz. Avis, Budget and Hertz operate worldwide with international networks in many countries. Eurodollar and Europcar are trying to establish global presence through cooperation. Eurodollar is the major licensee of the American Dollar group, and Europcar has marketing agreements with National in the USA, Tilden in Canada and Nippon in Japan.

The Budget Report estimates the car rental fleet in Western Europe at 610 000 cars. In 1990, Avis and Europcar together were the market leaders. In 1991, Avis surpassed Europcar and became market leader; the other three big companies followed closely.

After Hertz, Avis is the second biggest car rental firm worldwide; Avis Europe, in which the Belgian Lease International and to a lesser part General Motors and the American parent company Avis Inc. hold shares, is the market leader ahead of Europcar. In 1991 its pure rental turnover amounted to 175 million ECU.

Avis relies primarily on its extensive station network at airports and train stations in Europe. Exclusive contracts exist with the French, Belgian and Luxembourg railroads. In addition, there are cooperation agreements with most of the big travel agencies, many airlines (Lufthansa!) and hotel chains. At present Avis tries to establish ties with the East and West German railway companies. Avis, like the other big companies, provides a number of special services for the business customer, the major client. A computer system supports fast and flexible management decisions. With its "super value" programme in 1991, Avis was the first of the major car rental firms in Europe to offer leisure travellers special discount rates.

Hertz, the largest car rental company worldwide, is owned by Park Ridge Corporation, in which Ford Motor Company holds a majority equity share. The company relies primarily on its strong airport presence: it has 2 000 airport locations worldwide. Travel from the USA, where Hertz is market leader, is a cornerstone of its business. In the United Kingdom Hertz also has an exclusive agreement with British Rail, and additional cooperation agreements exist with the national railroads of the Netherlands.

Table 3: Car rental
Company fleet shares by EC Member State, 1991

(%)	D	F	I	NL	UK	Western Europe
Avis	11	15	20	8	12	13
Hertz	10	15	13	9	8	11
Europcar	13	14	11	3	9	11
Budget	12	9	9	14	10	10
Eurodollar	6	1	5	1	10	6
Other	48	46	42	65	50	49

Source: The Budget Report on Car Rental in Europe.

Hertz has specialised in the business segment of the market. The company has numerous fly-drive agreements with airlines, e.g. its "Business-drive" programme in partnership with British Airways. In combination with British Rail Hertz introduced its "Intercity-drive" programme. In 1991 a number of products were introduced for the leisure traveller, like the "Holiday-saver" programme in Europe. Since 1991 Hertz has been selling its used cars directly to the final consumer or user, respectively, rather than to wholesalers.

Europcar was created in 1989 by a merger of InterRent, a 100% Volkswagen subsidiary (market leader in Germany until then) and Europcar, the leading car rental firm in France and the United Kingdom, a subsidiary of the Belgian-French travel firm Compagnie Internationale des Wagons-Lits et du Tourisme. In Europe, Europcar has cooperation agreements with National Car Rental of the USA, Tilden rent-a-car of Canada and Nippon-rent-a-car of Japan. 1990 and 1991 were years of reorganisation, rationalisation, and network adjustment.

Europcar is extraordinarily active in East European markets; it entered the Soviet market in 1989, and the East German market in 1990. In addition it has licensees in Czechoslovakia, Hungary, Yugoslavia and Bulgaria.

With counters in about 260 airports in 79 countries, Europcar's share is around one third. In 1991 the company became the leading concessionaire at London Heathrow airport.

During 1991 the non-airport segment of the market was more intensively courted with the programmes "Cost cutter", "Business drive" and "Super drive". Especially for the visitors of Euro-Disneyland the company started the pan-European promotional campaign "Join the countdown to Euro-Disney".

Budget is the third largest car rental company worldwide with a fleet of 250 000 vehicles and 3 600 outlets in 140 countries. It operates its own network (in Belgium and in France), as well as a franchise network. Despite difficult market conditions, its own network grew at a rate of 15% in 1991.

Franchise partner in Germany is Sixt AG, which in recent years achieved second place with low-price strategies and a rapid pace of expansion. For 1992, a turnover of 263 million ECU was planned, a 20% increase compared to 1991. A new segment which Sixt thinks promising is the rental of heavy tractors and trucks (in excess of 9 tons). Budget was the first company to introduce all-inclusive rates. Within this all-inclusive rate it is the only company to offer personal insurance. Budget must also be considered the price leader among the big car rental firms.

The company focuses on the leisure segment of the market. Its "Holiday drive" programme is the best known leisure car rental programme.

Budget's fast pace of expansion was based on the mix of corporate and licensed operations. Especially the various local market segments could be reached with franchise partners. One specialty is the provision of luxury cars. Of all car rental firms Budget maintains the largest Mercedes fleet and is the biggest customer of Mercedes in the world.

Eurodollar International is the European franchisee of the American group Dollar Rent A Car Inc. Dollar in turn belongs to Chrysler Corporation, which also owns Thrifty Rent A Car.

Eurodollar has own and franchised outlets in 20 European countries. In 700 locations in Europe it offers more than 70 000 vehicles (worldwide this figure is 125 000 in 1 800 locations). In 1991 the French, Dutch and Italian franchisees were taken over by Eurodollar International. Through cooperation with Autohansa in Germany the franchise network was expanded there; an extension of the network is planned to Eastern Europe, the Middle East, and Africa. In early 1992 a new franchisee started in Poland. The sharp expansion, especially in the business segment, has diminished the originally strong dependence on the UK market.

Together, these five large companies represent 51% of the market in Western Europe. The remaining share of the car rental market is accounted for by a great number of small, medium sized and larger firms of local, regional and nationwide importance, which in turn frequently enter horizontal cooperation arrangements in order to raise their efficiency.

Strategies

Economies of scale and financial and/or contractual interrelationships with the automobile industry create structural competitive advantages for the large car rental companies. They use these advantages consistently and efficiently in order to safeguard and expand their market shares. The beneficiary is the car renter who enjoys very low rental fees.

In this way the airport business has fallen almost entirely into the hands of the big car rental companies; small and medium sized firms have no chance here. Price comparisons suffer from the very low degree of standardisation within the individual EC countries. The sector is in the process of providing a solution for the standardisation of services and quality levels. This should render the market more transparent and more competitive.

The numerous small and medium sized car rental firms focus on the non-airport segment of the market. This consists of the rental of substitutes for accident damaged cars (turnover share approximately 50%), the rental for business purposes (app. 30%), the rental to tourists (app. 15%) and the rental for other private purposes (app. 5%).

The sales prices of the small and medium sized firms are not always based on exact cost calculations, but are oriented on market prices. As this frequently results in prices which fail to cover costs, the car rental division is often being subsidised by other activities of these smaller firms.

Frequently there are still, especially in the countryside, local supply monopolies or oligopolistic constellations which make cost-covering prices possible. The increasing regional expansion of the large companies' networks, however, results in increasing price and service competition here, too.

REGIONAL DISTRIBUTION

No statistics are available about the regional distribution and the density of the car rental networks in the individual countries. If the ratio cars/million people is taken as an indicator of the density of networks, the United Kingdom ranks first with 2 357 cars per million inhabitants, followed by Germany (1 913), France (1 746), the Netherlands (1 416) and Italy (713) (see Table 1). The car rental networks are the densest in the large cities and metropolitan areas as well as in coastal and vacation regions. As a part of their expansion strategies, the big car rental companies are in the process of extending their networks also to medium sized and even smaller towns.

ENVIRONMENT

The car rental activity has positive and negative effects on the environment. Positive environmental considerations include the use of train for long distance travelling, the smaller size of rented cars compared to the own car, and the use of relatively new cars in rental fleets:

The combination train and rented car can replace the use of one's own car for the long distance travelling. The rented car is then used at the point of destination. The environmental damage and the resource use of the railroads, in terms of person-kilometres, is much lower than that of one's own automobile. Besides, the substitution of the train for the car ride results in less traffic especially on motor ways, contributing

to a decline in accidents and emissions. The economic costs of car accidents, in particular, are considerable.

Other environmentally beneficial effects of rental car use include substitution of as a rule much smaller, leaner rented cars for the relatively powerful own car, and regular maintenance and inspection of the relatively young car rental fleets

In all of these instances exhaust emissions are reduced. With respect to the strength of this effect, a pronounced north-south gap may exist among the EC countries, as the car rental firms in the Southern vacation countries frequently have older, poorly maintained cars in their fleets.

Environmentally damaging factors include the use of aeroplanes for long distances instead of one's own car. Exhaust emissions of aeroplanes, in terms of person-kilometres, are much higher than that of automobiles.

Another element is the creation of demand for the service "car rental" through a large variety of services, ubiquity and low prices. This consideration has relevance especially in the vacation countries.

A quantitative and qualitative weighting of these various effects on the environment and thus an overall assessment is not possible. Furthermore, each of the factors mentioned carries a different weight in the individual EC countries.

OUTLOOK

The service "car rental to drivers" offered by private firms has an essential place in all modern economies. In numerous cases it is a true alternative to the use of one's own automobile or truck, usually in combination with the use of the railroad or the aeroplane. Its use is closely correlated with the mobility of private households and business as well as the degree of utilisation of the highway network. Mobility in all EC countries is rising and this trend is expected to continue in the medium and long term. As a result, the car rental business will most likely continue to register high growth rates. Experts are forecasting a doubling of the German car rental market over the next ten years. This forecast is based on growing business travel in the wake of the completion of the EC internal market, on economic growth in Eastern Europe as well as continued expansion of Europe-wide tourism. There is evidence that 43% of business travellers are now using rented cars, more than double the figure of a year ago. Furthermore, growing concern for the environment has resulted in a switch to public means of transportation plus a rental car at the point of destination.

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Leasing
NACE 84

In the early 1960s, the rental sector in various European countries was enriched by a new variant which has proved to be very successful. The idea of equipment leasing, imported from the USA, very quickly gained general acceptance. Today, leasing is one of the most important form of renting capital goods in Europe, followed by renting itself. In some EC countries, leasing is responsible for around 30% of investment in plant and equipment.
Even though leasing has experienced a cyclical weakening in some EC countries, over the next few years a continuation of the positive trend in leasing can be expected, not least because of the effects of the single European market and the growth of new markets in eastern Europe. If those EC countries that have not allowed private automobile leasing, approve this rental form, strong growth in leasing is likely.

INDUSTRY PROFILE

Description of the sector

The word "leasing" is used throughout the world to designate certain forms of medium to longterm commercial renting of merchandise. The only exception is France where this form of renting is know as "credit bail". In English speaking countries in particular, equipment leasing is less easy to differentiate from traditional forms of renting elsewhere, since here, for example, a "for lease" sign is used to signify accommodation. Furthermore, the difference between leasing in the narrower sense is quite different from hirepurchase, renting or other rental forms, which is largely due to different taxation and civil law systems throughout the EC. If one disregards the renting of living space, it is easier to define the difference between renting and leasing in the EC countries. Renting then includes the short term transfer (also on an hourly or daily basis) of, for example, vehicles or construction equipment, on payment of a fee. The differentiation between hire purchase and equipment leasing is hard to make. A high proportion of English and French leasing contracts would be classified in Germany as hire purchase or even as hidden instalment buying with all the consequences for accounting and taxation.

In genuine leasing, unlike in renting, the regulations of the individual countries for accounting, taxation and relating to common law usually play a major role. Since most commercial and civil law codes in EC countries were developed at a time when leasing in its present form did not yet exist (the first leasing firm was founded in the USA in 1952), there are still on the most part no corresponding legal definitions of leasing. Only in France was leasing ("credit bail") put on a legal footing as long ago as 1966. Since ministerial decrees and court rulings have throughout the years taken the place of a legal definition, the resulting legal framework conditions covering leasing vary a great deal in individual EC countries. Market shares for leasing in the individual countries therefore vary considerably, and cross-border leasing has played a relatively limited role.

In most countries, equipment leasing has crowded out the traditional medium to long-term forms of renting; even the manufacturers of office machinery and EDP equipment, who traditionally made relatively frequent use of traditional producer renting, have today mostly switched to leasing, either through their own leasing firms or through distribution leasing, i.e. through an outside leasing firm. Disregarding the rental of dwellings, which is not the subject of this analysis, leasing is by far the most important of all rental forms, followed by renting itself, which supplements leasing through the provision of short term contracts.

NACE 84 includes: renting, leasing and hiring of agricultural machinery and equipment (without permanent staff) (NACE 841); renting, leasing and hiring of construction machinery and equipment (without permanent staff) (NACE 842); renting, leasing and hiring of bookkeeping and office machines, electronic data processing equipment and cash registers (without permanent staff) (NACE 843); hiring of consumer goods (NACE 846); renting, leasing and hiring of other movables (without permanent staff) (NACE 847).

This chapter will focus on leasing, which dominates the rental market, before genuine renting and hiring. The renting of cars and other means of transport without driver (NACE 844 and 845) is considered in a different monograph.

Main indicators and recent trends

In the larger EC countries, equipment leasing existed since the early 1960s with particularly rapid development since the

Table 1: Leasing
Main indicators by country (1)

(million ECU)	Investment leasing		Growth (%)		Number of companies ratio (2)		Leasing % of national associations	
	1990	1991	1990	1991	1990	1991	1990	1991
Belgique/België	1 534	1 671	21.2	8.2	63	59	9.0	90
Danmark	780	707	0.0	-10.3	19	18	12.0	70
BR Deutschland	780	707	36.5	-10.3	74	89	15.7	70
Hellas	97	139	49.2	30.2	4	8	6.0	95
España	7 569	7 170	-3.7	-5.6	106	97	27.8	95
France	15 111	13 100	-6.8	-15.4	127	129	17.3	95
Italia	13 368	13 426	87.7	0.4	142	122	21.3	87
Ireland	864	866	10.2	0.2	18	17	27.6	94
Luxembourg	172	121	6.8	-42.1	8	5	N/A	N/A
Nederland	2 559	2 411	10.7	-6.1	21	23	8.4	85
Portugal	1 041	1 288	23.6	19.2	18	20	N/A	N/A
United Kingdom	18 799	18 081	-4.3	-4.0	75	73	31.8	90
EC	62 674	59 687	8.1	-5.0	675	660		

(1) Only members of the national associations
(2) Share of leasing investment in total investment
Source: Leaseeurope

Table 2: Leasing
Breakdown of investment leasing by field of use, 1991

(million ECU)	Agriculture	Industry	Services	Public administration	Consumers	Other
Belgique/België	32	512	859	26	66	176
Danmark	10	163	250	145	0	139
BR Deutschland	77	5 945	6 973	400	1966	0
Hellas	1	57	54	1	1	25
España	168	3 060	2 814	59	531	538
France	669	4 742	5 345	237	2 107	0
Ireland	50	319	296	20	159	22
Italia	170	8 446	3 664	478	0	668
Luxembourg	1	25	85	1	0	9
Nederland	16	68	135	8	0	80
Portugal	33	511	523	12	1	208
United Kingdom	540	6548	9485	1508	0	0
EC	1 767	30 396	30 483	2 895	4 831	1 865
(%)	2.4	42.1	42.2	4.0	6.7	2.6

Source: Leaseeurope

mid 1970s. In the meantime, the United Kingdom, Ireland and Spain, with leasing shares of around 30%, have almost caught up with the USA, the pioneer in leasing, where the share of leasing in overall equipment investment was 32% in 1990. Despite the already relatively high market share of leasing in most EC countries, doubledigit growth rates have been common. According to figures from LEASEUROPE, annual new business of leasing firms rose thirty times over from 1972 to 1990.

The idea of leasing as an investment and financing alternative has had a remarkable career. In the first years of leasing, both in the USA and Europe, the manufacturers of capital goods dominated the market. They employed leasing as a marketing instrument; in some instances new office equipment in the 1960s was only available on a rental basis. Gradually leasing firms independent from manufacturers established themselves in Europe, often as bank subsidiaries, and the leasing option received further refinements. In the mid 1970s the independents overtook producer leasing in new business generated. Especially in contract design, several innovations were introduced.

Mainly, two contract types exist today, one with full payout (full amortisation) and the other with nonfull payout (partial amortisation). In the latter case, the lessee only uses the capital equipment for a portion of its normal service life, and there are normally one or more additional users. The leasing rates are therefore only calculated at a fraction of the purchase value. This type of contract is used almost always in relation to motor vehicles. It also used to be very widespread in computer leasing, although the rapid decline in prices has meant that leasing firms no longer lease as many computers due to the commercial risk involved. A particular form of partial amortisation contract is the terminable leasing contract (operating leasing). The prevalence of operating leasing varies among EC countries, being relatively high in the United Kingdom and relatively low in Germany.

International comparison

The trends in leasing in non-European industrial countries are similar to those in the EC. The leasing ratio in the USA is 32%, in Australia 33%, but only 9% in Japan. Although the market share of leasing is low in Japan, growth is very strong. New business in Japan has been estimated at around 60 billion ECU, compared with 95 billion ECU of the European market.

For the leasing market in the USA, various estimates exist. Leaving aside long-term industrial hire purchase business, the current leasing ratio should be at about 20%.

In the countries of Eastern Europe, leasing is not yet widespread; Bulgaria, Czechoslovakia, Poland and Hungary made the greatest advances.

MARKET FORCES

Demand

The European leasing markets also attribute their three-decade long expansion phase to the constant extension of the services they offer. Leasing companies soon abandoned the initial orientation upon office machinery, to include construction and manufacturing equipment and finally road vehicles. Presently, leasing companies offer nearly all commodities from typewriters to jumbo jets. At the same time, their dependency on large corporations as well as on banks and insurance companies has declined.

With increasing standardisation of leasing contracts and checks on creditworthiness, as well as with the widening of sales channels (e.g. via retailers or bankers,) leasing firms have been able to offer competitive prices to small and medium sized companies in practically all economic sectors. Thus, leasing rapidly achieved a foothold in the various service industries as well as in the trades. Today, the services sector ranks number one or two in most EC countries in the list of the most important lessee sectors.

Since the early 1980s, auto leasing to private persons, which had not been very wide-spread, made advances in Germany and France as a result of the massive sales promotion campaigns of auto manufacturers. Especially in times of sluggish auto sales, the car makers offered very attractive leasing conditions. In these countries, private leasing has gained a dominant position over medium sized personal loans from banks and savings institutions. Today, private households are in third position in the rental sector rankings in France and Germany (see Table 2).

Supply and competition

At the end of the 1980s capital goods manufacturers countered the success registered by independent leasing firms with their modern contracts was countered. Many of them founded leasing companies with an independent legal status and adopted

Table 3: Leasing
Breakdown of investment leasing by primary contract term,1991

(million ECU)	up to 2 years	up to 5 years	up to 10 years	longer than 10 years
Belgique/België	N/A	N/A	N/A	N/A
Danmark	130	453	124	0
BR Deutschland	2 046	10 945	1 874	496
Hellas	0	138	1	0
España	1 129	5 868	166	7
France	39	11 711	1 311	39
Ireland	202	599	65	0
Italia	874	11 969	583	0
Luxembourg	0	121	0	0
Nederland	N/A	N/A	N/A	N/A
Portugal	87	1171	30	0
United Kingdom	3 258	9 173	3 097	2 553
EC	7 765	52 148	7 251	3 095

Source: Leaseeurope

some of the contract ideas of the independent competitors. This period also saw a strong expansion of automobile leasing in Europe. A variety of major road vehicle manufacturers employed leasing as a marketing instrument in sales promotion campaigns. The boom in vehicle leasing has continued to the present day in most EC countries. Step by step, office machinery and EDP have lost their dominant position in the European leasing market. Today, in most EC countries, road vehicles occupy first place for leased goods.

With growing market share, the established European leasing firms expanded their services in the 1980s, achieving a stronger profile visàvis pure financiers and small newcomers. Today, renowned leasing firms are experts in investment, finance, law and taxation. Full-service contracts can include all commercial and technical services. For big-ticket leasing, especially in cross-border trade, some leasing companies also function as packagers and consultants.

Their product and market knowledge as well as their speed in reacting have meant that the European leasing companies, despite occasional detrimental taxation and depreciation regulations in several countries, have not experienced a permanent decline in sales.

REGULATIONS

EC countries not only define leasing differently, yet also have a wide variety of civil law, fiscal and accounting rules. In addition there is no standardised supervision by governments or central banks.

The rental sector in France has a somewhat unusual organisation. "Credit bail" is the most widespread form of renting, with its own laws. A "credit bail" transaction is only present when at the outset the renter is granted an option to buy. The law stipulates, moreover, that the purchase of goods for the purpose of renting is the precondition for a "credit bail" transaction. The law thus specifically excludes manufacturers from leasing. Firms such as Peugeot, Renault or IBM have therefore set up special finance companies in order to comply with these requirements.

Alongside "credit bail", France also has more diverse companies that offer other forms of leasing contracts (e.g. "location simple"). These companies do not have the importance of established "credit bail" firms. The latter are aided by legal regulations that guarantee market entry limitations, refinancing advantages, etc. On the other hand, they are subject to strict

Table 4: Leasing
Breakdown of investment leasing by type of asset, 1991

(million ECU)	Machines and industrial equipment	Office and computer equipment	Commercial vehicles	Cars	Ships, aircraft, railways	Other
Belgique/België	236	340	335	482	172	106
Danmark	119	167	107	40	191	83
BR Deutschland	2 023	3 317	978	7 173	1 050	820
Hellas	82	19	2	20	1	15
España	2 845	591	3 119	0	0	615
France	5 245	1 817	2 921	2 918	0	199
Ireland	141	51	116	558	0	0
Italia	7 144	981	860	3 450	340	671
Luxembourg	7	19	36	54	0	5
Nederland	338	736	363	342	381	251
Portugal	518	163	346	53	4	204
United Kingdom	5 061	3 792	1 514	5 536	1 224	954
EC	23 759	11 993	10 697	20 626	3 363	3 923
(%)	32.0	16.1	14.4	27.7	4.5	5.3

Source: Leaseeurope

government controls and rules on advertising, and, as finance companies, are treated as banks.

In the United Kingdom leasing is not subject to any specific regulations or restrictions, as is the case in Germany, the Netherlands and Denmark. An unusual aspect of British finance leasing is that the lessee can enter the leased object on the assets side, an element taken from US law. Not all sides see this as an advantage. In the United Kingdom, operating leasing is considerably more widespread than in most other EC countries, which is partially attributable to differences in definition. According to the accounting conventions decree SSAP 21, finance leasing contracts are those agreements transferring all the major risks and advantages from the possession of the leased object to the lessee. All other leasing contracts are treated as operating lease contracts.

In Denmark there is no specific leasing legislation. Leasing investments show in the balance sheets of the leasing firms; special tax codes for leasing are nonexistent. At the beginning, leasing in Denmark faced considerable acceptance problems and had to adjust to frequent changes in treatment by taxation legislation. Even today, big ticket leasing is still in its infancy.

In Germany, the lessor is accountable as the legal owner of the leased object and not the lessee. As a rule, both contracting parties see this as an advantage, and that is one of the reasons why hire-purchase and other rental contracts which do not conform to the edicts on leasing, are comparatively rare in Germany. Operating leasing is understood in Germany to mean short and medium term leasing contracts in which the lessee has the right to discontinue the agreement at any time. This form of contract is used especially for motor vehicles and in the construction equipment sector.

In the Netherlands, due to the tax code and government support stipulations, true leasing does not exist, as a rule, but rather hire purchase.

Spain and Portugal have, like France, introduced laws and relatively tight regulations for leasing. Spanish law obliges leasing firms to operate as stock companies and comply with minimum equity provisions. Two thirds of the companies are bank subsidiaries.

In Italy there are still no specific rules on leasing, although these are under preparation. The current trend is for the incorporation of leasing firms within financial institutions from which the leasing firms expect an improvement of their long-term refinancing.

Belgian law on "locationfinancing", that corresponds to the French system of "credit bail", obliges the lessee to enter the leased goods on the assets side; private leasing is not permitted. The leasing ratio is still below average at 8.3%, primarily due to the dominance of smallticket leasing.

The characteristic feature of the leasing market in Ireland is the relatively favourable fiscal situation and diverse subsidies, e.g. from the Industrial Development Authority. Moreover, the GPA group, which is by far the world's largest aircraft leasing firm, has its headquarters in Shannon.

The first leasing company in Greece was set up in 1987, with eight additional firms having been established since then. The law places them under the control of the Bank of Greece. The conditions for leasing are relatively disadvantageous; leasing of buildings, trucks and busses is not allowed and the depreciation rates are unfavourable.

OUTLOOK

It is impossible to make halfway precise medium or long term forecasts for the renting business and specifically for leasing, although one can indicate some trends. From 1992 to 1995, the rental sector in the EC countries will grow, on the whole, at the same pace as the economy's gross investment in plant and equipment (excluding housing construction). Spurred on by the economic recovery, several countries will even register higher growth rates, i.e. through increases in the market share of leasing. In this, vehicle investment will play a decisive role. With the EC single market and the new markets in eastern Europe, the need for road vehicles will continue to grow. In this segment, leasing should be able to increase its high market share. The available forecasts on increases in air travel and the resultant need for aircraft will spur aircraft leasing. In the last few years, leasing of aircraft has already been able to register substantial market share gains. More recently, however, the economic problems that several airlines have been experiencing translated into fewer aircraft orders.

The traditionally high share of renting and leasing in the areas of EDP, office machines and telecommunications should also see further rises in view of the rapid technological development and the still increasing market permeation of these devices. There are, however, trends in this market segment that are having a dampening effect on leasing, such as downsizing and the continuing decline in hardware prices. Finally, especially in unified Germany, machinery and industrial plants will ensure a continued expansion for the leasing branch. Up until now, private leasing has only existed in half the EC countries; in some places, this form of leasing is not permitted. Should this situation change, possibly with the completion of the single market, leasing growth will accelerate considerably. Due to intensified national and international competition, the movement towards concentration on the leasing markets should continue, also in the form of cross-border cooperation and takeovers.

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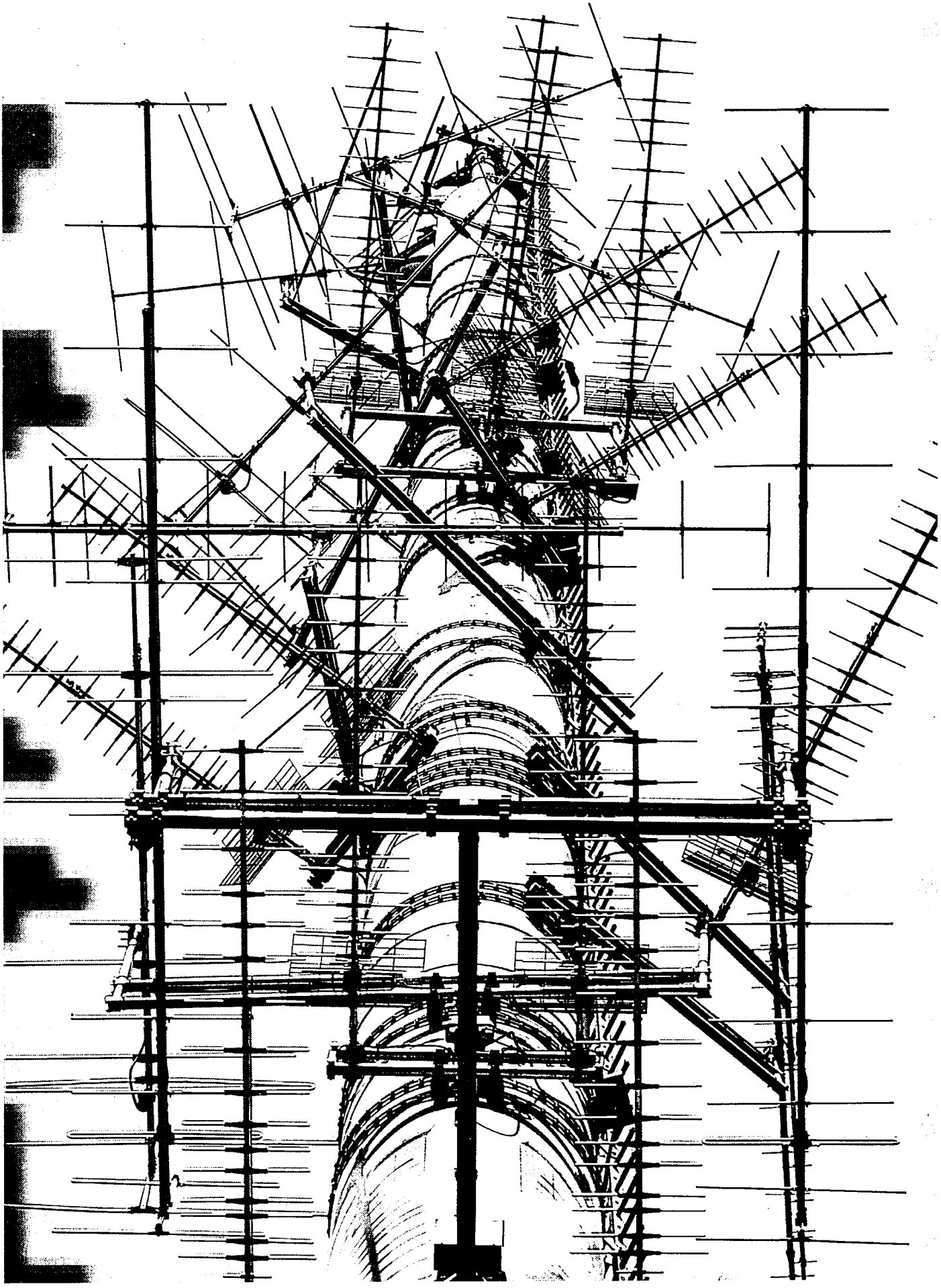

Information services

The economic value of technical activities in the processing, exchange and communication of information is growing substantially as modern economies evolve from an industrial age to the information age. Information services make up a fast growing market which totalled 135 billion ECU in 1991 in the EC. The sector is characterised by the increasing importance of software which has become a fundamental part of the cost and competitiveness of other subsectors such as telecommunications. The provision of information services takes place in a wide range of competitive environments, from the national monopolies controlling basic telecom services to the deregulated computing services market. For several years, however, the sector has been increasingly liberalised and the trend will continue throughout the 1990s.

INDUSTRY PROFILE

Description of the sector

Information services encompass telecommunications, software and computing services and electronic information services (i.e. on-line and off-line queries to data banks).

Telecommunications are part of NACE 79 (communication), which also covers courier and postal services. Software and computing services and electronic information services form NACE 839.2 (computer services) although the distinction between the two sectors is not clear. The forthcoming revision of the NACE classification (NACE/rev. 1), however, will be more detailed with a specific class for telecommunications (forthcoming code 64.20) whereas computer services will be split into several classes including a specific class for database activities (forthcoming code 72.40).

Main indicators

The world market for information services amounted to 500 billion ECU in 1991, of which telecommunications services accounted for 330 billion ECU and software and computing services, 170 billion ECU (of which about 10 billion ECU corresponded to electronic information services). If equipment related to information services is added, the current world market for information technology and information services can be estimated at 900 to 1000 billion ECU.

At the European level, information services represented 135 billion ECU in 1991, of which telecommunications accounted for 80 billion ECU and software and computing services, 55 billion ECU (of which around 3 billion corresponds to electronic information services).

In the EC, the information business (equipment and services) already accounts for more than 5% of GDP. This contribution will grow in the future, mainly due to the rapid development of the telecommunications sector. In year 2000, telecommunications alone should account for more than 7% of the GNP of the EC. At that time, the world market for information technologies and information services will approach 2000 billion ECU, with a projected contribution to GNP of more than eight percent. But this is only the sector's direct contribution. The economic value of the applications of information technologies and its effect on the productivity of administrative and infrastructure is many times larger. In Europe, more than 50% of GDP is in one way or the other affected by the availability and use of advanced information technologies.

The electronic tools of the information age - personal or business computers which can communicate with all sorts of information bases - have already and increasingly will transform our lives. Sectors such as education, health care, transport, rural development will share the benefits of the development of information and communication services. Telecommuting with resulting impacts on employment and energy saving, distance education and training, help to the physically disabled, environment and disaster management, and health care, to name but a few, will develop thanks to information technologies and related services.

Foreign trade

USA and Japan have taken a commanding lead in information technologies and consumer electronics. Europe's trade balance in electronics with the rest of the world shows a deficit of some 30 billion ECU. As far as the balance for services is concerned, estimations are more hazardous. Telecommunications, for instance, have a mechanism for sharing revenues between countries which depends on the usage of the networks in the countries and the tariffs applied in the different countries participating in the communication. In some cases, part of the revenue goes to the owners of intercontinental infrastructures (like Intelsat, for instance). The EC currently has a surplus in relation to the US in telecommunications services (about 300 million ECU in 1988). As far as other information services are concerned, it is believed that the Community is in deficit with respect to the US, particularly with regard to electronic information services such as data banks. Non EC suppliers of software and computing services tend to operate on the EC market through subsidiaries and associated firms established in the EC, thus contributing to employment and value added in the Community, which nevertheless still posts a trade deficit.

MARKET FORCES

Demand

For the sake of simplicity, demand can be divided into two main categories: corporate users and residential users.

Corporate users are driven by price/performance considerations and are fast developing into knowledgeable customers with growing bargaining power, particularly in the telecoms sector. They have become, in Europe, as vocal as their American counterparts about the fact that their needs must be met both functionally and economically.

Although residential users do not have requirements as wide ranging as those of the corporate users, they are very interested in the provision of services that combine convenience, ease of use and low cost. An example in the information services market is the rapid development of videotex (Minitel) services in France. Penetration of these markets requires however strong marketing efforts to generate broad acceptance.

Supply and competition

A major difference between telecommunications and other information services is that telecoms have traditionally evolved in a regulated environment featuring national monopolies, while other services, from their emergence on, have developed in a competitive environment.

Throughout the EC, telecoms are still primarily under the control of the national main operators, which still account for 95% or more of total revenues. Deregulation has opened competition in areas like mobile communications services and valued added services, which grow much faster than basic telephone services but still represent a low part of global revenues (telephone accounts for more than 85% of the revenues). In the emerging global communications environment, the major telecoms operators are vying to reposition themselves on the international scene and to meet this objective

are concluding all sorts of partnerships or acquisitions. New entrants have already made inroads in the market, mainly in value added services, mobile communications and video distribution, in expectation of further de-regulation.

In software computing and electronic information services, environment is non-regulated and calls for market forces to organise the competition. These sectors are undergoing significant changes in terms of supply and competition with new competitive pressure coming from large groups of different origins (professional services, manufacturers, end-users, consulting and audit firms), the accelerated trends towards the supply of global solutions and the expected arrival of new powerful entrants in spite of higher entry barriers.

The profile of the enterprise of the service branches and the regulatory situation, particularly in the telecom sector, are described in further details in the respective chapters.

OUTLOOK

The decade to come will see the advent of the "information age" following the "industrial age".

After several, yet unsuccessful attempts of convergence between data processing and telecommunications, convergence is starting to become a potential reality as distributed intelligence develops. Transmission, at almost any bandwidth, is about to become particularly cheap. This will give the potential to abolish distance, not only for voice, but for video and for the transmission of vast volumes of non-coded information. Today, we are able, commercially, to transmit 2.4 Gigabits per second on inexpensive optical fibres over a distance of 50 kilometres without need for regeneration, that is at very low cost. This capability, known as capacity-distance achievement, is expected to continue to double every year into the next century.

Software will be a major force in the development in all the information services sectors concerned. In the telecom sector in particular, costs will increasingly come from the software developments required to operate and manage the networks and to provide the many high functionality services that will emerge on the new infrastructures ("intelligent networks"). Tools and methods for the development, documentation, renovation and maintenance of software will therefore play an important role in the development of the information services sector.

Eastern countries, within their difficult race to catch up with western economies, will represent privileged markets for information services (and infrastructures obviously) and will certainly welcome the opportunity to so leapfrog development and benefit from the new technologies. Telecommunications, particularly, will have to be developed substantially to allow for the economic development of the countries. Some of the Central European countries have already engaged in deregulation and privatisation schemes for their telecommunications sectors, going sometimes further than Western European countries themselves (e.g. Poland).

In the future, the EC information sector, in particular software computing and electronic information services, will continue to try and overcome the challenge of operating in a market fragmented by different cultural, linguistic, legal and fiscal environments. The provision of (electronic) information services in "minority" languages, typically those of the merging Eastern countries, is very expensive.

In conclusion, information services is a sector where Europe is rather well positioned and has several winning cards to compete successfully and improve its market positioning. Nevertheless, in the context of growing international competition, Europe will be facing major threats and European actors should have a more aggressive strategy, notably outside Europe.

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Software and computing services
NACE 839.2

With a steady 20-25% growth rate per year over the 1985-1990 period, software and computing services is a strategic and very large market which affects almost all economic sectors. The software and computer services industry is characterised by a complex and dynamic range of goods and services in a rapidly changing environment where technologies play an important role. The industry is undergoing significant change as the two-digit growth rates of the market attract new and powerful entrants.

INDUSTRY PROFILE

Description of the sector

Software and computing services is a heterogeneous sector and is thus difficult to define. The sector can, however, be categorised into five broad areas of activities:

- consultancy, including strategy and management consulting as well as the development and management of information technology;
- processing services where the traditional service bureau is notably decreasing while sophisticated activities such as facilities management, value-added network services and on-line information are rapidly increasing;
- professional services which include technical assistance, business software, industrial and technical software, training and education;
- software packages including systems software, tools and applications packages;
- systems integration (SI) which essentially consists of putting together the best mix of software and hardware to solve a customer's SI problem; large SI contracts are often let on a fixed price basis and demand considerable expertise if costly delays and overruns are to be avoided.

Main indicators

The software and computing services revenues of the 12 EC Member States are estimated at about 50 billion ECU in 1991. The market is expected to grow at 10-12 percent per year from 1990 to 1995, much reduced from the average annual growth rate of 22% over the past five years (1985-1990).

Systems integration and software packages, the latter being driven mainly by the microcomputing, are the two fastest growing segments of the sector. Software packages is also the largest segment, with about a third of the sector's total revenues in 1990, and its importance is forecast to rise during the coming years. It is followed by professional services with nearly 30% of income in 1990.

The world market for software and computer services totalled 150 billion ECU in 1990. The US market share decreased from 56% in 1985 to 50% in 1990 and should continue to shrink until 1995 in favour of other main areas.

Foreign trade

Foreign trade is a difficult notion to handle in the field of software and computer services, due to the fact that suppliers tend to operate outside their country of origin via the intermediary of local subsidiaries and associated firms. This is why no distinction is made, in Tables 5 and 6, between actual exports and sales by a subsidiary based in a foreign country. With regard to the international activity of suppliers, American firms lead the world market, with particularly strong positions in consultancy, software packages and facilities management. Their local presence is continuously growing in Europe while, to date, few European software houses have made an impact outside their home country. In terms of foreign trade, according to the consulting firm EIC, the trade balance between the US and Western Europe shows a deficit of 2.5 billion ECU in 1990. With the rest of the world, the Western Europe trade balance is slightly positive and reaches 0.75 billion ECU.

MARKET FORCES

The software and computer services industry is undergoing significant changes in terms of end-user requirements, and accelerated trends towards a global solution offered by the suppliers. Technological changes are also playing an important role in the development of this industry.

Demand

As demand matures, users' requirements can be divided into two main segments according to the expected value added to final client. The high-end or strategic segment includes systems integration and high value added professional services (development of strategic information systems for clients). It represents roughly 30% of the total software and computer services market. The other segment (70%) includes software packages, processing services, systems operations and other "commodity-like" professional services.

The skills needed to compete in each segment are different: high differentiation in the high-end segment, low cost or efficient supplier in the low-end. Specifically, the high-end requires an international presence to help international clients successfully implement their information systems in their international location. It also calls for a good understanding of clients business in order to supply tailor made solutions and not only tools and products. In some cases, the supply of strategic services also calls for a unique external supplier capable of assuming total responsibility for cost/time/performance of the projects from the early stage of their inception to the final phase of their implementation at users' site in order to gain time and money. Nevertheless, some customers are hostile to such vendors' attempts to control and would rather continue to deal with different suppliers.

Despite change in the products and services requirement by end-users, few major changes occurred in the breakdown of

Table 1: Software and computing services
Revenues in the EC and in Western Europe

(billion ECU)	1985	1986	1987	1988	1989	1990	1991	1992 (1)
EC	N/A	20.8	25.9	31.6	37.8	43.7	49.7	56.0
Total Western Europe	18.8	23.7	29.6	36.1	43.3	50.2	57.2	64.0

(1) Estimate
Source: Input, IDC, specialized press, SEMA GROUP/Consultronique

Table 2: Software and computing services
Breakdown of EC revenue by major trades

(million ECU)	1990	1995	1990-95 (Avg annual growth in %)
Consultancy	4 830	7 390	9
Processing services	10 010	14 040	7
Professional services	12 700	21 430	11
Packages	14 460	27 350	14
System integration	1 760	3 700	16
Total	43 760	73 910	11

Source: Input, IDC, specialized press, SEMA GROUP/Consultronique

software and computer services by end-users sectors in 1990. The finance sector (banking, insurance, financial services) is still one of the major end-use segments, together with the manufacturing sector (discrete and process manufacturing). During the first half of the 1990s, demand from sectors such as communication, transport and retail are expected to grow slightly above the average. On the other hand, the demand from the defence sector will be affected by large cuts in military budget.

Supply and competition

Together with the diversity of products and services offered, the software and computer services sector is characterised by the large variety of actors playing in this domain. Six strategic groups of competitors can be identified according to their core business:

- independent software and professional services companies (CGS, Sema Group, Finsiel, Eritel);
- software packagists (or publishers) (SAG, SAP, Microsoft);
- audit firms (Arthur Andersen and other Big Six);
- strategy and management consulting firms (Bossard, Roland Berger, McKinsey);
- data processing departments or subsidiaries of end-user companies;
- hardware vendors (Siemens, Olivetti, Bull, IBM).

The competitive borders were clearly drawn amongst the six strategic groups of competitors from the beginning of the data processing industry up to the 1980s. Hardware manufacturers and software editors had the lion's share of the package sector while professional services companies dominated the sector of computing services and software development. Finally, the Big 6 and other strategy and management consulting groups were well entrenched in the consultancy and audit business.

Several factors are accelerating the restructuring of the sector, tending to eliminate that strict partitioning of supply. On one side, the market begins to show some signs of maturation and profitability differences between players are widening. On the other side, the nature of supply is changing as suppliers endeavour to offer global solutions and to be a unique interface for their clients. Competitive responses to these changes depend on strategic group.

For hardware manufacturers, a shift in focus to more "service-oriented" has started in the second half of the 1980s and will certainly accelerate in the 1990s. Several factors account for such a change. The move away from proprietary systems and the fact that hardware is being viewed as a commodity have affected industry profitability and margins are increasingly transferred from the hardware to the services and software. In addition, hardware manufacturers need to retain their installed base of customers and want to enlarge their market base to the SMEs which are primarily looking for "turn-key" solutions and complete services.

As hardware manufacturers and the audit firms move aggressively into their core business, professional services companies need to evolve quickly to adapt their service range by enlarging it to the new markets and the increasingly competitive environment. The key area of battle for them is the consulting sector, where both are clearly absent (or uncompetitive). Audit firms have built up their competitive advantage with their existing international network and their high visibility with clients. This advantage is becoming less significant, however, as they consider moving into other strategic segments (system integration and development, package). Improving their competence in such areas is a survival condition for these audit firms.

Table 3: Software and computing services
Breakdown of EC revenue by Member State, 1990

(million ECU)	
Belgique/België	1 300
Danmark	1 100
BR Deutschland	11 000
Hellas (1)	100
España	1 970
France	11 100
Ireland (1)	300
Italia	5 700
Luxembourg (1)	50
Nederland	2 400
Portugal	140
United Kingdom	8 600

(1) Estimate
Source: SEMA GROUP/Consultronique Analysis

Table 4: Software and computing services
Revenues in the EC, Japan and USA

(billion ECU)	1985	1990
EC	16.5 (1)	43.7
Japan	6.8	20.1
USA	34.4	74.0

(1) Estimate
Source: SEMA GROUP/Consultronique Analysis

Table 5: Software and computing services
Breakdown of world sales by origin of supplier, 1990

	Million ECU	Share in %
USA	90.0	58
Western Europe	43.5	28
of which EC (1)	40.0	26
Japan	14.0	9
Rest of world	7.7	5
Total	155.2	100

(1) Estimate
Source: Datamation, SEMA GROUP/Consultronique Analysis

The problem of software editors is similar to that of the hardware manufacturers. Services are essential to sell a product today. In the past, most of their efforts were concentrated in product development and marketing, leaving their partners (software and services companies) to integrate their products into a client's management information system (a higher value-added activity with a higher potential of profitability). The need to differentiate, along with the necessity to "verticalize"/"integrate" value-added activities, is forcing them to move outside their core business (product development and marketing).

Production process

Technology will be evolving fast during the 90's, driven by the demand as well as by supply. On-going standardisation will accelerate under market pressure, notably with respect to the operating system environment (UNIX, MS-DOS/WINDOWS) or system development tools (SQL, programming language such as C, C++). These industry-wide standards will, however, co-exist with other industry de facto standards of some hardware manufacturers (e.g. IBM's OS2 or AD/Cycle).

New generation products must be able to work under various systems architectures and hardware environments and application portability is becoming a crucial factor for new product development along with the increasing networking capability in future systems, necessitating the mastering of network technologies such as cooperative processing, distributed data bases. Multimedia systems will be introduced more and more in many end-use segments driven by the availability of affordable hardware equipment and optical devices (hypertext, image converters).

A major change is expected to occur in the software production process where, from the early stages of software industry, software engineers have faced the challenge of being both efficient and flexible in designing and developing software, a common problem to any industry where there are differences in customer's needs, shortages of skilled workers or competition based on price and innovation. During the 1990s, the answer could be the ability to better industrialise the software production process, relying on standardised designs and reusability of software basic components (or interchangeable components). This new approach will open up new ways for greatly improving programmers' effectiveness and productivity, much more than the current craft-oriented and job-shop software approach.

The rapid pace of these technological changes is exerting a high degree of pressure on every actor in the sector, forcing them to invest more and more in technology development, costly systems and tools, as well as in new market expansion enabling them to amortise the high costs involved.

Table 6: Software and computing services
International revenues of European suppliers, 1989 (1)

(% of sales)	Europe	USA
BR Deutschland	5	3
España	5	0
France	12	6
Italia	5	8
United Kingdom	8	3

(1) Estimates
Source: Annual reports of major actors, SEMA GROUP/Consultronique Analysis

Table 7: Software and computing services
Sales by end-user sectors in the EC, 1990

	Million ECU	Share in %
Financial services	12.2	28.0
Manufacturing	12.3	28.0
Other services (1)	10.0	23.0
Government	5.7	13.0
Defence	2.6	6.0
Others	1.0	2.0
Total	43.7	100.0

(1) Transport, retail,communications
Source: SEMA/Consultronique

INDUSTRY STRUCTURE

Companies

More than 16 000 companies are present in the field of software and computer services in Europe (including hardware vendors and non European firms). Only a few of them (40 to 50) employ more than 1000 employees representing 0.3% of the number of companies but 43% of the market.

European firms are traditionally well positioned in the professional services segment (CGS, Sema Group, SLIGOS, LOGICA) while the software packages segment have always been dominated by the US (ORACLE, Computer Associates, Microsoft). Except IBM (7%) no company holds more than 2 or 3% of the European market.

Strategies

The main actors are resorting to mergers and acquisitions to expand internationally and to become providers of a full range of services. However, each strategic group of competitors adapts this strategic thrust according to its current competitive positioning. For hardware manufacturers, acquisitions are used

Table 8: Software and computing services
Industry structure by company size in the EC, 1990

Company size by number of employees	Number of companies	Share in %
1000	40-50	0.3
500 to 1000	50-60	0.3
200 to 500	150	0.9
100 to 200	300	1.9
10 to 100	3 500	21.9
10	12 000	75.0
Total	16 000	100.0

Source: Consultronique's estimate

Table 9: Software and computing services
Major actors in Europe, 1990

Company	Origin	Category	European revenues (million ECU)
IBM	USA	Manufacturing	3 700
CGS	F	Professional services	1 150
Reuters	UK	Professional services	960
Siemens	D	Manufacturing	800
Finsiel	I	Professional services	690
Fujitsu (1)	JPN	Manufacturing	670
DEC	USA	Manufacturing	660
Andersen Consulting	USA	Audit	650
SEMA GROUP	F/UK	Professional services	450
Sligos	F	Professional services	440
Bull	F	Manufacturing	400
SD -Sicon	UK	Professional services	380
Computer Associates	USA	Packagist	370
Unisys	USA	Manufacturing	360
ESD (2)	USA	End-user	350
Microsoft	USA	Packagist	340
SAP	D	Packagist	330
Olivetti	I	Manufacturing	330
Debis	D	End-user	300
Oracle	USA	Packagist	300
Mac Kinsey	USA	Consulting	250
Datev	D	Professional services	250
Concept	F	Prof./Processing	250
Axime	F	Professional services	250

(1) Including ICL
(2) Excluding SD-Sicon
Source: Datamation, SEMA GROUP/Consultronique's Analysis

to enter new unfamiliar markets and to learn from the acquired companies rather than controlling them, while internal development, relying on existing resources and skills, is adopted in systems integration. Professional services companies play a market share game in Europe. Entry strategies into new geographical markets are mostly based on the acquisition of local firms although few have decided to move into the consulting sector by external growth. Packagists are entering systems integration and professional services segments to minimise their risks and increase the overall profitability of their traditional core segment. This move, which is essentially achieved internally, is eased by the "natural adaptation needs" of most important package during their implementation.

Audit firms prefer internal development when entering the information technology (IT) services market. A pioneer of such moves is Arthur Andersen in the middle of the 1960's, which was soon followed by other majors. End-user firms diversify into the IT services market, particularly in the sector of processing services and to a lesser extent the software package sector, by internal and external development (Daimler-Benz/Debis, BMW/Softlab). As information technology is becoming a board-level issue, strategy consulting firms extend their skills, mainly internally but also through small acquisitions, and develop strategic IT planning and approach for their clients.

OUTLOOK

In the context of growing international competition, Europe will be facing major threats during the 90's which could have important impacts on its future competitive positioning and a more pervasive but real economic impact on other economic sectors in which information technology and software technology are critical (banking, insurance, transportation, electronics and defence).

Despite the competitiveness of European firms in the professional services, Europe is clearly threatened in other main areas of the software and computer services, such as consultancy, packages and processing services (notably facilities management). In the sector of professional services, European firms are also facing competitive pressures and some of them are facing the threat of being acquired by other European and international large groups.

Nevertheless, Europe has several important winning cards to compete successfully and improve its market positioning: strong competence in methodologies and telecommunications capitalised through some European research and development projects (software factory, broad band communication); good competitive positioning in some high value-added activities like systems integration; dynamics of the Single European Market;

Major European groups of software and computer services could improve their competence in the sector of consultancy, notably with regard to strategy and management consulting, in order to gain the same understanding of their potential clients' strategies as the large international American groups (the Big 6).

In the field of software engineering, Europe can rely on its advance in new formal methodology to develop new generation of CASE tools (Computer Aided Software Engineering) facilitating the re-use of software or the re-engineering of old systems. In the same manner, under the dynamics of the single market, Europe can have its own line of software products responding to the specific needs of European firms and ad-

ministrations (accounting, taxes, custom system, social security, health,..).

Other large and pan-European systems can be also initiated at the European level, helping European firms improving their basic competence on software process and technology, and systems integration.

Edited by: Sema Group

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Electronic information services

The electronic information services industry includes the provision of financial and company data, market research, business information and news services. According to a joint IMO/EIIA survey of professional hosts and database providers in the EC, the industry generated revenues of some 3 150 million ECU and employed 22 000 people in 1990. The expansion of the electronic information services market in Europe is generating the creation of "transnational" information products. The industry is experiencing an increasing number of joint ventures and cooperative agreements in an effort to develop and serve a pan-European marketplace.

INDUSTRY PROFILE

Description of the sector

Over the last decade, the European Electronic Information Services market has been moving away from its traditional base, founded in the areas of science and technology, towards the domain of specialised information services. These services include amongst others, financial and company data, market research, business information as well as news services.

However the emergence of this market has not been along clearly defined lines. Consequently, the European Electronic Information Services market is somewhat ill-defined, and information about the industry arises out of a collection of irregular non-official industry statistics. One of the major difficulties involved in the measurement of the industry, is the fact that electronic information by-passes export and import regulations, and may go unrecorded in national trade statistics. Additionally, on-line databases which may be accessible internationally through a complex system of gateways, networks and host computers, make the tracking of cross-border information flows virtually impossible.

Nevertheless, despite these apparent obstacles and problems, the following sections will attempt to present an overview of the current state of the European Electronic Information Services market and key trends, both in terms of demand and supply, based on available sources of information. These sources whilst drawn from the industry at large, also include the work of the IMO (Information Market Observatory), which operating under DG XIII in Luxembourg, is charged with improving the understanding of the European Electronic Information Services market.

Main indicators

Table 1 shows some results of a joint IMO/EIIA (European Information Industry Association) survey of professional hosts and database providers in the European Communities.

This survey put the revenues of the suppliers of these services at some 3 150 million ECU in 1990. This shows a 12.5% increase as compared to 1989. This growth whilst significantly lower than for previous years, and attributed to the approaching economic downturn in the UK, is nevertheless higher than for the European economy in general.

The number of people employed by EC-based host and database organisations was 22 000 in 1990, an increase of 3.5% compared to the previous year. The highest growth rate is coming from the sales and marketing functions (more than 10%), whilst data-gathering and editorial functions represent the largest human resources function, with over 40% of the total.

Regarding mode of delivery, ASCII services account for 78% of the on-line sector, and also showed the fastest growth between 1989-90 with 15.1%, reaching a total of 2 054 million ECU. Professional videotex service revenues, which are estimated at about 450 million ECU (including telecommunication costs) account for around 17% of all on-line services in the EC. Including revenues from other unclassified on-line activities, total on-line revenues resulting from all activities are put at 2 638 million ECU in 1990, which is an increase of 13.1% from 1989. By comparison total off-line services increased by 5.9% to 316 million ECU in 1990.

Within the on-line sector, real-time services represent some 59% of the total, growing by 15% over 1989. Over the past three years (1988-90), the proportion between real-time and retrospective services has remained fairly consistent. Optical media (notably CD-ROM), shows a growth of some 31% over 1989-90, and has a market value of 30.5 million ECU in 1990. With respect to subject of interest, financial and business oriented information services, which arise mainly out of real-time services, represent 96% of the market. Scientific, technical and medical subject areas (STM), have only a 2% market share, and a relatively weak growth rate, at a little over 5% between 1989-90.

Geographic distribution of turnover showed that in 1989, around one third of revenues were generated in the same Member State as the hosts/distributors whose services/products

Table 1: Electronic information services
Dissemination of information in electronic form

	1989	1990	Growth (%)
Employment	21 215	21 958	3.5
Turnover (million ECU)	2 806	3 156	12.5
Geographic distribution of turnover (%):			
National consumption	33.9	33.7	14.3
Intra-EC trade	33.8	36.6	24.9
Total EC domestic	67.7	70.3	19.6
Exports	32.3	29.7	6.0
Turnover by subject content (%):			
Finance	68.5	70.7	15.2
Business	27.3	25.2	3.4
On-line services turnover (million ECU)	2 333	2 638	13.1
Real-time information services (%)	57.7	58.6	14.8
Retrospective information services (%)	41.4	40.5	10.5

Source: IMO/EIIA survey

Table 2: On-line ASCII databases
Worldwide production/distribution, 1991

	Number of database producers	Number of host services	Number of gateway services
North America	1 223	404	57
EC	651	226	26
Rest of world	284	101	23
Total	2 158	731	106

Source: Directory of On-line Databases, July 1991, Cuadra/Elsevier, New York.

Table 3: On-line services
Turnover by type of service/product, 1989/90

(million ECU)	1989	1990	Growth (%)
Real time	1 346	1 545	14.8
Retrospective	967	1 068	10.5
Other on-line	20	24	20
Total	2 333	2 638	13.1

Source: IMO/EIIA survey

Table 4: On-line ASCII databases
EC production/distribution, 1991

	Number of database producers	Number of host services	Number of gateway services
Belgique/België	23	5	-
Danmark	25	16	1
BR Deutschland	121	20	4
España	45	25	1
France	173	63	1
Hellas	-	-	-
Ireland	2	-	-
Italia	32	19	3
Luxembourg	5	2	1
Nederland	32	16	-
Portugal	8	9	2
United Kingdom	185	51	13
EC	651	226	26

Source: Directory of On-line Databases, July 1991, Cuadra/Elsevier, New York.

Table 5: Videotex
Installed videotex terminals, 1990

	Installed base of videotex terminals (1)	Share of total (%)	Year service commenced
Belgique/België	7 700	0.12	1986
Danmark	6 000	0.09	1987
BR Deutschland	260 000	3.91	1983
España	150 000	2.25	1986
France	5 817 000	87.41	1980
Hellas	1 000	0.02	1990
Ireland	3 000	0.05	1988
Italia	145 000	2.18	1986
Luxembourg	1 000	0.02	1986
Nederland	100 000	1.5	1980
Portugal	3 500	0.05	1989
United Kingdom	160 000	2.4	1979
EC	6 654 200	100	

(1) Includes dedicated terminals and emulated PCs
Source: Communications & Information Technology (CIT) Research Ltd.

Table 6: Videotex
Professional videotex usage, end 1990 (1)

	Number of Videotex users	% EC	% Professional use	Number of professional users	% EC
Belgique/België	7 700	0.1	95.0	7 315	0.2
Danmark	6 000	0.1	79.0	4 740	0.2
BR Deutschland	260 000	4.3	60.0	156 000	5.0
España	150 000	2.5	60.0	90 000	2.9
France (2)	5 256 300	87.1	50.0	2 628 150	84.2
Hellas	1 000	0.0	100.0	1 000	0.0
Ireland	3 000	0.1	100.0	3 000	0.1
Italia	145 000	2.4	50.0	72 500	2.3
Luxembourg	1 000	0.0	100.0	1 000	0.0
Nederland	100 000	1.7	75.0	75 000	2.4
Portugal	3 500	0.1	50.0	1 750	0.1
United Kingdom (3)	100 000	1.7	80.0	80 000	2.6
Total	6 033 500	100.0	52.0	3 120 455	100.0

(1) Estimates assume all terminals are active unless otherwise noted
(2) 10 % of Minitels are not active, according to France Telecom
(3) Only Prestel recorded users are taken into account
Source: Communications & Information Technology (CIT) Research Ltd.

they were purchasing. The remainder was evenly split between intra and extra-EC trade. In 1990, there was a significant growth of intra-EC trade of some 25%, at the expense of exports beyond the EC, with national consumption remaining at the same level. However, the export performance figures need to be considered in light of the fact that the US dollar weakened significantly against most European currencies over this period.

SECTOR ANALYSIS

ASCII

Table 2 shows world production and distribution of electronic databases, from which the concentration in the highly developed economies of North America and the European Community, can be clearly seen. However, despite the greater population size (US population, 244m, EC, 343m), and a comparable economic base (US GDP 4 300 billion ECU, EC GDP 4 200 billion ECU), there are nearly twice as many database producers and host services in North America as in Europe. In the high revenue-generating area of business databases, North America produces three times as many databases as Europe.

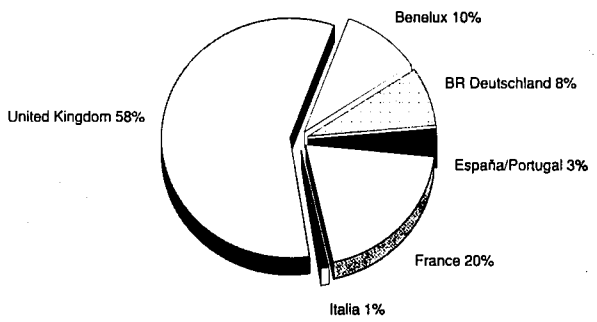
Further details of national ASCII markets, as well as turnover by type of service/product are shown in Tables 3 and 4.

Videotex

The European videotex service market is still very much dominated by France (87% of installed terminals and 80% of videotex service revenues), although other Member States are also making efforts to match the mass dissemination of videotex terminals as achieved by France Telecom. Details are shown in Table 5. The European videotex market is characterised by separate national approaches to videotex development, which has affected standards, terminal distribution policy, as well as procedures for billing customers. Thus there are three different videotex standards in operation, CEPT 1, 2, 3, with only six national videotex networks currently supporting multi-standard services.

One of the key trends in the videotex market has been the growth in the demand in the professional and business sectors. Again France dominates this market through its inherent market size, although only half of French videotex users are considered professional, and account for only 27% or 73 million ECU of videotex revenues attributable to the service providers (telecommunication costs not included). Elsewhere, the ratio

Figure 1: Audiotex
Share of EC installed lines, 1990



Source: Probe Research

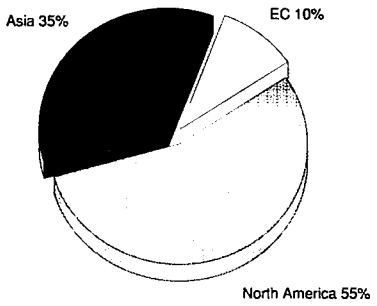
of professional users is much higher (see Table 6), and in the UK for example, travel and stock exchange services are successful applications. However, as with audiotex, there still remains several barriers to the growth and development of international videotex traffic, namely, differing national standards, lack of user awareness and services with a pan-European interest.

Audiotex

Audiotex is defined as those services where information is provided through interactive on-line access to a database using voice or tone recognition. Recently the European audiotex market has been stimulated by a degree of deregulation in the European Telecommunications market. This has allowed a new range of premium rate services (PRS) to be made available. The main advantage of PRS services is that users are charged directly by the network operator, and therefore there is no need to subscribe in advance to those audiotex services required, which in effect encourages demand.

Within Europe the level of market development is very uneven, with the UK, France and Netherlands accounting for more than 90% of the 1990 market, which has been valued at 530 million ECU. Estimation of future market trends are difficult,

Figure 2: CD-ROM
Installed base of CD-ROM drives by continent



Source: Infotech

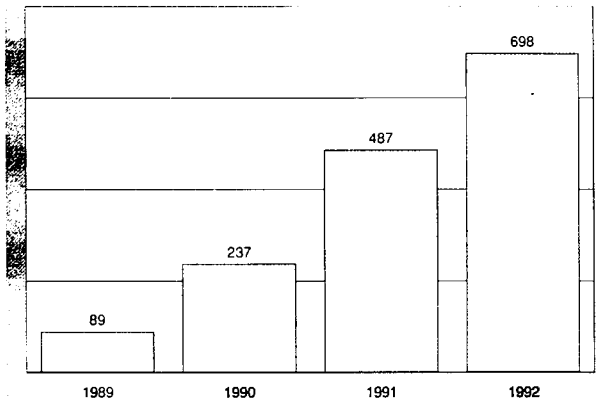
given that there are a variety of barriers which hinder development, particularly in terms of PRS services. However, even from a technical point of view, there are currently no facilities to support the development of European transborder audiotex services, since no interconnections of PRS are available, and there is no single and common free-phone number. Some indication of the European market is given by the 1990 audiotex share of installed lines as seen in Figure 1.

Optical information media

The optical media market, of which a major component is represented by CD-ROM, has shown rapid growth rates in previous years, which makes the collection, validation and processing of data for the production of statistics especially difficult. Although growth in the turnover of the optical media sector between 1989 and 1990 was high at 31%, with revenues of some 30.5 million ECU, the sector is nevertheless still quite small in the EC.

The installed base of CD-ROM drives within Europe compared to North America and Asia is low (see Figure 2), and therefore the European market for CD-ROM is still underdeveloped.

Figure 3: CD-ROM
CD-ROM titles published in Europe, 1989-92



Source: CD-ROM Facts and Figures 1992 (TFPL Publishing)

Worldwide the production of new titles available on CD-ROM has increased steadily over recent years. Although the rate of increase varies according to the source, it can be assumed to be more or less doubling annually. Details of the evolution of the number of European titles given by the organisation TFPL's "CD-ROM Facts and Figures" are shown in Figure 3. One interesting finding by the Optical Publishing Association suggests that by the end of 1992, more than 6 400 commercial titles will be available worldwide. If correct, this means that by 1993 there will be more databases available on CD-ROM than on-line in ASCII mode.

INDUSTRY STRUCTURE

Europe has a number of competitive strengths in the world markets for professional information services. Partly, and not least of which, is the presence of several world-ranking information and media conglomerates within the EC. These companies, notably Reuters, Reed International, Maxwell Communications Corporation, Pearson-Financial Times, Elsevier and VNU, have been active in the field of information services for more than a decade. In addition, Europe is characterised by some large and established markets for professional electronic information services in key areas such as chemicals, pharmaceuticals and financial services.

On the other hand, the European Electronic Information Services market by comparison with North America's, remains relatively underdeveloped. The reasons for this, not only lie in the fact that the European market is more fragmented and heterogeneous, but also that national markets are dominated by national operators. Thus, database services have tended to develop along national lines and national languages. Another weakness arises somewhat paradoxically out of the existence of an efficient supply of traditional (non-electronic) business and professional information in many EC countries. This has the effect of negating the perceived need for electronic information.

OUTLOOK

The electronic information services market in Europe not only faces the challenges of American and increasingly Japanese competition, but also those challenges from within: technological change, diversification and changes of ownership.

The expansion of the pan-European marketplace is also beginning to create "transnational" information products. As a result, there is an increased tendency for joint ventures and co-production arrangements. The creation of a pan-European marketplace is essential for the future of the European information industry. This will be achieved only by:

- the elimination of legal and administrative barriers;
- the convergence of national telematic infrastructures (especially with respect to videotex and audiotex networks);
- the harmonisation of government owned primary data collections.

Such initiatives as the European Commission's IMPACT 2 programme will facilitate the creation of such a marketplace, especially with respect to balancing development between the richer and the less favoured regions. However, it is also important to balance technological and market development with user requirements, through more user friendly access systems.

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The European Association of Information Services (EUSIDIC). Address: B.P. 1416, L-1014 Luxembourg; tel: (352) 250 750 220; fax: (352) 250 750 222.

Telecommunications services
NACE 790

Revenues generated by telecommunications services in the EC totalled 80 billion ECU in 1989. The market is still largely dominated by basic voice services which account for about 85% of total turnover, but other services are expanding rapidly. Total growth during the second half of the 1980s averaged 7% per year, but exceeded 20% for data communication and 50% for mobile communication. The development of the sector will be spurred by changes in information technologies but also by increasing use of digital technology in consumer electronics. The supply of telecom services is still predominantly controlled by national monopolies. Though value added services have been deregulated in most of the Member States, basic services are still monopolised by national operators in nearly all countries. Liberalisation is however prodding the restructuring of the sector.

INDUSTRY PROFILE

Description of the sector

Telecommunications services cover: point to point interconnection (interconnection of persons with each other, of persons with computers and machines, or of machines with each other); and, point to multipoint distribution (distribution of information from one point -man or machine- to a large number of addresses).

The information transmitted can be voice, data, or images (fixed or full motion). Until recently, each of these types of information required the use of a specific network. However, recent networks like ISDN (Integrated Services Digital Networks) allow for the integrated distribution of voice and data.

The transmission can be on line, or real-time, as in the case of telephony. It can also be deferred, when the addressee is not available. The information is stored then and either forwarded at a later stage or retrieved by the addressee (voice mail or mailbox services).

Beyond the pure transmission of information, which is referred to as basic service (telephone, telex), a whole sector of value added services (VAS) has emerged and is bound to develop substantially. Thanks to the digital revolution, the information can be processed, adapted, stored and forwarded as required.

Voice mail or mailbox services already belong to this kind of services, as do protocol conversion services that allow the interconnection of applications activated on two different computer systems.

Mention should also be made of the extension of the videotext, which opens up the value added services market to residential users and small firms. The service is most highly developed in France which, in 1987, had over 90% of all capacity installed within the EC.

Over the coming decade, existing basic infrastructure will start giving way to essentially new services, featuring vast amounts of built-in intelligence. One such example is automatic translation from one language to another to support real-time communication between individuals from different countries.

Access to the services is offered on dedicated networks: Public Switched Telephone Networks (PSTN), Data Networks (PSDN) like X25 networks (Transpac / Datev), and progressively, ISDN.

"Private" networks, most often based on leased capacity (leased lines), allow enterprises to avail of their own transmission and networking capacities on an exclusive basis. Virtual networks share capacities while the user accesses the network when required only (instead of on a permanent basis), while having the impression that he is the sole user.

Networks are becoming increasingly "intelligent" and will become platforms for the provision of brand new services.

The majority of communications are currently established between access points belonging to the fixed infrastructure. A major growth area in telecommunications, though, is the mobile communications sector, where demand currently exceeds capacity, and which is the leading edge of the "universal" network which would allow an addressee to be called in and to call from any part in the world through a combination of fixed and mobile links. Cellular communication being put into place now, is, paving the way for the mobile and cordless communication, freeing the user from being tethered to the network.

Table 1: Telecommunications services
Main indicators

(million ECU)		Turnover excluding VAT	Number of persons employed
Belgique/België	(1989)	1 944	25 255
Danmark	(1989)	1 768	18 000
BR Deutschland	(1988)	18 250 (1)	216 156
Hellas	(1989)	900	29 654
España	(1989)	5 559	71 155
France	(1989)	14 821	157 313
Ireland	(1989)	880	13 705
Italia	(1989)	12 627	116 391
Luxembourg	(1988)	130 (1)	745
Nederland	(1988)	3 500 (1)	29 142
Portugal	(1989)	488	10 696
United Kingdom	(1987)	19 500 (1)	223 084
EC 12		80 360 (1)	911 296

(1) Estimate/rounded figures
Source: SEMA GROUP using UIT, Eurostat data

Table 2: Telecommunications services Income by sector, 1989

(million ECU)	Total income telecom-munication services	Income telephone system	Income telex services	Income other services	Telephone as proportion of total (%)	Revenue per main line (ECU)
Belgique/België	1 944	1 702	74	161	87.5	460
Danmark	1 768	1 196	32	538	67.7	427
BR Deutschland	18 250 (1)	15 887 (2)	341 (2)	1 750 (2)	88.1 (2)	N/A
Hellas	900	796	27	70	88.4	215
España	5 559	4 865	92	594	87.5	412
France	14 821	11 440	286	3 095	77.2	425
Ireland	880	785	12	83	89.2	872
Italia	12 627	11 411	318	764	90.4	538
Luxembourg	130 (1)	110 (2)	6 (2)	1 (2)	93.2 (2)	550 (2)
Nederland	3 500 (1)	2 641 (4)	2 641 (4)	N/A	N/A	2 641 (4)
Portugal	488	400	35	52	82.0	400
United Kingdom	19 500 (1)	11 391 (3)	511 (3)	1472	85.2 (3)	515 (3)

(1) Estimate/rounded figures
(2) 1988
(3) 1987
(4) 1986
Source: SEMA GROUP, using UIT data

Main indicators

In 1991, the world market for telecommunications services totalled 330 billion ECU for a corresponding investment in telecommunications equipment of 83 billion ECU. Growth in total telecommunications services has averaged 7.3% per year since 1986, ranging between 5% for telephone, to about 20% for data communication and more than 50% for mobile communication services.

In the EC, revenues generated in telecommunications services totalled some ECU 80 billion ECU in 1989, with over 900 000 persons employed. Telephone still accounts for the vast majority of the services, with more than 85% of the total, while telex and telegraph, on the decrease, represent less than 2%. The other services account for the remaining 13 %.

Mobile communications, with some 5 to 6 million subscribers in Europe, are expected to reach some 20 million by the late 1990's, particularly with the implementation of the Pan European Digital Cellular System (GSM) and the second generation cordless telephone.

Table 3: Telecommunications services Distribution of main lines, 1989

	Millions of main lines	Lines per 100 inhabitants
Belgique/België	3.7	37.8
Danmark	2.8	55.5
BR Deutschland (2)	30.5 (1)	56.5
Hellas	3.7	37.8
España	11.8	30.4
France	26.9	47.0
Ireland	0.9	25.5
Italia	21.2	36.9
Luxembourg (1)	0.2	45.4
Nederland	6.6	43.7 (1)
Portugal	1.8	17.9 (1)
United Kingdom (1)	22.3	39.2
EC	132.4	43 (1)
USA	125.8	50.6
Japan	50.0	40.7

(1) Estimate - rounded figures
(2) Data for reunified Germany.
Source: SEMA GROUP, using UIT data

The networks provided for some 132 million main lines in 1989, a level comparable to that of the USA. Penetration rates ranges between 18 and 56 main lines per 100 inhabitants depending on the country, with an average of about 43 for the EC, against 50 in the USA and 40 in Japan.

Telex services are operated on a separate network which covered about 660 000 lines in the EC in 1989. The number of lines is decreasing in most of the European countries as companies switch to other systems to transfer documents (micro-computers, fax, etc.). Investments in telecoms are substantial. They ranged from 4 to 14% of GDP according to the Member State in 1989.

Foreign trade

International telecommunications services are regulated by a mechanism by which revenue is shared among the countries and carriers involved in the communication. The revenue, based on usage, also depends on the tariffs in the different countries. The European Community had a trade surplus with the United States of around 300 million ECU in 1988. As far as individual Member States are concerned, given that residents in high-income countries generally make longer and more frequent calls, high income countries tend to show a trade deficit in telecommunications services.

National traffic, that is among the Member States of the Community, accounts for more than 90% of total traffic, leaving less than 10% for international, of which intra-European traffic is but one part. By comparison, long distance traffic accounted for more than one third of overall telecommunications services revenues in the USA in 1988.

MARKET FORCES

Demand

Rapid technological progress has an enormous influence on the nature of demand for telecoms services. Until recently, telecommunications essentially meant telephony. Emerging information technologies has allowed for increasingly efficient generation, processing and storage of computer generated in-

Table 4: Telecommunications services
Distribution of telex subscriber lines, 1989

	Thousands of main lines	Lines per inhabitants
Belgique/België	20.9	3.1
Danmark	10.0	19.5
BR Deutschland (2)	173.0 (1)	32.3
Hellas	24.5	25.5
España	36.9	9.1
France	147.4	25.7
Ireland	4.5	12.6
Italia	67.9	11.8
Luxembourg	27.0 (1)	69.5
Nederland	33.0 (1)	18.1
Portugal	28.4	27.4
United Kingdom (1)	111.0	19.0
EC (1)	660.0	22.0
USA	58.7	2.4
Japan	40.0	3.3 (1)

(1) Estimate - rounded figures
(2) Data for reunified Germany
Source: SEMA GROUP, using UIT data

Table 5: Telecommunications services
Telecommunication investments as a share of GDP

(in parts per thousand)	1988	1989
Belgique/België	3.4	4.2
Danmark	6.8	5.6
BR Deutschland	16.7	N/A
Hellas	5.3	6.3
España	9.8	13.7
France	N/A	5.0
Ireland	N/A	8.5
Italia	7.7	9.4
Luxembourg	N/A	N/A
Nederland	4.8	N/A
Portugal	10.5	6.8
United Kingdom	N/A	N/A
USA	3.8	3.9
Japan	5.5	5.6

Source: UIT

formation. Data processing and consumer electronics have both accumulated, on the local level, a fantastic amount of capability which, so far, has been restricted to local usage and passive distribution. The computer is no longer a terminal in the usual communication sense. Comprising an ever expanding network of functional devices, the 60 million personal computers in the world can potentially function as telecommunications switches.

The same holds for the video sector in consumer electronics. As video goes digital, video and computer technology will merge. Smart video, digital video, desktop video or video computer, all describe the same concept of extremely powerful computing machines, which will process not only data, but full motion video. They will, of course, operate interactively and, of course, must be networked globally. To provide interconnection for this local intelligence is the major challenge of the information age.

Telecom users can be divided into two main categories with differing needs and monopsony power: corporate users, and residential users.

Corporate users are driven by price/performance considerations and are developing considerable bargaining power. Advanced users are beginning to ask for broad band capabilities. Communication facilities matching the capabilities of local area networks will be more and more demanded. European users are now becoming as vocal as their American counterparts about the fact that their needs must be met both functionally and economically. If they can't get satisfactory responses from established telecommunications operators, they will increasingly look for alternative answers.

In most cases, residential users, unlike corporate users, cannot afford to subscribe to costly new services, but welcome the provision of services that combine convenience, ease of use and low cost. The penetration of advanced telecommunications services at the household level will take more than just making them available at low tariffs and will require marketing effort to generate broad acceptance. Itemised billing and call transfer,

Table 6: Telecommunications services
Local and long distance tariffs in Europe

(ECU per 3 minutes)	1980 (current prices)		1980 (1990 prices)		1990	
	Local	Long distance	Local	Long distance	Local	Long distance
Belgique/België	0.14	0.57	0.21	0.85	0.14	0.7
Danmark	0.05	0.29	0.09	0.51	0.15	0.36
BR Deutschland	0.09	1.37	0.15	2.18	0.11	1.35
Hellas	0.02	0.67	0.03	1.17	0.03	1.06
España	0.01	0.91	0.01	1.7	0.03	1.27
France	0.09	1.28	0.13	1.99	0.11	1.27
Ireland	0.09	0.78	0.16	1.44	0.15	1.45
Italia	0.06	0.93	0.11	1.83	0.09	1.55
Luxembourg	0.07	0.07	0.11	0.11	0.12	0.12
Nederland	0.05	0.25	0.08	0.38	0.06	0.26
Portugal	0.04	0.83	0.07	1.56	0.05	1.08
United Kingdom (British Telecom)	0.13	1.21	0.21	1.92	0.21	0.71
United Kingdom (Mercury)	0.2	0.52				

Source: Telecom et réseau international Décembre/Janvier 1992

Table 7: Telecommunications services
Long distance tariffs in USA and Japan

(ECU per 3 minutes)	1980	1990
USA		
Until 30 km (A)	0.42	0.47
More than 320 km (B)	0.83	0.55
Ratio B/A	2.0	1.2
Japan		
Until 30 km (A)	0.17	0.27
More than 320 km (B)	1.43	1.52
Ratio B/A	8.4	5.6
USA to		
France	5.06	3.14
BR Deutschland	7.54	3.14
Italia	7.54	3.28
United Kingdom	3.45	2.77
USA from		
France	6.14	3.46
BR Deutschland	8.75	4.6
Italia	6.43	7.27
United Kingdom	3.51	2.84
(British Telecom)		

Source: Telecom et réseau international Décembre/Janvier 1992

for instance, have already gained some acceptance in certain countries of the Community.

Supply and competition

Due to the current regulatory situation, supply is still primarily controlled by the main national operators in most of the countries of the Community. In general, basic services continue to be entrusted to the main operator. The United Kingdom, however, has opened the competition for basic services, with Mercury as main contender of British Telecom, and contemplates opening the competition further.

Value added services are generally open to competition, as are, on a concession basis, mobile communications. In the latter case, the combination of limited capacity and fast growing demand have entailed high tariffs. Capacity is increasing, however, and the implementation of the new pan-European cellular system is expected to greatly improve the situation.

As the major operators endeavour to re-position themselves on a deregulated market, technological know-how, R&D and marketing have become key competitive factors. Long distance, particularly transatlantic, tariffs have decreased as a consequence of competition and forced the operators to progressively re-balance their tariff structure, reducing the cross-subsidies which were traditionally the rule between the profitable long distance communications and the local communications.

Productivity, as expressed by the number of main lines per worker, increased during the 1980s. In countries such as the United Kingdom, Spain, Belgium and Ireland, staff cuts were necessary to achieve those productivity gains. More recent staff cuts include the 18800 people let go by British Telecom in 1991, and an estimated 16000 in 1992.

Two main inputs are purchased by the telecom operators (TO) for the production of telecommunications services: telecommunications equipment (switching, transmission equipment), often supplied by large multinational groups, and software, provided either by equipment producers or by specialised software houses.

INDUSTRY STRUCTURE

Competition is still limited by current regulations, but the liberalisation that has already taken place and the prospect of further such steps sharpen the appetite of new entrants.

Telecom operators on one side, like AT&T, the American RBOC's (Regional Bell Operating Companies), USA long distance carriers or the Japanese NTT, are all eyeing the large and profitable European market or have already entered into joint-ventures, or undertaken acquisitions or cooperation agreements. The following examples show the diversity of activities and countries targeted.

AT&T: agreements with several European carriers on Virtual Private Networks; agreement with PTT Netherlands; increased service activity in all major European countries; individual contracts with national operators in specific sectors (e.g. USA direct services);

SPRINT: joint-venture with British Waterways for the establishment of the third UK carrier;

Bell Atlantic: agreements in Denmark (second GSM licence); in Spain (cooperation with IBM in network management); and in Czechoslovakia (cellular, public switching);

Bell South: agreements in France (cellular, cable TV) and in the UK (paging);

Table 8: Telecommunications services
Employment and productivity of the telecommunications operators in OCED countries, 1978-1987

	Employment 1987 (thousands)	Growth in employment 1978-1987 (%)	Productivity 1987 (main lines per worker)	Growth in productivity 1978-1987 (%)
Belgique/België	26.7	-5.1	127.6	5.7
Danmark	19.0	N/A	142.7	N/A
BR Deutschland	216.0	18.0	126.0	3.2
Hellas	29.4	2.6	117.7	5.9
España	63.3	-7.7	161.7	6.7
France	163.4	8.9	151.8	7.4
Ireland	14.6	-3.7	54.5	8.1
Italia	109.7	8.6	174.2	4.9
Luxembourg	0.7	11.6	233.3	1.9
Nederland	29.8	11.5	209.0	3.0
Portugal	22.8	1.9	72.6	6.7
United Kingdom	233.1	-4.7	99.2	4.8
Japan	300.0	-10.2	160.1	4.1

Source: OECD, "Indicateurs de Performance pour les Exploitations de Télécommunications Publiques"

Table 9: Telecommunications services
Top 10 world telecommunications services suppliers, 1990

Company (billion ECU)	Country	Turnover
NTT	JPN	34.8
AT&T	USA	19.7
DB Telekom	D	19.5
BT	UK	19.1
France Telecom	F	16.6
Bell South	USA	11.2
SIP	I	11.0
Nynex	USA	10.7
GTE	USA	10.1
Bell Atlantic	USA	9.7
World		251.7

Source: Financial Times Monday October, 7, 1991

NYNEX: agreements in France (Network control, telemarketing); in Germany (software services); in Hungary (banking software) and in UK (cable TV franchises); and

Pacific Telesis: cooperation with Mannesman consortium (Cellular D2 Network); agreements in the UK (personal communication network, cable TV).

In the reverse direction, European operators are vying for size and market share on the international market, through direct investment (e.g. stock acquisition by France Telecom in Argentina, Poland and Mexico operators, British Telecom or Cable and Wireless investments in the USA, STET in North and South America, and Deutsche Telekom in Eastern Europe) or through agreements with customers or other operators overseas to supply them with global networking and network management services.

Potential new entrants on the "traditional" telecommunications scene are also to be observed among cable operators (traditional or new comers like utilities providers) which are waiting for the regulations to allow them to provide telecommunications services. Conversely, some telecom operators are eyeing the cable TV market.

Table 10: Telecommunications services
Number of firms and dates of issue of corresponding licences

Country	Basic telephone services	Radio mobile telephone	Radiopaging	Value added services
Belgique/België	RTT	RTT	RTT	RTT others
Danmark	Teledenmark	Teledenmark	Teledenmark	Teledenmark others
BR Deutschland	DBP Telekom	DBP Telekom (1991) Mannesmann Mobilfunk (1991) (1)	DBP Telekom Mannesmann Mobilfunk (1991) (2)	DBP Telekom others
Hellas	OTE	n.e.	OTE	OTE
España	Telefonica	Telefonica (1989) Telcel SA (Motorola/Amper) (1990)	Telefonica (4)	Telefonica others
France	France Telecom	FT Cofira (a connection of 14 imerprises) (1989)	FT (4)	FT others
Ireland	Telecom Eireann	Birpage (TE/Motorola) 1985	TE	TE others
Italia	STBT / SIP IRI / Telespazio / Italcable	SIP (6)	SIP	SIP/ Italcable/ ASST others (7)
Luxembourg	P&T	P&T	P&T	P&T (8)
Nederland	PTT Nederland	PTT Nederland	PTT Nederland	PTT Nederland others
Portugal	CTT TLP CPRM	CTT/TLP (5)	CTT/TLP (4)	CTT/TLP others
United Kingdom	BT Mercury (1983) Kingston-upon-Hull Nainet (1991) 3 cable-TV firma (1991)	BT Cellnet (BT/Securitor) (1984) Racal/Vodafone (1984)	BT Mercury-Motorela Intercity Paging Digital Mobile Racal/Vodafone Mercury Millicom	BT Mercury others

(1) Two more licences, to supply mobile network in Eastern Germany will be granted soon.
(2) The network is not in operation yet.
(3) Satellite services were recently opened to competition, and new licences for these services well be given.
(4) Licences for private national radiopaging networks are in the process of being issued.
(5) A licence was granted in August 91 to a private supplier.
(6) Another licence has been granted recently to a private supplier.
(7) VAS services were not liberalized in Italy but there is already "de facto" competition on that market.
(8) Liberalization of the VAS market is expected for the end of the year.
Source: CEC, DGII

Table 11: Telecommunications services
Regulatory environment

Country	Main operators	Regulatory body	Services markets liberalized	Rules concerning leased lines (3)	Markets for terminal equipment
Belgique/België	Régie des Téléphones et Télégraphes (RTT) a public utility. (2)	RTT and the Ministry	VAS	Connection forbidden Resale forbidden	All wide-diffusion terminals are still a monopoly of the RTT
Danmark	Telecom Denmark, a state holding which owns 4 regional monopolies (1)	Telec. Inspectorate, a public enterprise created in 1990.	Only VAS	Connection allowed Resale allowed	Liberalized in 1990
BR Deutschland	Deutsche Bundespost Telekom, a public utility	Department of Regulatory Issues (under the Ministry) created in 1989	Mobile telephone, mobile radio, satellite communication VAS	Connection allowed only international lines Resale forbidden	
Hellas	OTE, a public utility	The Ministry regulates the sector	None	Connection forbidden Resale forbidden	First telephone set is still a monopoly of the TO
España	Telefonica, a private company, 35% state-owned VAS	A department of the Minstry, since 1987	Mobile communications (3)	Connection allowed Resale forbidden	Liberalized in 1987
France	France Telecom, a state-owned public enterprise, and its holding Cogecom	DRG, a body under the Ministry, created in 1990	Mobile communications (3),VAS	Connection allowed Resale forbidden	Liberalized in 1987
Ireland	Telecom Eireann, a state-owned company	Department of Communications (under the Ministry) since 1983	Only VAS	Connection allowed Resale forbidden	Liberalized in 1984
Italia	STET, a holding 85% state- owned, and IRI, a holding 100% state-owned, control 3 concessionaries: SIP, Italcable, Telespazie. There are also three government departments supplying telecoms: ASST, DCSR, DCST	Non-existent but several bodies assist the Ministry in the regulation of telecoms.	None (3)	Connection forbidden Resale forbidden	First telephone set and terminals are not open to competition
Luxembourg	Administration des Postes et communications, a goverment department et Communications, P&T, a government department	P&T and the Ministry regulate the sector	None	Connection allowed Resale forbidden	First telephone set is still a monopoly of the TO
Nederland	PTT Netherlands 100% state owned (1)	HDTP, under the Ministry, created in 1988	VAS	Connection allowed Resale forbidden	Liberalized in 1990
Portugal	Post and Telecommunications (CIT) Public Utilies (1): TLP "CPRM; a private company, 51% state-owned"	ICP, an Institute under the Ministry, created in 1989	Mobile communications (3) VAS	Connection allowed Resale forbidden	Liberalized in 1984
United Kingdom	British Telecom, 49% state-owned Mercury, private	OFTEL, an independent body, created in 1984	All, including telephone services provided with fixed links (1990)	Connection allowed Resale allowed	

(1) The governments announced that part of its shares will be sold to the public
(2) RTT will be split into two organizations, Belgacom, a telecoms operator, and a regulatory body. Belgacom will be partly privatized in the near future
(3) Connection is to the possibility of connecting private circuits to the Public Switched Telephone Network (PSTN); resale is the possibility of resailing spare capacity on lines rented by private subscribers from the telecoms operators
Source: CEC, DGII

Table 12: Telecommunications services
Telecommunications in Eastern Europe and in the CIS, 1989

	Main lines (1 000)	Main lines per 100 inhabitants (%)	Number of telex lines (1 000)
Ex- DDR (1)	1 761	10.6	17.4
Bulgaria (2)	N/A	15.1	6.0
Hungary	916	8.7	13.5
Poland (1)	2 953	7.8	33.5
Rumania (3)	N/A	N/A	6.8
Czechoslovakia	2 226	14.2	12.0
USSR (1)	33 991	9.1	2.6
Yugoslavia	3 560	15.0	15.0

(1) 1988
(2) 1983
(3) 1981
Source: OECD, UIT

Projects for pan-European broad band networking are also under elaboration, like METRAN or GEN in the traditional framework of operators cooperation or HERMES, an initiative put forward by a consortium of European railways from 11 countries, of large private companies (Daimler Benz AG, Compagnie de Suez) and of foreign carriers (Sprint International, Nynex International). Both projects are taking longer than foreseen and are experiencing difficulties in the process of negotiations among so many partners.

Despite all these projects and new ventures, the impact on the concentration of telecoms operators in the Community has been weak, with telecommunications services mainly in the hands of the traditional operators. The only exception so far is the United Kingdom where British Telecom accounts for 85% of the total market, the rest being shared between Mercury (13%) and other smaller operators (2%). Turning to value added services, all the EC markets but Italy, Luxembourg and Greece are liberalised, but the market shares of private suppliers remain very small (usually at about 1%). Similarly, France, Spain, Germany, and Portugal have already granted licences to private mobile radio operators, but their share is negligible. So far, only the United Kingdom has granted licences for the for the development of telepoint, private mobile radio (PMR) and PCN networks.

REGULATIONS

The sector is facing major regulatory changes as a result of increasing liberalisation. Two kinds of move have been made so far in Europe:

- partial or total privatisation of telecom operators and the introduction of competition in the provision of services;
- liberalisation and opening to competition the provision of telecom equipment.

Most countries have so far kept the provision of basic services under state monopoly, whereas value added services have generally been opened to competition. Provision of services in this context must rely on the principle of equal access to basic networks and networks of third parties to allow for the provision of these services. This is the "open network provision" policy which the EC has been promoting for years.

The other liberalisation promotion favoured by the EC has been the opening of the telecom equipment market, so far largely restricted to national suppliers in Europe. This is slowly coming into force, but decades of close relationships and habits cannot be overcome rapidly and progress is limited so far.

Table 11 gives a summary of the regulatory situation in Europe, particularly the main operators, the services which have been liberalised, and the terminal markets open to competition.

Privatisation has already been conducted in the United Kingdom and it is foreseen in 1993 in countries such as Belgium, Denmark, Germany, Ireland, and Portugal.

Pursuing its push towards a European deregulated market, the European Commission has adopted, in 1991, two long awaited directives: one on leased lines, lifting the technical restrictions imposed by the operators on the interconnection of leased line networks to the public network (Open Network Provision, applicability to leased lines); and the other on satellite communications, breaking up satellite communications monopolies for both TV and other communications purposes.

The enforcement of the latter implies a thorough revision of the Eutelsat, Intelsat and Immarsat conventions, and agreements from individual member states to allow direct access to capacity.

OUTLOOK

Telecommunications are undergoing a profound and rapid evolution. With and beyond the extension of current services, new services will appear and transform the economy, allowing new approaches to employment (teleworking, telecommuting), to education and training, to the assistance to the physically handicapped or to the environment and disaster management systems, to name only few.

Among the major trends currently underway are the development of broad band services (for large volumes of data and full motion picture), multimedia services, mobile and cordless services and network management services (intelligent networks).

The opening up of Eastern Europe is another major area of development. Although the countries of Eastern Europe currently lag in terms of telecommunications services, these markets have the potential to develop quickly by benefiting right away from new technologies (like, for instance, France did in the 1970s with the digital technology). Optical fibre, now or soon as cheap as copper, can be used for local networks, and mobile/cellular technology can be an economic and rapid solution to urgent needs. Eastern countries are about to or intend to liberalise and deregulate their telecommunications and call for a rapid assistance to built up their networks and operations. Various operators have already responded in investing (in Poland, for instance) or will do so in the coming years. German presence is also significant in the Central European Countries.

Finally, as has been mentioned earlier, competition in the telecom services sector is about to change profoundly and the operators are endeavouring to position/reposition themselves on the international scene in preparation of the global communications world of tomorrow.

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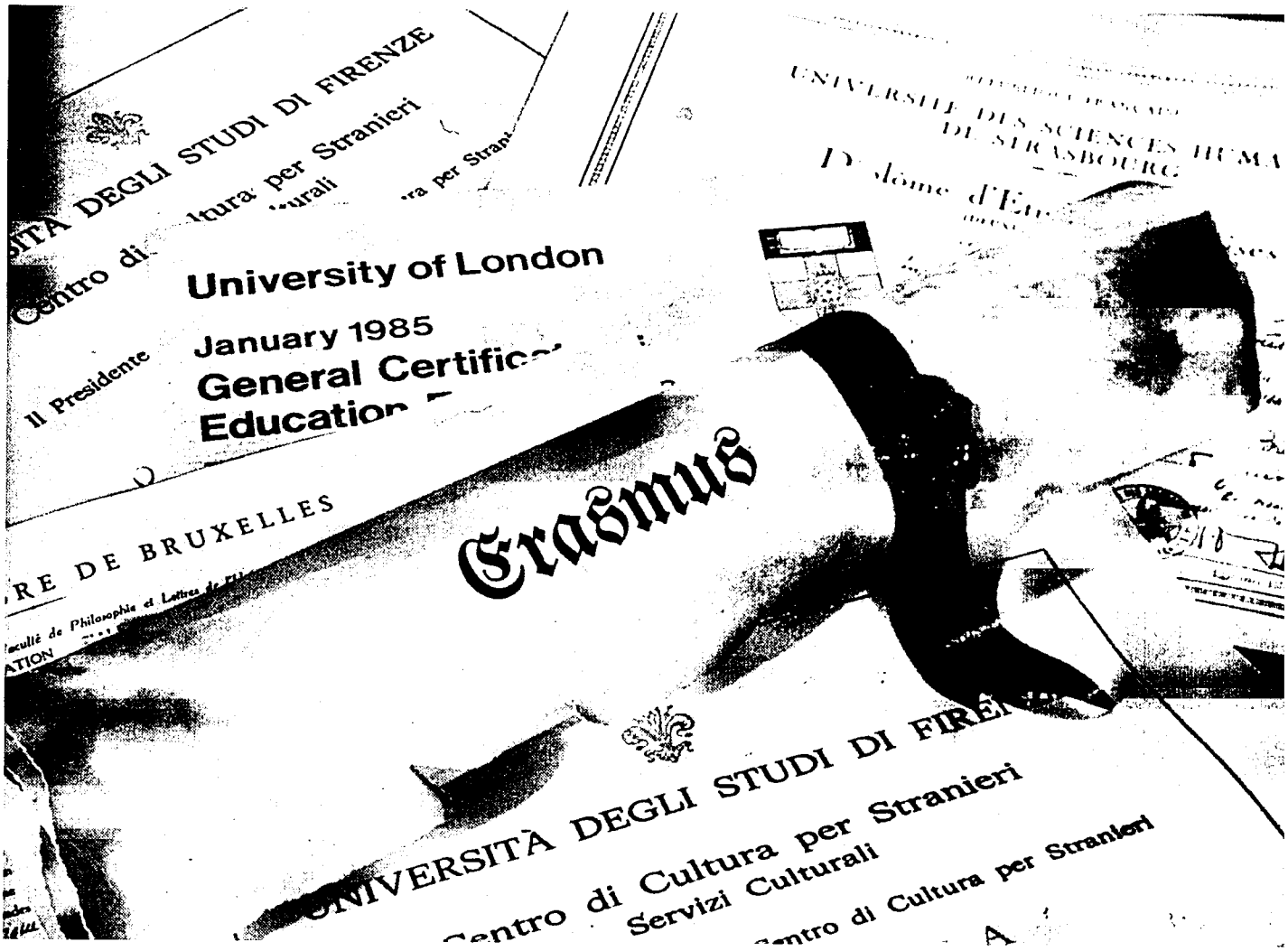
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Education
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Total public expenditure on education represents approximately 10% of total public expenditure in most EC countries, compared with figures of 13% or so in the USA and Japan. Europe's future will be built essentially on the quality of its human resources and therefore on the past and future ability of its member states and economic participants to develop and disseminate training at school level (teaching in the kindergarten, in primary and secondary schools and at university level), and to accompany professional careers in relation to all common and specific economic and social factors. Through its content, organisation and the quality of its results creating expertise in each member country, education is the first way of satisfying demands and changing conditions in the labour market. In this sense, it is the most important investment in every country.

INDUSTRY PROFILE

Description of the sector

The structure and evolution of the teaching sector reflect the way in which each country has attempted to build in historical components of its main demographic and economic factors (mainly in terms of activity and jobs), taking the best possible account of foreseeable and estimated developments, and the extent to which they have succeeded.

Its organisation is different according to countries, since each has organised its own education system giving different priorities to technical and professional teaching, incorporating part time education at very different scales, and defining diploma types and levels in a specific manner, particularly in higher education corresponding to nonhomogeneous theoretical ages.

Also, the importance of private education is very variable within the various education systems. This sector includes all structured teaching activities in schools or universities which issue diplomas at any level.

This sector's characteristics makes it relatively dynamic, and atypical of other activity sectors.

Recent trends

Table 1 shows the two main trends essential for understanding the main developments in education in Europe.

The first trend relates to demographic changes in the EC Member States, characterised by a general weakness. Thus between 1980 and 1990 the growth rate in West Germany was negative (average 0.2% per year); it was close to zero in Belgium, Denmark, Italy, Luxembourg and the United Kingdom, about 0.5% in Spain, France and Portugal, and 0.9% in Ireland during the same period.

Logically, this lack of demographic vitality is combined with a relative ageing of the population of the Member States. For example, the proportion of the population under 15 years old to the population between 15 and 65 years old in West Germany changed from 27% in 1980 to 21% in 1990, from 34% to 25% in Italy, and from 42% to 31% in Spain.

This is obviously a difficult trend which affects all Europe, and in which the less developed countries (particularly in Southern Europe) are reducing their differences with the more developed countries. It has a strong influence on the size of the educated population and on their proportion in the total population.

The second main trend relates to increasing school attendance. A significant increase in the educated population is caused by a relative diversification of some syllabuses (secondary technical and professional education, tertiary education) in order to take advantage of needs in the job market and technical developments. However, this increase also depends on the increased time that students need to spend in the education system (increased higher education but also protection against unemployment and a political desire of many countries to increase the opportunity for as many students as complete their secondary studies).

These two opposing trends work together, with the second only partly compensating the negative effect of the first.

Table 1: Education
Changes in the population attending school as a percentage of the total population

(%)	1980	1984	1986
Belgique/België	22.8	24.3	23.6
Danmark	21.5	21.0	20.6
BR Deutschland	23.3	21.5	20.7
Hellas	19.8	20.5	20.7
España	25.3	26.1	26.3
France	25.5	25.0	24.9
Ireland	26.8	28.2	28.4
Italia	22.3	21.2	20.4
Luxembourg	18.2	16.7	16.4
Nederland	27.5	25.9	25.1
Portugal	16.9	16.9	16.8
United Kingdom	N/A	22.1	21.7
Canada	24.9	24.4	24.2
Japan	22.7	22.4	22.0
USA	25.6	24.4	23.7

"Source : OECD 1991; Education in OECD countries 1987-1988"

Table 2: Education
Change in the population attending school in the EC

(thousands of students)	1975/76	1989/90
Pre school education	8 683	8 772
Primary	28 374	21 768
Secondary	32 285	32 929
Higher education	5 186	8 299
Total	74 528	71 768

Source: Eurostat

Portugal is a special case because, despite its demographic growth which is average within the community, it is distinguished by its fairly stable school attendance ratio.

Referring to Table 2, the most significant point concerns the very large increase in the number of students registered for tertiary education. Over the last 15 years this growth was 60%, whereas the number of students receiving primary education decreased by more than 23%. In this case we can clearly see the effect of smaller classes in the education system, in an age group at which school attendance is compulsory.

The drop in the total school population is almost equal to the difference between the increased number of higher education students and the reduced number of primary students.

According to the OECD, in 1987-88 about four million people were employed in the education sector in the EC (taking into account only primary, secondary and special education and excluding the administrative personnel). About 1.5 million people worked in primary education schools, about 2.4 million in secondary schools and 0.1 million in special schools.

Developments in education for girls

The proportion of girls within the 524 year old population in the community is 49% (1985). This ratio is almost identical in all countries.

The proportion of girls receiving full time education within this same period was 49%. Their education ratio is therefore the same as their proportion within the 5 to 24 year old population.

This total number hides some disparities: up to 17 years old girls are proportionally more numerous than boys, although this changes later. After 18 years old there are more boys than girls in West Germany, Greece, the Netherlands and the United Kingdom. In Ireland and in France, girls are more highly educated than boys up to 19 years old, whereas in Belgium this is true up to 20 years old.

The general trend is undoubtedly towards seeing the same ratio in the education system as their proportion within the population.

However, one should note that the unemployment rate for girls is higher than that for boys (24.3% compared with 19.6% for the under 25 years of age in 1987). This difference may be partly due to the difference in the school leaving age, but is no doubt also partly due to traditional - but reducing practice of hiring boys rather than girls in what are still predominantly male work environments, or due to potential maternity risks, etc.

Private education

In Europe, private education, in other words education that is not directly under the authority of the State, is given varying degrees of importance by country as a function of education level and the type of relation with the State, particularly concerning financing.

Thus, the proportion of private education in Belgium and the Netherlands is very high, due to the fact that it is entirely covered by public funds. There are also hybrid formulas in which State participation methods vary. The higher the amount paid to private school financing by the State, the larger the proportion occupied by private schools in the education system.

There are many reasons explaining why the private sector exists and the varying support given to it. These include religious and historic factors or image - related factors along with a possible difference in quality, and special training.

The pedagogic environment

Table 4 shows the trend towards a relative reduction in the number of students per teacher, such that some age groups

Table 3: Education
Private education as a percentage of the total students by level, 1980-1986

	Primary and first part of secondary			Secondary			Technical and professional education			Third level		
(%)	1980	1984	1986	1980	1984	1986	1980	1984	1986	1980	1984	1986
Belgique/België	53	54	55	N/A	58	66	N/A	67	60	65	57	65
Danmark	10	11	12	8	9	9	97	N/A	96	26	25	26
BR Deutschland	N/A	5	5	N/A	10	10	4	4	N/A	N/A	N/A	6
Hellas	6	5	5	5	4	4	16	8	9	2	N/A	0.4
Espana	37	35	35	34	32	30	37	33	28	N/A	N/A	9
France	6	17	17	25	24	24	21	22	22	N/A	N/A	N/A
Ireland	2	1	1	0	0	0	10	5	4	N/A	N/A	3
Italia	6	6	16	16	15	8	7	6	N/A	N/A	10	N/A
Luxembourg	3	4	5	5	5	5	12	11	12	N/A	N/A	N/A
Nederland	73	87	86	71	71	71	86	87	87	59	58	53
Portugal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13	16
United Kingdom	5	5	6	9	9	10	N/A	N/A	N/A	N/A	N/A	N/A
Canada	3	4	4	7	8	6	N/A	N/A	N/A	N/A	N/A	N/A
Japan	1	1	1	29	29	29	25	25	25	78	76	76
USA	11	12	12	9	10	10	N/A	N/A	N/A	22	23	23

Source: OECD 90; Education in OECD countries 1987-1988

Table 4: Education
Change in the number of students per teacher

	Primary		Secondary	
	1980	1988	1980	1988
Belgique/België	18	14	10	6
Danmark	12	12	11	9
BR Deutschland	17	18	14	12
Hellas	24	23	20	16
España	28	25	21	21
France	21	19	13	14
Ireland	29	27	16	16
Italia	16	13	11	9
Luxembourg	14	12	12	10
Nederland	23	17	15	14
Portugal	18	16	12	12
United Kingdom	20	20	15	14
Canada	18	17	17	18
Japan	25	22	17	18
USA	23	26	25	20

"Source:UNESCO 1991; National report on education"

benefit from better teaching ratio. There are two reasons for this. The first is pedagogic, based on the principle that teaching efficiency improves when there are fewer students, while the second relates to the logic of adapting to demographic changes.

These numbers hide important differences in that they are national averages whereas there are reduced numbers of students per teacher due to population drops in some areas, and at the same time there are sometimes large increases in suburban areas. This urbanisation phenomenon, almost complete in countries in Northern Europe (97% urbanisation ratio in Belgium) is continuing in other countries, particularly in the South (for example the urbanisation ratio of 32% in Portugal). It will result in further adjustments in the number of students per teacher, and will be affected by some hysteresis.

SECONDARY SCHOOLS

This is the sector in which there are the largest differences between teaching in the various countries.

These differences are related to teaching matter (general or polyvalent compared with technical or professional), and also to its organisation (full time and part time or apprenticeships).

In 1987, general or polyvalent full time education (full time in all countries) represented 41% of all education in the second part of secondary education for the entire community. This ratio was 25% for West Germany and Italy, 96% for Portugal and 42% for France, compared with 72.2% in Japan and 100% in Canada and USA.

These differences are the result of national policies which heterogeneously encourage the introduction of technical and professional components into education and therefore preparation for entry into the labour market.

Quantitatively, the senior secondary education across the community provides secondary education representing its concern with professional needs but also showing up differences in selected approaches.

Table 5: Education
Student population in second part of secondary in 1987-88

(in thousands of students)	General/ Polyvalent full time	Technical/ Professional full time	Technical/ Professional part time	Apprentice-ships
Belgique/België	433.3	372.4	N/A	N/A
Danmark	70.7	156.8	N/A	N/A
BR Deutschland	606.4	2 349.2	25.6	N/A
Hellas	267.1	113.4	N/A	N/A
España	1 356.6	1 110.3	N/A	213.7
France	N/A	N/A	N/A	N/A
Ireland	111.1	23.7	5.4	8.9
Italia	671.5	2 047.9	N/A	N/A
Luxembourg	3.9	8.8	N/A	3.1
Nederland	226.4	295.6	N/A	N/A
Portugal	193.4	7.5	N/A	N/A
United Kingdom	2 034.0	423.0	1 502.0	N/A
EC	5 974.4	6 888.6	1 533.0	225.7
Canada	1 124.5	N/A	N/A	N/A
Japan	3 926.4	1 480.2	56.6	N/A
USA	10 357.0	N/A	N/A	N/A

Source : OECD; Education in the OECD countries, 1987-88

Table 6: Education
Number of higher education students per 100 000 inhabitants

	1980	1988
Belgique/België	2 111	2 566
Danmark	2 074	2 385
BR Deutschland	1 987	2 779
Hellas	1 256	1 896
España	1 859	2 665
France	1 998	2 655
Ireland	1 610	2 219
Italia	1 981	2 263
Luxembourg	N/A	N/A
Nederland	2 544	2 833
Portugal	944	1 267
United Kingdom	1 468	1 913
EC	1 890	2 450
Canada	4 057	5 025
Japan	2 065	2 117
USA	5 311	5 438

Source : UNESCO; World report on education 1991

HIGHER EDUCATION

The challenges faced by the European community (trade competition, research and development, demography,...) have already resulted in a relative drop in the proportion of unqualified labour. This trend will undoubtedly continue. For example:

- between 1980 and 2000, the population of technicians in Denmark is expected to increase from 10% to 30%.
- in Germany over the same period, the demand for university graduates will increase by 1 600 000.
- in France between 1982 and 2000, the proportion of students with at least a level 5 degree (first degree issued after two years at university) will increase from 11% to 21%.

There are differences between Member States partly due to the initial situation, characterised in the case of Greece, Portugal and Ireland by a relatively low proportion of students. In these cases, there is a catching up effect, and also a political objective of creating the ability to meet the main economic and social challenges.

The ratio used here is biased due to the fact that the reference population, due to its ageing, is not identical in composition over the two periods. The proportion of women having received higher education increased from 40.40% in 1975 to 46.40 % in 1985 (more than 50% in France and Portugal) therefore approaching the proportion of girls in the 5-24 year old population.

Higher education is also characterised by the level of diplomas obtained by students (see Table 7).

Globally

There are important differences between the percentage of the highest level graduates (6 and 7) in community countries and the equivalent values in Canada, Japan and the USA. In 1987, the level achieved in the EC was less than in the countries mentioned. Different efforts therefore need to be made in the different countries in order to reach the same level of higher education as in the USA, Canada and Japan.

Graduates

Qualitatively, related to changes in high level abilities related to new technologies, it is interesting to note the ratio of natural sciences and engineering sciences taught in universities (excluding non-university education which exists in some countries - for example Engineering Schools in France).

Scientific characteristics of the higher education

Table 8 shows the diversity of situations in EC countries related to two aspects:

- the historical and cultural aspect, which partly explains the ratio that each country assigns to engineering sciences and natural sciences in university education compared with the total number of programs, and the ratio for each of these sciences.
- the socio-economic aspect, concerning the importance given to engineers in economic activities: as this increases, the engineering function is better recognised and rewarded; the case of Japan is significant in this respect.

Table 7: Education
Higher education diplomas in 1987

(in thousands)	Total	Including level 6 and 7	Proportion of level 6 and 7
Belgique/België	51.5	23.5	45.6
Danmark	19.0	10.7	56.3
BR Deutschland	239.9	154.8	64.5
Hellas	24.6	16.9	68.7
España	109.5	66.9	61.1
France	317.4	188.6	59.4
Ireland	15.3	10.7	69.9
Italia	94.4	90.0	95.4
Luxembourg	N/A	N/A	N/A
Nederland	58.8	20.5	34.9
Portugal	N/A	N/A	N/A
United Kingdom	315.0	189.7	60.2
EC10	1 245.0	772.3	62.0
Canada	199.0	140.0	70.3
Japan	586.0	410.0	70.0
USA	1 830.0	1 364.0	74.5

Source : OECD, Education in OECD countries

Table 8: Education
Relative importance of engineering and natural sciences (beginnig of the 1980s)

(in % of students)	Proportion of engineering courses in universities	Proportion of natural sciences in universities	Total	Proportion of engineers in the total workforce (%) (1)
Belgique/België	11.4	10.3	21.6	2.0
Danmark	20.1	9.8	29.9	1.4
BR Deutschland	14.1	18.1	32.2	2.2
Hellas	16.1	15.1	31.2	N/A
España	10.5	11.5	22.0	N/A
France	7.1	12.9	18.7	1.2
Ireland	17.1	14.3	31.4	N/A
Italia	18.3	12.9	31.2	0.4
Nederland	16.3	12.0	28.3	1.8
Portugal	18.5	7.0	25.5	N/A
United Kingdom	16.7	22.8	39.3	1.0
EC 11	15.0	13.0	28.0	1.4
USA	5.9	11.6	17.5	1.4
Japan	21.6	3.2	24.8	2.5

(1) Regardless of the source : universities, schools (University level)
Source : IRDAC, Qualification deficit in Europe

Overseas students

There is a very big difference concerning the presence of foreign students in higher education, both in absolute and relative terms.

There is a very strong correlation in terms of origin, between the representation of some continents and the history of the country (former colonies, common language, which is obvious in the case of France, Belgium, and the Netherlands. Apart from France and Belgium, the geographic mobility of students is still low, both globally and between countries in the community. In this case, origin is undoubtedly related to:

- the fairly limited knowledge of the characteristics and possibilities of higher education in other countries;
- the non-existence of a genuine community work market;
- the fear of additional financial costs;
- lack of understanding of the language.

ECONOMIC FACTORS

Education is generally considered as a public consumer item, with a price close to zero and which, in any case, does not reflect the costs to produce it. However, it is sometimes considered as a private consumer item for which the price is fixed freely by schools.

Education is also an investment item since it prepares the future of the individual and the nation.

The complexity of the education concept and the various perceptions that it covers make economic and qualitative evaluations difficult and inaccurate, and also make comparisons between countries difficult.

In order to compare education expenditures between countries, we need some common points: the concept of Purchasing Power Parity specific to education, recently developed by the OECD, allows to convert different foreign currencies into a same unit by taking into account the relative purchasing power of different currencies. Using this method, the relative effects of education expenditures and their changes may be analysed more precisely.

The two main indicators that are used are the total public expenditures for education per student as a percentage of the GDP per student (Table 10), and the total public expenditure for education as a percentage of the total public expenditure (Table 11).

Table 9: Education
Foreign students in Community higher education, 1989

	Number of foreign students	% of the total number of students	% of EC students in the total number
Belgique/België	23 561	10	46.6
Danmark	5 171	4	18.1
BR Deutschland	97 985	6	23.5
Hellas	1 357	1	5.7
España	10 570	1	32.1
France	131 654	12	15.7
Italia	20 199	1	46.7
Nederland	9 224	2	9.3
Portugal	3 608	2	9.3
United Kingdom	N/A	N/A	N/A
EC 9	303 329	5	23.9

Source: Eurostat

Table 10: Education
Total public expenditures for education per student

as a percentage of GDP per capita (1)

Year	B	F	D	GR	IRL	I	NL	P	UK	CAN	JPN	USA
1970	N/A	N/A	20.5	16.0	24.3	N/A	31.0	N/A	31.6	34.5	23.9	21.8
1971	N/A	N/A	21.8	14.3	24.4	23.6	31.1	N/A	31.5	34.0	24.5	22.0
1972	N/A	N/A	22.1	14.8	24.3	23.6	30.4	N/A	32.3	31.6	23.6	20.9
1973	N/A	N/A	21.3	14.4	24.6	23.2	29.3	9.1	30.2	31.0	23.0	20.4
1974	N/A	22.3	21.6	16.9	27.7	21.8	28.3	10.2	32.7	30.4	25.2	20.7
1975	N/A	22.6	22.6	16.6	24.3	21.6	29.1	16.2	31.8	31.2	24.6	21.8
1976	N/A	22.1	20.9	16.4	24.8	21.9	28.2	17.6	30.0	31.1	24.5	21.4
1977	N/A	21.7	20.3	18.2	24.3	21.3	27.8	18.9	28.3	33.1	24.5	20.6
1978	N/A	21.4	20.1	18.7	24.7	19.7	28.4	17.3	27.4	31.7	25.5	20.2
1979	25.8	21.2	20.1	17.5	25.1	20.7	28.5	16.3	27.4	31.7	25.1	20.3
1980	N/A	21.0	20.4	16.1	24.2	20.2	29.2	18.1	28.3	32.3	26.0	20.8
1981	N/A	22.8	20.7	16.8	24.8	21.1	30.4	10.8	28.2	32.6	24.1	20.5
1982	N/A	23.4	20.0	10.3	22.9	21.6	30.9	18.2	27.8	33.7	23.2	21.4
1983	25.0	23.7	20.4	18.0	23.4	22.2	30.6	18.7	27.3	32.6	22.9	21.3
1984	24.4	23.6	19.7	18.6	22.3	23.9	29.1	18.4	26.6	31.4	22.1	20.7
1985	25.0	23.8	20.0	19.5	22.1	23.9	29.5	18.4	21.9	30.5	21.4	21.2
1986	25.0	23.7	20.1	18.6	23.1	24.7	31.1	19.7	22.9	31.1	21.6	22.2
1987	24.1	23.5	20.2	18.6	22.8	N/A	32.8	19.4	22.6	30.7	21.1	22.3
1988	N/A	22.7	N/A	16.8	N/A	N/A	N/A	N/A	N/A	30.3	20.7	N/A

(1) Taking account of Purchasing Power Parity
Source OECD : Education expenditures, coast and financing trench analysis, 1970-1988

Public education expenditures schematically follow two main expenditure types: capital expenditures (facilities, infrastructures), and current expenditures (mainly salaries and in some countries subsidies to private education). By definition, the latter are higher and represent the majority of expenditures (between 85% and 99% depending on the country). Their elasticity is low, meaning that any capital expenditure can only be a supplementary expense and appears to be treated as such.

In general, public teaching expenditures are proportional to the Gross Domestic Product (6.2% for Ireland, 4.1% for Portugal, 4.8 for the United Kingdom, 6.9% for the Netherlands, 4.0% for Greece in 1987). However these major differences are influenced by the catching up trend for less developed countries in which the demographic component has had a real influence on education expenditures up to the end of the 1980s.

In 1987, this proportion varied between 3.8% for Greece and 6.9% for the Netherlands, namely a ratio of 2. The same ratio was 2.7 in 1970.

In general, the table shows a wide dispersion for this indicator, however, this is not surprising considering the difference in the development level of the observed countries. It is interesting to note that the countries with the highest levels in the early 1970s (the United Kingdom and the Netherlands, and the United States and Canada on the other part) are precisely those which dropped during the period under consideration. The reverse phenomenon is true for countries with the lowest ratios, particularly Greece and Portugal. It is therefore possible to talk about a catch up phenomenon for the countries lagging behind, itself contributing to convergence of the observed ratios since differences are reduced.

These countries would therefore increase their efforts in the education field as a function of the economic development level achieved.

The first indicator (Table 10) shows a difference between less developed countries in the EC and the more economically advanced countries, although the difference between these two groups tended to reduce between 1970 and 1988. The fundamental reasons are unchanged - demographic changes, and efforts made to reduce the differential by countries such as Portugal which increased by 100% between 1973 and 1988. Greece only maintains its level of 50% percent relative to the Netherlands. This indicator has been fairly stable in other countries, except in the United Kingdom which experienced a major drop, representing the relative disengagement of this country's Government from financing education in general, in particular since the middle of the 1980s.

It also appears - taking account of the Purchasing Power Parity method - that a fairly constant relation has been maintained in recent years between public expenditures per student and the GDP per capita.

The second indicator (Table 11) shows another approach to public education expenditures. The trend for the European countries studied is almost always downwards, which would no doubt be a concern if part of this trend were not due to the influence of a relative reduction in the educated population.

EC countries classified as less developed generally have lower values than the other Member States or than the USA and Canada. This also confirms the fact that education expenditures are a function not only of the development level, but also of priorities and choices defined by governments. The case of West Germany is undoubtedly partly a result of demographic changes and of efforts made in education in the 1960s.

Convergence of this indicator over the same observation period (1970-1988) is a result of lower values recorded for all countries.

This variation is also due to a less important relative increase in education expenditures relative to other items in national budgets.

Nevertheless it is not easy to interpret this relative reduction as a sign of an increasing efficiency of education systems, since this efficiency cannot be measured in terms of education or diplomas only, but must include socio-economic effects.

Considering demographic changes in European Community countries and the ratio of 18 to 25 year olds within the total population, it is interesting to note the attitude of the various

Table 11: Education
Total public expenditures for education as a percentage of total public expenditures (1)

Year	B	F	D	GR	IRL	I	NL	P	UK	CAN	JPN	USA
1970	N/A	N/A	N/A	9.4	10.0	13.1	N/A	15.6	N/A	13.8	24.4	20.2
1971	N/A	N/A	N/A	10.4	9.6	13.0	N/A	15.9	N/A	14.4	23.5	20.0
1972	N/A	N/A	N/A	10.8	10.5	13.5	N/A	15.7	N/A	14.7	21.5	19.1
1973	13.1	N/A	N/A	10.8	10.3	13.6	N/A	15.6	N/A	14.3	21.1	19.1
1974	14.2	N/A	12.6	10.9	10.8	15.0	N/A	15.4	N/A	14.9	19.6	20.3
1975	12.6	N/A	11.9	10.5	10.5	13.1	N/A	15.0	N/A	14.5	18.8	18.7
1976	12.3	N/A	11.8	10.1	10.2	13.0	N/A	14.6	N/A	13.8	19.3	18.2
1977	12.7	N/A	11.9	9.8	10.8	13.6	N/A	14.4	12.4	13.2	19.8	17.6
1978	12.2	N/A	11.5	9.7	11.0	13.5	N/A	14.1	10.5	12.7	18.6	17.4
1979	11.8	N/A	11.2	9.7	10.2	13.4	N/A	13.8	10.0	12.6	18.6	16.8
1980	11.4	11.0	9.7	9.4	12.6	10.5	13.4	15.8	12.5	17.7	17.7	14.1
1981	10.8	11.4	9.6	8.6	12.9	10.4	12.8	9.7	11.7	17.4	16.0	13.6
1982	10.8	11.4	9.3	9.0	11.0	10.0	12.1	9.8	11.5	16.3	15.3	13.0
1983	10.4	11.2	9.1	8.8	11.0	9.8	11.6	8.8	11.2	15.7	14.9	12.7
1984	10.3	11.1	8.6	9.0	11.1	10.3	10.9	9.1	10.9	15.2	14.7	12.7
1985	10.4	11.0	0.6	9.2	10.8	9.0	11.0	9.2	10.7	14.7	14.5	12.6
1986	10.1	10.9	8.6	8.6	11.2	9.7	11.1	9.3	11.1	15.2	13.9	12.9
1987	9.7	10.7	8.4	8.2	11.8	N/A	11.4	N/A	11.6	15.2	13.6	13.0
1988	9.6	10.6	N/A	7.4	N/A	N/A	N/A	N/A	N/A	15.3	13.4	N/A

(1) Taking account of Purchasing Power Parity
Source OECD : Education expenditures, coast and financing trench analysis, 1970-1988

governments towards higher education. This comment is particularly important in that European institutions are strongly encouraging the development of higher education and the mobility of European students by the implementation of EC programs. Three trends have developed over a long period (1970-1988): the trend characterised by Portugal which made a major effort in its higher education and with an average ratio over this period of 11.4%, the trend in Ireland, Greece and Italy where the ratios were between 5.5% and 7.3%, and finally that typical of other countries with ratios of between 1.5% and 2.1% which appears to characterise an apparent maturity of financial efforts made for this level of education.

In as much as higher education is increasing in all countries studied, this would appear to mean that - still using the Purchasing Power Parity method - it is difficult to place real expenditures in a genuine continuum; there are signs of individual efforts (major infrastructure or education projects) succeeded by periods of stability. Faced with the importance of the challenges to countries, it may be important to consider the public financial effect dedicated to higher education within a long term view essential to its efficiency. Unfortunately, measurements of this efficiency can often only be made based on economic and social results observed several years after the expenditures were made.

The catching up effort made in education in general is thus confirmed in higher education.

EC POLICIES AND FINANCING

The developed world is inexorably advancing into a qualifications society where everyone seeking secure employment will require a qualification, where activities which in the past did not require special skills or knowledge now require such, and where the unqualified will be largely excluded from the labour market. The Community has taken these radical changes as well as the special needs of the post-1992 workforce into account when it decided on a number of strategic policy actions and programmes.

In this context, the Community has implemented a number of programmes to stimulate and encourage recognition of education and to improve its quality by increasing exchanges of information and experience and encouraging mobility of students and knowledge.

The major EC industrial training programmes are:

- COMETT, which assists with the development of transnational education by cooperation between companies (particularly small and medium sized companies) and universities in industrial and technological fields. COMETT aims to exploit, in particular, the continental dimensions of the Internal Market, plus EFTA, in an area characterised by increasing economies of scale, particularly via transnational, sectoral and regional networks and training projects. The programme has so far financed 7000 training courses, involving 150 000 persons, 10 000 firms, 2 400 universities and 4 000 other organisations.
- ERASMUS, contributing to increased mobility of students receiving higher education with recognition of study credits within the Community, and cooperation between universities (university cooperation programs, the implementation of the "ECTS" (European Capitalisable Credit Transfer System" experiment with a 1990-1992 budget of 192 million ECU.
- LINGUA, designed for the promotion of foreign languages through teachers and relations between students - 200 million ECU for the 1990-1994 period.
- EUROTECNET is an innovation promotion program within the professional training field, taking account of technological transfers and their consequences on employment, work and qualifications. It contributes to the development of new abilities and qualifications. EC support was 7.5 million ECU for 1990-1993.
- FORCE, which provides incentives for institutions and enterprises in the Member States to invest in continuing vocational training and the promotion of wider access to training and development of transnational measures at EC level. It is organised to work interactively with the objectives and actions carried out by ESF (European Social Fund), the EUROTECNET and COMETT programs, IRIS networks. Some 24 million ECU were allocated for 1990-1991, plus 61 million ECU from the ESF.

Note also the existence of:

- EURYDICE, an information network about education within the EC for which the public consists of responsible national, regional and local authorities.
- YOUTH FOR EUROPE which facilitates student exchanges.
- YOUNG WORKER EXCHANGES (18 to 28 years old), designed to complement and enrich their professional training in other Community countries.
- IRIS, European youth training program network.
- PETRA, an action program for training and the preparation of young persons for adult and professional life (transnational partnership projects, youth initiation projects). This program had a financial budget of 40 million ECU for the 1987-1992 period.

OUTLOOK

The above information and comments raise a number of questions about future developments in this sector.

The first development initiated throughout the Community concerns developments in higher education. In this respect, it is worth mentioning the obligation of European education systems to:

- increase the proportion assigned to scientific and technical programs in order to satisfy the needs of senior technicians and engineers in the various economic sectors;
- increase relations between these economic sectors by making more use of engineers and research workers from industry in education or by increasing common projects;
- search for more harmonisation projects between universities and countries, while maintaining individuality, on syllabuses and teaching programs in order to improve collective vitality.

Some progress has already been made in these various fields, and this must not be only increased and consolidated, but also made better known and shared; the various EC projects contribute towards this.

The second development concerns globally improving the efficiency of education systems. It is obvious that this efficiency may be measured individually by granting diplomas; in reality its effect as an investment will be felt throughout the subsequent career.

A major effort must be undertaken concerning these two dimensions in order to integrate all education techniques as far as possible (remote education, interactive computer assisted education,...), to allow teachers to concentrate more on their main objective: to take the necessary steps to ensure that future workers learn how to learn and make a self-training effort that will stand them in good stead for self-adaptation throughout their professional careers.

Related to the above point, and taking account of actual difficulties generated by viscosity in the education system related to the labour market and resulting in about 15 million unemployed in 1990 (annual average), there is a more and more urgent need to make efforts in two directions. For the young, methods of reinserting them into school activities (giving them the opportunity to approach, or to be comparable with those that have been able to follow standard syllabuses), or to include them in training programs to make them operational and satisfy the needs of various economic sectors. Major efforts have been made, frequently encouraged by the necessity to cope with practical situations and with a real concern for foresight. For other job seekers who have already had a professional activity, experience has shown that reconversion problems are better solved when they are anticipated.

The example of a number of companies who have implemented reconversion operations (possibly leading to diplomas), sometimes months or years before a reduction in the workforce materialises, demonstrates the benefits of formulas which undoubtedly require public assistance, but also a confirmation of their will and commitment.

Finally, we should emphasise the influence, which will increase in future years, of the arrival into the secondary education systems of the smaller numbers of students currently in the primary education system. The question of a reorganisation or redeployment of infrastructures and teaching facilities and in terms of numbers and abilities of teachers has already arisen in some countries and will arise in others. It is a controlling factor in the ability of all education systems to efficiently manage the situation with respect to the qualitative and quantitative development of higher education. In short, capital education resources and teachers must be provided to match these needs as well as possible, reducing differences between EC countries in order to optimise competitiveness and social harmony within the EC.

Written by: Quaternaire Développement

Health care services
NACE 95B1, 95C1

Spending on health care amounted to 390 billion ECU in the EC in 1991. The sector provides employment for approximately 6.9 million persons. The rapid increases in health care expenditure during the mid-1980s alarmed governments. This resulted in spurious health care cost containment programmes being implemented throughout the EC. The challenge beset today's governments is to contain health care costs, while increasing services, without reducing quality. This implies that some organisational changes and new policies must be made over the next few years. Public and private hospitals for instance are now becoming familiar with efficiency and quality evaluations.
During the 1990s, emphasis will be placed on transferring part of the institutional sector budget to the more cost effective home care and community care sector. In some Member States, there is also still a need for substantial investment in health care. Even in the countries with the best developed health care systems, additional money will be required to provide for services in areas where the system has always been lacking, e.g. full reimbursement of medical supplies for the chronic ill.

INDUSTRY PROFILE

Description of the sector

There are many healthrelated services. They comprise hospitals and clinics, registered nursing homes, special treatment centres, polyclinics, first-aid centres, health centres, dentists, paramedical centres, home medical supplies and nursing services, mobile medical equipment services, leased high nursing care services, primary care provided by general practitioners, specialist medical and surgical cabinets, psychiatric institutions, rehabilitation services, community nurses, chemists, drug stores, pharmacies and parapharma medical supplies services.

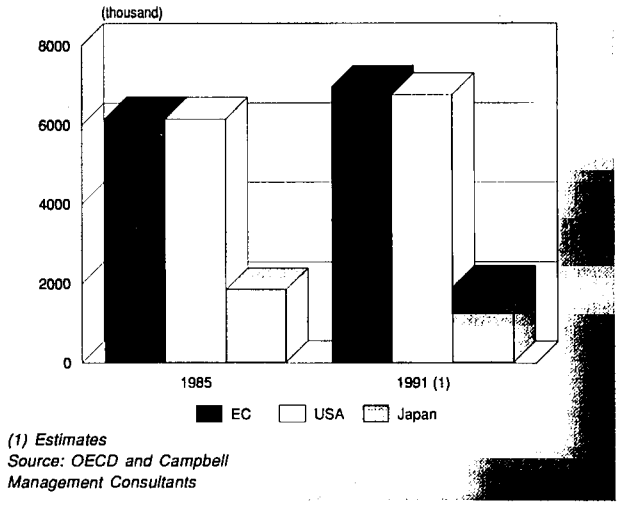
Because of the overlap between health care and social care, it is difficult to draw a line between the two. This also poses a major problem when it comes to assessing health care expenditure. This is the reason why health care expenditure data often differ from one official source to another.

Private hospitals account for an important percentage of institutional care services. Many had their roots as charitable hospitals, founded by religious bodies, when the institutional system was in its infancy. Today many of them are included in national health care plans.

Private commercial enterprises are newer to the system and provide additional hospital, clinic, day centre, and nursing home facilities (in the United Kingdom almost entirely private); they are mainly a result of developments in health insurance paid to private sickness funds or commercial insurance companies. In most European Community countries they are an important part of the health care system, which would be unable to cope without them. In Italy private hospitals are an important part of the hospital system working under convention (law 833/78) within the national health service (SSN).

The home-care and primary care sector in its present form is new. Home-care probably existed before hospitals. Family doctor practices, which provided almost all primary care in the 1960s, are being replaced by health centres. There is also an important trend of specialised physicians leaving the institutional environment and opening practices in the community.

Figure 1: Health care services
International comparison of employment



(1) Estimates
Source: OECD and Campbell Management Consultants

Main indicators

The main sources of revenue for the sector are national public health insurance plans and private health insurance contributions. Organisation of the former is very disparate across the EC. Public health funds are collected through sickness fund agencies (e.g. ziekenfonds and mutuelles), national insurance contributions or by taxation. Private health insurances are paid by persons who opt for additional or alternate coverage to national health provision.

Other sources of revenue are contributions which are not reimbursable, made by patients directly to care providers or drug and medical supplies dispensaries. These payments amount to a substantial sum, and are often unaccounted for in estimations of health care expenditure. In some countries it is not necessary to make payments for most health services whereas in others payments must be made by the patients or their relatives and then reclaimed through sickness funds.

Private health insurances work in a similar way. Sometimes there are agreements between private and publicly owned hospitals to settle accounts directly, and other times the patient must pay directly and then claim from a private insurance body retrospectively.

Day hospital care, enabling the patient to be sent home after a minor operation is slowly spreading in the EC. In parallel, institutions which provide care for chronically ill patients and the elderly have had a sharp increase, corresponding to rising needs of an ageing population. More recently, some public hospitals in France have expressed interest in working with hotel groups. These would provide facilities next to hospital complexes to cater for aftercare of patients who have undergone minimally invasive surgery such as laparoscopic surgery.

International comparison

The EC as a whole spends more per capita on health care than Japan, but significantly less than the USA. Currency exchange rates affect the comparison, however. Expenditures per GDP are also not particularly good indicators of the state of nations' health care programmes, but can be used to show how health care expenditure is developing.

Ironically, the better systems get at treating people with life-threatening illnesses, the more times these people will go through the system. In the 1950s for instance, when many health care systems were at an early stage of development, patients with heart disease, cancer, chronic kidney failure, and diabetes often died early. In the 1990s they can be successfully treated and sometimes cured. The health care system has thus tended to become more expensive, and more difficult

Table 1: Health care services
Main indicators, 1991

	Expenditure (1) (billion ECU)	Per capita (ECU)	Manpower (thousands)	Rate per 1 000 inhabitants
Belgique/België	11.1	1 116	210	21.1
Danmark	5.7	1 113	133	26.0
BR Deutschland	128.9	1 640	2 017	25.7
Espana	20.1	517	520	13.4
France	79.8	1 422	1 480	26.4
Hellas	2.9	289	140	14.0
Ireland	2.2	625	57	16.2
Italia	64.7	1 124	682	11.9
Luxembourg	0.4	1 053	5	11.9
Nederland	17.3	1 165	357	24.0
Portugal	2.9	281	120	11.6
United Kingdom	53.2	924	1 223	21.3
EC	389.2	1 141	6 944	20.4
Japan	150.0	1 219	1 905	15.5
USA	470.0	1 900	6 750	27.3

(1) Estimates
Source: OECD estimates

to fund. Moreover, as more new treatments become available, some requiring high cost technology, there is a greater demand for them, and this adds to the problem of spiralling costs.

However, even with these improvements a large group of people still fail to get full treatment. This is another important measure of health care status. Apparently, a minority of people fail to obtain treatment in some health and social security systems because of their financial income status. Whereas most people receive excellent care, some minorities get virtually none. This applies both to Europe and to the USA.

Health care concerns more than just hospitalisation. Primary care, convalescence and the access to other services such as those offered by dentists, opticians, and aids for the infirm are also very important. There is still a long way to go for some members of European society to have fair treatment. This applies to the chronic ill such as diabetics, ostomates, and incontinent people. Diabetes, the major chronic disease, is often poorly diagnosed according to health experts due to inadequate screening. Recently many national screening programmes have incorporated blood glucose monitoring. However, the majority of insulin dependant diabetics in the EC do not receive full reimbursement for all of the supplies they use, while other, chronic ill, people get the whole or majority of the cost paid by the health care system.

Clearly the very large sum of money involved in health care has prevented some authorities from providing full support. The United Kingdom has one of the best programmes for people with chronic health and hygiene problems in terms allowing them access to necessary supplies free of charge. Some sickness fund based health care systems fare poorly in this area, e.g. those of Belgium and Germany.

Because of these different approaches to health care financing, a large gap has opened between EC countries. The quality of health care varies as a result. The systems with the poorest general performances are those which developed using mainly publicly run national health services. The United Kingdom, a pioneer in national health care provision, was the best service in Europe just after the Second World War. However, by the 1970s, in the hospital environment it began to fall behind standards set by other countries, such as Belgium, Denmark,

Table 2: Health care services
Health care expenditure at current prices

(billion ECU)	1980	1985	1986	1987	1988	1989	1990	1991
Belgique	5.7	7.7	8.4	9.0	9.5	10.1	10.8	11.1
Danmark	3.3	5.0	5.0	5.3	5.4	5.6	5.7	5.7
BR Deutschland	47.5	69.5	75.9	81.2	84.5	87.9	94.1	128.9
España	8.4	12.9	13.7	14.3	16.2	17.8	18.3	20.1
France	36.2	58.7	63.0	64.7	66.3	70.2	75.0	79.8
Hellas	1.3	2.2	2.1	2.1	2.3	2.4	2.8	2.9
Ireland	1.1	1.7	1.9	1.9	1.9	1.9	2.0	2.2
Italia	21.2	37.7	41.0	46.5	50.6	57.5	63.0	64.7
Luxembourg	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Nederland	10.2	13.9	14.9	15.8	16.2	16.6	17.1	17.3
Portugal	1.1	1.9	2.0	2.0	2.2	2.5	2.8	2.9
United Kingdom	21.6	35.1	33.9	35.4	45.1	48.6	48.8	53.2
EC	157.8	246.5	262.2	278.5	300.6	321.5	341.0	389.2

Source: OECD estimates

France, Germany, Luxembourg, and the Netherlands. This is because countries with "reimbursement per act or service" systems have allowed an almost unlimited use of health care resources. Consequently, as the systems required more money, individuals and their employers were made to pay more into it according to demand, not subject to maximum budget constraints.

Foreign trade

Within EC countries and with other countries, it is difficult to assess exports of health care services, i.e. facilities for the benefit of non-residents, when they pay for this out of their own purse. The export of health care services payable by social security organisations within the EC is limited by Community regulations. It includes migrants and patients residing near borders, emergency care during international transits (E111), and where treatment is authorised by the patient's own social security organisation (E112) because it is not available locally. Some centres of excellence rely upon patients travelling internationally to be able to maintain continuous specialty services or further develop pioneering work.

Private clinics provide services for residents of many extra-EC countries. These are either covered by international agreements or individual financing. Often they are due to historic relationships, especially with ex-colonies. Examples include Algerians and Moroccans treated in France, Libyans in Italy, and Latin Americans in Spain. These patients seek particularly the services of highly specialised private clinics which offer superior treatments to those found in hospitals in their own countries. Commonly they are affluent members of societies in those countries.

MARKET FORCES

Demand

Demand for continued improvements in health services mainly by health care professionals is one major reason for cost increases in health care in every country within the EC. This has resulted in improved quality of life and an increased life expectancy of individuals living in the EC, which is the system's main aim.

Health care in the 1990s often makes routine use of technologies unimaginable only two decades ago, and could not have been achieved without sending costs spiralling. Other factors contributing to growth in health expenditure are multiple. Some main ones are: the public seeking more health services from the system, the development of new services including screening programmes, the development of professional personnel in the sector, increased capital investments, and increasing costs of better treatments and medical supplies.

In some countries commercial enterprises are encouraged to participate in the provision of all aspects of health care (includes France, Spain, Germany, Greece, and more recently, the United Kingdom and Ireland). Whereas in others they are prevented by law or de facto from owning hospitals, (includes Belgium, Luxembourg, and the Netherlands). In the other countries (Denmark, Portugal and Italy) commercial clinics have to compete in environments where the major emphasis is on developing national health care through the establishment of publicly owned hospitals.

Private hospital chains probably consider the obvious barriers against them in some countries to be unfair, and not in the spirit of the single European market. Since state monopolies are being dismantled elsewhere the private professional hospitals could consider that they are being unfairly discriminated against.

Any idea that hospitals should be non-profit making, because they may trade quality of service for profits, is also unfounded. The reality is that the latter provide very high quality services, which are often charged "cost plus" to the patient's health insurance company. Many leading physicians work in private professional hospitals. The greatest danger of qualitylapse is more in the public hospital sector where the number of patients seeking treatment is unlimited and budgets are controlled by lump sum allocations.

The control of quality should be a legal one, which is the direction currently being taken in most countries to ensure good practice. Throughout the 1990s the legal profession has increased its participation in discussions and conferences on this subject. Health authorities are having to dismantle some protection they have built up for hospital staff, and make them accountable for all of their actions. In the United Kingdom, Crown protection of the national health service (NHS) is no longer in force; formerly no patient in the United Kingdom could sue the NHS.

Cost containment of health care in Germany was attempted in 1987 when the Bundesrat passed a law to not allow hospitals to have retrospective calculated claims for medical acts. It was thought by many observers that several least efficient hospitals would go out of business after this act. However, most were saved because of oil prices falling. This had the consequence of reducing heating bills, which is an important part of hospital expenditure for hospitals in the northern part of Europe.

Many German hospitals still rely heavily on making profits on the sums they get for convalescence following surgery. Even patients that have been operated on using minimally invasive surgery are kept more than eight days following surgery in most German hospitals, in stark contrast in other countries patients which are treated using the same techniques are sent home after two or three days.

Developments in the United Kingdom are currently providing important opportunities for private enterprises. After many years strongly supporting centrally controlled publicly owned facilities, the conservative government has opted for a system of decentralised power. It aims at achieving greater efficiency by allowing market forces to find some lowest common denominators, and do away with nugatory practices of the civil service based system. Hospitals which can fulfil certain conditions, which prove they can be self-governing, have the option of becoming trusts within the NHS.

Already more than 150 hospitals and other services have become NHS Trusts, and many primary health centres are now fund budget holders on a capitation basis. Services remain available to all, paid for mainly out of general taxation and mostly free at the point of use. Local health authorities are now purchasers of services and hospitals public or private are providers.

NHS Trust hospitals have the power to make all of their own managerial and financial decisions, and must compete for business against other hospitals, although central government is still setting targets for patient waiting lists and national returns on the capital employed. Units providing high quality, value for money, services will be more successful in attracting contracts and funds to provide services for patients.

They may even choose to make subcontracts for some services. If a service offered by private initiative is less costly than the equivalent national health service facility it would be selected. Patients would be transferred from the latter to the former by the budget holder, or by the NHS Trust hospitals' managers.

INDUSTRY STRUCTURE

Companies

There are currently more than three thousand owners of commercial enterprise health care services. Most have been formed

Table 3: Health care services
Distribution of manpower, 1991 (1)

(thousand)	Physicians	Nurses & Midwives	Pharmacists	Dentists	Others	Total
Belgique/België	35.0	63.0	12.6	7.2	92.2	210.0
Danmark	13.6	33.3	1.5	5.0	80.0	133.4
BR Deutschland (2)	280.8	490.0	41.0	55.2	1 149.9	2 016.9
Espana	150.0	175.0	36.6	8.0	150.0	519.6
France	150.0	335.0	55.0	38.5	901.5	1 480.0
Hellas	44.0	28.0	8.4	9.2	50.4	140.0
Ireland	5.0	24.0	1.1	1.2	25.9	57.2
Italia	65.0	225.0	20.0	12.0	360.0	682.0
Luxembourg	0.8	1.0	0.3	0.2	2.2	4.5
Nederland	36.8	100.0	2.2	8.5	209.7	357.2
Portugal	29.0	28.0	12.7	0.8	49.5	120.0
United Kingdom	125.0	425.0	12.6	20.5	640.0	1223.1
EC	935.0	1 927.3	204.0	166.3	3 711.3	6 943.9
Japan	225.0	725.0	85.0	75.0	795.0	1 905.0
USA	635.0	1 725.0	170.0	155.0	4 065.0	6 750.0

(1) Estimates
(2) Includes former East Germany
Source: OECD and Campbell Management Consultants

by small groups of medical professionals. In Italy there are almost 700 owners (natural and juridical persons) of commercial enterprise health care services. However, bigger investors are getting involved. This started with health insurance companies, and has gone on to include all types of company from capital venture groups to water companies. Several private hospital chains run by financial groups with money from finance centres or insurance companies have been established within the EC.

The largest EC private health care group is the French chain Compagnie Générale des Eaux which owns 60 institutions. With Clinivest and Alphamed this chain owns almost 7% of all private clinic beds in France. Through its subsidiary, American Medical International, it has acquired 18 institutions located in England.

The combined turnover of more than 435 million ECU placed CGE just ahead of the British company, BUPA. BUPA had a turnover from health services of just over 290 million ECU in 1991. BUPA has expanded its health service and insurance operations in Spain through its newly acquired subsidiary, Sanitas which had a turnover of 245 million ECU in 1991 .

REGIONAL DISTRIBUTION

The EC health care institutional environment contains a panoply of facilities. They have the titles hospital or clinic. They range from large high tech purpose-built hospitals to an older generation of hospitals housed in buildings of a bygone age (sometimes even former workhouses). Clinics vary in character. Often they are indistinguishable from hospitals (sometimes they are prevented by law from being called hospitals).

It would be inaccurate to say that private clinics are generally inferior or subordinate to public hospitals. Where inferiority exists, it is often one of size or the variety of services. However, many well equipped major facilities in Europe are privately run.

Hospitals have obtained fair compensation per medical act or for bed occupancy from the health (or sickness) insurance funds. In these systems, most health care costs are funded through employees' and workers' and their employer's health care insurance contributions. Individuals who are self-employed are encouraged to cover themselves adequately for hospitalisation for which there are sometimes obligatory minimums, and primary care coverage can be optional.

The sections below describe the health care industry structure by country.

Belgium

All private hospitals in Belgium are non-profit making. They compete on an equal footing with publicly owned hospitals. Most were founded by religious bodies. A minority were started by groups of doctors or associations. Private "for profit" hospitals have been largely forced out of the system by hospital funding regulations which prevent them from benefiting from state subsidies for equipment and construction.

Considerable investments have been made to rebuild the Belgian hospital system. The average size of hospitals has increased. This is largely due to a cost containment measure, taken by the Ministry of Health and Social Affairs in 1987, to close the smaller hospitals. At primary care level the general practitioner's coordination, the Yellow and White Cross association and others offer community nursing services. Paramedical and primary care services are increasingly being organised by private professional groups.

In Belgium, hospital physicians, general practitioners and specialists in the community are paid on a fee basis, which can be fee for service or a fee per capita. Some physicians choose to supplement their income from hospitals by running their own cabinet in the community. Other hospital staff are salaried. Sick fund societies manage reimbursement claims for most of the population.

Self-employed have the choice of whether they wish to have full or partial coverage. Companies in Belgium are increasingly offering group insurances to their employees as perks. This allows extra hospital costs, such as private rooms, other comforts plus all non reimbursed medical products, to be recovered by the insured.

Luxembourg

Approximately 40% of the private hospitals in Luxembourg are not "for profit" enterprises. Private health insurance in Luxembourg amounts to a few percent of the total health care expenditure. Hospital staff are employed on a salary basis, whereas general practitioners work on a fee per act basis.

The public also uses the services of some hospitals in countries surrounding Luxembourg, particularly Germany.

Denmark

Denmark has a national health service funded by general taxation. Practically all treatment is provided by publicly owned hospitals. There is one private hospital and about a dozen of X-ray clinics under private control. The private insurance market has declined because practically the whole population have their complete hospital costs paid. Most primary care is provided by general practitioners. Most work in group practices. Hospital personnel are salaried whereas medical professionals working in the primary health sector charge fees per act.

France

France, which has the largest number of private hospitals in Europe, also has the greatest number commercial enterprise private hospitals. About half the country's health provision comes from the "cliniques privées". Of the approximately 200 000 beds in the private hospital sector roughly 54% are owned by commercial enterprise (2% of these are psychiatric institutions). Private hospitals tend to be much smaller than public hospitals in size, and it has often been said they are less intimidating for some people.

The French state's commitment to the national hospital programme has been to establish public hospitals (centre hospitaliers) in every major town in France. About 40 of these are very large complexes with university affiliations. Public hospitals are autonomous and can try to borrow money from private companies for capital investments. They often apply for government subsidies when they run into liquidity problems.

Private hospitals tend to concentrate on offering specific therapies which provide sufficient profitability. This is illustrated by the very low percentage of long stay beds in the private sector. But there is a trend to increase the private sector in this area. The data for medium stay patient entries, from the Ministry of Social Affairs and Employment, shows that more patients are treated in private hospitals than in public hospitals.

In France, hospital doctors can be salaried or charge fees per service for their services. Many work for several establishments simultaneously, and some also practice in the community. However, the level of fees they earn is regulated for about 95% of them. Practically every person in France is covered by health insurance. Some workers pay into additional health insurance schemes to have full reimbursement for all services.

Germany

The state and local governments account for less than half the hospitals in Germany. Private hospitals compete on an equal footing. They obtain funds through a dual financing system. Funds for capital items are provided by the state and local governments, and other income comes from earnings against treatments. These are agreed between hospitals and local sickness fund organisations. This is calculated on a sum per day basis. Many hospitals, public and private alike, compete for specific surgery or medicine services.

Less than a third of the German private acute care hospitals are commercial enterprises. Many are small and specialised clinics. There is an evolution in the number of parapharma hospitals run by commercial enterprises. The private sector is now expected to rapidly develop home-care services. Home dialysis, including nursing assistance, is now provided by medical supplies companies.

Almost seven million Germans (roughly 10%) were covered by additional private insurances in April 1990. The number was five million in 1985. The health care system is financed by sickness fund associations, private insurance and state and local government. Hospital doctors are either paid salaries or fees per medical procedure or surgical act; the hospital they work for decides its payment policy. General practitioners charge fees which vary according to the nature of the service they are providing, on a fee per act basis.

Greece

Greece has a health insurance system which is similar to that of Portugal. Approximately 95% of the population are covered by an insurance fund. There are 35 funds. With these funds there are four major ones. The largest is the IKA (2.56 million employees and workers and 2.62 million of their families). Second is the OGA (1.91 million agricultural workers and 0.59 million of their families). TEBE follows (0.48 million artisans and 0.82 million of their families), and the government has the fourth largest fund (0.19 million directly insured plus 0.27 of their families and retired civil servants). Voluntary hospitals, private clinics are licensed to provide additional health care services. Provision of health care in Greece is improving.

Ireland

Ireland has a national health care service which covers its entire population. One fifth of the population is covered by additional private health insurance besides national health insurance. In recent years the Irish national health care service has made efforts to contain health care costs. Ireland's very young population has a very different demand to that of countries with older populations. Instead of geriatric facilities it needs paediatric centres.

Italy

The Italian National Health service came into being in 1979, replacing a sickness fund service. Sickness fund offices still have an involvement in collecting contributions for old-age pensions, but sickness social insurance INPS (Istituto nazionale previdenza sociale) is the only state organisation entitled to collect contributions. Health care is organised on a regional level. Of the private hospitals, 90% are agreed by the national health service to provide services to national health service patients. They work within a convention made by local health units (USL).

An Italian law of December 1991 requires that there are 6 beds per 1 000 inhabitants, of which half a bed allocation must be for rehabilitation or long-stay. The standard applies to public and private hospitals. But private hospital bed numbers are calculated at 50%, not to reduce too much of the system's flexibility assured by their essential contribution. These private hospitals are paid on a daily rate basis and must be profitable to continue.

Italian private hospitals that are accepted in the plan are reimbursed by local health units for services that they provide to patients insured under the national health service plan. By law this payment should take 90 days to be reimbursed. However, payment can take seven months in some areas of the country. Private insurance patients are a valuable source of additional funds of free private hospitals and clinics. The 10% of private health care institutions providing specialised and general acute care treatments are licensed but not within the convention to provide services within the Italian national health service plan. These hospitals have to conform to the laws in force to be licensed, but not those concerning conditions settled to obtain a convention with a local health unit.

They are expanding because the average Italian is increasing private health care coverage. There are approximately 1.5 million private policies providing coverage for approximately 3.7 million people. Generali is the main insurance group involved in the private insurance system in Italy. It accounts for roughly 14% of private policies. RAS, SAI, and Fondiaria have respectively 9%, 7% and 5%. The remaining policies are divided among many insurance companies.

Netherlands

Health care in the Netherlands is decentralised and organised to a large extent by sickness funds and local authorities. There are more than 70 of these. Public and privately owned hospitals operate under the same conditions. A part of their budget is given by the Ministry of Health, and the rest is from reimbursement given by ziekenfonds (sickness funds).

Nearly half the health care services in the Netherlands are voluntary or religious; the latter, although called private, are not commercial enterprises. Most new major private hospital investments have been made by Dutch universities. Community care is provided mainly by the Cross Associations (private and religious in character) which run many nursing homes (verpleeghuis).

The Netherlands has the most developed nursing home system in the EC. General practitioners provide most primary care. They are nearly all self-employed. Some have grouped to form health centres, and obtain subsidies from the central and local governments. Not every person has the same rights concerning coverage. Persons with higher than average incomes are not entitled to full reimbursement by the national system; however, their hospitalisation is mostly free of charge. As far as payments go fees and costs of products must be paid by the patients, but most are recoverable from the ziekenfonds retrospectively. Reimbursement rules also vary from one locality to another.

Portugal

The Portuguese health care system is largely run by the public authorities. In the 1980s significant investments were made in upgrading the hospital sector. Several new major hospitals were built during the 1980s to ensure the Portuguese population a health service comparable with the rest of Europe. Private hospitals contribute about 20% of the total number of beds which amounted to about 54,000 in 1990.

A significant number of hospital beds in the Portuguese private clinic sector belong to institutions of religious and social security character. Some specialised services such as dialysis centres have been set up by private companies, e.g. WR Grace; these do not have beds. More than 200 health centres and more than 1 500 medico-social clinics provide the country's primary care services.

Spain

Hospital ownership in Spain is divided between several owners. The major publicly owned hospitals have either regional or municipal status. These are supplemented by private hospitals owned by the Red Cross, universities, religious concerns and private companies. The number of private hospitals is much greater than the number of public ones, however, in terms of bed numbers they account for only about one third.

Private enterprise hospitals in Spain, of foreign and local ownership, account for about 15% of all beds. Many have closed since the late 1980s owing to the Ministry of Public Health and Social Security's policy to make the public hospitals more efficient by increasing bed occupancy rates. However, this has allowed many new investors to establish themselves by buying up failing private hospitals.

Towards the end of the 1980s the British private health group, BUPA (a provident society), decided to invest in Spain. It owns, Sanitas, one of Spain's major private health care groups. Another major group is the 'La Alianza' hospitals in Catalonia.

Physicians in Spain are paid salaries or fees per service. There is a well developed family doctor establishment, working either for the social security or the state. Primary care is also provided by private centres, emergency centres, outpatient clinics. Some dialysis centres are run by commercial companies, and the Ministry of Health and Social Security allows companies to provide a peritoneal dialysis home service on a fee per day basis.

United Kingdom

The United Kingdom has a national health care service which provides for the whole British population. Its public sector is going through a process of decentralisation of hospital management, by offering many hospitals 'trust status'. The private and not "for profit" (independent) sector is now able to compete for services against publicly owned hospitals.

BUPA, Britain's largest health insurance company (with about 50% of the UK's private health care market), has increased its scope. Besides offering health insurance for private treatment it now has its own hospital and nursing services. The independent sector comprises some charitable institutions, private enterprise hospitals and nursing homes. Among others manufacturers of commodity products such as alcoholic beverage and hotel groups are participating in the rapidly growing registered nursing homes' sector, which caters for Britain's old and infirm.

Primary care in the United Kingdom is being organised into health centres. These are rapidly replacing single practices. Most general practitioners are paid fees on a per capita basis, but a few are salaried. However, in health centres they can also apply to the become fund holders. This allows the doctors to keep budgets and select where their patients should go for treatment.

Medical supplies companies offer services such as home parenteral nutrition, and peritoneal dialysis, e.g. Baxter Healthcare and Fresenius. Baxter also owns some dialysis centres through a subsidiary company.

REGULATIONS

Laws forbid hospitals to make profit in Belgium, the Netherlands, and Luxembourg. There are no very small private cooperative hospitals in Belgium or the Netherlands either. This is because Belgium has a regulation which says that the minimum number of beds a hospital may have is 150. It must also provide a certain minimum in terms of the scope of services. In the Netherlands hospitals must have a minimum of 180 beds, unless they are within 15 km of another hospital, whereon they must have a minimum of 120.

In Italy private hospitals are accepted within the national health care hospital plan which works according to a convention of six beds per 1 000 patients per annum. This is not aimed at limiting short-term treatments, but at controlling the number of beds in areas. It served to reduce the number in areas of over capacity upon its inception. Private hospital beds are counted at only 50% because their presence is judged essential. This rule may seem out of place within the next few years as laparoscopic surgery and other minimally invasive therapies replace traditional surgery which required more time to convalesce.

Private clinics in Greece, which account for about one fifth of the country's health care expenditure, are facing a law which threatens to close about 95% of them according to the Greek private clinic association. Greek law forbade the establishment of further private clinics between 1982 and September 1990. The same law prevented existing clinics from increasing their number of beds.

For economic reasons, Greece's private clinics had to reduce their overall bed number by 8 000 beds to become 15 512 beds by the end of 1982. During this period the public hospital sector only increased its bed number by 2 900 beds. The law, since December 1991, authorises the establishment of new private clinics, but the minimum requirements of services which must be provided are roughly three times greater than those before the embargo.

The investment necessary, being so large, resulted in no new registrations before June 1992. The current private clinics must also increase services to meet the new standards within 18 months of the December 1991 law.

The CEHP, UEHP, and UIHP would like to see more freedom for patients to seek hospitalisation at a hospital of their choice within the EC. An obvious problem is the disparities existing among health insurance systems within the 12 Member States. In the short-term it is unrealistic to expect someone in Portugal to make the same contribution to health insurance as someone in Germany.

It is also unrealistic to accept massive movements of patients within the European Free Space until greater equality of health provision has been achieved. On the other hand patients should not be prevented from seeking treatment anywhere in the EC, and having their national health insurance cover considered. Agreements already exist between countries, although these contain cumbersome administration formalities and restrictions for the main part.

OUTLOOK

In the early 1980s governments in Europe and the USA began closer monitoring of the mounting costs, and most instigated health care cost containment measures. These have affected many aspects of health care provision programmes. In particular they have led to rationalisation of some services and greater control of expenditure by increasing public institutions' expenditure. Circumstances vary importantly from one country to another, and demand is tied to factors such as age structure and general nutritional status of a population.

Future demands on health care systems will depend on these two factors very importantly, among many others. By 1990 a great deal had been learnt about controlling health care costs. One major finding was that the systems needed better management. This management needed to focus on value for money. The idea is being developed even further.

Another important consideration is that deinstitutionalisation can bring benefits to patients able to convalesce at home; it allows them to recover in their own often more agreeable surroundings and hence reduces institutional costs significantly. This is at an early stage of development in Europe. In contrast, the USA it is at an advanced stage of development.

Changing policies of health ministries will increasingly allow private enterprise to become involved in the provision of certain health-related services, although they are not being given the same consideration in every country. The clearest example of a country with a very positive interest in the development of the private health care sector is the United Kingdom's NHS. It is undergoing the most radical change since its formation. The idea of "money following patients" is a radical departure from earlier arrangements. The other major EC countries, Italy, France and Germany all appear to favour the development of private health care.

Evidently, privately run health-related services are increasing in scope and also in number. A new direction for private enterprises will be to examine niches opportunities in the acute care sector. They would protect their stake by investing in the best technology available.

Health care services need not be stationary structures, nor do they need to be capital intensive. A good example of the former is the mobile screening service of BUPA in the United Kingdom. The General Electric Company has participated in a similar venture in Germany. Smaller scale hospitals can achieve savings by hiring the services of mobile units. This may be a good business strategy for the short-to-medium-term, but could have limitations in the longer-term if there is a concerted trend toward closing small hospitals.

On the other hand, home intravenous therapy and peritoneal dialysis programmes organised by medical supplies companies Kabi Pharmacia, Baxter, and Fresenius, appear to have better longer-term potential. The home-care sector, which is only at its initial stages of development, will continue to expand in the EC.

A new peer infrastructure is needed for doctors, and it may be difficult to change professional habits. Some hospital physicians will not wish to temporarily pass the control of some patients to doctors in the community, while the patient is still under the care of the hospital. It may also be difficult for some physicians to accept to place high-tech medicine in the hands of primary care doctors and community nurses.

The primary health care sector will need a good overhaul to cope with secondary care. There is a need for greater professional competence at community level. Some retraining will be necessary. Doctors in the community will need to have greater contact and guidance from central hospitals. Dismantling more of the institutional structure and consolidating it into larger units will continue to be met with resistance by hospital personnel.

The idea of having large supra-regional centres of excellence supported by many dependent hospitals has a great deal of merit, but small specialised surgery and medicine clinics can also play an important role. The private sector will continue to invest in the expansion of registered nursing home facilities across the EC. More than 100% growth can be expected in this service over the next five-year period.

The UEHP states "the European private hospitals', clinics', and nursing homes' sector must maintain and strengthen its commitment to provide its patients with the high quality medical technical and human assistance, performing quality control and revision (quality assurance) within its structure, according to standard methods designed to guarantee homogeneous results".

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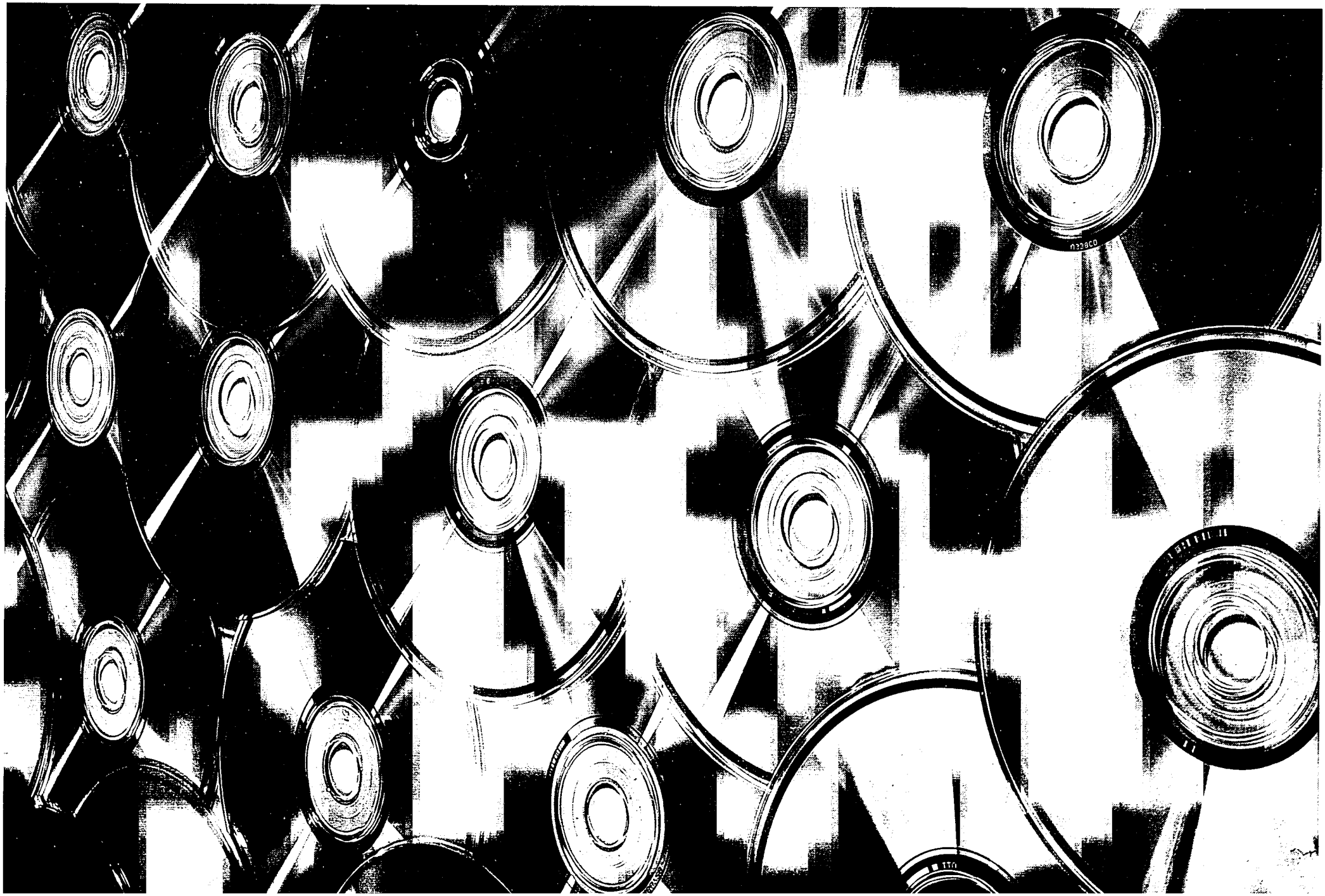
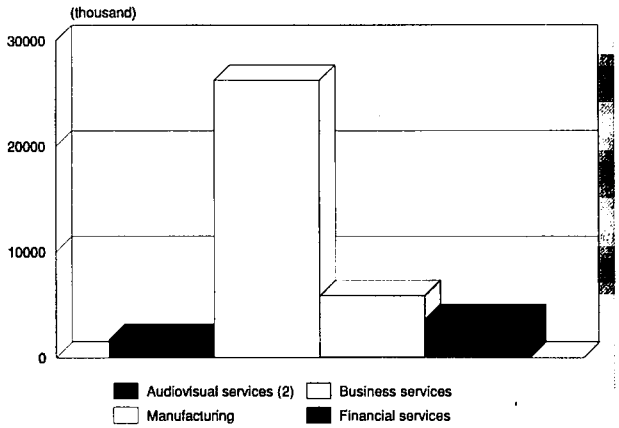


Audiovisual services
NACE 971, 972, 973, 974, 345.2

While the European audiovisual industry exhibits continued growth, this performance varies widely from country to country. The rapid expansion in recent years of southern Europe continues, yet Europe as a whole registered problems in 1991.
The proliferation of television channels exacerbated the problems of some countries and led to increased US programme content. The European production sector appears unable to benefit from global market growth: cinema attendance figures are declining, and some countries have had to introduce special measures to combat the problem.
Europe's audiovisual hopes are now pinned on High Definition Television (HDTV) and multimedia developments. In both instances, Europe's future depends on countries being able to pool their product and market strategies coherently. Europeans will have to learn to cooperate, especially by developing audiovisual production partnerships.

Figure 1: Audiovisual services
Employment compared to selected sectors, 1990



(1) Excluding Italia
(2) NACE 97
Source: Labour force survey's, Eurostat

INDUSTRY PROFILE

Description of the sector

Audiovisual products can be defined as images and sound put together and recorded or transmitted for the entertainment, information and/or education of the consumer. They take various forms, from reels of film to video-cassettes, and include radio and TV programmes.

The audiovisual sector thus groups four main sub-sectors: film production (NACE 971); film distribution (NACE 972); cinemas (NACE 973); radio and television broadcasting (NACE 974). The music recording sector, although being part of NACE 345, is also considered within this chapter.

The already close links between these sub-sectors of the industry have intensified over recent years. A film - usually developed for the cinema and, as a result, a product aimed at that sub-sector - can extend its life-cycle via broadcasting, perhaps several times, on television and by being recorded on video-cassette.

The speed with which a motion picture moves from one medium to another obviously depends on agreements between the cinema sub-sector and television. Another factor entering into the equation is how many homes are equipped with recording hardware (VCRs). The emergence of pre-paid specialised channels and subscription and cable channels (such as Canal+) has changed the negotiating balance between the cinema industry and television, and has led to cinema/TV co-productions (as in the case of Channel 4 in the United Kingdom).

Main indicators

The global market for the audiovisual industry, including equipment and services, was estimated in 1990 at about 195 billion ECU. Average growth at constant 1990 prices was 6.5%. Audiovisual equipment (such as television sets, compact discs and VCRs) represents the bulk of this total, accounting for 54% of the whole.

On the services side - which is the prime focus of this study - TV broadcasting recorded a turnover of about 82 billion ECU in 1990, outpacing the film industry, whose share was only 4% of the world market. This pattern, repeated and reinforced over the last five years, seems to be becoming more pronounced.

The annual growth rate in cinema receipts - 1% between 1985 and 1990 - trails TV receipts, up 7.4% a year on average over the same period. In the short term, the trend towards cable, satellite and specialised channels will only exacerbate the difficulties faced by the film industry.

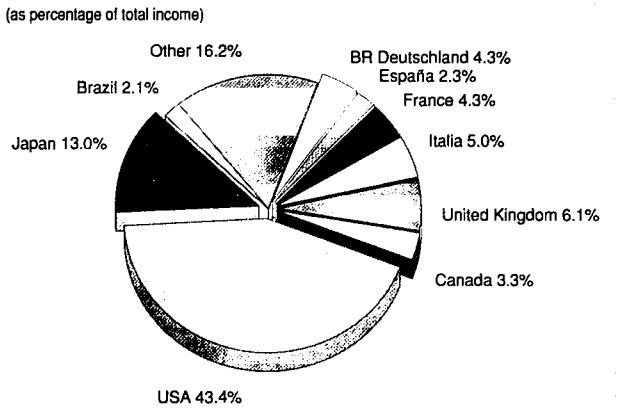
Recent trends

Continuing change over more than a decade has totally transformed the European audiovisual sector. Virtually total deregulation of the sector has led to a proliferation of TV channels, an increasing supply of programmes and radical changes in conventional financing methods. Advertising revenue has gradually taken over from licence-fee income.

In the past ten years, as many new TV channels have come on stream as during the entire previous history of the industry. By the end of the 1980s, commercial channels outnumbered public channels.

These two events have conspired to provoke a major upheaval in the European audiovisual sector. The number of hours of

Figure 2: Audiovisual services
Share of income by country, 1990



Source: OMSXC

Table 1: Audiovisual services
World market in audiovisual equipment (1)

(billion ECU)	1985	1986	1987	1988	1989	1990
BR Deutschland	7.59	8.89	9.89	10.24	10.26	10.34
España	1.86	2.09	2.38	2.73	2.88	2.91
France	5.62	6.55	7.30	7.45	7.71	8.34
Italia	3.91	4.45	4.93	5.25	5.50	6.17
United Kingdom	5.66	6.03	6.10	6.22	6.79	6.58
Japan	10.98	12.98	16.12	18.55	19.13	19.40
USA	28.22	30.79	31.43	32.33	32.79	32.74

(1) 1990 constant prices
Source: OMSYC

programming necessary to meet market demand has multiplied tenfold over the course of several years. Nevertheless, this growth in the number of channels has not fed through to growth in programme production. In effect, the principal beneficiaries of growth in the number of channels have been US programmes which have been exploited in subsidiary European markets. It is anticipated that European programme production will not benefit from the knock-on effects of increased programme demand until the viability of the new channels has been firmly established.

It must be noted, however, that the scarcity of international-class programmes being produced is a contributory factor in Europe's trade deficit in this area.

Some of the characteristics of TV production work against its diffusion on a large-scale: non-reproducibility; low productivity gains; more support for new technical media than for production per se; a short-lived product which in many cases does not outlive its first broadcast (news programmes, game shows); pre-production methods of financing which discriminate in favour of programmes which are a priori profitable; and prohibitive redistribution costs which favour imported products. These few observations help explain the low level of internationalisation of European productions.

In practice, it is rarely easy to opt from the start for production on an international scale, given that producer and distributor are both confronted by obstacles common to most countries: language on the one hand and, on the other, consumption patterns such as the optimal length of TV films or the optimal number of episodes in a series, and so on.

European co-production could represent an extremely short term remedy to production shortfalls, but this is by no means easy to put in place. Experience has shown that groups which are accustomed to autonomy and non-accustomed to cooperation often experience difficulties in working together. What is more, the success of a TV film in the ratings will more often than not hinge on its leading characters: finding stars who are identified as such in all European countries - let alone in the entire world - is a daunting task.

MARKET FORCES

Demand

Changing consumption patterns across Europe are linked to changes in penetration of audiovisual equipment into the average household. Europe leads the USA and Japan as a potential market for audiovisual equipment but, predictably, there are marked differences between countries. The French and Italian markets, for example, are much less dynamic than those of Germany and the United Kingdom.

In terms of the different kinds of equipment, video-based hardware, especially camcorders and VCRs, is the fastest-growing. Increasingly, integrated VCRs are sold with new TV sets.

European households are approaching saturation point for many items of equipment. One result has been changed patterns of televisual consumption. As other, currently less well-equipped countries see this pattern emerge in the years to come, there will be a degree of market homogenisation which will serve only to intensify the problems facing the European cinema industry. To put it another way, cinema and television will be brought closer together through co-productions or broadcasting agreements.

The advent of HDTV must be viewed as a threat by the film industry. Image quality and stereo sound will reinforce the current tendency to consume cinematographic products at home -all the more so as the number of available channels continues to grow.

Table 2: Audiovisual services
World market for VCRs (1)

(million ECU)	1985	1986	1987	1988	1989	1990
BR Deutschland	958	1 210	1 445	1 273	1 280	1 265
España	299	361	393	448	487	534
France	550	715	1 068	1 084	1 076	1 233
Italia	180	463	707	856	958	1 218
United Kingdom	1 029	1 280	1 257	1 320	1 218	1 076
Japan	1 964	2 561	3 441	3 543	3 323	3 142
USA	3 229	3 472	3 315	2 836	2 600	2 734

(1) 1990 constant prices
Source: OMSYC

Table 3: Audiovisual services
Total income of TV networks (1)

(billion ECU)	1985	1986	1987	1988	1989	1990
Europe	10.91	12.26	13.52	15.18	16.37	18.07
North America	30.48	32.64	34.18	36.00	36.79	38.42
Japan	8.57	8.74	9.38	10.13	10.38	10.68
Rest of world	7.52	7.86	8.85	11.13	12.96	15.05

(1) 1990 constant prices
Source: OMSYC

Television

The television market is made up of: terrestrial broadcasts, cable transmissions and satellite television. Within these sub-sectors, a distinction must also be made between public TV on the one hand and commercial channels on the other.

The European market represents approximately one-quarter of the global income of TV networks, trailing far behind North America (46.7%). European growth rates, however, are more healthy. Italy and France, both of which have recently experienced major deregulation, have seen their respective shares of the world market grow by 18.9% and 17.5%.

Europe is the market that has evolved most rapidly over the last five years. With average annual growth of 10.6%, it is far ahead of North America (4.7%) and Japan (4.5%). Europe's market share has risen from 21% in 1985 to 25% in 1990.

Other regions such as China, Latin America and India have also grown at the same time. Satellite distribution has spawned new markets with large numbers of potential consumers; in the long term, this could drastically change the economies of production and lead to a further internationalisation of consumption in the form of an increase in co-productions.

Most income - even these days - is generated by terrestrial broadcasting. In 1990, cable TV garnered only 20% of total income. However, this pattern is likely to shift in the years ahead, nowhere more so than in Europe, where the number of channels is increasing rapidly. Income generated by cable TV is growing at double the rate of income from terrestrial networks. The structure of TV financing has also altered as terrestrial networks evolve and monopolies and duopolies are replaced by a market economy. Advertising has become a key source of income: even some public networks have had to resort to it, applying the same economic arguments as their commercial counterparts. This has inevitably triggered debate on the role of public television in the case of those public channels whose output is virtually indistinguishable from that of commercial broadcasters; France's A2 (public) and TF1 (private) channels are a case in point.

Since 1988, public financing has accounted for some 20% of total funding, including taxes or licence fees in countries where those exist, as well as government credit and regional contributions. It follows that advertising is the principal source of funding for these channels. In the case of encoded subscription channels such as Canal+, the financial structure is, of course, entirely different, since it is primarily dependent on fees paid by subscribers. In 1990, Canal+ income was, for the first time ever, greater than the total amount of licence fees paid in respect of all the public channels in France.

The share of public financing shows a pronounced downward trend in almost all European countries. In 1990, terrestrial channel income rose slightly more than 10%, whereas public financing rose only 4%.

Cable television

Overall, cable TV in Europe has grown slowly and revealed wide differences between countries. Three countries seem particularly dynamic in this respect: Germany, with almost 7 million households connected in 1990; the Netherlands (4.1 million); and Belgium/Luxembourg (3.2 million). With the exception of Switzerland - which, with 1.6 million subscribers, features in the list of top European cable TV countries - all the other European countries are in what can best be described as an intermediate situation, with development prospects which are more or less promising.

In this context, France is perhaps a special case: although the possibility of supply already exists, demand has yet to emerge. In October 1991, from a total of 3.8 million available connections, only some 20% (700 000 subscribers) were connected, far below the penetration rate of the encoded Canal+. It seems that the successful privatisation of TF1 and the commercial success of Canal+ have failed to encourage French viewers to move to cable. The 1992 target of two million new cable subscribers will probably not be met, even if current growth rates do testify to increasing interest.

The proliferation of cable channels has had a clear impact on household demand for programmes. In most European coun-

Table 4: Audiovisual services
Public financing of channels (1)

(million ECU)	1985	1986	1987	1988	1989	1990
BR Deutschland	1 469	1 477	1 500	1 508	1 485	1 524
France	699	707	573	597	621	754
Italia	903	958	1 037	1 060	1 123	1 249
United Kingdom	1 202	1 210	1 233	1 249	1 273	1 288
Japan	1 964	1 980	2 003	2 019	1 987	1 972
USA	299	306	314	314	306	314

(1) 1990 constant prices
Source: OMSYC

Table 5: Audiovisual services
Individual satellite receivers

(thousand)	1988	1989	1990
BR Deutschland	20	35	50
España	16	23	30
France	10	37	65
Italia	N/A	N/A	5
United Kingdom	18	54	290
Japan	600	920	1 550
USA	2 000	2 400	2 750

Source: OMSYC

tries, cable has expanded considerably, posting growth rates in excess of 30%. France and Germany lead the field in this respect, with average annual growth from 1985 to 1990 of 93% and 35% respectively (although the actual number of households connected remains undisclosed). Germany seems to have the most cable subscribers, with some 10 million in 1992; this compares with an aggregate of some 15 million in the other EC Member States.

Forecasts for the growth of cable over the next five years show three distinct European areas: first, the area comprising those countries nearing saturation where, consumption should level out, i.e., Netherlands, Belgium, Luxembourg; second, the area comprising Germany and Nordic countries such as Finland and Denmark, already well cabled and with continuing annual equipment growth of over 10%; and third, the area grouping France and the countries of southern Europe, which are still poorly equipped and which represent significant development potential.

The United Kingdom represents a special case: one of the weakest markets in Europe, its forecast growth rates suggest that it will remain so for the foreseeable future. The entire future of UK cable TV hinges on private operators and the success of the Astra and BSB satellites.

As in the case of terrestrial broadcasting, cable channels are experiencing serious financial difficulties. Financing is essentially derived from household subscription income, with advertising representing only 10% of total revenue. There are two explanations for this: a commitment by many cable networks to reduce advertising to a minimum; and the size of the current market which reduces the interest of advertisers in this type of medium.

In future, however, larger audiences could revive advertiser interest. If this happens, it will cause a further upheaval in the advertising market, similar to that caused when the emergence of commercial stations prompted the substitution of TV for other advertising media. In fact, a sort of double competition could emerge - between different media and within the medium itself.

Satellite broadcasting

Another phenomenon in recent years has been the growth in satellite reception, as evidenced in most European countries by the number of individual satellite reception dishes purchased and installed. Growth in the individual or collective dishes will continue over the coming years, fuelled by price reductions and the availability of more powerful satellites which cost less and are less cumbersome to install.

The United Kingdom is Europe's healthiest market. There, the sluggish launch of cable and the attractions of US programming have worked in favour of satellite reception.

This broadcasting mode (for which numbers of households are still undisclosed) represents direct competition to cable reception. In Japan and the USA, where over 3% of households are now equipped with dishes, cable operators have had to encode their transmissions to avoid satellite viewers being able to receive their broadcasts directly.

Film and video

The structural problems of the European film industry in recent years have been a particular cause for concern. Throughout the 1980s, cinema attendance rates dropped markedly, going from 750 million in 1981 to 564 million in 1990. This trend continues.

Film output has paralleled this trend as outlets became more scarce. In the course of a single decade, the number of feature-length films produced fell and only 416 features were made in 1990. Finally, the number of cinema houses continues to decline, as does their average seating capacity.

The situation would be less worrying were it evenly applicable to all the players in the market. However, while the European film industry is going through a difficult period, its US counterpart presents an enviable picture of robust financial health.

Two elements have changed fundamentally in the course of the last few years: film consumption patterns and video consumption. The erosion of cinema attendance has come about as a result of changes in the client base allied to a lack of adaptation of the product. The cinema-going public has become progressively family-oriented and increasingly more haphazard. In order to maintain revenue, the film industry has had to reorient itself to meet the demands of cinema audiences which are made up of out-and-out cinema buffs on the one hand and, on the other, casual cinema-goers for whom a visit to the cinema is simply one among many alternatives. Given such a mix of clientele, the problem of building loyalty is immediately obvious. Meanwhile, family-oriented consumption has moved to the home, facilitated by the increasing availability of equipment for reproduction and recording.

The upshot is that, in order to maximise profitability, producers have been obliged to diversify their revenue sources to take account of the proliferation of television channels and the increase in mass-market video. In Europe, video took off comparatively recently, its growth having been initially delayed by the comparative non-availability of domestic reproduction equipment and the slowness of the film industry to adapt.

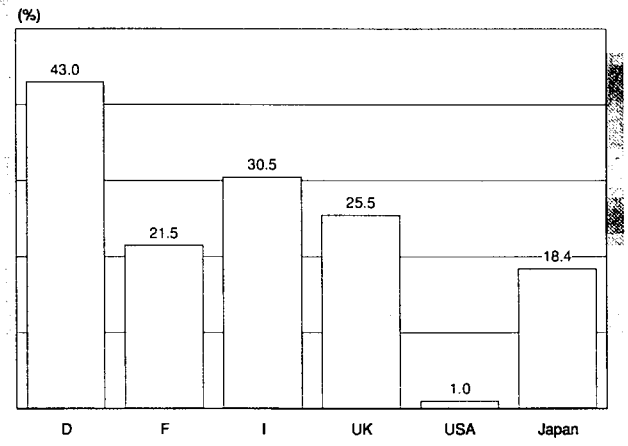
On the basis of global box-office receipts in recent years, it emerges that a sustained recovery is taking place in Japan, after a marked fall of 11% in 1987. 1990 growth of 3% has brought the industry back up to 1985 levels. The contrast is even more marked in the USA. Between 1985 and 1990, US box-office receipts in constant dollars rose by nearly 34%.

The decline in European film audiences is exacerbated by a fall-off in competitiveness. As for television, the trade balance continues to deteriorate - to the benefit of the USA. The national film industries in Europe account for less than 20% of total receipts, compared with 70% for films from the USA. Japan, despite having a poorer reputation than Europe as a film-making nation, has been more resilient than Europe in this respect: 42% of the films shown are made locally, with 55% imported from the USA.

It is difficult to make a positive case for European attempts in recent years to penetrate the North American market. Such successes as there have been proven to be very limited. This is probably because protectionism in the USA market is very effective, but it is also attributable to the need for dubbing, problems in accessing distribution networks and, not least, because European productions rarely betray international ambitions. Film and video are thus experiencing the same problems as television: strong penetration by US products and poor positioning abroad by European producers.

However, whereas the growth in the number of television channels has had the effect of benefiting programmes from

Figure 3: Audiovisual services
Public financing of networks, 1990



Source: Various

abroad, the same situation does not apply to the film industry. In film, dependence is due primarily to the commercial aggressiveness of US distributors and, even to a greater degree, to the fact that Europe does not always make the most of its internal market.

To generate profit from products which are increasingly costly to make, US film producers can draw on a market of 249 million consumers - sufficient to amortise their product. Europe, on the other hand, has a potential consumer base of 326 million but, for the time being, has failed to overcome the obstacle of regional differences. In fact, the national or regional flavour inherent in some productions usually prevents them from targeting a European market, let alone an international one.

Faced by this challenge from a USA that is perfectly organised in terms of both production and distribution, Europe has no other option than to strengthen its own enterprises. At present, Europe's network of small and medium-sized producers are no match for the majors. Clearly, such a fragmented structure can only stand up to global concentration by developing effective intra-European partnerships.

The probable direction the industry will take scarcely gives grounds for optimism, be it the advent of HDTV - which will further upset a troubled industry - or the growing presence of Japanese electronics companies aiming to synergise mass market hardware and video software.

Convergence of film and video techniques, notably during shooting, should promote productivity gains within the industry. Until now, productivity gains were mainly derived from distribution. The development of more luxurious and more comfortable multi-screen complexes has proved a vital step in adapting to the needs of the new consumer. It is also conceivable that a number of players totally new to the audiovisual scene could emerge, lured by prospects of profitability implicit in new technology.

INDUSTRY STRUCTURE

Strategies

The stakes are high in the audiovisual market. Not surprisingly, therefore, a number of manufacturers have recently adopted strategies designed to secure themselves a slice of a potentially lucrative market.

More than ever, the audiovisual market now comprises interlinked segments: the interface between equipment and the consumption of services; VCR and video cassette, interactive compact disc or multimedia software; and the link between the various media available to a product (films shown in cinema houses, on television and, finally, in video-clubs or at home).

These overlapping structures attract to the market firms which have widely disparate aims but which view themselves as indispensable to the audiovisual sector. These players can be classed into five groups, each with its own inherent logic.

Product logic

Product logic dictates that consumer equipment groups (Matsushita, Sony, Thomson, Philips, Siemens) have a presence in all the new segments. The aim is to avoid over-dependence on programme producers becoming a major element in equipment supply. Consumer electronics groups, to achieve their aims, have therefore to seek strong complementary links with television and cinema, and avoid outright competition.

While seeking to renew the existing stock of equipment with new products and multimedia products, these firms must improve their expertise by controlling the provision of programmes. This is behind the recent acquisition by some of the electronic giants of cinema distribution networks or production companies.

This logic is fundamental to strong competition surrounding HDTV between Europeans, Americans and Japanese, each set on its own standard.

Information technology logic

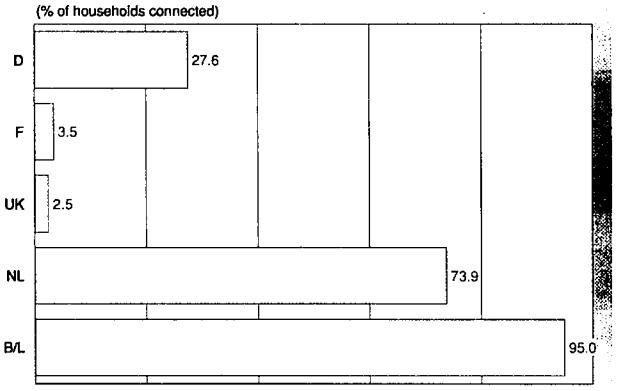
In an attempt to secure a place in the consumer electronics market, the main groups (IBM, Bull, Apple) have adopted a two-level strategy: equipment market penetration based on cheap domestic micro-computers, and mastery of programme production in multimedia.

The strategy here is to assimilate audiovisual consumption as a whole and micro-computer consumption by insisting on the advantages of information technology for service, maintenance or accounting applications.

Programme logic

While it cuts across most of the other approaches, this logic is particularly relevant to traditional film or TV companies. In essence, it is a question of their financial well-being. In the case of TV, these companies are threatened with the loss of a large part of their income from advertising. In the case of cinema, they face the prospect of continued decline in cinema attendance.

Figure 4: Audiovisual services
Cable penetration rates, 1990



Source: Various

Table 6: Audiovisual services
Origin of non-news programmes in EC countries in 1989

(%)	National	European	American
Belgique/België	2	20	61
BR Deutschland	22	7	63
España	4	12	46
France	35	9	47
Italia	6	2	78
Nederland	10	17	50
Portugal	0	12	43
United Kingdom	30	1	47

Source: BLM and Partners

Table 7: Audiovisual services
EC-US film and video trade balance, 1988

(million USD)	Video	TV	Cinema
EC imports from USA	901	743	693
EC exports to USA	23	140	43
Trade balance	-878	-603	-650

Source: Idate, Afma, Goldman Sachs

For all of them, the obligation is to improve the quality of their programmes, an impossible task unless there are major developments in European co-production and the targeting of international markets.

Network logic

Audiovisual, computers and telecommunications are distinct sectors which are nevertheless very close to each other; in practice, reference is often made to the "communications" sector as grouping all three.

Telecommunications companies (AT&T, NTT, British Telecom, France Télécom) all see audiovisual as a logical extension of their core activities. The ideas of networks, cable, telecommunications and satellites are all integral to their sector.

The logic of these players is to extend transmission hours so as to generate profits as quickly as possible from their major infrastructural investments. Once technical issues have been resolved (e.g., coaxial cable or fibre-optics, high or medium power satellites), the profitability of the sector will hinge predominantly on programme quality. It is therefore understandable that these players, who currently run networks, should invest in becoming producers. France Télécom, spurred on by HDTV, was among the first to invest in that technology as a means of presenting industry professionals with attractive demonstration products.

Multimedia logic

Multimedia is as yet a technology of the future, although it is already well-established in professional circles, especially in training. There is every indication that multimedia should rapidly become mass-market. Technical standards are being negotiated and should soon produce a world multimedia standard. Thereafter, even if the possible applications are of interest to players from different backgrounds, it can be expected that major programme producers such as Time Warner, Disney, Murdoch, Berlusconi, CLT, Havas or Hachette will be in the vanguard in developing synergies with their other media activities.

OUTLOOK

For cinema and television, the years ahead promise to be turbulent. The convergence of computers, telecommunications and audiovisual technologies will rapidly give rise to a new market phenomenon: multimedia.

In addition to integrating a number of existing technologies -sound, image, data and video - on the same support, the multimedia revolution will require producers to adapt to other forms of know-how.

It is difficult to predict at this juncture who will emerge victorious. That said, for the domestic, image-based sub-sector, existing enterprises in the audiovisual sector will have a significant competitive edge.

The second key focal point in the next decade will be HDTV. Here, there is more at stake than the audiovisual sector alone. HDTV offers Europe a chance to reposition itself as a leader in mass-market consumer electronics equipment such as television receivers, decoders and satellite dishes. Additionally, the performance of equipment manufacturers has always had a knock-on effect on programme production, inasmuch as hardware supply and software availability are inseparable.

The difficulty for Europe will be to achieve a rapid consensus on a European HDTV standard in order to provide industry with a stable technological base. Accordingly, priority must be accorded to elaborating a timetable for the introduction of European HDTV while at the same time safeguarding as far as possible the diverse interests of those players already committed to the project.

By 1995, average annual growth should match recent trends of around 6%. However, this growth will disguise setbacks in several market sectors: the growth of cable and specialised channels; growth in satellite reception; and the expansion of video to the detriment of the cinema industry.

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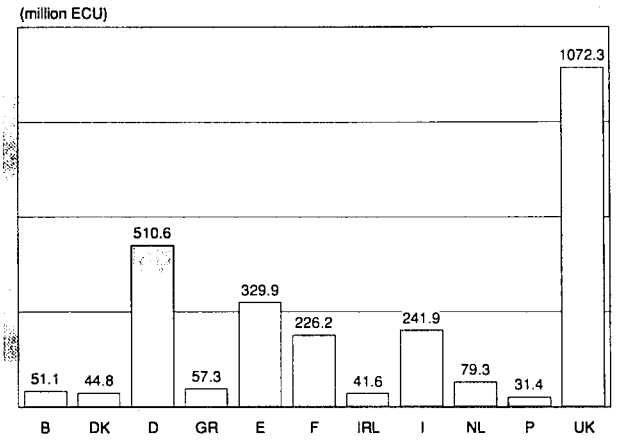
Film and video
NACE 971, 972

The European film industry is currently undergoing a difficult period. Attendance has dropped sharply since the start of the 1980s, the number of feature-length motion pictures made annually is in decline, and the number of cinema houses has progressively decreased.
The overall situation is in marked contrast to the robust health enjoyed by the motion picture industry on the other side of the Atlantic - at least up to 1990.
The problems facing the industry at present appear to reflect not only a decline in film output but also difficulties of adaptation to new marketplace conditions, notably the problems of attracting new audiences and accommodating profound changes in consumption patterns. In the longer term, the real question to be addressed may well be how European producers can adapt to these changing conditions and respond to intensified competition from US and Japanese groups.

Figure 1: Film and video
Video income by Member State, 1990



Source: Screen Digest

INDUSTRY PROFILE

Description of the sector

There are five main groups of activity in the film and video industry:

- Production destined for cinema or video consists of assuming responsibility for the entirety of a project from its initial financing through to selection of the optimal distribution channels.
- Technical aspects of the industry relate to the provision of specific services such as post-production, lighting, printing and duplication.
- Distribution to cinema houses is increasingly affected by large networks at the expense of smaller, independent distributors.
- Video publishing is still largely dependent on cinema output in terms of the titles issued.
- Recent years have seen the emergence of a new breed of operator in the guise of companies whose objectives are to acquire audiovisual rights attached to a product and to sell these rights in a designated geographical area for a limited period of time.

The above activities, which are comparatively easy to define in terms of their objectives, are very broadly integrated into overall strategy. As a result, it is extremely difficult to identify viable statistical data for each of the above. No global statistics are available with respect to employment in the film production and distribution industry; the same holds true of video publishing.

Box office receipts emerge as the most reliable economic indicator of the film industry. In 1990, receipts for the EC as a whole amounted to about 2.07 billion ECU.

Main indicators

In recent years, the European film industry has been characterised by three major and related trends: firstly, falling cinema attendance which has depressed box-office receipts; secondly, digressive output in terms of feature-length films; thirdly, increasing availability of home video cassette playback capability has triggered substantial growth in video sales.

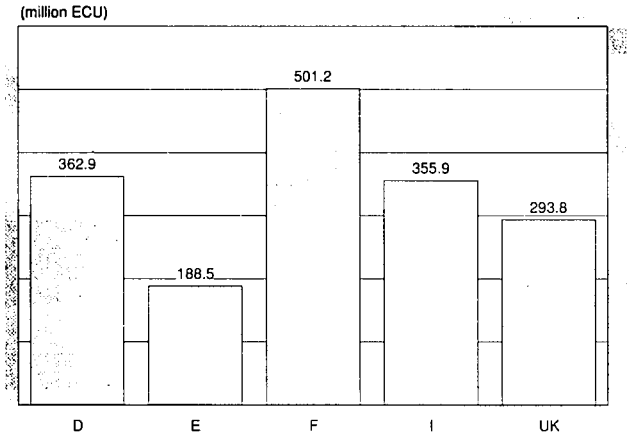
For the five largest European countries (i.e. Germany, France, the United Kingdom, Italy and Spain) taken together, box-office receipts declined by some 13% over the period 1985 to 1990.

Table 1: Film and video
Breakdown of cinema receipts by country at 1990 constant prices

(million ECU)	1985	1986	1987	1988	1989	1990	% of total (1990)	Average annual growth (%)
BR Deutschland	404	410	426	423	394	390	5.0	-0.7
China	324	310	292	298	333	341	4.4	1.0
España	262	232	231	200	222	207	2.7	-4.6
USA	3 371	3 377	3 665	3 694	3 943	4 006	51.7	3.5
France	738	728	604	562	541	573	7.4	-5.0
India	298	296	301	300	320	340	4.4	2.7
Italia	419	461	412	371	383	382	4.9	-1.8
Japan	1 021	1 050	943	940	942	961	12.4	-1.2
United Kingdom	244	243	247	245	245	249	3.2	0.4
Other	288	282	350	359	323	334	4.3	3.0
Total	7 368	7 390	7 468	7 392	7 648	7 749	100.0	1.0

Source: OMSYC

Figure 2: Film and video
Cinema income in the five largest EC Member States, 1990



Source: Screen Digest

The five largest European film producer countries made an aggregate of 433 films in 1985; by 1990, this number had fallen to 410.

Today, film producers acknowledge that a growing portion of their revenue derives from sales and rental of video cassettes. For the five European jurisdictions noted above, the video market in 1990 was valued at 2.38 billion ECU.

Recent trends

Since 1990, there has been a pronounced divergence in growth patterns in the video market as opposed to cinema box-office. Cinema attendance has been progressively eroded in the majority of European countries. Between 1981 and 1990, attendance fell from 750 to 564 million - a drop of some 25%. At the same time, the number of cinema houses fell from 20 513 to 16 728 over the 1985-90 period.

It is difficult to identify a clear trend in terms of the number of films made: these averaged out at 450 per year for the period 1981-1988, but fell strongly in 1989 and 1990. That said, it would be premature to conclude on the basis of these erratic production figures that the recent drop in output reflects a genuine adaptation to new market conditions.

Box-office receipts exhibit a corresponding downturn, although this trend appears to have levelled off recently. The changing pattern which emerges for 1988 to 1990 should be noted. To a large degree, this would appear to reflect a loss of competitiveness in the European film industry, the slight upturn in attendance being attributable in the first instance to imported product.

Growth patterns in the video market reveal a totally different picture. The various indicators available show pronounced differences from one national market to the next, but nevertheless demonstrate an unequivocal upwards trend in the medium term:

International comparison

The downwards trend in cinema attendance in most European countries since the 1960s is in contrast to the remarkably stable attendance figures recorded for the USA and, since 1987, for Japan.

Foreign trade

The dwindling international competitiveness of the European film industry is a further cause for concern. Revenue generated by national production represented on average 19.5% of total revenue in 1990, whereas 70% of total revenue was generated by films of US origin. In Japan, too, there is a similar disequilibrium, albeit less pronounced: there, US product accounts for some 55.1% of total revenue, with the domestic film industry generating 41.4%. By contrast, US-made films account for 97% of receipts in North America.

Consequently, there is a major trade imbalance in Europe: in 1988, for example, the EC trade deficit in this sector amounted to some 500 million ECU in terms of films and 570 million ECU in videos.

Further, the weakness of intra-European trade in the film sector is well-documented: European film output is piecemeal, with films which attract a pan-European audience being the exception rather than the rule.

Table 2: Film and video
Trends in demand and supply in Europe

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Number of films	469	446	420	527	488	457	484	466	419	410
Number of cinemas	19 778	19 208	18 650	21 831	20 513	19 217	18 340	17 592	17 059	16 728
Attendance (millions)	750	692	659	713	674	658	608	559	569	564

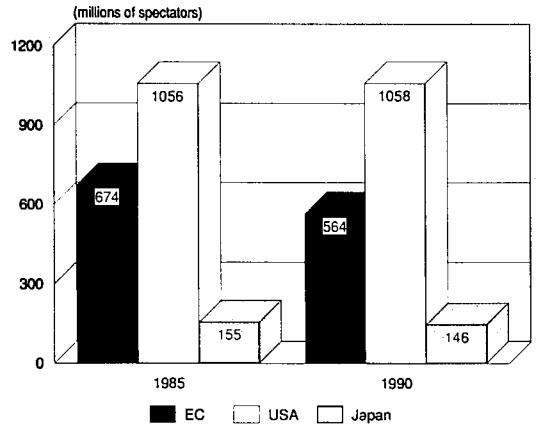
Source: C.N.C.

Table 3: Film and video
Growth of box-office receipts in the five largest European countries at 1990 constant prices

(million ECU)	1985	1986	1987	1988	1989	1990
BR Deutschland	404	410	426	423	394	390
España	262	232	231	200	222	207
France	738	728	604	562	541	573
Italia	419	461	412	371	383	382
United Kingdom	244	243	247	245	245	249
Total	2 224	2 074	1 919	1 802	1 786	1 801

Source: OMSYC

Figure 3: Film and video
International comparison of cinema attendance



Source: C.N.C.

Table 4: Film and video
Average annual growth in key film sector indicators

(%)	1985-90	1988-90
Box-office receipts	-2.7	0.0
Number of cinema houses	-4.0	-2.5
Number of feature-length films	-3.4	-6.2
Attendances	-3.5	0.5

Source: OMSYC

Most analysts predict that US productions will continue to harvest a larger slice of revenue in foreign markets in the course of the next few years. Estimates suggest that US productions will account for in excess of 55% of box-office receipts by yearend 1992.

MARKET FORCES

Demand

Demand can be assessed according to two different criteria: attendance; and distribution channels and financing.

From the outset, it is important to recognise that the film industry has many different audiences: useful distinctions are made between habitual and sporadic cinema-goers cut across social, cultural and economic barriers.

In short, there is a cinema public which views attendance as a "night out", whereas another cinema public spends a night out (specifically) "at the movies". This polarisation has largely replaced the traditional "family audience" which, today, represents only a very modest share of box-office receipts.

This pattern is not without economic impact. A certain type of cinema audience (often in groups and attracted to films of the "blockbuster" variety) will undoubtedly favour big-budget productions. In this category, US productions clearly boast an undeniable edge.

Perhaps the most significant technological development within the sector is the emergence of high-definition television (HDTV), a new mode of film distribution which offers cinema-quality image reproduction on domestic TV receivers and, as such, represents a potentially serious competitive challenge to traditional cinema houses.

It goes without saying that the development of HDTV receivers will go hand in hand with the development of high-definition video product. This being the case, the film industry must face up to the challenge in much the same way as it did when television originally came on the scene: in other words, it must convince the public at large that cinema still offers a qualitatively better product in terms of image, special effects and viewing comfort. This is imperative if it is to retain a significant market share. In any event, the advent of HDTV will undoubtedly reinforce public perceptions of the relative appeal of television and cinema.

What must also be taken into consideration is the financial pressure on cinema houses: on the one hand, they are squeezed by falling attendance whereas, on the other, they are in urgent need of funding to modernise their premises.

A further major consideration impacting on demand is in respect of distribution channels: increasingly, revenue derives less from cinema performances and more from onwards sales to TV networks and video houses.

Over time, film production houses will certainly experience a growth in these outlets. At the same time, however, consumer patterns are changing at such a pace that cinema house operators are facing a transformation: there will be progressively fewer cinema houses in Europe but they will be more sophisticated and more luxurious. The emergence of large multi-cinema complexes clearly documents that this trend is inexorable.

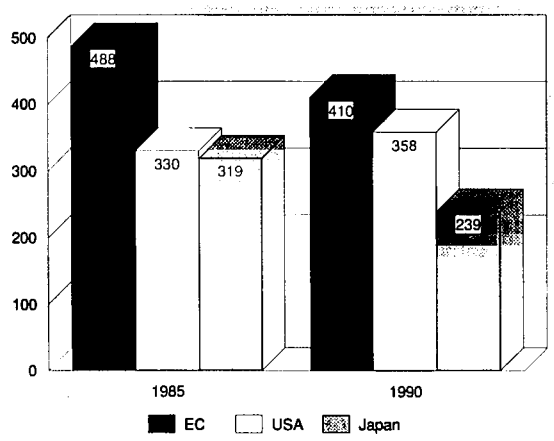
The video sector has blossomed as more and more European households purchase or rent VCRs, often on the strength of reduced-price lease-purchase deals. The increased availability of film on video has also led to a structural distortion of traditional markets: video equipment rentals now account for a progressively lower share of the European market.

Supply and competition

The canons of conventional economic analysis are difficult to apply to a industry as idiosyncratic as the film industry. Industry analysts repeatedly stress that the success or failure of a given film cannot be predicted with any degree of certainty; in other words, the film industry cannot be assessed in conventional economic terms.

This may be true. Nevertheless, an analysis of the economic structure of the US film industry reveals certain key elements that may account for the current domination of this sector by the USA.

Figure 4: Film and video
Number of films produced



Source: C.N.C.

Table 5: Film and video
Growth patterns in the European video sector, 1989/90

(%)	Market growth rate	Growth in rental	Growth in sales
Belgique/België	4	-13	160
Danmark	3	15	150
BR Deutschland	1	-5	60
España	5	0	75
France	5	-10	20
Ireland	11	8	33
Italia	18	15	33
Nederland	7	0	98
Portugal	15	9	95
United Kingdom	13	5	25

Source: Screen Digest

The principal factor exerting a positive influence on the US film industry is the immense size and comparative homogeneity of the North American market.

What also emerges is that the North American market - unlike its European counterpart - is virtually impenetrable to foreign films. The linguistic barrier represents a formidable obstacle: US audiences seem as little disposed towards viewing films in the original language as they are to accept the loss of quality implicit in dubbing.

Above and beyond these cultural problems, however, US companies have been successful in setting up efficient marketing and commercial structures in Europe, whereas the same can by no means be said of European firms in the North American marketplace.

Moreover, the financial resources available to US producers constitute a major plus in terms of competitiveness. With precious few exceptions (some German and Italian studios), European film producers are small-to-medium sized enterprises which face perennial funding problems when attempting to get projects off the ground. There is a marked contrast between Europe's myriad small producers and the Hollywood giants such as Warner, Paramount, Columbia or Disney, all of which boast annual turnover in excess of 1 billion USD. It follows that the US majors can embark on big budget movies which will be worldwide box-office successes.

In the long term, Europe's film industry runs the risk of being caught between a rock and a hard place. The rock is the financial muscle of the major US studios which enables them to turn out products for the mass market. And the hard place is Japan's powerful consumer electronics industry which has now recognised that access to film libraries will be the key to longer-term marketplace dominance and, as a result, has espoused vertical integration strategies.

Production process

Making a full-length feature motion picture is a long and complex process which entails mobilisation of technological and artistic resources of the highest order.

Technological innovation impacts directly on the production process. The key development in this respect is perhaps the advent of "electronic cinema", that is:

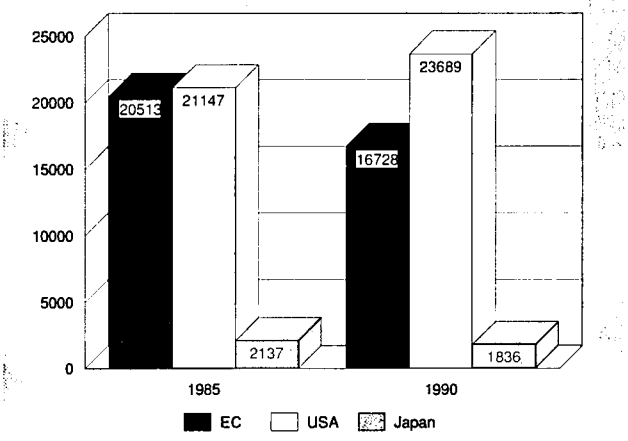
- synthetic imaging for special effects;
- gradual convergence (possibly over the next four to five years) of new video and existing film production technology;
- new distribution technology which, some analysts predict, will ultimately result in celluloid copies being replaced by digital data transfers between distributors and operators.

Overall, computers seem set to play an increasingly important role, particularly in animated films, where synthetic imaging comes into its own. It must be conceded, however, that technological advances, however impressive, have not as yet resulted in transforming the industry from its traditional labour-intensive roots (division of tasks, hierarchies of competence, etc.).

In terms of output, various models co-exist within the industry:

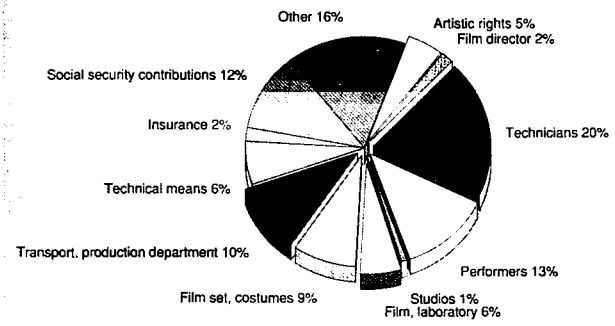
- Productivity gains are relatively weak in the case of full-length feature production and, in any event, relate only to certain aspects of the production process (computer-assisted special effects, montage and video sequences).
- Productivity gains are achieved in animated features by division of work along Taylorian lines and, additionally, by reducing image quality (lower number of frames per second and simplification of designs and animation).
- Productivity gains at the consumer end of the industry are generated as a rule by the establishment of multi-screen complexes which permit overheads to be apportioned and by recourse to distribution networks which depress transaction costs and permit more cost-effective advertising.

Figure 5: Film and video
Number of cinema houses



Source: C.N.C.

Figure 6: Film and video
Breakdown of typical film budget, 1990



Source: C.N.C.

INDUSTRY STRUCTURE

Companies

On the technical side, firms tend to be small and to offer services which predominantly reflect the particular expertise of their founder or a nucleus management team.

On the whole, European film production companies are also on the small side, although there are a number of large production companies which tend to be linked more often than not with TV programme distributors and to offer a mix of film and video production services. Cases in point are Bavaria Film in Germany, Reteitalia in Italy or SFP in France.

In practice, the largest European production groups tend to have their own studies which boast in-house technical facilities.

The trend in Europe at present is towards the establishment of large distribution and operations networks. There are pronounced differences from one country to the other: in France, Gaumont, Pathé and UGC control 20% of the nation's screens but have a virtual 100% monopoly in Paris. In the United Kingdom, Rank is the leading distributor (with 80 houses and 300 screens). In Germany, UFA is in the number one spot (120 houses and 320 screens). In Italy, Fininvest is the only group at present to have developed a geographical strategy with regard to distribution.

Strategies

Three essential strategic considerations deserve comment: first, recognition of film production as an integral part of the multi-media strategies pursued by the communications industry; second the advent of mass-consumption electronics; and third, the growing physical presence of major US production studios in the European marketplace.

A number of televisual distributors are also extremely active in film production - notably Canal+ and Bouygues in France, Fininvest in Italy and Bertelsmann in Germany. The film industry constitutes a potentially lucrative market for such groups as long as they can exploit the distribution networks that they already own in order to target a larger audience more cost-effectively. There can be no doubt that films - despite differences from one country to the next - represent an optimal means of building a faithful customer base.

This does not necessarily mean that the film industry is becoming a hostage to the dictates of televisual distribution; in fact, the above-mentioned and other major distribution groups view the film industry as merely one aspect of a comprehensive portfolio of audio-visual services which they can offer. Accordingly, some of these groups have actively positioned themselves within the video publishing market.

Another major development in this sector has been the emergence of equipment suppliers as key players within the industry. Recent acquisitions of a controlling interest in major Hollywood studios - such as by Sony at Columbia or Matsushita at MCA - confirm this trend, as does the interest shown by Philips in expanding into the sector.

It seems highly probable that conquering world HDTV markets will hinge on access to filmed material. For the moment, the focus is on HDTV hardware but, in the final analysis, it will be access to film libraries that will determine the respective success or failure of the various high-definition standards currently being developed.

Squeezed profit margins in respect of hardware mean that future profits will essentially be generated via software. This fact underpins Japan's interest in the film industry.

Controlling film distribution networks is a strategic priority within the industry. Not only is network control fundamental to the success of a given film on the cinema circuit, it is also a precondition of downstream revenue generated by video sales and TV broadcast rights.

Of particular interest in this context are the aggressive distribution strategies adopted in Europe by leading US operators. For example, Warner has recently commissioned 30 multi-screen complexes in the United Kingdom and Ireland, earmarked 80 million USD for investment in Germany and announced plans to expand in Spain.

In the longer term, it appears that US domination of European film production could be paralleled by domination in the distribution sector. If this were to happen, the effects would be cumulative: cinema houses would be owned by major US studios which had direct outlets for the films they themselves produced.

REGULATIONS

The majority of the EC Member States have put in place support programmes for their respective domestic film industries.

Support comes in various guises - direct subsidy, selective financial support, grants for screenwriters, fiscal incentives, or measures regulating subsequent TV broadcasting and TV distribution quotas.

Financial support for the film industry is substantial. In France, for example, state aid accounted for some 15% of the aggregate film production budget in 1990. This being so, industry professionals are anxious to maintain the derogations in favour of the film industry currently enshrined in the General Agreement on Tariffs and Trade.

OUTLOOK

In the immediate future, a major question mark hangs over the ability of individual European countries to meet two distinct challenges.

The first challenge is to halt the decline in cinema attendance which has been recorded over the past three decades. Certain countries, such as the United Kingdom or Germany, now appear to have succeeded in this respect. Luring audiences back into the cinema houses has been achieved principally by modernising existing facilities and introducing the concept of the multi-screen cinema complex.

The second major challenge is to recapture a substantial part of lost share in domestic markets. This would appear to be a much more difficult task, notably because of the problems

most European film producers face in targeting pan-European audiences. That said, the increased incidence of European co-productions offers a ray of hope in this respect.

The growing importance of the video industry and televisual distribution as a source of financing for the film industry is the only certain development in an uncertain marketplace.

Written by: Eurostaf

The industry is represented at the EC level by: European Federation of Audiovisual and Cinema Technical Industries (FEITIS). Address: 50 avenue Marceau, F-75008 Paris; tel: (33 1) 47 23 75 76; fax: (33 1) 47 27 40 47.

Television
NACE 974

Four important issues characterise the European television industry at present. First, the globalisation of the communications industry, including television, is at the heart of so-called multi-media strategies whose results so far have been well below declared objectives.
Second, the range and power of European communications groups result from concentration in production rather than in financial terms. Concentration has a twin aim - to respond to the need to diversify into multi-media and to use external growth to achieve a dominant position in the market segment or segments concerned.
Third, the current drive towards internationalisation has imparted a European dimension to the television industry. This is primarily due to relatively restrictive national regulations and the activity of centralised advertising space purchase agencies.
Finally, the audiovisual industry in Europe is still highly fragmented, with cultural and linguistic environments only impacting on the creative aspect of high-quality television. Meanwhile, programmes in general are dominated by the American model, with series production, light entertainment and game shows all aimed at mass audience distribution.

INDUSTRY PROFILE

Description of the sector

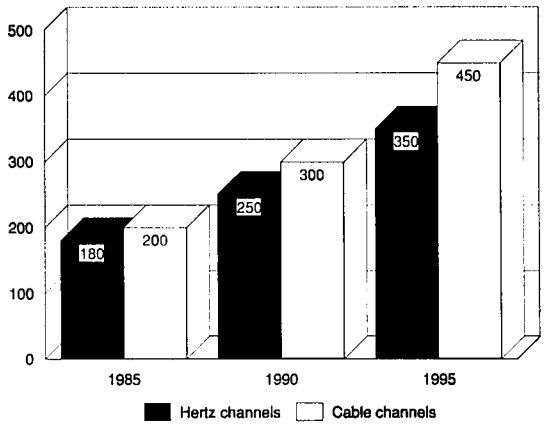
The television industry can be divided into two main sub-sectors: production and broadcasting.

Production

TV products, by their nature, are extremely diverse; they include drama, sports, game shows, light entertainment, news and current affairs and children's programmes. It is also worth noting the important place occupied by motion pictures.

Producers nowadays include audiovisual professionals, communications groups, manufacturers, institutional investors and industrial technicians.

Figure 1: Television
Distribution of television programmes in Europe



Source: Carat TV

Costs, which continue to rise, come in three stages: the acquisition of rights, royalties and trade marks and the payment of producers; technical overheads; and general overheads.

Financing comes in the form of either direct or indirect public funding, start-up capital or risk capital.

Broadcasting

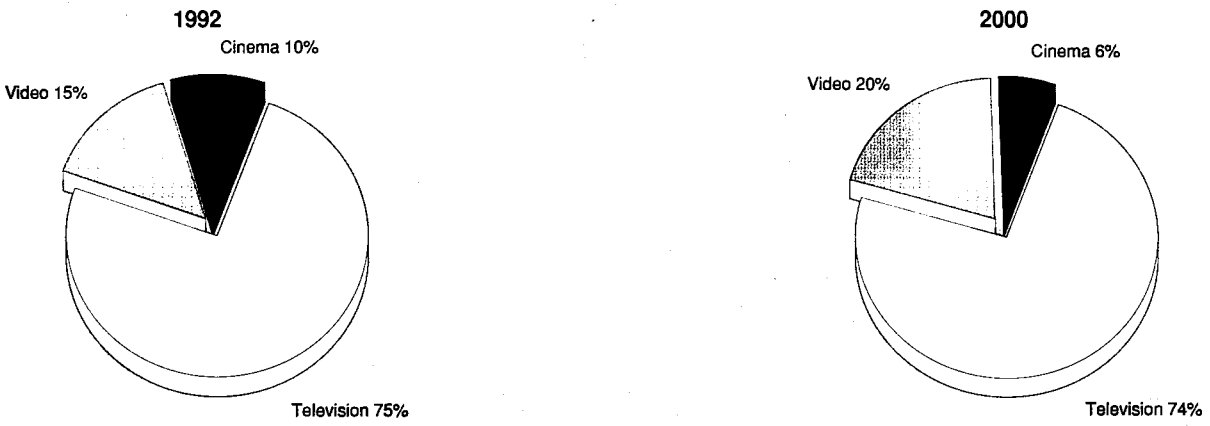
These days, there are two ways of bringing pictures to the consumer: via the airwaves (terrestrially and by satellite) and via cable. The perennial problem of compatibility between PAL, SECAM and NTSC standards will surface once again with the advent on the market of high definition television (HDTV) and its own array of standards - including Europe's MAC, D-MAC, and D2-MAC.

The channels operating today can be grouped in three main but overlapping categories: they are either public or commercial, national or transnational, and general or specialised.

Broadcasting operators include governments, major communications groups and what could be termed multi-media groups.

The resources needed to meet escalating overheads come from various sources: taxes, sale of advertising space, exchanges

Figure 2: Television
Structure of the programme market



(1) Eurostat estimates
Source: Screen Digest

Table 1: Television
Relative weight of different means of production in Europe

(%)	1988	1998 (1)
Internal production	66	53
Independent production	13	19
Co-production	1	3
Imports	20	25

(1) Eurostaf estimates
Source: IDATE

or barter, sponsorship, subscription and pay-per-view. Their respective weighting depends on the type of TV concerned.

Recent trends

The European television industry has recorded average growth rates of 6% over the 1980s. It represented a 42.2% share of the world audiovisual market in 1990, with a value of around 82 billion ECU. This share is poised to grow further by 1995.

Production

The 1980s saw European production sacrificed in favour of bargain imports from the USA. Falling audience ratings, relative increases in the cost of imported US programmes and the approaching exhaustion of film library stocks (in France, the current percentage of repeat broadcasts is 58%) are some factors that encourage to think that the situation might change soon.

That said, four major questions remain to be asked. Will we see the emergence of genuine European demand? Language barriers mean that the answer is far from clear.

In light of the attractions of vertical integration, will production be externalised - in other words, will independent producers be encouraged? Given the requirements of government authorities and the economic weight of the sector, it might be assumed that the answer will be yes.

Will channels have the financial muscle to invest in both equipment and in programmes? Pay-per-view and the increase in advertising revenue ought to, and probably will, bring this about.

Will the line between cinema and television markets be redefined? The growing power of the networks, the massive scheduling of film programmes, falling cinema attendance and the increasing role of television in film financing and production strategy - all of these favour a long-term convergence of cinema, video and television.

The development of programme production is a prerequisite of success, given that television is the key market for producers.

Given the slow reaction of the EC, this will not be simple, not least since producers are working in a rapidly-changing environment. In effect, the audiovisual sector is subject to all manner of restrictions, necessitating major restructuring. The borders between cinema, video and television are coming down. Major technical changes are taking place. Production costs are rising, and broadcasters are reducing their financial commitments.

Broadcasting

Deregulation and technical development have come together to foster major growth in the number of television channels in the EC: 75 in 1985 and 123 in 1992 (see Table 10).

Deregulation started in 1954 in the United Kingdom and is continuing in other European countries. It is prompted by the inappropriateness of rules originally drawn up when television was in its infancy and still a state monopoly.

The main thrust of deregulation is to amend legislation in order to ensure that a restricted market is opened up to the private sector. The principal result has been a progressive dismantling of the monopoly of state television.

Technological progress has put an end to a "shortage" of frequencies and increased the impact of new modes of broadcasting such as cable and satellite, breaking down traditional boundaries in the process.

The major development in the run-up to the next century promises to be the advent of high-definition television. HDTV cinema-quality images are purported to be so good as to make the commercial development of HDTV seem inevitable: in-

Table 2: Television
Penetration of cable and satellite in Europe

(million)	1990	1992 (1)	1995 (1)
Households with cable	21.0	24.0	28.0
Households with collective antennas	2.0	4.0	9.0
Household with individual satellite dish	1.5	4.5	9.5

(1) Eurostaf estimates
Source: Screen Digest

Table 3: Television
World market for HDTV receivers

(thousands)	1990	1993 (1)	1995 (1)	1997 (1)	2000 (1)	2005 (1)	2010 (1)
USA	N/A	6	20	80	1 000	6 700	11 000
Europe	N/A	9	50	300	1 500	5 500	8 500
Japan	20	260	450	800	1 600	5 000	4 500
Other	N/A	3	3	15	700	4 000	6 000
Total	20	278	523	1 195	4 800	21 200	30 000

(1) Eurostaf estimates
Sources: Various

Table 4: Television
Television resources in western Europe

(million ECU)	1990	1991	1992	1993	1994	1995
Advertising	9 466	11 041	12 203	13 438	14 366	15 335
Taxes	6 088	6 844	7 103	7 345	7 587	7 789
Pay TV	1 398	1 703	1 921	2 058	2 098	2 260
Programme sales	566	751	8 152	1 009	1 130	1 170
Total	17 518	20 339	22 115	23 850	25 182	26 554

Source: CIT Research Frost & Sullivan

creased screen size, better colour definition, improved brightness and contrast scales, stereo sound and digital images all contribute to a dismantling of the traditional frontiers between cinema and television.

Technological progress has resulted in substantial changes in the task of broadcasters, notably by making them more dependant on producers and by necessitating major investments.

Faced with rising overheads, financial resources inevitably have to be adapted. In Europe, these represented about 17.5 billion ECU in 1990, and are expected to rise to 26.5 billion ECU in 1995.

Advertising, the source of revenue likely to experience the most substantial change, already contributes the major part of television resources, often at the expense of other media.

International comparison

Production

Three main factors characterise international trade in television programmes:

- One-way traffic from the major exporting countries: in Western Europe, 45% of imported programmes come from the USA, 15% from the United Kingdom, 7% from Germany, 5% from France and 28% from the rest of the world.
- The predominance of drama productions and light entertainment in exported programmes.
- The weak share held by co-productions.

The USA has the lion's share as far as TV drama is concerned, providing 75% of series in Spain, 64% in Italy and 14% in the United Kingdom; the USA is also responsible for 60% of films imported into Europe. The Japanese dominate in animated cartoons.

Each country has its own speciality: cultural programmes from France, religious programmes from Italy and educational programmes from the United Kingdom.

Broadcasting

Even without potentially large-scale commercialisation of HDTV in the years ahead, the world audiovisual market can be expected to expand. This is predicated on the current rate of household spending on equipment such as TV receivers and VCRs, together with major growth in spending on video products.

Penetration rates for satellite dishes and cable reception are constantly growing and are still far from saturation point.

Year-on-year growth in total revenue of television networks is estimated at in excess of 5%. The share of public financing is now growing only slowly if at all, whereas advertising revenue continues to climb. Finally, subscription income to cable channels is growing in tandem with market penetration.

Foreign trade

Europe nowadays is a dominated market in TV terms to the extent that European television networks are massively dependent on programmes made in the USA. These imported programmes were valued at 766 million ECU in 1989, out of total spending in the order of about 1200 million ECU.

Import volumes differ according to the country concerned: imports of US programmes were valued at 103 million ECU in Italy, at 240 million ECU in the United Kingdom, 331 million ECU in France, 309 million ECU in Germany and

Table 5: Television
Television advertising in Europe

(million ECU)	1990	1991 (1)	1995(1)
Austria	203	231	278
Belgique/België	314	351	393
Danmark	64	98	120
BR Deutschland	1 226	1 417	1 789
Hellas	148	240	392
España	1 783	2 115	3 207
Finland	106	142	163
France	1 677	1 876	2 224
Ireland	64	77	77
Italia	2 176	2 530	2 956
Nederland	233	262	327
Switzerland	95	111	131
United Kingdom	3 333	3 621	3 793

(1) Eurostaf estimates
Source: Various

Table 6: Television
Annual household spending on video equipment at 1990 constant prices

(ECU)	1985	1986	1987	1988	1989	1990
BR Deutschland	126	154	173	178	178	176
España	97	106	115	133	137	140
France	123	141	164	170	176	192
Italia	106	121	136	142	148	169
United Kingdom	121	135	134	135	150	144

Source: OMSYC

135 million ECU in Spain. By contrast, total exports were calculated as 453 million ECU (Italy), 336 million ECU (United Kingdom), 145 million ECU (France), 118 million ECU (Germany) and 81 million ECU (Spain). The US/Europe balance of trade in TV programmes thus massively favours the USA.

MARKET FORCES

The structure of the European television market will, in the long term, be conditioned by strategies deployed by two main groups of players: on the one hand, consumers and broadcasters and, on the other, US producers, independent producers and new arrivals in the market.

Demand

The increase in household ownership rates for colour TV receivers and VCRs and the growth of satellite and cable TV reception, the increase in broadcasting times and major technological advances such as HDTV and the video disc - all conspire to bring about increased demand, not only in quantitative but - primarily - in qualitative terms.

This increased demand will be all the more difficult to harness as supply diversifies, as pay TV establishes a larger market share, and as the TV market becomes more international.

Over the period 1989-1999, annual growth in TV programme demand is projected at be around 37%. This breaks down as follows: repeat showings 145 000 hours in 1989 and 187 000 hours in 1999; programme purchases 168 000 hours in 1989 and 254 000 hours in 1999; in-house productions 148 000 hours in 1989 and 159 000 hours in 1999; co-productions 19 000 hours in 1989 and 35 000 hours in 1999.

To cope with this demand and generate viewer loyalty from a paying audience - either through advertising or subscription revenue - broadcasters will exert pressure on producers, all the more so as their margins are weak.

Broadcasters will take advantage of the disappearance of boundaries between television, cinema and video to become producers themselves; this will give rise to the establishment of multi-media groups and an increase in concentration in the sector. Nevertheless, there will be casualties along the way, as witness the demise of France's TV channel La Cinq.

Supply and competition

Technological advances and deregulation will result in a proliferation of TV channels and a demand for TV programmes that will multiply by a factor of 25 over the next ten years.

It remains to be seen how the supply side will react. As of right now, prospects seem rather bleak. Broadcasters seem concerned exclusively with ratings. And, here in Europe, they have only recently come to recognise the problems they face at the hands of US and Japanese producers.

Production process

The need to develop programmes is growing and will be a crucial factor in any successful European audiovisual strategy.

Set against the current background of broadcasters searching for a different identity, programme quality - and therefore the investment needed - are prime considerations.

Table 7: Television
Imports of programmes in Europe

(%) from	Europe	USA	Rest of world
Austria	53	N/A	N/A
Belgique/België (Flemish)	N/A	50	N/A
Belgique/België (Walloon)	50	40	10
Danmark	41	49	10
BRD Deutschland (ARD)	65	20	15
BRD Deutschland (ZDF)	15	49	36
Hellas	15	49	36
España	24	60	16
Finland	37	49	14
France	22	55	23
Italia (RAI)	42	49	9
Italia (commercial TV)	N/A	86	N/A
Nederland	43	50	7
Portugal	N/A	50	N/A
United Kingdom	N/A	70	N/A

Source: Various

Table 8: Television
Total receipts of television channels at 1990 constant prices

(billion ECU)	1985	1986	1987	1988	1989	1990
Europe	10.9	12.3	13.5	15.2	16.4	18.1
North America	30.5	32.6	34.2	36.0	36.8	38.4
Japan	8.6	8.7	9.4	10.1	10.4	10.7
Other	7.5	7.9	8.9	11.1	13.0	15.1
Total	57.5	61.5	65.9	72.4	76.5	82.2

Source: OMSYC

There appears to be a remarkable correlation between development budgets and ratings success. This also applies to those programmes which are most successful in export markets.

As far as product development is concerned, three main trends are noteworthy: upstream, the sector is becoming more industrial and more specialised; increased recourse is had to market research; and developed prototypes are not always brought to market.

The need for bigger development budgets has been clearly recognised by different players in the European market. Ways of selecting promising projects have also been developed. That said, mobilisation of financial resources is in itself not enough -what is also required is access to promising creative talent.

INDUSTRY STRUCTURE

Companies

Institutional and private investors, national and multinational communications groups, manufacturers and industry professionals are all involved in the sector.

Producers can be split into two groups: independents and multi-media groups.

Independent producers have been accorded a growing role in the light of recent EC policy decisions, but they remain largely nationally-based.

Multi-media groups have their roots in other media, but are now developing audiovisual activities. European players include Hersant (F), Hachette (F), Bertelsmann (D), Amaury (F), Fininvest (I), Havas (F) and the global empires of Murdoch and (formerly) Maxwell operating in Europe.

As for broadcasting, the number of television channels has grown considerably in recent years (see Table 10).

Strategies

Production

Public TV channels have come under pressure from regulatory authorities, rising costs and increasing specialisation. They have now tended to assume the role of specifiers.

Commercial channels have hived off their production activities more and more to independents. It is they who define a large part of production strategy, usually confined to a national scale.

In Germany, the independent sector first saw the light when a second national channel (ZDF) came on stream. It is based around the major studios and about 80 medium-sized enterprises. The emergence of the private sector has called existing organisational structures into question, and the sector has yet to stabilise.

The independent sector in Spain, after a long period of underdevelopment, now takes a major role in production, following the appearance of new players on the market.

In France, the sector is weakly concentrated, with only 13 companies having more than 50 employees. It would appear that some form of regrouping is called for, presumably based around current production groups.

The structure of the sector in the United Kingdom approximates to that of France and exhibits the same problems and strategies.

Italian producers usually exercise a dual role as producers for both cinema and television. This is an advantage in the medium term, as is the fact that international partnerships are more advanced in Italy than other European countries.

The Americans cannot be ignored: they are no longer able to function purely autonomously and have to look for new market outlets for their product. Finally, the Japanese, by acquiring major studios and their film libraries, have emerged as potentially important European players.

Table 9: Television
Public financing of channels at 1990 constant prices

(million ECU)	1985	1986	1987	1988	1989	1990
BR Deutschland	1 469	1 477	1 500	1 508	1 485	1 524
Canada	676	628	605	589	566	550
USA	299	306	314	314	306	314
France	699	707	573	597	621	754
Italia	903	958	1 037	1 060	1 123	1 249
Japan	1 964	1 980	2 003	2 019	1 987	1 972
United Kingdom	1 202	1 210	1 233	1 249	1 273	1 265
Other	3 598	3 645	3 786	4 108	4 478	5 090
Total	10 809	10 911	11 053	11 445	11 838	12 718

Source: OMSYC

Table 10: Television
Television channels by country and type, 1992

	Public	Commercial	Transnational	Specialist
Belgique/België, Luxembourg	5	4	0	0
Danmark	2	1	7	0
BR Deutschland	2	5	0	3
Hellas	3	5	0	0
España	2	3	5	0
France	6	3	6	15
Ireland	2	1	0	0
Italia	4	6	0	0
Nederland	3	1	0	0
Portugal	4	0	0	0
United Kingdom	3	27	0	0
EC	36	56	18	18

Source: Eurostaf

Broadcasting

The larger European broadcasters face the temptation to integrate vertically. There are two factors which induce them to resist: the compelling economic logic behind the separation of the roles of broadcaster and producer; and the regulatory environment which governs relations between the two sides in many countries.

This has the following strategic consequences: first, a partial externalisation of production; second, a search for optimum value from own resources; and third, a development of intellectual property rights management for all broadcasting support activities.

REGULATIONS

Over and above the usual statutes relating to any activity -upholding public order, decency and so on - television is also subject to broadcasting quotas, a general commitment to respect certain rules governing the relationships between producers and broadcasters, and detailed provisions as regards advertising content.

The quota situation differs greatly between countries. None at all exist in Denmark, Greece, Luxembourg or Germany. In other countries, the situation varies, as shown in Table 11.

Aside from debate on the opportunities or restrictions occasioned by quota systems, it has to be said that they constitute a barrier for the majority of the players in the market.

In order to limit vertical integration - with its aim of creating a real audiovisual programme market and improving intra-European broadcasting and financing - regulation of the links between producer and broadcaster have been put in place in France and the United Kingdom. Such regulation does not exist in other European countries.

As far as advertising is concerned, different forms of regulation in different countries prescribe: the duration per hour of advertising spots; the admissibility or otherwise of advertising during broadcast of films; and the advertising in certain sensitive sectors.

In addition to national rules, the EC directive on broadcasting and the provisions of the convention on trans-frontier television also apply.

OUTLOOK

The audiovisual industry in Europe is in a transitional phase between television dominated by the public sector and television governed by the laws of the marketplace.

Prospects for growth and profitability, as well as the promotional possibilities inherent in the media, will encourage new country players such as Japan, as well as groups from other sectors, to invest in the industry.

Although there is still room within the sector for new participants, the costs of entry in terms of annual investment and the financial risks involved will accelerate concentration in the sector in the medium term.

The most urgent question still to be resolved is how the television industry will adapt to the demands of the post-1992 Single European Market in terms of free movement of goods (standardisation) and services (programmes), people (creative and technical personnel) and, not least, capital.

Table 11: Television
Broadcasting quotas in Europe

Belgique/België	60% of TV films and series EC output, or francophone for the RTBF
España	Public service TV: a certain volume of Spanish production by 'contractual agreement'
España	TVE/Cinema: one-third Spanish films
France	50% French language originals and 60% European
Italia	40% rising to 50% European, with a majority Italian
Ireland	35% Irish production
Nederland	10% Dutch culture for pay TV
United Kingdom	No quotas since 1983, but industry self-regulation. 86% EC programmes

Source: J.N. Dibie "Keys to the international audiovisual market"

Table 12: Television
Regulation of TV advertising of sensitive sectors in EC countries

	Distribution	Tobacco	Spirits	Beer and wine	Medicine	Toys
Belgique/België, Luxembourg	R	P	A	A	R	A
Danmark	A	P	R	R	P	A
BR Deutschland	R	P	A	A	A	A
Hellas	A	P	R	A	A	P
España	A	R	R	R	A	A
France	P	P	P	P	A	A
Ireland	R	P	R	R	R	R
Italia	R	P	R	A	R	R
Nederland	A	P	A	A	R	R
Portugal	A	R	R	R	R	R
United Kingdom	A	P	R	A	A	A

A = Authorised
R = Restricted
P = Prohibited
Source: World Federation of Advertisers

Written by: Eurostaf

Music recording
NACE 345.2

The recorded music sector was adversely affected by the recessionary climate which prevailed in all the industrialised nations in the course of 1991. In the USA, 1991 record sales were down 11% by comparison with 1990. In the United Kingdom - the Member State which heads EC rankings in the music sector - sales were off 7% by comparison with the previous year.

INDUSTRY PROFILE

Description of the sector

The recording industry is a highly capital-intensive sector which presupposes substantial investment commitments. Five companies currently hold more than 80% of the world market. These five majors can be grouped in three categories: mass-market consumer electronics (Philips and Sony), multi-media groups (Warner and Bertelsmann) and distributors (Thorn-EMI).

Recent trends

The traditional products of the recorded music industry were 33 and 45 rpm (revolutions per minute) vinyl discs and audio cassettes. Since the early 1980s, however, technological innovations have radically changed the quality of recorded music and prompted swingeing changes in consumer buying preferences.

Laser-based compact discs (CDs) have gradually replaced their vinyl counterparts. Following a reduced demand for traditional formats, the principal labels had progressively reduced or totally eliminated vinyl output. Thus, some companies no longer manufacture 33 rpm discs, whereas other labels now typically press a modest 3 to 4 thousand vinyl copies even in the case of the most popular recording artists.

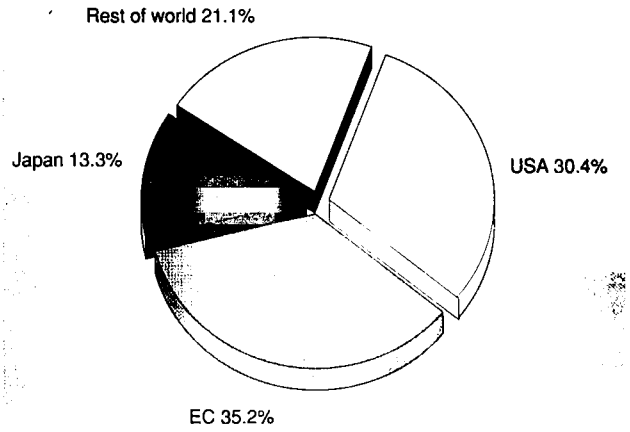
Images have impacted on the music scene, notably in the form of music-video broadcast on dedicated TV music channels. More recently still, the laser video disc has emerged, offering a permutation of image and high-quality CD sound.

The digital-sound compact cassette is being launched in the course of 1992 in the form of Philips' DCC (Digital Compact Cassette) and Sony Corporation's Mini-Disc.

International comparison

In the absence of precise data, it is difficult to effect a direct comparison between EC and non-EC markets. In the recorded music sector, competition is international: the five leading companies are multinational in character and each owns a number of national labels.

Figure 1: Music recording
World market share by country, 1991



Source: IFPI

That said, European groups such as Polygram, Bertelsmann or Thorn-EMI have performed strongly in world markets. At the beginning of 1992, it was estimated that they had captured some 52% of the world market.

MARKET FORCES

Demand

By its very nature, recorded music is a product for which demand is difficult to quantify and anticipate. Records are consumer end products which have an extremely broad-based market, the majority of which is at an average 25 years of age. Demand can be quantified by reference to such parameters as global sales development, market share by country and by hardware support systems.

Since the beginning of the 1980s, the market has grown by some 3.5% on a yearly basis, with the most important growth occurring between 1986 and 1989. The latter fact is no doubt attributable to the advent of the laser disc in 1982 and, more particularly, to a progressive reduction in the cost of both the discs and the laser-based hardware support systems.

The recession which set in as of 1990 has affected the world's industrialised nations and has also impacted on the recorded music sector. Between 1990 and 1991 sales fell 11% in the USA and 7% in the United Kingdom. France and Germany - despite 15% growth in the wake of reunification with the former DDR - both anticipate falling sales in the course of 1992.

Consumption of recorded music on playback systems is, by and large, exclusive to the industrialised countries of the world, the three principal market blocs being the EC, the USA and Japan.

Table 1: Music recording
Distribution of aggregate EC sales by product category

(%)	1980	1985	1986	1987	1989	1990	1991
Singles (1)	33.9	35.7	31.5	27.6	18.2	17.3	15.4
LPs	45.7	35.0	32.8	29.8	21.2	16.1	9.9
MCs	20.4	26.7	30.1	31.7	33.4	33.6	31.8
CDs	0.0	2.6	5.6	10.9	27.2	33.0	42.9

(1) Vinyl, CD and cassette
Source: IFPI

Within the EC, the United Kingdom is the largest consumer, followed by Germany and France. Together, these three countries represent over 70% of total EC consumption. The comparative weakness of the other EC markets is explained in part by their size and in part by their level of economic development.

These percentages do not take account of the volume of pirate copies sold in the respective markets. In Italy, for example, the IFPI estimates that pirate copies represented 13% of market volume in 1990; in the USA, the corresponding figure was 4%. The losses associated with pirate copies in Europe is about 300 million ECU, a figure which represents about 10% of European sales.

The increase in CD consumption is linked to ownership of the appropriate playback hardware. In the EC, the number of CD players sold in 1982 was below one million; this figure rose to 1.7 million in 1986 and to 3.2 million in 1987. This explains the surge - albeit somewhat belated - in compact disc sales: CD's share of the EC sound recording market rose from 2.6% in 1985 to 10.9% in 1987, and then boomed to about 43% in 1991.

Demand is a function of the support hardware purchased, but it is also conditioned by the type of recorded music available. The vast majority of recorded music is pop music or variations on classical music. A rough estimate reveals a ratio of 9:1 in favour of pop as opposed to classical recorded music sold, although in the USA classical music accounted for as low as 4% of overall sales in 1991.

The impact of publicity in all its various forms cannot be denied. In this respect, the key media are radio and television, although television is less important than might be assumed. Nevertheless, experience in France has demonstrated that permission to advertise recorded music on TV was hailed as a major breakthrough by the recording companies.

Advertising campaigns mounted by the recording companies are strongly reliant on proven formulae. Thus, in 1991, compilation albums accounted for 16% of album sales in the United Kingdom. In addition, the sale of boxed albums featuring the collected recordings of an individual performer or group has emerged as a viable strategy for stimulating demand and boosting profits.

International industry events such as MIDEM have also helped promote broader acceptance and consumption of recorded music. In this case, the recorded music is underpinned by music-video- presentation.

Supply and competition

In the recorded music business, supply adapts very rapidly to demand. A simple comparison between domestic consumption of CDs in the principal markets and annual production capacities reveals the existence of substantial over-capacity. Worldwide, annual capacity in 1989 was in excess of one billion CDs with a consumption of 770 million units in 1990.

Within the EC, competition is waged among five large firms which, together, hold some 80% of the EC market. In 1991, according to CEO Alain Levy, Polygram had a 24.5% share of the EC market.

The smaller independent labels often do not have the financial muscle to underwrite large-scale production or to assume the financial risks inherent in launching a new recording.

Distribution equates to between 25 and 35% of production costs and, as such, is beyond the financial resources of the smaller labels. This being so, the general practice is for the smaller houses to subcontract distribution to the larger firms by way of catalogue sales, on the grounds that risks are increasingly spread as the number of catalogue outlets increases.

Since its recent acquisition of Virgin Records, Thorn-EMI now has a catalogue featuring 825 000 titles. For their part, the smaller labels rely on a quick commercial turn-around and, accordingly, subcontract operational phases both upstream and downstream of the recording phase.

Production process

The production process comprises origination, recording, publishing and distribution.

Origination stage costs vary. Essentially, this phase relates to performer contracts, the value of which will necessarily fluctuate depending on the relative status of the performers concerned.

The costs associated with the recording stage, i.e., sound recording and mixing, also vary depending on the desired end product. These costs can fluctuate between 10 and 30% of total production costs in the case of a compact disc. The leading labels all maintain their own recording studios.

Publishing stage costs relate principally to recording royalties. The producer, in issuing the recording for public consumption, assumes all potential profits and losses.

"Pressing" denotes serial reproduction of the recording. Like recording studios, pressing facilities represent an essential input to the production process. Pressing and surface treatment

Table 2: Music recording
Sales by product category in individual EC Member States, 1991

(%)	Singles (1)	LPs	MCs	CDs
Belgique/België, Luxembourg	27.2	1.8	13.7	57.3
Danmark	4.9	32.7	16.8	45.6
BR Deutschland	11.0	10.3	33.5	45.2
Hellas	(2)	58.7	27.5	13.8
España	2.0	30.7	42.7	24.6
France	15.8	1.0	30.3	52.9
Ireland (3)	12.8	15.4	64.1	7.7
Italia	1.7	16.8	45.3	36.2
Nederland	12.7	2.6	5.5	79.2
Portugal	1.8	26.8	33.9	37.5
United Kingdom	28.3	6.5	33.6	31.6

(1) Vinyl, CD and cassette
(2) Singles are included with LPs
(3) 1989 data
Source: IFPI

Table 3: Music recording
Consumption of recorded music in the EC, 1991

	(million ECU)	as % of the total
Belgique/België, Luxembourg	271.7	3.7
Danmark	75.7	1.0
BR Deutschland	2 074.2	28.2
Hellas	67.2	0.9
España	548.1	7.5
France	1 315.4	17.9
Ireland (1)	29.4	0.4
Italia	560.4	7.6
Nederland	483.6	6.6
Portugal	62.5	0.9
United Kingdom	1 862.8	25.3
EC	7 351.	100.0
USA	6 312.6	-
Japan	2 768.4	-

(1) 1989 data
Source: IFPI

of the product absorb between 15 and 25% of the total production costs of a CD.

Manufacturing compact discs presupposes leading-edge technology and a commitment to substantial investment. The five major labels have integrated the disc pressing stage and now have facilities in all major markets. As of 1990, there were more than 60 pressing facilities in 17 countries worldwide.

Small, independent pressing firms have typically diversified their production into micro-groove, cassette and CD video production in a bid to optimise return on investment.

Distribution is a key stage in the recorded music industry. The distributor is a direct client of the publisher who, in effect, has no contact whatsoever with the end user (other than via promotional activities).

In the course of the last 15 years, distribution patterns have altered considerably: small distributors are now disappearing from the scene to be replaced by larger distribution infrastructures. As an illustration, there were 50 small distributors in Paris in 1992, down from 150 a decade and a half ago. Typically, the small distributors specialise in niche markets, leaving mass markets to the larger houses.

The prime distribution channel is via large chain stores which tend to exhibit a restricted choice but an attractive pricing structure. A second distribution channel has emerged in recent years in the form of "multi-specialist" stores which, to all intents and purposes, are effectively music supermarkets. Here, the choice is extremely wide-ranging (e.g., in excess of 100 000 titles at Virgin). In both the above cases, the volume of sales is such that distributors are in a strong position to negotiated preferential discounts.

The third distribution channel comprises medium-sized record chain store outlets which offer customers a quality service at cut-price rates. Examples are Nuggets in France or Our Price in the United Kingdom.

The final distribution channel comprises the sales outlets of the record companies themselves. Virgin Megastores and Thorn-EMI's HVM outlets sell both from their own lists and those of other labels.

Table 4: Music recording
Domestic consumption patterns and production capacities, 1989

(million units)	Consumption	Production capacity
France	25.9	53.0
United Kingdom	29.2	65.0
BR Deutschland	39.2	202.0
Nederland	17.8	10.0
USA	149.7	300.0
Japan	115.5	139.0
Australia	5.7	10.0

Source: Eurostaf

INDUSTRY STRUCTURE

Companies

The recorded music industry is characterised by a marked concentration of firms, with five multinational groups sharing 80% of the global market. Additionally, there are many companies in each country (particularly in the United Kingdom, where there are about 1500 companies).

The five groups in question and their main labels are: Sony Music, notably via BS (Japan); Polygram (NL), controlled by Philips; EMI, notably via Thorn-EMI and, as of 1992, Virgin (UK); Warner Music (USA); BMG Music, notably via Bertelsmann Music Group (D).

Concentration within this sector has been intensified in the wake of a number of acquisitions which, by definition, have resulted in the disappearance of some of the smaller independent houses: between 1987 and 1992, there was a ten-point fall in the number of independents. The most recent major development in this respect came in March 1992 when the Virgin Music Group was acquired by Thorn-EMI in a takeover valued at around £550 million.

The five leading producers are diversified groups; as such, they accord varying levels of importance to their music business.

Geographically speaking, firms in the recorded music sector are from three main countries or regions of origin - Europe, Japan and the USA. To a considerable degree, however, this distinction is specious inasmuch as each of the major houses publishes titles in a great variety of national markets and, moreover, maintains production facilities (notably pressing plants) throughout the principal consumer markets.

Strategies

In essence, the main players in the recorded music sector follow one of three broad strategies. Respectively, these are based on control of the production process, catalogue content, or advanced technology.

Table 5: Music recording
Share of world market

(%)	1987	1992 (1)
CBS	19.5	19.5
Poygram	17.3	17.5
EMI	15.9	20.5
WEA	14.1	15.5
BMG	11.0	14.0
Other	22.2	13.0
Total	100.0	100.0

Source: Eurostaf

Control of production

Control of production means integration of upstream activities such as recording and pressing and downstream control of distribution. This strategy is reserved to those firms which have the commensurate financial resources.

The majors have integrated the pressing phase, either by forging links with other industrial groups - as is the case with Philips/DuPont de Nemours or Thorn-EMI/Toshiba - or by other means, such as equity participation. The shining example of downstream integration is undoubtedly that of Virgin Megastores, which were excluded from the takeover by Thorn-EMI.

Catalogue content

The publisher's catalogue or list comprises the full range of titles made available to distributors. Lists can be short and tailored to niche markets, which is the case with the smaller independents, or extensive - which is the rule among the majors. Anticipating a takeover, Virgin signed extremely expensive contracts with leading performers in order to boost the value of its portfolio: 35 million USD with The Rolling Stones and 30 million USD with Michael Jackson.

Advanced technology

The technological challenge consists in the continuing development of new products to boost demand and obviate market saturation. The recording industry will this year launch new pre-recorded formats (DCC and mini-disk) which promise to achieve precisely that over the longer term.

To ensure that the copyright owners are not disadvantaged by the new technology (i.e. through private copies), a new system of protection (SCMS) has been incorporated to limit the number of copies that can be made from the pre-recorded original.

REGIONAL DISTRIBUTION

It should be noted that, taken together, the United Kingdom, Germany and France represent more than 70% of the EC market.

The Netherlands is one of the smaller EC Member States and, as such, exhibits only a modest share of the total EC market. That said, market penetration is high: the Netherlands is one of the largest per capita consumers of CDs and one of the best-equipped countries in terms of playback hardware.

REGULATIONS

Generally speaking, recorded music is a product which conforms to commonly-accepted commercial standards. On the other hand, by its very nature as a creative product, protected by intellectual property legislation, producers must take into consideration the moral and economic rights of all the contributors (authors, composers, performers).

Each country has its own regulatory provisions in this respect, that are currently subject to EC harmonisation. Usually, in each country collecting societies manage the rights of the creators.

The music industry is facing the problem of piracy and private copying. In the former case, the copies in question are made with a view to fraudulent sale and without due remuneration of the authors concerned. Copying for private use is, as such, free from prohibition. In a bid to curb illegal copying, some Member States have established a royalty on sales of blank cassettes and hardware equipment.

OUTLOOK

Despite the recessionary climate, the recorded music sector should continue to grow in importance in the years ahead.

In geographical terms, the leading firms in this sector are predicting market growth in the countries of Eastern Europe, together with increased market demand in Latin American and Southeast Asia.

On the technology front, the introduction of DCCs in 1992 should stimulate demand. According to some analysts, DCCs could secure between 4 and 5% of the market in the course of 1993.

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The industry is represented at the EC level by: International Federation of the Phonographic Industry (IFPI). Address: Rue de Belle-Vue 20, Bte 2, B-1050 Brussels; tel: (32 2) 646 7300; fax: (32 2) 646 5395.

Abbreviations

A	Austria
AAGR	Annual Average Growth Rate
AC	Alternate Current
ACP	African, Caribbean and Pacific countries
ASICS	Application Specific Integrated Circuits
ATC	Air Traffic Control
B	Belgium
Benelux	Belgium, Netherlands and Luxembourg
BLEU	Belgo-Luxembourg Economic Union
CAD	Computer Aided Design
CAM	Computer Aided Manufacturing
CAP	Common Agricultural Policy
CD	Compact Disc
CD-I	Compact Disc-Interactive
CD-ROM	Compact Disc - Read Only Memory
CEC	Commission of the European Communities
CEN	Comité Européen des Normes (European Committee for Standardisation)
CENELEC	Comité Européen des Normes Electroniques (European Electronics Standard Committee)
CFC	Chlorofluorocarbons
CGT	Compensated Gross Tonnes
CGRT	Compensated Gross Registered Tonnes
CH	Switzerland
CHP	Combined Heat and Power
cif	cost, insurance and freight
CIM	Computer Integrated Manufacturing
CMEA	Council of Mutual Economic Assistance
CNC	Computerised Numeric Control
COCOM	Coordinating Committee for Multilateral Security Controls
CRS	Computer Reservation System
D	Federal Republic of Germany
DAT	Digital Audio Tape
DC	Direct Current
DCC	Digital Compact Cassette
DG	Directorate-General
DIY	Do-It-Yourself
DK	Denmark
DPP	Direct Product Profitability
DRAM	Dynamic Random-Access Memory
E	Spain
EAF	Electric Arc Furnace
EC	European Community
ECSC	European Coal and Steel Community
ECU	European Currency Unit
EDI	Electronic Data Interchange
EDM	Electrical Discharge Manufacturing
EDP	Electronic Data Processing
EEA	European Economic Area
EFT	Electronic Funds Transfer
EFTA	European Free Trade Association
EFT-POS	Electronic Funds Transfer at the Point Of Sale
EPA	Environmental Protection Agency
EPOS	Electronic Point Of Sale System
Eurostat	Statistical Office of the European Communities
F	France
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment
FGD	Flue Gas Desulphurisation
FMS	Flexible Manufacturing System
fob	free on board
FTE	Full-Time Equivalent
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GNP	Gross National Product
GR	Greece
GSP	Generalised System of Preferences
GVW	Gross Vehicle Weight
GW	Gigawatt
HCFC	Hydrochlorofluorocarbons
HDPE	High-Density Polyethylene
HDTV	High Definition Television
HFC	Hydrofluorocarbons
I	Italy
IAEA	International Atomic Energy Agency
IC	Integrated Circuits
ICA	International Coffee Agreement
ICO	International Coffee Organisation
IDN	Integrated Digital Network
IEA	International Energy Agency
IGCC	Integrated Gasification Combined Cycle
IMF	International Monetary Fund
IRL	Ireland
ISDN	Integrated System Digital Network
ISO	International Standards Organisation
IT	Information Technology

JPN	Japan
kW	Kilowatt
L	Luxembourg
LCD	Liquid Crystal Display
LDC's	Less Developed Countries
LDPE	Low-Density Polyethylene
LME	London Metals Exchange
LP	Long Playing
LPG	Liquefied Petroleum Gas
LWR	Light Water Reactor
M&A	Mergers and Acquisitions
MD	Mini Disk
mdf	medium-density fibreboard
MFA	Multi-Fibre Arrangement
MNCs	Multinational Corporations
MW	Megawatt
N	Norway
N/A	Not Available
NACE	General industrial classification of economic activities within the European Community
NAFTA	North American Free Trade Agreement
NBP	Net Banking Products
NCM	Numerically-Controlled Machinery
NIC's	Newly Industrialised Countries
NL	The Netherlands
NVOCC's	Non-Vessel-Owning Common Carriers
OE	Original Equipment
OECD	Organisation for Economic Cooperation and Development
OEM	Original Equipment Manufacturer
OJ	Official Journal of the European Communities
OPCVM	cooperative savings banks
OPEC	Organisation of Petroleum Exporting Countries
osb	oriented strand board
OTC	over the counter
P	Portugal
PBX	Private Branch Exchange
PC	Personal Computer
PCI	Pulverised Coal Injection
PVC	Polyvinyl Chloride
PWR	Pressurised Water Reactor
QWPDR	Quality Wines Produced in Determined Regions
RAM	Random Access Memory
R&D	Research and Development
R,D&D	Research, Development and Demonstration
S	Sweden
SCMS	Serial Copy Management System
SF	Finland
SICAVs	interest-bearing current accounts paid in other European countries
SITC	Standard International Trade Classification
SMEs	Small and Medium-sized Enterprises
SWU	Separative Work Units
TGV	Train à Grande Vitesse (High Speed Train)
TJ	Terajoule
toe	tonne of oil equivalent
TPA	Third Party Access
TQM	Total Quality Management
tU	tonne of uranium
TW	Terawatt
UHT	Ultra-High Temperature
UK	United Kingdom
UN	United Nations
USA	United States of America
USD	US Dollar
USSR	Union of Socialist Soviet Republics
VAT	Value-Added Tax
VCR	Video Cassette Recorder
WHO	World Health Organisation
X/M	Exports/Imports ratio

Contributors

The following list provides the names of the trade associations and consultants that contributed to this edition of Panorama. Associations are listed in alphabetical order according to their acronym, together with an indication of the chapter of pertinence. The full address details of the asociations can be found at the end of their respective chapter. Independent consultants are listed with their full address.

Associations

AACI Airports Association Council International
Chapter 22

ACE Architects Council of Europe
Chapter 24

ACEA Association des Constructeurs Européens d'Automobiles
Chapter 11

AEA Association of European Airlines
Chapter 22

AECMA Association Européenne des Constructeurs de Matériel Aérospatial
Chapter 11

AESGP Association Européenne des Spécialités Pharmaceutiques Grand-Public
Chapter 6

AFCASOLE Association des Fabricants de Café Soluble des Pays de la CEE
Chapter 13

AIBI Association Internationale de la Boulangerie Industrielle
Chapter 13

AIIC Association Internationale des Interprètes de Conférence
Chapter 24

AIS Association Internationale de la Savonnerie et de la Détergence
Chapter 6

AITC Association Internationale des Traducteurs de Conférence
Chapter 24

APAG Association Européenne des Producteurs d'Acides Gras
Chapter 6

APFE Association of European Glass Fibre Producers
Chapter 6

APPE Association of Petrochemicals Producers in Europe
Chapter 6

ASSILEC Association de l'Industrie Laitière de la CEE
Chapter 13

AVEC Association des Centres d'Abbattage de Volailles et du Commerce d'Importation et d'Exportation des Volailles
Chapter 13

BIBM Bureau International du Béton Manufacturé
Chapter 5

BLIC Bureau de Liaison des Industries du Caoutchouc de la Communauté Européenne
Chapter 17

CAACE Communauté des Associations d'Armateurs de la Communauté Européenne
Chapter 22

CAEF Comité des Associations Européennes de Fonderie
Chapter 7

CAEJ Association Européenne d'Editeurs de Journaux
Chapter 16

CAFIM Confédération des Associations des Facteurs d'Instruments de Musique de la CE
Chapter 18

CAOBISCO Association des Industries de la Chocolaterie, Biscuiterie, Biscotterie et Confiserie de la CEE
Chapter 13

CAPIEL Comité de Coordination des Associations de Constructeurs d'Appareillage Industriel Electrique du Marché Commun
Chapter 9

CBMC Confédération des Brasseurs du Marché Commun
Chapter 13

CCBE Conseil des Barreaux de la Communauté Européenne
Chapter 24

CDL Comité de Liaison de l'Industrie du Tube d'Acier de la Communauté Européenne
Chapter 3

CEA Comité Européen des Assurances
Chapter 23

CEC Confédération Européenne de l'Industrie de la Chaussure
Chapter 14

CECD Comité Européen du Commerce au Détail
Chapter 20

CECED Conseil Européen de la Construction Electrodomestique
Chapter 9

CECIMO Comité Européen de Coopération des Industries de la Machine-Outil
Chapter 8

CECIP European Committee of Weighing Instrument Manufacturers
Chapter 12

CECOF Comité Européen des Constructeurs de Fours et d'Equipments Thermiques Industriels
Chapter 8

CECOMAF Comité Européen des Constructeurs de Matériel Frigorifique
Chapter 8

CECT Comité Européen de la Chaudronnerie et de la Tuyauterie
Chapter 7

CEEC Comité Européen des Economistes de la Construction
Chapter 24

CEES Comité Européen d'Etude du Sel
Chapter 2

CEFIC Conseil Européen de l'Industrie Chimique
Chapter 6

CEFS Comité Européen des Fabricants de Sucre
Chapter 13

CEHP Comité Européen de l'Hospitalisation Privée
Chapter 26

Cei-Bois Confédération Européenne des Industries du Bois
Chapter 15

CEIR Comité Européen de l'Industrie de la Robinetterie
Chapter 8

CEMA European Committee of Agricultural Machinery Manufacturers
Chapter 8

CEMAFON European Committee for Materials and Products for Foundries
Chapter 8

CEMATEX Comité Européen des Constructeurs de Matériel Textile
Chapter 8

Cembureau Association Européenne du Ciment
Chapter 5

CEO Comité Européen de l'Outillage
Chapter 7

CEPCEO Association of the Coal Producers of the European Community
Chapter 1

CEPE Comité Européen des Associations de Fabricants de Peintures, d'Encres, d'Imprimerie et de Couleurs d'Art
Chapter 6

CEPI Confederation of European Paper Industries
Chapter 16

CEPT Conférence Européenne des Administrations des Postes et des Télécommunications
Chapter 25

CERAME-UNIE Bureau de Liaison des Industries Ceramiques du Marché Commun
Chapter 5

CERP Confédération Européenne des Relations Publiques
Chapter 24

CESA Committee of EC Shipbuilders' Associations
Chapter 11

CET Comité Européen de la Trefilerie
Chapter 3

CEdT Comité Européen du Thé
Chapter 13

CETOP European Oil Hydraulic and Pneumatic Committee
Chapter 8

CIAA Confédération des Industries Agro-Alimentaires de la CE
Chapter 13

CIBJO International Confederation of Jewellery, Silverware, Diamonds, Pearls and Stones
Chapter 12

CIELFFA Comité Internationale d'Etude de Laminage à Froid du Feuillard d'Acier
Chapter 3

CIETT Confédération Internationale des Entreprises de Travail Temporaire
Chapter 24

CIPF Comité International du Profilage à Froid
Chapter 3

CIRFS Comité International de la Rayonne et des Fibres Synthétiques
Chapter 6

CITPA International Confederation of Paper and Board Converters in the EC
Chapter 16

CLECAT Comité de Liaison Européen des Commissionaires et Auxiliaires de Transport du Marché Commun
Chapter 22

CLEPA Comité de Liaison de la Construction d'Equipements et de Pièces d'Automobiles
Chapter 11

CLGEE Comité de Liaison des Géomètres-Experts Européens
Chapter 24

CLITRAVI Centre de Liaison des Industries Transformatrices de Viandes de la CE
Chapter 13

COCEMA Committee of European Manufacturers of Food Industry
Chapter 8

CoESS Confédération Européenne des Services de Sécurité
Chapter 24

COLIMO Comité de Liaison des Constructeurs de Motocycles de la CE
Chapter 11

COLIPA Comité de Liaison des Associations Européennes de l'Industrie de la Parfumerie, des Produits Cosmétiques et de Toilette
Chapter 6

COMITE VINS Comité de la Communauté Economique Européenne des Industries et de Commerce des Vins
Chapter 13

COMITEXTIL Comité de Coordination des Industries Textiles de la CE
Chapter 14

COPAMA Confederation of Packaging Machinery Association
Chapter 8

COTANCE Confédération des Associations Nationales de Tanneurs et Mégissiers de la CE
Chapter 14

COTREL Comité des Associations de Constructeurs de Transformateurs du Marché Commun
Chapter 9

CPDP Comité Professionel du Pétrole
Chapter 1

CPHE Permanent Committee of European Watch and Clock Makers Secretariat
Chapter 12

CPIV Comité Permanent des Industries du Verre
Chapter 5

CPIV Comité Permanent International du Vinaigre
Chapter 13

EAAA European Association of Advertising Agencies
Chapter 24

EACEM European Association of Consumer Electronics Manufacturers
Chapter 10

EACRO European Association of Contract Research Organisations
Chapter 24

EBEMA European Bakery Equipment Manufacturers Association
Chapter 8

ECATRA European Car and Truck Rental Association
Chapter 24

ECLA European Clothing Association
Chapter 14

ECSA European Computing Services Association
Chapter 25

ECTA European Cutting Tool Association
Chapter 7

ECTAA Group of National Travel Agents Associations within the EC
Chapter 21

ECTEL The European Telecommunications and Professional Electronics Industry
Chapter 10

EDMA European Direct Marketing Association
Chapter 24

EECA European Electronic Component Manufacturers Association
Chapter 10

EEO The European Express Organisation
Chapter 22

EFCA European Federation of Engineering Consultancy Associations
Chapter 24

EFFA European Fragrance and Flavour Association
Chapter 6

EFMA European Fertilisers Manufacturers Association
Chapter 6

EFPIA European Federation of Pharmaceuticals Industries' Association
Chapter 6

EGGA European General Galvanizers Association
Chapter 7

EIFI European Industrial Fasteners Institute
Chapter 7

EIGA European Industrial Gases Association
Chapter 6

EIIA European Information Industry Association
Chapter 25

EISA European Independent Steelworks Association
Chapter 3

ELC European Lighting Council
Chapter 9

ELMO European Laundry and Dry Cleaning Machinery Manufacturers Organisation
Chapter 8

E.S.O.M.A.R. European Society for Opinion and Marketing Research
Chapter 24

ESTA European Security Transport Association
Chapter 24

ETOA European Tour Operators Association
Chapter 21

EUCA Fédération Européenne des Associations de Torréfacteurs de Café
Chapter 13

EUCHEMAP European Committee of Chemical Plant Manufacturers
Chapter 8

EUCOMED European Confederation of Medical Suppliers Associations
Chapter 12

EUMABOIS Comité Européen des Constructeurs de Machines à Bois
Chapter 8

EUMAPRINT European Committee of Printing and Paper Converting Machinery Manufacturers
Chapter 8

EuPC European Plastics Converters
Chapter 17

EURIMA European Insulation Manufacturers Association
Chapter 5

EURO-ROC European International Federation of Natural Stone Industries
Chapter 2

EUROBAT Association of European Accumulator Manufacturers
Chapter 9

EUROBIT European Association of Manufacturers of Business Machines and Information Technology
Chapter 10

EUROFER Association Européenne de la Sidérurgie
Chapter 3

EUROFINAS Fédération Européenne des Associations des Instituts de Crédit
Chapter 23

EUROFORGE Comité de Liaison des Industries Européennes de l'Estampage et de la Forge
Chapter 7

EUROGAS European Union of the Natural Gas Industry
Chapter 1

EUROGLACES Association of the ice cream industries of the EC
Chapter 13

EUROM European federation of Precision Mechanical and Optical Industries
Chapter 12

EUROMALT Comité de Travail des Malteries de la CE
Chapter 13

Eurométaux Association Européenne des Métaux
Chapter 4

EUROMINES International Association of European Mining Industries
Chapter 2

EUROMOT Association of European Manufacturers of Internal Combustion Engines
Chapter 8

EUROPACABLE European Confederation of Associations of Insulated Cables and Wires
Chapter 9

EUROPECHE Association des Organisations Nationales d'Entreprises de Pêche de la CE
Chapter 13

EUROPILE Association of European Dry Battery Manufacturers
Chapter 9

EUROPLANT European Plant Manufacturers
Chapter 19

EUROPUMP European Committee of Pump Manufacturers
Chapter 8

EUROTRANS European Committee of Associations of Manufacturers of Gears and Transmission Parts
Chapter 8

EUROVENT European Committee of Air Conditioning Equipment Manufacturers
Chapter 8

EUSIDIC The European Association of Information Services
Chapter 25

EWA European Welding Association
Chapter 9

FAFPAS Fédération des Associations des Fabricants de Produits Alimentaires
Chapter 13

FAIBP Fédération des Associations de l'Industrie des Bouillons et Potages de la CE
Chapter 13

FBE Fédération Bancaire de la Communauté Européenne
Chapter 23

FEACO Fédération Européenne des Associations de Conseils en Organisation
Chapter 24

FEBMA Federation of European Bearing Manufacturers Association
Chapter 8

FEDIOL Fédération de l'Industrie de l'Huilerie de la CE
Chapter 13

FEDOLIVE Fédération de l'Industrie de l'Huile d'Olive de la CE
Chapter 13

FEE Fédération des Experts Comptables Européens
Chapter 24

FEFAC Fédération Européenne des Fabricants d'Aliments Composés pour Animaux
Chapter 13

FEICA Federation of European Adhesives Manufacturers
Chapter 6

FEITIS European Federation of Audiovisual and Cinema Technical Industries
Chapter 27

FEJ Fédération Européenne du Jouet
Chapter 18

FEM European Federation of Handling Industries
Chapter 8

FEMB Fédération Européenne du Mobilier de Bureau
Chapter 18

FENI Fédération Européenne du Nettoyage Industriel
Chapter 24

FESI Federation of the European Sporting Goods Industry
Chapter 18

FEVE Fédération Européenne du Verre d'Emballage
Chapter 6

FEWITA Federation of European Wholesale and International Trade Associations
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FHCEE Fédération Hypothécaire auprès de la Communauté Economique Européenne
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FIABCI Fédération Internationale des Professions Immobilières
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FIFE	Fédération Internationale des Associations de Fabricants de Produits d'Entretien Chapter 6
FIT	Fédération Internationale des Traducteurs Chapter 24
FORATOM	Forum Atomique Européen Chapter 1
GAM	Groupement des Associations Meunières des Pays de la CE Chapter 13
GBCCEE	Groupement des Banques Coopératives de la Communauté Economique Européenne Chapter 23
GCECEE	Groupement des Caisses d'Epargne de la Communauté Economique Européenne Chapter 23
GIFAP	Groupement International des Associations Nationales de Fabricants de Pesticides Chapter 6
GPRMC	European Organisation of Reinforced Plastics / Composite Materials Chapter 17
HOTREC	Confédération des Associations Nationales de l'Hôtellerie et de la Restauration de la CE Chapter 21
IFPI	International Federation of Phonographic Industries Chapter 27
IFTO	International Federation of Tour Operators Chapter 21
IMACE	Association des Industries Margarinières des Pays de la CE Chapter 13
INTERGRAF	International Confederation for Printing and Allied Industries Chapter 16
IRU	International Road Transport Union Chapter 22
ISTA	International Special Tooling Association Chapter 8
LEASEUROPE	European Federation of Leasing Companies Associations Chapter 24
LISS	Ligue Internationale des Societés de Surveillance Chapter 24
OEITFL	Association of European Fruit and Vegetable Processing Industries Chapter 13
ORGALIME	Organisme de Liaison des Industries Metalliques Européennes Chapter 7 and 8
SEFEL	Secretariat Européen des Fabricants d'Emballages Métalliques Légers Chapter 7
TBE	Fédération Européenne des Fabricants de Tuiles et de Briques Chapter 5
TME	Toy Manufacturers of Europe Chapter 18
UEA	Union Européenne de l'Ameublement Chapter 18
UEAES	Union Européenne des Alcools, Eaux-de-Vie et Spiritueux Chapter 13
UEEA	Union Européenne des Exploitants d'Abattoirs Chapter 13
UEHP	Union Européenne de l'Hospitalisation Privée Chapter 26
UEPG	Union Européenne des Producteurs de Granulats Chapter 2
UIHJ	Union Internationale des Hussiers de Justice et Officiers Judiciaires Chapter 24
UITP	Union Internationale des Transports Publics Chapter 22
UNEBIF	Union Européenne des Fabricants de Bijouterie Fantaisie Chapter 18
UNESDA	Union des Associations des Boissons Rafraichissantes des Pays Membres de la CE Chapter 13
UNIFE	Union des Industries Ferroviaires Européennes Chapter 11
UNILC	International Union of the Notary Profession Chapter 24
UNIPEDE	Union Internationale des Producteurs et Distributeurs d'Energie Electrique Chapter 1
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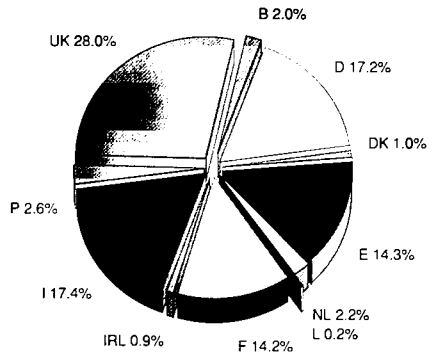

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