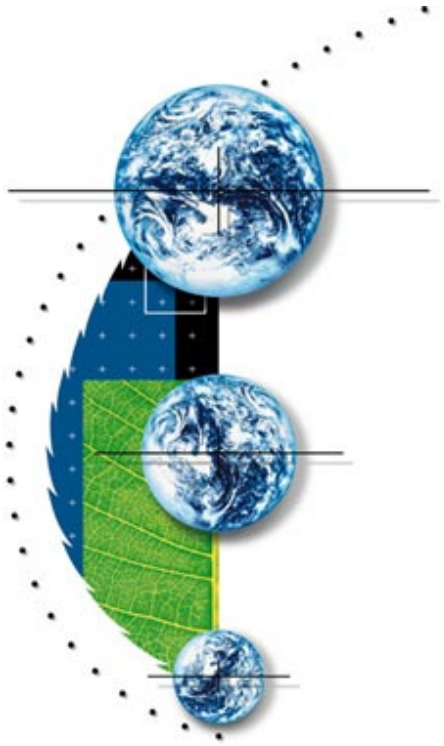
TELECOM DEVELOPMENT SUMMIT

Speakers' Book Supplement



TELECOM 99

Geneva, 10-17 October

Inter@ctive 99

International Telecommunication Union

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Opening session DEV.1

PALEXPO – Room A

Monday, 11 October 1999	09:00 - 10:30

Chairperson:	**H.E. Mr. Chen CHIMUTENGWENDE,** *Minister of Information,* Posts and Telecommunications (Zimbabwe)
Welcome Address:	**Mr. Yoshio UTSUMI**, *Secretary-General,* International Telecommunication Union (ITU)
Introductory Remarks:	**Mr. Hamadoun I. TOURÉ**, *Director,* Telecommunication Development Bureau (ITU/BDT)
Keynote Speakers:	**Mr. Tony REIS,** *CEO,* Swisscom AG (Switzerland)
	Mr. John CHAMBERS, *President and CEO,* CISCO Systems Inc. (U.S.A.)

Mr. Tony REIS
Chief Executive Officer
Swisscom AG
(Switzerland)

DEV.1

"Do telecommunications distance man from community?"

Ladies and gentlemen,

It is quite extraordinary that we – you and I – have all gone to considerable lengths just to be here today. Some of you have travelled halfway around the globe to visit an exhibition that promises the latest solutions for avoiding these very trips. Why are we here, rather than using the benefits of the emergent information society? After all, telecommunications and computer technology mean that we can communicate with each other regardless of time and place. At the click of a mouse, we could all look at the exhibition stands at our leisure from anywhere, download information, ask for advice, et cetera et cetera..... So what are we doing here?

Telecommunications are not the same as communications

There is no doubt that telecommunications are required in all walks of life. However – and this is the provisional answer to my question – telecommunications, with their sheer boundless possibilities, cannot satisfy all our requirements. And one very human requirement in particular: the need for direct communication. A contradiction? Not at all. Telecommunications do indeed allow us to broaden our horizons and to extend the scope of our actions into almost immeasurable dimensions. Nevertheless, telecommunications are nothing more than a tool for communication – tool that should be used appropriately and not prevent us from practising and cultivating direct, human communication. In contrast, direct, interpersonal communication stimulates all our senses: what we hear, see, feel, smell and taste. And each of these senses adds its own element to our perceptions. In addition to the actual subject matter, we therefore gain an overall impression that can help us detect contradictions and consider, interpret and evaluate what has *not* been said. It is in this very respect that direct communication is superior to its technically-assisted counterpart. The possibilities opened up by the electronic marketplace are of course fascinating: the market saves time and money, offering customers information round the clock. But would you offer someone a job without having had a one-on-one interview with them? Would you conclude an important deal with a business partner without ever having met him or her face to face? I don't think so! But it can make sense and be useful, and save time and money, if the recruitment process is triggered by telecommunications and if telecommunications take care of the administrative work.

Telecommunications as a complement to communication

I'm sure I'm not telling you anything new when I refer to the importance of communication in a human community. Humans are, as social beings, dependent on communities and our entire civilisation would be unimaginable without the cultural achievements of communication. It is therefore paradoxical that, in its evolution towards telecommunications, communication, as the basis for a functioning society, actually becomes a risk for this very society. Though it makes people more autonomous, more independent, more mobile, it perhaps makes them even more lonely – despite the link to the whole world. Put more provocatively, the risk is: communication connects – telecommunications disconnect.

Now, you may well point out that the human race has up until recently never had so many opportunities to make so many and so varied contacts so quickly, and to communicate and gather

information on a worldwide scale. And what about these so-called chat rooms or Internet cafés – are these not new, modern communities that fit in with our global age better than the close-knit village community? A comparison between interpersonal relationships in the real and virtual worlds provides the answer. I would like to go into some of the most striking differences:

It is quite possible to exchange ideas in virtual rooms. Here, too, people feel bound by common values and interests and act accordingly. Unlike the real world, where written laws and obligations govern relationships, people can shirk responsibility much more easily: as an anonymous traveller in no man's land, the world-wide web.

Virtual communities are not binding and are usually of only limited duration – that is, unless they progress to materialise as real-world contacts. The members of such communities do not plan any common future based on similar interests, objectives and values. Such communities do not create any lasting culture and do not possess any history. In a world where everything is possible, why should anyone care?

Nothing can replace real encounters and relationships. I'm thinking here of the continuity and quality of living together, of exchanging feelings and of physical contact. I can't think of any case where posterity has been ensured by platonic love alone – or do you think "cyberlove" could help here?

In conclusion: communication and telecommunications are not the same. They do not substitute each other, they complement each other.

Do telecommunications distance man from community?

What conclusions can we draw from this? Do telecommunications distance us from community? It has often been suggested that the invention and propagation of new media uproots communities and pushes people into isolation – ever since the invention of the printing press. However, if looked at in absolute terms, this standpoint is incorrect. The following arguments support this:

Neither the spread of printed matter nor the development of radio or television have turned people into wandering hermits. On the contrary, it has spurred us on to think about what we have read on paper, heard on the radio or seen on television and to communicate it. What's more, as far as I'm aware, no new medium has as yet led to the complete eradication of an existing one. It is rather the case that the use of the Internet requires language knowledge and literacy. And last but not least, it is in fact the book trade that is flourishing most on the Internet.

It is claimed that the incredible mass of information is gradually making us lose our bearings. From an anthropological point of view, people are now confronted with limits to their capacity to perceive and process things: human beings can only cope with so much information at any one time and cannot communicate without restriction. Not even with technical aids. We therefore use selection to sift out the essential information from a manageable quantity. The flood of information tends to force people to further refine their capacity to differentiate and select in order to decide what they want to share a part of and what not. It is new media like the Internet that allow a more refined selection of subject matter, not to mention the benefits of the Internet as a useful working tool for the individual and the as yet unquantifiable benefits for the economy as a whole that electronic trade and electronic commerce will bring in the near future. Services that will in particular benefit, amongst others, disabled people – people who have their freedom of movement restricted.

In summary, I can say that the new achievements of telecommunications lead to major improvements in everyday life. But people cannot and do not want to do without direct communication. People need bonds, communities and common experiences. And I am standing here to talk to you about telecommunications rather than letting telecommunications try to tell you how to communicate.

Better quality of life with telecommunications?

Each innovation has its opponents: those who stick to trusted routines and paint a gloomy picture of the future without noticing that they themselves are already in the middle of it. The information society also has its sceptics and prophets of doom. But despite all this, we cannot turn back the clock. The information society is a fact of life and has a promising future.

Telecommunications offer countless possibilities in the fields of business, education, medicine, politics and culture. There is therefore huge potential for improving our quality of life by putting telecommunications to good use. The opportunities for better quality of life on the one hand correspond with the risks on the other; allow me to explain:

– The desire for unlimited mobility is eroding our living space and we have to seek out traffic-free areas.
– The paperless office has brought with it a bigger deluge of paper than ever before.
– Technical progress and automation have brought greater efficiency. But they also lead to an increase in unemployment.

What am I trying to say with these three examples? All these achievements are based on visions that aim primarily to increase efficiency, but considering human beings in the equation. The resulting negative consequences are a result of a one-sided interpretation of technological developments. I have a more drastic example of such a failing: industrialisation itself. Productivity gains from machines obviously represented considerable progress, which in turn brought about drastic changes. But only on the one hand. Nobody considered improving social conditions in line with these changes. Tomorrow's economic structures collided head-on with yesterday's social structures.

Vision for the information society

I am convinced that each one-sided development necessarily leads to major disparities. Today we are talking about redefining markets and the arrival of new value chains. This places a major challenge in our path, only days before the new millennium. However, we must extend this structural change to other areas. Otherwise we will be creating new structures but still using old patterns of thought. As history shows, it is difficult and expensive to make corrections later on; social tension is often unavoidable. Social unrest and tests of political strength have more often than not destroyed what had been achieved, at least in part, and led to set-backs and temporary stagnation.

This is why we need a workable vision for the information society. A vision that takes full account of people and all their needs and allows continuity in the future for the second root of the present, our humanistic thoughts and actions. And I think that telecommunications offer an excellent opportunity that we *must* use. After all, telecommunications give us enough room for manoeuvre, both in terms of time and space, so that we are no longer bound by the constraints of physical availability where this would compromise our quality of life. Telecommunications offer interesting prospects for stimulating economic development in the Third World and developing countries. In many parts of these countries, a considerable amount of know-how and cultural heritage lies dormant, as yet untapped because it is detached. We should be using telecommunications rather than letting telecommunications use us. Using telecommunications, we can help to put people back where they can provide the greatest benefit and where they do their greatest work. And that is in the community.

Conclusion

Ladies and gentlemen,
Rapid changes, a fast working pace and permanent reachability are unmistakable signs of the times. There is no doubt that we must be flexible and willing to change and to learn in order to keep in step. But we will only succeed in doing this if we accept and respect our limits as human beings – and our legs can only move so fast. This is why, even in these fast-moving times, taking your time can be of great benefit.

Take the time at TELECOM 99 to get to know some of the interesting aspects of the world of telecommunications. But also take time for interesting encounters with people. Use this platform for communication *par excellence*!

Biography

Tony Reis represents a new generation of executive in Switzerland. His initials “T” and “R” could just as easily stand for “telecommunications and reconstruction”. Anyone who, like him, has made their name as the re-shaper of a company in the extremely dynamic telecoms business must display exactly these qualities: dynamism and a will to change. Qualities which not only distinguish him as CEO of the Swiss carrier Swisscom, but which also contribute to his strength as a leader.

Change is “my way of life”, he says, and he has always found well-trodden paths a little suspect. And so it was that around 30 years ago the young Tony found his native Lucerne somewhat restrictive. Curious about the world, he left Switzerland behind and set off to put the finishing touches to his commercial training, first in Paris and then in the capital on the Thames. On his travels, he took with him one thing above all: an acute

instinct for customers and their concerns. “Customer” was the word which was ever-present in his parents’ business and which made a lasting impression on him.

In London, his career took a decisive turn. Fascinated by automation, he made the decision to sign up for the “big blue”. And so, back in Switzerland, he started work as a 23-year-old beginner at the IBM group in Zurich. In the years that followed he obtained ever more responsible managerial positions in Switzerland, Brussels and Paris.

His big test came in 1990. Appointed as General Manager and Chairman of IBM Switzerland, he succeeded in putting the group, which at the time had got into dire straits, back onto an even keel – first in Switzerland and then throughout Europe, as the new boss at the Paris headquarters. In addition to the Old Continent, the successful reformer was subsequently entrusted with the Middle East and Africa too.

But Tony Reis is not the kind of person to sit around twiddling his thumbs once his work has been done. Success spurs him on to new challenges. Radical changes had been announced for the then state-owned company, Swiss Telecom PTT. Liberalisation of the market and privatisation of the company – the biggest privatisation in Swiss economic history. Once more, Tony Reis was the man of the hour, responsible for change and reconstruction. As Chief Operating Officer of the new Swisscom, he continued with the process of change already begun, but in a new and livelier gear. His goal: to transform the former colossus into a dynamic, customer-oriented service company – and in particular to change the way of thinking of some 20,000 employees. Thanks to this culture change, Tony Reis, as new CEO, successfully led the company onto the stock exchange in 1998.

The free market poses a continuous challenge. This means that Tony Reis has little time for his hobbies: mountain climbing and fly-fishing. His employer comes first. But that isn’t Swisscom. No, Tony Reis’ real employer is and always has been – the customer.

PALEXPO

TDS.3

Monday, 11 October 1999	15:20 - 16:45

TDS.3	Community Access

Chairperson:

Professor Heather HUDSON,
Professor and Director,
Telecommunications Management and Policy Programme, McLaren School of Business, University of San Francisco (USA)

Keynote Speaker

Mr. Daniel ESPITIA,
Vice-President,
Global Strategy, FINSTRUCT (South Africa)

Panelists

Dr. Clement DZIDONU,
Executive Director,
International Centre for Internet and Telecom Technology (Ghana)

Mr. P. C. GUPTA,
General Manager (Development),
Gujarat Telecom Circle, Department of Telecommunications (India)

Prof. Kenji SAGA,
Professor,
Faculty of International Relations, Asia University (Japan)

Rapporteur/Right of Response

Ms. Paula UIMONEN,
Researcher,
Department of Social Anthropology, Stockholm University (Sweden)

PALEXPO

TDS.3

Monday, 11 October 1999	15:20 - 16:45

TDS.3	Community Access

Having promoted the development of rural telecommunications and the concept of multipurpose community telecentres (MCT) for many years, BDT is considered a leader in this field. However, it must continue sharing experiences with the delegates of developing countries, in order to find possible ways to implement the concept in their respective countries and regions.

The idea of this panel is to give an opportunity to discuss examples of MCTs in rural areas, the role of the community in creating a successful MCT, the necessary funding and its duration, what it takes to make MCTs sustainable, the management profiles needed to make MCTs successful, the benefits and spin-offs for the community (impact on social, economic and cultural development), technology options, and so forth.

Dr. Heather E. HUDSON
Professor and Director
Acacia Project
(United States of America)

TDS.3

Biography

Dr. Heather E. Hudson is Professor and Director of the Telecommunications Management and Policy Program in the McLaren School of Business at the University of San Francisco. She is also currently Evaluating and Learning Systems Coordinator for Acacia, a project sponsored by the International Development Research Centre (IDRC) to provide community access to the Internet and other services in Africa.

Dr. Hudson has a Ph.D. in Communication Research from Stanford University and JD from the University of Texas at Austin. She has planned and evaluated communications projects in more than 30 developing countries, and has consulted for many international organizations and development agencies including the ITU, World Bank, Unesco, UNDP, USAID, CIDA, IDRC, and the Commonwealth of Learning.

She is the author of several books ranging from, When Telephones Reach the Village (1984) to Global Connections: International Telecommunications Infrastructure and Policy (1997), more than 50 articles and numerous conference papers. She is a member of the Board of the Pacific Telecommunications Council and Telecommunications Policy Research Conference, and Governor of the ICCC. She was a special advisor to the Maitland Commission.

Dr. Clement K. DZIDONU
President and CEO
International institute for information Technology (INIIT)
(Ghana)

TDS.3

Providing universal access to shared telecommunications and communications services

Abstract

The implementation of community telecenters, multipurpose community telecenters (MCTs), rural telephony and other forms of rural communications services are being seen as some of the ways to achieve the concept of universal access in a number of countries. The provision of affordable telecommunications and communications services to under-served communities through telecenters or MCTs it is argued could bring these communities into the mainstream of economic activities and thereby have a positive impact on economic developments of their respective countries. The point has often be made that: the concept of telecenters as embraced by a number of countries especially in developing countries offers a real possibility to make communications technologies available to areas, which would otherwise not have access to these technologies and services.

A number of pilot and operational telecenters and MCTs are currently underway to demonstrate and evaluate the sustainability of this concept and evaluate their impact on communities. In this paper, we look more closely at the concept of multipurpose community telecenters as a practical solution to the problem of providing universal access to basic telecommunications and communication services in a number of countries. We also advanced the case for using these MCTs as community gateways to other Internet-driven application development and delivery platforms like SchoolNets, telemedicine and electronic commerce systems.

1 Introduction

The telecommunications and communications industry is regarded as the dominant and the fastest growing sector in the world's economy. In both the developed and developing world this sector is being seen as the main driving force behind most of the fastest growing economies. There is no doubt that the telecommunication revolution is having a major impact in developing countries as well.

In fact, the argument has been put forward in relation to how countries, particularly those in developing countries could be part of this emerging telecommunications revolution and how access to basic telecommunication services can be extended to those communities which hitherto are not served. The concept of universal access to basic telecommunications and communication services is being implemented in a number of these countries to address the issue of serving the under-served communities.

There is no doubt that telecommunications is being seen as the main driving force behind the world economy of today. In fact a number of studies have shown that there is a direct link between telecommunications infrastructure and per capita growth in a given country. Experts and industry watchers are now moving away from the view that telecommunications is the consequence of economic development to a belief that telecommunications is in fact a necessary precondition not only for economic growth but for sustaining that growth.

In a number of countries in particular those of the developing world, connectivity and access to telecommunications and communications facilities is being seen as a window of opportunity through which these countries could integrate their communities into the mainstream of their economies as well as leap-frog their ailing economies into a fast moving information-driven economies which could deliver the goods that eluded their citizens for many years.

The common view is that: most countries cannot afford not to be part of the emerging telecommunications and global connectivity revolution. There is now a consensus that in what is increasingly becoming a highly competitive information-driven world economy, development without a sound telecommunication infrastructure and modern communication services is not possible.

In fact, connectivity and access within the context of developing countries is seen not only in terms of the extent to which the country's telecommunication and communications infrastructure is well integrated into the international globally-based internetwork but also in terms of the extent to which universal access to these facilities by its people is achieved. The question of how to put in place mechanisms, policies, strategies and schemes that will facilitate and speed up the process of universal access has been the concern of a number of developing countries.

2 The universal access concept

Any industrial or technological development with the potential to have a major impact on the economies of the world, is most often governed or driven by some basic concepts – the telecommunication revolution is no exception. For example, 'universal service' – the telecom by-word for a number of years – served as one of the key driving forces behind the spread of telecommunications and communications services particularly in a number of developed countries.

There is however much emphasis these days, particularly in developing countries in relation to the need to move away from this concept of 'universal service' to that of 'universal access' – which simply means providing basic access to telecommunications and communications service to all.

The implementation of the concept of universal service differs significantly between developed and developing countries – for example, in developed countries universal service is typically interpreted to mean telephone in every household, with emphasis on low-income households, and the disadvantaged communities.

On the other hand, according to [Singh,1998], the idea of universal access – the ability of any person on the planet to access a telephone – is a simple one, but the means and will required for it, especially in developing countries, are fraught with complexity. In his view, while developed countries, most of which have relatively low population densities and high investment in telecom infrastructure, have come close to getting dialtone to all their people, developing nations in Asia and Africa remain far behind.

In fact, the World Telecommunication body – the International Telecommunications Union (ITU) pointed out that for many developing countries with low teledensity, the provision of service to every home remains a long-term objective – thus the focus is on providing universal access to services rather than aiming at universal service [ITU, 1998]. According to the ITU, the concept of universal access as implemented in a number of developing countries has taken a variety of forms, such as village payphones, public call offices and urban and rural telecenters.

It could therefore be argued that, the real challenge facing developing countries in the next couple of years is to provide basic telecommunications access and communications services to the millions in under-served communities most of which are in rural areas. Most of these countries now have in place a framework for universal access aim at achieving this goal of extending basic services to their 'yet-to-be-served' communities in both the urban and rural areas. For each country, this framework provides details of types of universal access policies to be implemented, how these policies will be enforced and the types of universal access services that will be taken on board.

To ensure that the universal access framework they put in place deliver the goods, some governments are insisting that their national telecommunication organizations (PTTs) and other telecommunication service operators meet specific 'universal access' obligations. [ITU, 1998]. For example, some of these countries have put in place specific policies and policy instruments that obliges these service providers to meet specific universal access service provision targets to facilitate the under-served communities in their respective countries.

Some of the universal access policies and strategies being implemented in some of these countries

include: setting aside a universal access fund to provide services to rural communities in particular, the provision of government subsidies to facilitate the provision of affordable services to under-served communities, cross-subsidization of services and access charges. As a way of putting into practice some of their universal access policies, a number of these countries provide a basket of universal access services, these include: basic telephony, public payphones, telex, data transmission, Internet and fax services. In some of these countries, governments are encouraging the implementation of telecenters to serve as vehicle to deliver on their universal access policies.

In fact, it could be argued that the implementation of community telecenters, rural telephony and other forms of rural communications services are being seen by some countries especially developing countries as of some of the ways to achieve the concept of universal access to basic telecommunications and communication services. For example, according to [ITU, 1998] – in Africa, the implementation of the 'universal access' concept laid emphasis on the development of community telecenters as points of access – these centers are equipped with ICT-based tools to provide a number of services including connections to the Internet and other public networks and databases.

3 Telecenters: providing universal access to services

Historically, according to [Simmins, 1997], the first telecenters were built in Denmark and Sweden in 1983-5. The idea was taken up in Europe, notably in the UK during the later part of the 1980's. The establishment of telecenters in developing countries is a more recent phenomena. Generally these facilities were referred to by a number of names, including: 'community teleservice centers', 'televillages', 'virtual village halls', 'telelearning centres', and 'telecottages'. In Sweden for example, community teleservice centers as they were called were located in isolated rural communities and typically have personal computers, printers, a modem, a fax machine, and a consultant [Grimes 1992].

Basically the idea behind telecenters is that: telecommunications and communications related services can be made available to a given community provided from a centrally located facility – a *telecenter* on a shared basis. The cost of installing the facility, operating and managing could in some instances be shared among the users of its services; thereby making the services provided by the telecenter not only accessible to a wider community but also affordable to the subscribers, the majority in some instances being low income households, who may otherwise not be able to afford the service on their own.

Given that about 80 percent of the population in most developing countries, lived in rural and non-urban areas, the provision of affordable communications services to these communities through telecenters will, it is argued no doubt bring these communities into the mainstream of economic activities and thereby have a positive impact on economic developments of these countries. Furthermore the setting up of these community telecenters can be seen as one way of providing affordable universal access to basic services to a greater number of households in these under-served areas.

It is our contention that the low teledensity level in developing countries especially those of African countries has major implications on access to basic telecommunications and communications facilities by the vast majority of communities in these countries. It could therefore be argued that the implementation of telecenters in a number of African countries is one way to go around the this problem.

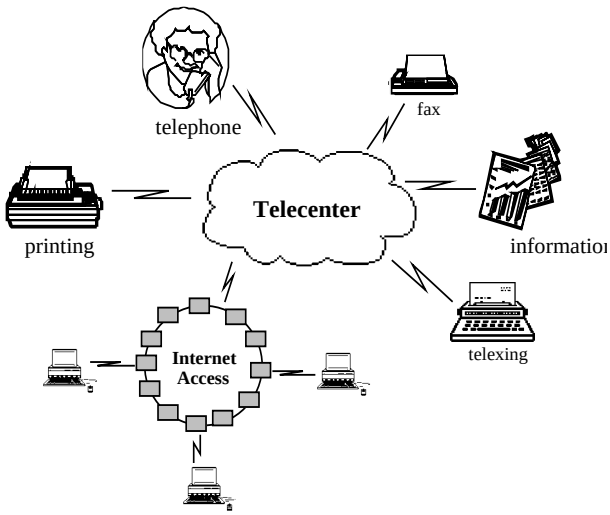
For example, a village or a neighbourhood community in a disadvantaged section of an urban settlement could share telephone services provided at a centrally located telecenter – the universality of access can by this way be assured without the need for every one to own a telephone. The community could also be serviced via the telecenter to have access to say the Internet – again in this case, not every household need to own a computer in order to access the vast resources on the Internet, all that is required is one or two computers at the telecenter hooked to Internet for everyone to used on the time-shared basis.

In effect facilitating universal access via telecenters does not mean universal ownership of modern communication equipment or facilities but rather that, steps should be taken to make access to these facilities universal and affordable – in other words the concepts of 'universal access' to services and the 'affordability' of these services by the target group must go together.

The emphasis is therefore on: the universality of accessibility, facilitating the sharing of common resources and services and the affordability of the services deriving from the common telecommunication and communication based resources and facilities of the telecenter.

3.1 The telecenter: basic configuration

The telecenters now in operation all over the world, differs considerably in the type of services they provide to their client-base. The most basic set-up will normally offer services like: community-based telephone service, access to fax and telex facilities, photocopying services and in some cases, provide basic computer services including document preparation and printing. Some of the basic telecenter set-up also provide access to the Internet and to information both on-line and off-line information sources. The diagram below depicts a typical basic telecenter set-up.



Apart from providing access to basic telecommunication and communication services like those described above, some of the operational telecenters, serve other community-base functions. According to [Anderson J et al, 1998], telecenters should not be seen just as technology centres; but also as living laboratories which could facilitate local sharing of information and ideas. To them, telecenters are not only a way to provide simple, single-point access to external information and services, but also a facility for local residents and groups to organise town meetings, video conferences and technology training to address local development needs.

In North America, for example, some of the operational telecenters or 'telecottages' as some of them are called, provide among other things access to computers and video conferencing equipment; technical assistance, and information, as well as provide retable space for telecommuters. Some also function as a distance learning and telemedicine facility as well as serve as meeting place for civic organizations.

Also, the majority of telecenters in the Nordic and the European countries offer a number of services up and above the basic services including: shared telecommunications, computer, and office facilities; information technology consulting services; local business support services; electronic information access; telecommuting services; national and local government information access services and the provision of meeting space for local organizations as well as the provision of training in the use of information and communication technologies (ICTs).

However, according to [Anderson J et al, 1998], telecenters which employ ICTs are a relatively recent phenomena. Telecenters, they pointed out may employ a number of types of ICTs and offer services such as access to telephones and fax machines, typing, photocopiers, printing equipment, training in the basics of PCs, word processing, spreadsheets, desk top publishing, e-mail and electronic networking. In their view, much of the provision of access to ICTs by rural communities in developing countries is likely to go through the development of telecenters.

3.2 Telecenters and the emerging technologies and applications

It could be argued that the emerging telecommunication and electronic messaging technologies coupled with recent advances in ICTs is beginning to have a major impact on technology-driven type of applications like telecenters both in terms of the technologies employ at this centers and the type and ranges of services offered.

In fact the rapid growth in the spread and the use of Internet resources and globally based electronic messaging platforms and systems in the last couple of years, has given rise to the availability and advancement of a number of sophisticated transmission and delivery platforms. These include: multichanneled direct digital broadcasting satellite (DDBS) systems, interactive computer-mediated multimedia conferencing (CMMCS) systems, radio (including packet radio) and TV broadcast technologies (one-way and two-way interactive systems) and other systems based on advanced telecommunication, communications as well as global and organizational networking technologies to support high speed voice and data transmission and multi-media presentation applications like videoconferencing. These technologies, and application development and delivery

platforms and the improving telecommunication services and advances in global networks like the Internet has given additional impetus to the drive to set-up telecenters in a number of countries.

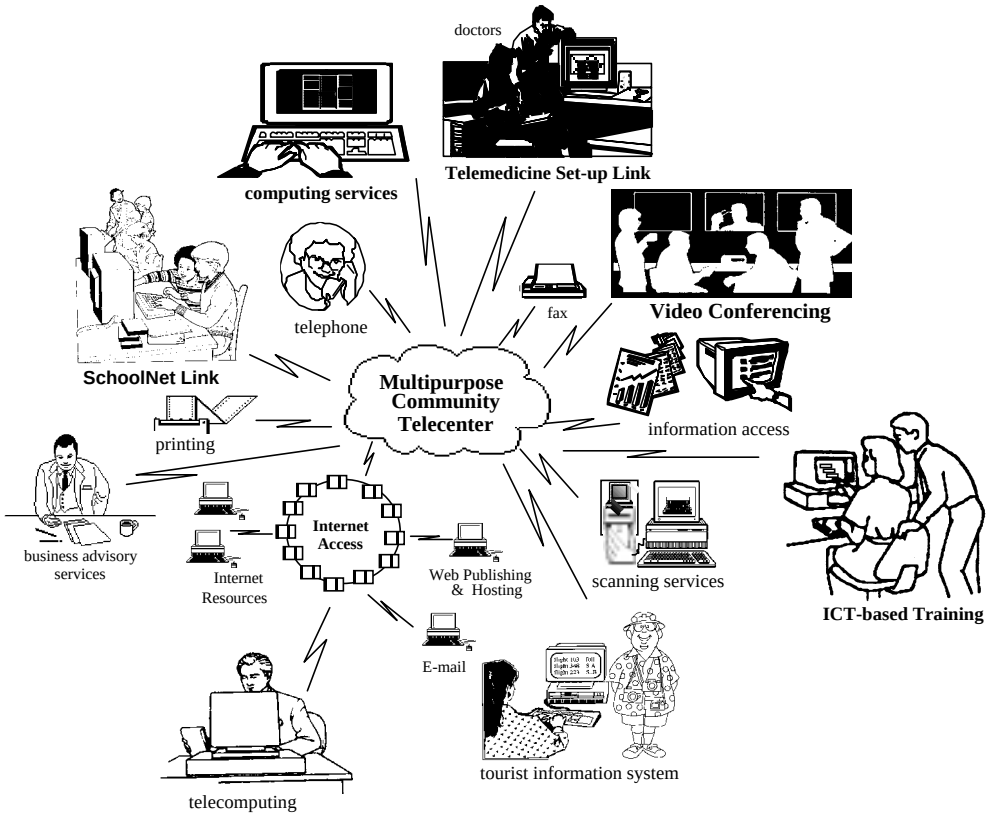
There is also no doubt that the global networking of computers, to facilitate data communications and electronic messaging of one kind or another is increasingly becoming common place. This trend and other developments in multimedia presentation and technologies is opening up the possibilities for the modern types of telecenters to provide up and above the traditional basic services, electronic messaging services as well as multimedia, electronic and video conferencing services to their clientele.

The prediction is that the unprecedented rapid growth in global electronic messaging technologies and ICT offerings as well as in organizational network systems as seen in the last couple of years is going to revolutionize the way we live, work and learn [Dzidonu, Mangena and Mulvey, 1997]. The anticipation is that in some developing countries, sophisticated telecenters like MCTs being promoted by the ITU will be the suitable platform for the development and the delivery of technology-driven applications and services based on these emerging technologies to a wider community at an affordable cost.

4 Multipurpose community telecenters: extending the telecenter concept

The multipurpose community telecenter (MCT) is often seen as an advanced type of telecenter both in terms of sophistication and the range of services it is designed to provide. While traditional telecenters most often concentrates on the provision of access to basic telecommunications and communication services, MCTs according to its proponents will provide a range of services. For example, in addition to the public- telephone, fax and voicemail services, fully fledged MCTs are designed to provide access to the Internet for email, file transfer, access to electronic libraries and databases, government and community information systems, market and price information, environment watch and so on. Some of the MCTs are also being designed to provide multimedia and publishing services as well as TV broadcast, studio and video production training facilities to the community.

Illustrated below are some of the services that an MCT can be designed to provide directly to its users using its in-house facilities and resources or indirectly by serving as a community access point – a gateway to other systems or facilities like community-based Internet-driven application development and delivery platforms for example: SchoolNet, telemedicine, teleducation and electronic commerce systems.



4.1 MCTs as a community gateways to internet-driven application platforms

As indicated above, MCTs can be used as gateway to other Internet-driven external systems namely: access to SchoolNet systems by local neighbourhood schools; access to telemedicine systems by local hospitals and community health centers, as well as access to electronic commerce facilities by local entrepreneurs and organizations to market and trade in their goods and services. Let us examine each of these possibilities in some detail.

Gateway to SchoolNets

Basically a SchoolNet involve the linking of schools electronically via a nationally or globally based electronic messaging network system to serve more or less as an ICT-mediated application development and delivery environment. SchoolNets in effect serves as a platform for the development and delivery of educational programs and other school-related materials and information targeted at schools at the pre-university level. As of now, the Internet and its resources serves as the main educational program development environment as well as the delivery infrastructure of the national and regional SchoolNet system now in place.

Generally, SchoolNets can be perceived as a powerful means to utilize the emerging communications, telecommunications, satellite-based and electronic messaging technologies for the dissemination of teaching and learning materials and information in an electronic form. The availability of these new educational and electronic messaging technologies is opening up new opportunities for implementing SchoolNets on a much larger scale than was possible before. The use of these technologies to service new ways of education, is beginning to make the implementation of SchoolNets a realistic possibility in a number of countries including those of the developing world.

MCTs could serve as community access points to SchoolNet systems by local neighbourhood schools. It will in fact be possible for a number of neighborhood schools lacking the necessary computer and communication resources to avail of the facilities and resources of a SchoolNet system using the local MCT as their community gateway to the system.

Local schools connecting via this access point could used the SchoolNet as a delivery platform for information relating to: (i) inter-school activities like sport competitions, social meetings, teachers' congresses and so on (ii) school syllabus and recommended text book lists for various subject areas, (iii) examination papers and results including those of annual school examinations and school leaving certificate examinations (iv) Ministry/Department of Education guidelines on various subject matters relating the running and administration of the schools (iv) data relating to the details of the pupils, teachers, the physical infrastructure, facilities and other resources, and the performance record (in sports, examination etc.) of schools within the SchoolNet system.

4.3 Gateway to a telemedicine system

Briefly, telemedicine is the application of computer, communications and electronic messaging delivery and multimedia presentation technologies to support the delivery (mainly at-a-distance) of health care services, medical and health-related training and education (to medical personnel and the community at large), the capturing, storage, processing, retrieval and the exchange of medical or health-related data in the form of sound, images, text, and voice.

Telemedicine is utilized by medical service providers in a growing number of medical specialties, including: dermatology, oncology, radiology, surgery, cardiology, psychiatry and home health care among others. One of the key goal of telemedicine is to bring health-care services to the community (rather than bringing the community to the health-care service provider or establishment), and at the same time keeping costs down by making efficient use of resources. In fact telemedicine systems are being designed to address four key general application area namely: medical education, consultation and research as well as access to medical-related information and resources.

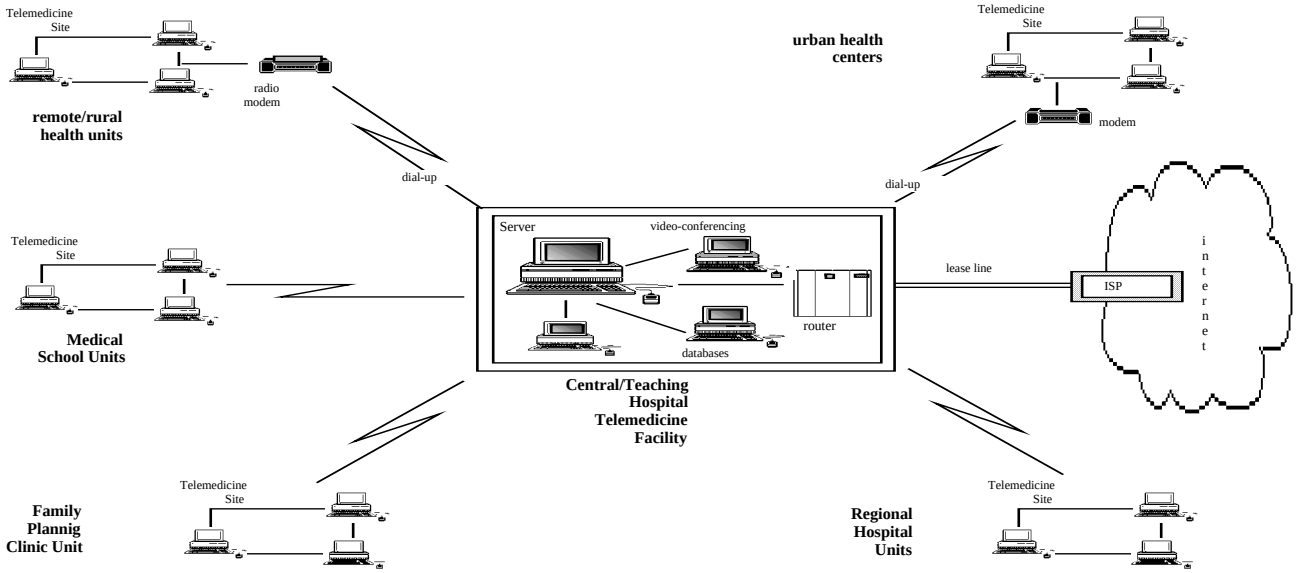
MCTs could also serve as gateways to a national and internationally-based telemedicine provision system for local doctors and other health delivery practitioners who may not have access to the system at their own hospital or community health center. It is possible within this set-up for a less endow local rural community health center without the necessary ICT facilities to directly access a telemedicine system, via the facilities of a local MCT.

Using the MCT as a gateway to a telemedicine system can in practice make advanced medical treatment and consultation possible in local hospitals and health care centers that have limited expertise in some of the medical specialities. For

example, junior medical practitioners based at a less equipped regional hospital or health center could be able to access the expertise of their senior colleagues based at a more endowed Central Hospital via say a video-conference link.

By facilitating local health delivery units access to a typical telemedicine communications network (as shown below), MCTs will in effect contribute to improving the provision of health care services and access to these services through utilization of electronic messaging and communications technologies, as well as facilitate the delivery of timely and quality medical care services to the local community without the constraint of distance or geographical isolation of the health delivery establishment and/or the patients.

A Telemedicine Communications Network

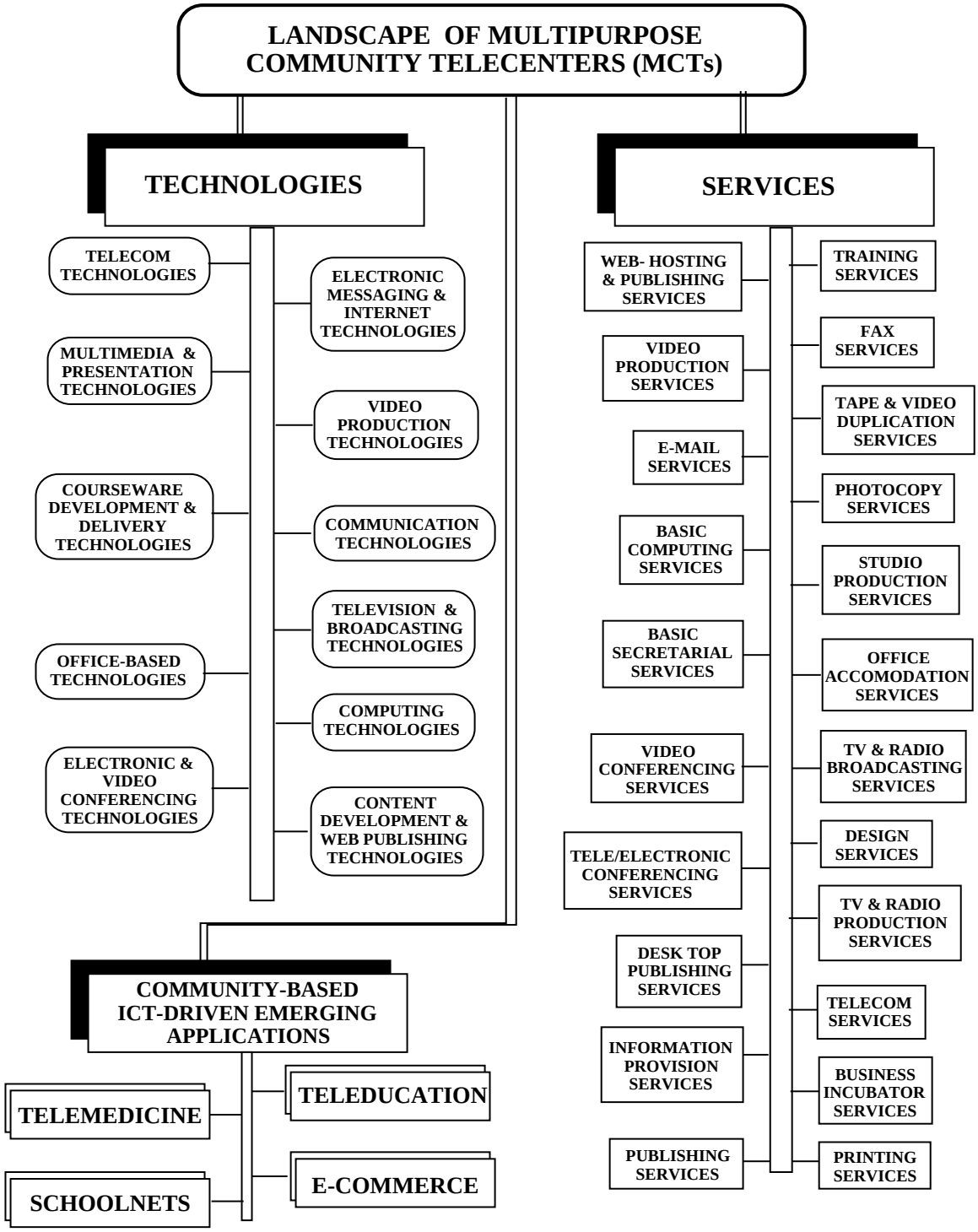


4.4 Access point to electronic commerce facilities

The prediction is that the Internet is going to be the global market place of the future and that electronic commerce is likely to become the mainstream application area of the Internet in the very near future [Dzidonu, Reddy and Agrawala, 1997]. Electronic commerce facilitated by the Internet's infrastructure and resources will be transforming the Internet into the global medium for transacting business both locally and internationally. Business organizations in both the developed and developing countries could use the facilities of e-commerce to publicize and market their product, seek customers to trade with internationally without involving middle men.

However, particularly in some developing countries, rural communities and some of the small to medium scale business establishment and organizations wishing to do business on the Internet will not be a position to acquire their own access facilities. It is therefore possible to have a situation where local merchants, entrepreneurs, and organizations, without Internet access resources could benefit from participation in electronic commence on the Internet, by availing of the facilities of MCTs near to them. These MCTs will in effect not only serve as a community gateway to facilitate e-commerce participation by local organizations but could also provide value-added e-commerce services like hosting electronic fronts, and providing link to e-commerce merchant systems and electronic payment and clearing systems

Concluding, on the whole, a given MCT set-up can provide services up and above those that its resources can provide by serving as a community gateway to other resources and facilities by using its electronic messaging facilities to link its users remotely to other Internet-based systems. The resources of SchoolNets, electronic commerce and telemedicine systems are just some of the external facilities that MCT users can avail of outside their local MCT set-up. It is our contention that MCTs can in effect provide access to ranges of value-added services and external resources by simply serving as a local access point or a community gateway to them.



5 The technological and services landscape of MCTs

It could be argued that the MCT concept is an emerging one. There are therefore not many operational systems around except for a number of pilot projects and systems. The ever-changing and advancing telecommunications and allied technologies in both the computer and communications field means that the landscape of MCTs will continue not to be a static one.

More sophisticated and advanced technological offerings, and the availability of new application development platforms and environments especially in the areas of Internet and multimedia presentation and delivery technologies will in the future mean that the MCTs of the future will be offering ranges of services and facilities to their clientele.

Despite this dynamic and changing technological environment, we identify in the diagram below what could be the possible technological and services landscape of MCTs of the future.

Also depicted in the diagram above is the point already made to the effect that MCTs apart from serving clients, from their in-house facilities and resources, could also be designed to serve as local and community access points to other community-based ICT and Internet-driven systems like SchoolNets, telemedicine, teleducation and electronic commerce systems.

With the growth and the rapid spread of the Internet technology in the developed as well as developing countries, the prediction is that MCTs will apart from providing ranges of in-house services up and above the basic telecommunication and communication services hitherto provided by the traditional telecenters, will in the future serve more and more as the local community-access point to ranges of Internet-driven applications and systems.

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Biography

Dr. Clement K. Dzidonu, President and CEO of the International Institute for Information Technology (INIIT), received his Ph.D. in Computer Science and Operations Research from the University of Dublin, Trinity College. During the past 17 years, Dr. Dzidonu has been involved in a number of IT related projects in Europe and Africa for a number of companies, NGOs, international and governmental agencies. He has published seven computer books and a number of scientific papers and reports.

Before Dr. Dzidonu's appointment to INIIT in 1998, he taught and conducted research at the University of Dublin, Trinity College since 1984. Other universities he taught at are the University of Galway, Ireland, Makerere University, Kampala, Uganda and the National University of Science and Technology (NUST), Zimbabwe.

Between 1986 and 1989 he served as the Technical Co-ordinator of the United Nations University/Trinity College Dublin Informatics Project; involving the training of academics and senior managers from a number of African universities and establishment in Information Technology (IT). Between 1989 and 1990 he served as an IT consultant to the European Union (EU) and was the principal investigator in a EU-wide IT project.

Dr. Dzidonu is currently the co-ordinator of the African Network for IT Experts and Professional (ANITEP). He is the initiator of the African-IT Project (A-ITP) and currently the project director. He is also the co-ordinator of the Trinet Project, designed to configure and implement a low-cost terrestrial and LEO satellite base communication network to facilitate the communication needs of academics and researchers in Africa and other developing countries. He is also currently co-ordinating the activities of the Standing Committee of the Electronic Distance Education Consortium for Africa (EDECA).

Dr. Dzidonu is a member of the Council of the Informatics Development Institute (IDI), Ireland and a member of the Board of the International Center for Information Technology (ICIT), USA. He is listed in Who's Who in the World as a Computer Science Educator.

Dr. Dzidonu is a Commonwealth Fund for Technical Co-operation (CFTC) Expert in Computer Science as well as a Chartered Information Systems Practitioner (UK). He is a member of a number of professional bodies including those of Computer Science, Operations Research, Statistics and Industrial Engineering; these are:

- Association of Professional Computer Consultants, UK (Member)
- The Institution of Analysts & Programmers UK (Fellow)
- The British Computer Society, UK (Member)
- The Irish Computer Society, Ireland (Member)
- Institute of Industrial Engineers, Ireland (Member)
- European Institute of Industrial Engineers, Switzerland (Member)
- Operational Research Society, UK (Member)
- Institute of Statisticians, UK (Chartered Statistician)
- The New York Academy of Sciences, USA (Member)

PALEXPO

TDS.4

Monday, 11 October 1999	16:45 - 18:15

TDS.4	Telecoms for teleapplications

Chairperson:

H.E. Mr. Purna B. KHADKA,
Minister for Communications & Home Affairs,
Ministry of Communications & Home Affairs (Nepal)

Moderator

Mr. Craig MATTHEW,
Director,
Creative Communications Group (United Kingdom)

Keynote Speakers

H.E. Mr. Ismail ALAOUI,
Minister of Education,
Ministry of Education (Morocco)

Dr. Salah MANDIL,
Director-Advisor,
Health Informatics and Telematics (HIT) (WHO)

Panelists

Dr. Isao NAKAJIMA,
Associate Professor,
Emergency Medical Service Centre, Tokai University School of Medicine (Japan)

Mr. Muhammad JAVED,
Chairman,
Pakistan Telecommunications Authority (Pakistan)

Mr. Renato CORTINOVIS,
Officer,
Human Resources Development (HRD) (ITU/BDT)

Mr. Emiel DE HERT,
Principal Scientific project officier
European Commission,
DGXIII-F (Belgium)

Rapporteur/Right of Response

Ms. Barbara WILSON,
Officer,
Human Resources Development (HRD) (ITU/BDT)

PALEXPO

TDS.4

Monday, 11 October 1999	16:45 - 18:15

TDS.4	Telecoms for teleapplications

Having promoted the combined use of information technologies and telecommunication facilities for distance working and distance training for many years, the BDT is also considered a leader in this field. New multimedia applications are now easily available in developing countries, and the distance-training approach is maturing towards teletraining for telecommunication organizations and tele-education for communities in general. The ITU has also being promoting the concept of telemedicine to improve health-care services in rural areas using the available telecommunication and multimedia facilities.

This panel will provide the opportunity to discuss such applications, and how they may be incorporated as services of the multipurpose community telecentres. Consideration will be given to the ways in which industrialized organizations may establish contact with developing countries in order to provide the equipment required and set-up the infrastructure to deliver the services in question.

Ms. Barbara WILSON
Human Resources Development
ITU-BDT

TDS.4

Biography

Barbara Wilson has been in the BDT-HRD Coordination group ever since she joined ITU in 1974; all her studies and graduate work (in training and HRD) were done in Canada: Dalhousie University in Halifax, Nova Scotia; Sir George Williams University in Montreal.

PALEXPO

DEV.2

Tuesday, 12 October 1999	**09:00 - 12:30**

Dev.2	**Universal Access: how to make it happen**

Chairperson

Prof. Jean-Pierre CHAMOUX,
Professor,
Université du Havre (France)

Keynote Speakers

H.E. Mrs. Oulématou Ascofare TAMBOURA,
Minister of Communication,
Ministry of Communication (Mali)

Mr. Noah A. SAMARA,
Chairman and Chief Executive Officer
WorldSpace Management Corporation (U.S.A.)

Presentations

Mr. José Leite PEREIRA-FILHO,
Counsellor,
ANATEL (Brazil)

Strategy to provide Universal Access in Developing Countries

Mr. Gustavo Peña QUIÑONES,
General Coordinator,
Telecommunication Regulation Commission(Colombia)

Market Trend and Technology for Access Networks to realize Universal Access in Developing Countries

Mr. Paul BERKOWITZ,
Vice President,
Product Planning, UTStarcom (U.S.A.)

Co-author: **Mr. Takuya IWAKAMI,**
Senior Manager,
Overseas Transmission Network Systems Division, NEC Corporation (Japan)

Mechanisms for promoting tele-density in liberalised emerging markets

Mr. Graham JOHNSON,
Senior Consultant,
Telecoms Consultancy Analysis Ltd. (United Kingdom)

Co-authors: **Mr. Andy DYMOND**,
Intelecon Research and Consultancy Ltd (United Kingdom)

Mr. Lam Leong KIEN,
Analysys Ltd (United Kingdom)

The positive Impact of Universal Access on the Rural Population: Chile, Two Years Later	**Mr. Jorge BASCOR MATURANA,** *General Manager,* Global Village Telecom (Chile)
Development Flexible Network by Internet oriented switches	**Mr. Harry TAKEICHI,** *General Manager,* Integrated Systems Division, Telecommunication Network Systems Group, Fujitsu Limited (Japan)

Published

Attainment of Universal Access/Service by the South African Telecommunications Regulatory Authority through regulation in the public interest and using the bill of rights (181)	**Mr. Myron ZLOTNICK,** *Company Legal Adviser,* Office of the CEO, M-WEB Limited (South Africa)
The access bottleneck: The broken link to provisioning high speed internet access in Latin America	**Mr. Hector HERNANDEZ,** *Research Manager,* Telecoms Advisory Services, Pyramid Research-The Economist Intelligence Unit (United States) (1481)
Advantages and Possibilities of Virtual Telephony(1130)	**Mr. Michael GULLEDGE,** *Vice President,* Marketing and Applications Engineering, Glenayre (U.S.A.)
Compatibilización del Servicio Universal con la Apertura del Servicio de Telecomunicaciones (1419)	**Sr. Guido Loayza MARIACA,** Ingeniero en Telecomunicaciones, Superintendencia de Telecomunicaciones (Bolivia)
Universal service: a hope for Africa in the new millennium (240)	**Mr. Muriuki MUREITHI,** *Director,* Summit Strategies (Kenya)

Tuesday, 12 October 1999	09:00 - 12:30

Dev.2	Universal Access: how to make it happen

The trend of globalization of economies around the world threatens to increase the gap between those who have access to information services and those who are, for different reasons, deprived of this access. It has been already quite generally acknowledged that the universal access should not only cover basic telephony services but also basic data services and Internet. Therefore the universal access to the so-called basic telecommunication services has become a priority issue for policy makers and regulators in almost every country. Even in the most developed countries with relatively high average teledensities, this question remains an important political and socio-economic issue.

The speakers in this session will present various alternatives how to make the basic telecommunication services accessible to all sections of population in a geographical area or an entire country.They will also discuss ways how to make universal access happen in a fast and economical way in the context of the universal phenomenon of de-monopolization, privatization and competition.

Mr. Jorge BASCOR MATURANA
General Manager
Global Village Telecom (Chile)

DEV.2

The positive impact of universal access on the rural population: Chile, two years on

Company Profile
Global Village Telecom (GVT) is a unique service operator specializing in telecommunication services in emerging markets worldwide. To provide these services, GVT utilizes low-cost, operationally proven Very Small Aperture Terminal (VSAT) satellite technology and Wireless Local Loop systems (WLL). GVT is a Netherlands company with offices in Brazil, Chile, Colombia, Israel, the Netherlands, Peru and the United States. It has assembled a world-class team drawn from many of the leading companies in the telecommunication services and equipment providers. This team combines innovative technology with a long-term commitment to service and has become a leading provider of wireless telecommunication services. In each country of operation, GVT establishes a local company that provides the telecommunication services.

Focusing on satellite and WLL services, GVT provides ideal solutions for Domestic Long Distance (DLD) and International Long Distance (ILD), private voice and data networks, fixed local telephony for rural areas and remote locations, Internet services and distance learning.

The company's prime market is Latin America, with current operations in Chile and Peru, and very soon in Brazil and Colombia. GVT is seeking other business opportunities in other emerging markets for "second tier".

Portfolio of Services

The company uses satellite and WLL state-of-the-art technologies to offer voice, fax, data and broadcast services in a very cost-effective way, and rapid time of implementation. These services are offered at a high quality and grade of service. The voice services are offered on both payphones and private lines, focusing on high-volume lines and business users with complementary services of fax and data requirements. The company aims to acquire basic service licenses and from there to expand to complementary profitable services such as long-distance services, data networks and value-added services based on the existing infrastructure.

Mirror License in Brazil

GVT has been awarded a license by the Brazilian government to supply telephone and other telecommunication services in south central Brazil. The region covered by the license contains a population of 38 million and encompasses nine states, including the nation's capital Brasilia. The award was granted as part of an ongoing privatization program carried out by the Brazilian government, which, thus far, has attracted participants such as Telefónica of Spain, Telecom Italia and MCI.

As part of the award commitments, GVT has undertaken the establishment of a telephone network of 500,000 lines over the next three years with an expected investment of approximately USD 550 million.

DLD and ILD Services

GVT is in the process of establishing a Pan-American ILD network utilizing VSATs that provide on-demand voice, fax and data services with full-mesh connectivity. The network will enable direct connection between customers in different countries in Latin America and the

United States that will maximize the use of available space resources and interconnection costs. The current network's points of presence are in Chile, Guatemala, Peru and the United States, and we plan to expand them to Brazil and Colombia in the second stage

In 1999, GVT was awarded a license to provide DLD and ILD services in Peru. In accordance with the plan presented to the Peruvian authorities, GVT is committed to deploy the infrastructure for DLD in the cities of Lima, Piura, Tumbes, Arequipa and Cajamarca, using VSATs. We expect that this first phase will be completed within one year.

In addition, GVT has a license to provide DLD and ILD services in Guatemala and is expecting to acquire similar licenses in Chile and an International Carrier license in the United States in the second half of 1999.

Private Voice and Data Networks

GVT provides private satellite-based VSAT networks which enable interactive voice and data communications between a central location and a large number of geographically dispersed sites. GVT provides these services with proven operating expertise and using the low-cost satellite technology developed by Gilat Satellite Networks Ltd., an affiliated company. The Gilat companies assembled one of the largest private VSAT networks in Europe for the British National Lottery (2,000 sites) as well as large-scale data networks for the Shell Oil chain of gas stations (6,000 sites) and the Rite-Aid chain of drugstores in North America (4,000 sites). From a private voice network for the Ministry of Defense in China to the strict reliability requirements of the national Stock Exchange in India, these sophisticated satellite networks are operating worldwide with great success.

Fixed Local Telephony for Rural Areas and Remote Locations

GVT provides rapid deployment of networks which become ideal solutions for governments that are willing to develop the rural areas in their countries in a rapid and efficient way. The company also provides services for commercial enterprises with branches in remote locations and small communities that require wireless communications. GVT provides telephone service in rural areas with public payphones as well as private lines, introducing an affordable pricing strategy to the rural end user.

GVT's satellite networks provide basic telephony service at prices substantially lower than those charged by providers using alternative telecommunications technologies. Terrestrial solutions for rural telephony are generally unattractive due to the high costs of installation and maintenance, extremely wide geographical areas to be covered and often difficult topography and harsh environmental conditions.

At the end of 1997, GVT won a public tender published by the Chilean government to provide basic telephony services to 1,725 rural communities in Chile. GVT expects to provide telephone service to all the 1,725 remote villages – spread over Chile's entire 4,000 kilometers – by the end of 1999. Deployment in many of these communities is performed in challenging geographical and climatic conditions.

In addition, GVT won a governmental tender in Peru to provide rural telephony services to villages in the regions of Amazonas, Cajamarca, Piura and Tumbes, located in the north of Peru. The company expects to extend its services all over Peru to the maximum number of villages possible in cooperation with the Peruvian government.

Within the next two years, the company plans to roll out the deployment of rural telecom services to additional countries. Its prime targets are Brazil, Colombia, Guatemala and Mexico.

GVT intends to leverage its core expertise as a provider of remote and rural telecom service in Latin America using VSAT and WLL technologies, focusing on expanding its customer base of governments, businesses and home users, to achieve profitability based on its cost-effective solutions and value-pricing.

Internet Access

GVT provides satellite-based, high-speed Internet access with a direct connection between the customer and the Internet backbone in the United States at a price substantially lower than those charged by providers using alternative telecommunications access technologies. The Internet service can be combined with other services provided to a customer terminal, such as ILD services.

Chile – Country Overview

I would like to start with a description of Chile, my country.

Chile has a population of 14.5 million people with GDP per capita income of USD 9,000

It is situated on the west coast of South America and extends for 4,500 km. as far as Cape Horn, with the Andean range as its eastern boundary and the Pacific Ocean on the west. Its widest point from east to west is of approximately 280 kilometers with an average width of 80 kilometers.

The northern part of the country is mostly desert (the Atacama Desert is the driest in the world), with nitrate fields and copper mines as the main production activities on land, and the fishing industry on the coast. This desert holds the biggest open-air copper mine in the world (Chuquicamata), while the northern ports of Arica and Iquique have the world's second largest production of fishmeal.

The Central Zone is very fertile and produces excellent fruits and wine renowned for its quality, all of which are greatly favored internationally.

Santiago, its capital, lies in the center of this Zone.

To the south of this central part of the country, the climate has a higher rainfall, and the area produces mostly lumber and cattle on its continental shelf which ends in Puerto Montt.

From there the country extends to the southernmost point of South America, and as the Andean range sinks into the Pacific Ocean, it forms into what we call our inland seas, with their fjords and gulfs.

This part of the country, in recent years, has become the second largest producer of salmon in the world, where hundreds of salmon farms have been placed in fjords, inlets and inland seas, giving birth to a prosperous industry.

The city of Punta Arenas, the most southern city in the world, is host to oil and natural gas industries, hundreds of thousands of sheep with their producers' refrigeration installations, and a fishing industry.

Our economy, which twenty years ago was highly centralized and state controlled (about 80% including telecommunications) was liberalized through a privatization process.

The development that followed the legal process of deregulation by the Government affected the state telephone carriers and brought about the entrance of new competitors; ten years later we can see the following transition:

– Telephone density has more than doubled
– New companies offered their services
– Service prices were lowered considerably due to competition
– New technologies were introduced to the market

Today, Chile presents a multi-operated telecom system with:

– Over nine local carrier companies
– More than twelve long distance carriers
– Four mobile cellular and PCS carriers, and
– Five rural telephone carriers

The penetration of telephone services is approximately 19 lines per one hundred inhabitants and the technology used is totally updated, so that the telephone service is of the highest quality.

In the last thirteen years, telecommunications growth has highly developed throughout Chile's economy, and was much higher that the GDP growth rate. While the economy grew at an annual average of 7%, the telecommunications sector grew at an average of over 15%.

Unfortunately, this impressive growth was uneven in rural areas in comparison to penetration rates in urban areas regarding telephone services.

Taking into consideration the recent Chilean telecommunications market experience, we can draw some conclusions, such as:

– The traditional telecommunication industry structure, based on a single or a couple of large state-owned companies, does not guarantee a growth consistent with the people's and business needs, and usually the deficit of services tends to increase.
– Deregulation and privatization processes helped to develop the telecommunication industry through competition and new capital resources to support its growth. These investments, if in state-controlled telecommunication companies in underdeveloped countries, tend to be used by governments by allocating these resources to public health, educational programs, or housing.
– When competition arises, new money comes to finance telecommunication development. Those new resources preferentially go to large cities where the amount of business and profitability are more attractive to operators. Competition takes place mainly in those high-density population areas.

– We see that even though deregulation and privatization processes bring new investments to the telecommunication sector, they usually don't go to rural areas.
– Furthermore, if the government formerly used its state-owned telecommunication companies as tools to develop some rural telecommunications (because of political pressure), after privatization, it's no longer a tool because the ownership of those companies has been transferred to private hands.
– Privatized telephone companies operating under a competitive system face a new environment, with new threats that require protecting its main traditional business from competitors, and therefore their business is not focused on rural needs.
– Of course, competition takes place where the "cream of the telecom market exists" and that is not in rural zones.

Governments that promote free enterprise should consider policies that develop rural communications; privatization alone won't do it, at least not on a short-time basis.

Why not? Not only because the competitive scenario takes place mainly in large cities, but because rural communications have a double negative characteristic that scares private investors.

– Those remote locations demand significant investments in order to expand the public network, with considerable operating expenses for maintaining the rural network
– In addition, rural communities do not produce high traffic, and therefore revenue from traffic use is small unless service expansion is being implemented.

It is obvious, therefore, that poor revenues from high investments are not attractive to private capital.

Consequently, governments should seek new formulas, in order to encourage carriers operating in a free market, and stimulate development of telecommunication services in rural areas and develop their telecommunications evenly for all citizens.

– The negative aspects of rural telecommunication services are high investment and low revenues and therefore should be taken into account while designing government incentives: either reducing investment or producing higher revenue in terms of subsidy payments.

1 STRATEGY FOR THE DEVELOPMENT OF CHILEAN RURAL TELECOMMUNICATIONS

The Chilean Government, through its Telecommunication Administration (SUBTEL) – Ministry of Transport and Telecommunications, decided to take action on the rural telecommunication lagging, within a global program of reducing poverty indexes in the country.

The selected method to do so was the creation of the Telecommunication Development Fund, which will encourage the development of rural telecommunications networks.

The Telecommunication Development Fund is financed by the Nation's General Funds in order to avoid cross-subsidy in the activity within the telecom market. Its administration is handled by the Telecommunication Development Council, composed of four Ministers, three of whom are Experts (professional residence of regions that comprise extensive rural areas) and the last is Head of the Chilean Telecommunication Administration (SUBTEL).

Once or twice a year, SUBTEL publishes public tenders for the installation of payphones in rural areas. Several projects are listed together and are grouped geographically, with a maximum subsidy payment for the winner of each project.

The tender is awarded to the bidder that asks the lowest subsidy payment who will get paid once the project is built and approved by SUBTEL's inspectors. The winner obtains a thirty-year lease as a public telephone service provider in the region where he has been granted the license for either public payphones or private lines.

This program has been successful to the extent that it has provided telephone service to more than 6,000 villages which had not had service.

The rural development program aims to be completed by the year 2000, with the intention to continue on a wider concept, including additional "Information Services" to the rural population.

According to the Ministry's Telecom Fund '98 Annual Report, GVT Chile has proved to have the best performance among the bidding telephone companies, in terms of having accomplished the building of awarded projects.

2 GVT CHILE OPERATIONS

Site Survey

Once a locality has been identified as a potential place to provide telephone services, we enter into a process that gathers relevant information about that locality, taken from three different sources.

- Local authorities
- Community leaders
- Our survey people

The main objective we pursue with this survey is to determine how attractive that particular rural locality is or will be, in terms of its current and expected service demand. We establish how many families are living in the village, existence of business activities and so on.

We also obtain information regarding the presence of other public services such as electric power supply, post office, police station, schools, as a window of opportunities for service expansion.

In public tenders, some of this information is usually provided to bidders.

Location and Installation

After we have decided to install a telephone in that village, we select the location and concessionaire within the village. Different alternatives are studied, but we give preference to schools where possible, for various reasons such as:

– Everybody knows the location of the school

– Educating the population on how to use it (stickers are not enough)

– Future addition of new services (Internet)

Our standard telephone set consists of four main parts:

- VSAT with up to three ports.
- Radio links in addition to the satellite solution.
- Indoor/outdoor payphones with coins or prepaid solutions.
- Fax machine and Internet connectivity.

Payphones are labeled with calling information regarding area codes, tariffs, emergency numbers and instructions on how to use the service.

Some road signals are placed to announce the existence and location of the payphones.

We provide the concessionaire with a detailed instruction manual on how to make local, domestic or international calls and other related services.

GVT has established a regional maintenance system controlled by zonal agents for the proper operation of almost 2,000 locations in a very wide area. The company maintains relations with local authorities in each zone, and takes care of the private-customer needs in their zone through the central calling center located in Santiago.

The calling center receives every operating or maintenance requirement or complaint directing them immediately to the zone agent for a solution to the customer's satisfaction.

First Phone Call in the Village

It is difficult to explain the reaction of the village people when they first have access to a telephone service.

When local authorities inaugurate the service in the village, we notice that the villagers, usually with mixed emotions and rational expressions, thank the authorities for their decision to bring the service to their village, as well as the company's effort for the installation, adding that personal and community problems will be easier to solve due to the arrival of this new social development in the village, mentioning that the telephone will now be able to save lives and allow emergency help, ambulance, firemen and police to be called.

The authorities emphasize that the telephone service will now link the village with the rest of the outer world, while family members will be able to keep in touch with their loved ones who have left the area to study, work or live elsewhere.

The improvement in the quality of life takes many different forms, and the whole community celebrates, showing its best local culture at the inauguration, with music, traditional dances or handicrafts of artisanal manufacture within a truly joyful village celebration.

The period following the introduction of the service to the village will be accompanied by relatively low traffic compared to urban lines. The reason is not the cost of service, nor the lack of education on how to make calls.... it is simply an unawareness of the need. The need to communicate has to be awakened and it may take years before the community has the need to communicate with the outside world through developing communication habits.

When the village has some dominating business activity such as a fishing industry or a lumber-mill

community, the reaction is much quicker and the traffic volume is closer to the one observed in urban areas.

3 CHALLENGES

The development of rural telecommunications in countries like Chile becomes a real challenge in many different aspects.

Usually, our country still exhibits some significant grades of poverty among its people.

Even though you may find more poverty in the suburbs surrounding large cities, the origins of the people there are mostly rural.

As they cannot find work in their hometowns, they relocate to the big city looking for better opportunities. As most of them are not qualified workers, they remain poverty stricken. The government realizes that if small towns and villages were to offer better working conditions, there wouldn't be the need to displace to big cities.

Therefore, the development of rural localities can be achieved through the development of local infrastructures, with telecommunications as one of them.

- The Community:

  The community will develop the need to use communication services, not only as a way to solve dramatic family or individual occasional problems, as may be the case if calling for emergency medical attention, but as a means of getting to know news of interest from the rest of the country, getting closer to larger communities, exchanging development experiences, creating new links to the world, being known by others and understanding that, by doing this, opportunities will appear and will help to develop the village, bringing a better quality of life to the villagers.

- Governments:

When a government wishes to develop a creative environment for the development of rural telecommunication services, it should bear in mind the following:

  – Sufficient incentives to attract serious bidders and key-players.

  – The subsidy payments should be adjusted to the operational period.

  – Protection of rural operators from the dumping practices of the dominant carriers.

Authorities realize that it's not enough to install a telephone in order to satisfy socio-economic development targets in a village. Even though it might help, the use of the telephone encounters a fundamental barrier which is not easy to overcome.

In some rural areas, the learning curve for the use of a telephone will take time because the main barrier – where to call – is a real one, so the actual need remains at the level of emergency use.

In this case, authorities should promote village activities that encompass groups of villages and promote local fairs, religious festivities, sports competitions, school championships in the region, etc., that project the village and its people to wider horizons.

The Chilean Government plans to end its current program of installing one payphone in every village with a population of over 200 people by the year 2000. Parallel to this, the Ministry of Education is developing a program providing every state school with access to the Internet (Plan Enlace).

The next step in social development is already being planned by the Telecommunications Development Fund and a pilot plan will probably be under way by the last quarter of 1999.

It consists of an initiative to install in every rural village with a certain number of families a new public service called *Information Stand*, consisting of a public place where villagers congregate to receive, through the Internet, local news, country news, social events, sports, entertainment and information of common interest for villagers.

Technology Research

As we have seen, part of rural telecommunication services deployment problem is that of the cost involved in providing access to Public Switching Telephone Network from rural areas.

Before GVT came into Chile, a couple of tenders were declared void, because operators were not interested in remote locations.

In this regard, in the Telecommunication Development Fund Annual Report, the Undersecretary of Telecommunication leading the Fund Executive Team quotes:

"There are some issues of The Fund that have received some criticisms. The entrance into service of payphones has been slower than expected...

This situation which, in some ways has clouded the perception of the Fund performance, is

undergoing a significant change because, in the last tender, a new technological solution that will enable a faster telephone access for rural communities and at a lower cost was presented. We refer to the satellite solution".

Undoubtedly the reference was made to GVT, as it was the first operator that introduced the Satellite VSAT technology in its projects, with a full unrestricted coverage of the country.

Considering the geographic, and socio-economic characteristics of rural communities, the need for permanent research studies to create suitable technological solutions to provide access to telecommunications has become a challenge. Traditional means of voice transmission (land lines, microwaves) may not provide adequate solutions, in many cases, for distant rural zones.

Rural Telephone Operators

The most difficult challenges are the ones faced by rural telephone companies.

As we can see, the decision to be a rural telephone service operator received a "powerful incentive", because of the subsidy offered by the Government, as it helps to support the initial investment, always a significant factor in telecommunications.

In the Chilean environment, together with the subsidy and the license awarded to the operator company, exists the obligation to provide the service for the next ten years according to regulated quality standards.

On the operational side of the business, the rural operator has a certain type of help from the regulation system. This consists in the definition of a regulated (per time unit) value for access charges to rural companies' networks. This value, that has to be paid by the calling party (collected by the telephone company that originates the call), is determined according to a legal mechanism that the Telecommunications Law establishes for every regulated tariff of the telecommunication services.

Some important elements, included in the legal formula to determine regulated access charges, are the investments and the operational costs covering a five-year development plan.

As these elements are relatively higher than the ones needed to run telephone companies operating in urban zones, the access charge values established for rural networks' incoming calls become higher than those existing in large cities.
Usually, the operational costs of certain payphone installations are higher because of their location. Besides, sending somebody to rural zones to do repairs and carry out collection functions, often requires special transport (4WD, helicopters, etc.), all this being very expensive.

The challenge consists in *making a business out of it*. The portfolio criteria may help by selecting a mixture of localities (where possible) to meet the challenge, because the patterns of use are very uneven among the different locations; but still it may not be enough.

Another tool is to decentralize the operation, allocating responsible employees regionally, with residence close to the localities to be attended. In my opinion, this tool is helpful in rationalizing the operation but business may still not appear.

The creative and innovative approach may be of help.

One cannot fight successfully against "learning how to use the telephone" in rural areas, that usually results in low traffic because of cultural problems that may take years to solve.

The company management must create (or select) and promote certain services to the rural public, provided through the use of the payphone. Among these we can mention voice mail messaging, and publishing in the payphone booth the telephone number of some frequently used vendors in the rural area.

Similarly, making agreements with people or firms whose activity is connected with rural zones, to promote the use of telephone as way of contributing to the enhancement of their business activities.

In any case, we can affirm that it is very difficult for a telephone company that operates public payphones in rural areas exclusively to survive in the long run.

GVT Chile used this way to introduce itself into the Chilean telecommunications environment, but today its business activity is being complemented by the offer of wireless telecommunication services to private customers (residential and business) that reside in rural or remote places.

Our offer will also include wireless data transmission services, the Internet and private networks to business customers.

In Brazil, GVT will provide wireless telecommunication services, not only in rural communities but also in larger cities.

4 FORECASTING THE NEAR FUTURE

In countries such as Chile, the agendas of presidents or government authorities usually include, as a high priority, the overcoming of poverty among the people, by moving the country towards higher grades of development.

Whatever might be the strategy to meet the objective of getting a higher level of development, it usually considers the enhancement of education for poor people and their insertion into the active business community, equalizing their opportunities with those that the rest of the people have.

It is a hard struggle to eliminate the many deficiencies that exist in the country. One of these is the lack of adequate infrastructure in many different aspects throughout the country. Telecommunications is one of them.

Telecommunications traditionally were seen as a way of communicating between people. Nowadays, with recent developments in data processing, it has to be considered also as a powerful means of education, as well as an important tool for health care in remote places.

We can state today that telecommunications are an important ally in every government policy that aspires to be a winner in the race to reach higher levels of development for its country.

Globally, the challenge to develop telecommunications in underdeveloped economies is huge; and the focus of government policy makers should be pointed to rural areas where most of the deficits can be found.

PALEXPO **DEV.3**

Tuesday, 12 October 1999	**14:00 - 17:30**

Dev.3	**Wireless Access: a viable option for developing countries**

Chairperson:

Mr. Raghavendra RAU,
Senior Director,
Business Operations, Network Sector, MOTOROLA Inc. (USA)

Keynote Speakers

Lic. Jorge NICOLÍN FISCHER
President
Federal Telecommunications Commission
Cofetel (Mexico)

Fixed mobile convergence and the regulatory response to these trends

Mr. Daniel ROSENNE,
Director General,
Ministry of Communications (Israel)

Presentations

Hon. Ms Lauri J. FITZ-PEGADO,
Vice President, Corporate Affairs and Communications
IRIDIUM Inc. (U.S.A.)

Key success factors for the introduction of GMPCs in developing countries

Mr. Rudi WESTERVELD,
Delft University of Technology (Netherlands)

Strategy for Implementation of Local Information Infrastructure in Developing Countries

Ms. Milica PEJANOVIC,
Professor,
University of Montenegro (Yugoslavia)

Co-author: **Dr. Natasa GOSPIC,**
Community of PYTT (Yugoslavia)

Mr. Jean-Paul RANSINANGUE,
Director General,
Actipole (France)

Co-author: **Mr. Xavier David BEAULIEU,**
Actipole (France)

Mr. Dan THOMAS,
Vice President Sales and Marketing,
Telemobile Inc. (U.S.A)

VSAT provides impetus for Rural Telecommunications Development

Mr. Erez ANTEBI,
Vice-President, Marketing,
Gilat Satellite Networks Ltd. (Israel)

Mr. Iqbal Z. QUADIR,
Co-Founder,
Grameenphone Ltd. (Bangladesh) (U.S.A.)

Published

The correlation between economic and telecommunications development in Mozambique

Mr. Khaya DLUKULU,
Regional General Manager (Africa), Commerical,
ICO Global Communications (South Africa)

PALEXPO

DEV.3

Tuesday, 12 October 1999	14:00 - 17:30

Dev.3	Wireless Access: a viable option for developing countries

Satellite and terestrial wireless access technologies for fixed and mobile users have developed to the extent that makes almost all of them at least a viable option to consider when planning to build new telecommunication networks in developing countries or to enhance the existing ones. In order to achieve the best economic results it is necessary to take into account the special geographical and socio-economic conditions of individual countries. Quite often it is also necessary to adjust the existing regulatory framework if it is inherently prohibitive for the introduction of new telecommunication technologies.

The best approach to deployment of wireless access technologies usually varies from country to country. Besides discussing the advantages and disadvantages of technologies as such it is the intention of this session also to present successful examples of using these access technologies in several developing countries around the world.

Hon. Ms Lauri J. FITZ-PEGADO
Vice president, Corporate Affairs and Communications
Iridium (USA)

DEV.3

Biography

Lauri Fitz-Pegado is Vice President, Corporate Affairs and Communications, for Iridium, LLC. Iridium launched in November 1998 the first global mobile personal communications system using Low Earth Orbit (LEO) Satellites. Ms Fitz-Pegado oversees message development and coordination as well as dissemination to key internal and external audiences. She joined Iridium LLC in May 1997 as the Vice President for Global Gateway Management. In that capacity she managed the Iridium team charged with monitoring, advising and supporting the Gateway operators.

Appointed by the President and confirmed by the Senate in June 1994, Ms Fitz-Pegado served as Assistant Secretary and Director General of the U.S. and Foreign Commercial Service (the Commercial Service) for three years prior to joining Iridium LLC. Ms Fitz-Pegado also led the Department of Commerce's South Africa Task Force, the Trade Promotion Coordinating Committee's Africa Working Group and major missions and initiatives to Latin America and the Caribbean.

Ms Fitz-Pegado was a Senior Vice President and Managing Director of the International Public Affairs Counseling Division at Hill and Knowlton Public Affairs Worldwide from 1990 to 1993. She occupied positions at the firm ranging from Junior Account Executive to Senior Vice President from 1982 to 1993. Her responsibilities included domestic and international public and government relations activities.

She served as a Special Advisor on international issues to the then-Chairman of the Democratic National Committee, Ron Brown, from 1989 to 1992. In addition, Ms Fitz-Pegado was Director for Public Liaison for the Clinton/Gore Presidential Inaugural Committee, responsible for outreach to 18 constituent groups and the international community.

As a Foreign Service officer with the U.S. Information Agency (USIA) from 1978 to 1982, Ms Fitz-Pegado served in the Dominican Republic and Mexico. Prior to entering the diplomatic corps, she worked at USIA in personnel, public information and the Voice of America.

A Phi Beta Kappa graduate of Vassar College, Ms Fitz-Pegado received her Master of International Affairs Degree from the Johns Hopkins School of Advanced International Studies. She serves on the Advisory Committees/Boards of the Constituency for Africa, the Federal Aviation Administration's Commercial Space Transportation, the Export-Import Bank and the Ronald H. Brown Foundation. She is a member of The Council on Foreign Relations, The Women's Forum, Women in International Trade and the Women's Foreign Policy Group.

Lic. Jorge NICOLÍN FISCHER
President
Federal Telecommunications Commission
Cofetel (Mexico)

DEV.3

Biography

Mr. Nicolín Fischer is an attorney at law (Universidad Nacional Autónoma de México). He began his career at the law firms of Santamarina y Steta and Ritch, Heather y Mueller. Afterwards, at Banco de México, he fully developed the positions he was assigned to, such as: Head of the Office of International Banking Analysis, Deputy Manager of International Banking Analysis, Manager of Foreign Exchange and International Agreements and Manager of International Agreements and Coins, among others.

In May 1994, he was appointed Vice President of Specialized Supervision at the National Banking and Securities Commission. In September 1996, he joined Nacional Financiera, S.N.C. as Chief Operating Officer and in May 1997 he was appointed General Director at Banco Nacional de Comercio Interior, S.N.C.

In May 1998, Mr. Nicolín was appointed Under-Secretary of Communications at the Secretariat of Communications and Transportation. Currently he is President of the Federal Telecommunications Commission (Cofetel).

Mr. Nicolín has been board member of several banking institutions and councilor to several organizations such as the Radio-Broadcasting, Telegraph and Postal Service National Standardization Committee; Telecommunications of México (Telecomm); the Mexican Postal Service (Sepomex); the National Metrology Council; Notimex; the Mexican Radio Institute; and Nacional Financiera.

In addition, Mr. Nicolín has participated as a speaker in various conferences and seminars sponsored by the World Bank, the Interamerican Development Bank, the U.S. Agency for International Development, the Federal Reserve Bank of New York, the Bank for International Settlements, Nomura Securities, Universidad Iberoamericana and the Mexican Bankers Association.

PALEXPO **DEV.5**

Wednesday, 13 October 1999	14:00 - 17:30

Dev.5	Development Models

Chairperson:

Dr. Marko JAGODIC,
Adviser to the Director General,
Iskratel (Slovenia)

Keynote Speakers

H.E. Dr. Ivy MATSCOPE-CASABURRI,
Minister for Communications,
Ministry of Communications (South Africa)

Mr. Daniel S. GOLDBERG,
General Counsel and Member of the Board
New Skies Satellites (Netherlands)

Presentations

Information Technologies for Development	**Mr. Jean-Guy CARRIER,** *Manager, International Management Research Development (IMRD)* World Trade Organization (WTO)
Acceso Universal, Nuevos Servicios y Competencia en la nueva era de las telecomunicaciones	**Mr. Alejandro HERRERA,** *Specialist in Competitive Analysis of telecommunication products and services,* AH-Studies of Telecommunications (Argentina)
MRAs Speed Introduction of technology	**Mr. Eric NELSON,** *Vice President,* Telecommunications Industry Association (TIA) (USA)
Innovative approach to ICT and development	**Mr. Mart van DE GUCHTE,** *Managing Director,* International Institute for Communication and Development (Netherlands)
Turnkey solutions for the developing countries - from Concept to Profit	**Mr. Christian MOREL,** *Vice-President,* Switching Systems Division, Alcatel (Belgium)

Fostering Economic Development through Privatization: The case of Telecommunications Industry in Thailand	**Ms. Ratirat PAIRAT,** *Marketing Manager,* Nippon Telegraph and Telephone Corporation (NTT) (Thailand) Co-author: **Dr. Boonmark SIRINAOVAKUL,** *Senior Dean,* Graduate School of CEM, Assumption University of Thailand (Thailand)

Published

Effective Transfer of Technology for Industrialization of a Nation	**Mr. Kailash N. GUPTA,** *Executive Director,* Center for Development of Telematics (India)
Market Development Strategies for low income markets	**Mr. Simon ALBURY,** *Senior Consultant,* Analysis Ltd. (United Kingdom)

PALEXPO

DEV.5

Wednesday, 13 October 1999	14:00 - 17:30

Dev.5	Development Models

De-monopolization, privatization and competition are creating a completely different environment for development of telecommunications in every country. To adjust to this rapidly changing environment is very demanding task and even more so for the developing countries. The importance to be able to use to the greatest possible extent the available information technologies for the benefit of their emerging economies poses before them a genuine problem to select the most appropriate development model to establish on time the necessary information and telecommunication infrastructure.

The session will address the issue of appropriate models to stimulate the sustainable development based on the widespread introduction of information and telecommunication technologies and also present results of case studies in several developing countries.

K.N. GUPTA
Executive Director
C-DOT (INDIA)

DEV.5

Effective transfer of technology for industrialization of a nation

Abstract

In the new global marketplace, it is imperative for both companies and countries to sustain a competitive advantage. Technology is seen as a key to build competitive advantage and the technological progress of a country has been identified as the main source of its economic growth, but little importance has been attached to the technology transfer process itself. In this article, focus has been placed upon the concept of effective transfer of technology (TOT), its cost and benefits and the factors influencing the industrialization and technology. The various methods for TOT and the problems associated with it have also been discussed.

Efficient TOT results in the industrialization of the country, not only in the telecommunication production field but also in the field of infrastructure industry for general electronics in the country. For the successful TOT process, the recipient should be able to easily absorb the technology and be able to set up the production unit with minimum capital investment, maximum production per employee and maximum value addition in his plant. Exhaustive documentation, minimal dependence on technology provider and periodic interactive meetings with production agencies are an essential part of any effective TOT. The basis for any TOT process should be "know-how".

The technology transfer process consists of characterizing the available resources of the firm, identifying future technologies and problems of potential customers evaluating, the available alternatives and selecting the best technology in terms of greater customer satisfaction, and finally developing and pursuing a plan for its exploitation. TOT permits immediate access to control over supply and this can be achieved only when the skills, information and technical excellence that constitute technology are transferred to an enterprise from where it can diffuse into the economy.

The aim of technology transfer is to bring about growth by multiplication of production units with similar technologies and the capability of both production techniques, and diversifying the product-range, thereby achieving economies of scale and economies of scope.

A well-developed TOT can substantially motivate the recipient to do R&D in related fields. This, in the long run, develops technical skills to handle future technologies by the recipient. Thus, the TOT process can finally serve as a major input to develop the technological capacity through "learning-by-doing" under the guidance of technology transfer.

A case in India, where C-DOT transferred the technology to 20 manufacturers, not only helped the production of telecom equipment in India to grow but also helped infrastructure industries in India to come up in a big way because of volumes generated by these telecom equipment manufacturers, and is an illustration of the above.

Introduction

Technology and Economic development are two sides of the same coin: if a country wants economic development, it needs technology. Technology can lead to an absolute cost advantage as well as product differentiation. For technology to be sustainable and state-of-the-art, it needs to be

innovative, which can be broadly defined to include new technical methods, new products, new sources of supply and new forms of industrial organization. Firms in the same industry differ from one another and consistently outperform other firms in the same business based on their level of innovation and its ability to acclimatize itself. Also, innovation may create and then eliminate differences among firms in the same industry depending on their levels of core capabilities. Firms with similar core capabilities will be in a better position to learn from each other than those whose core capabilities differ from the innovator. Innovation is costly and requires both capital and human resources along with extensive support.

Technology transfer is concerned with the ability and willingness of the supplier to transfer and it is perceived as an economic activity which brings with it both costs and benefits, and TOT takes place when the benefits outweigh the cost of transfer. The cost of TOT includes the cost of cultural differences, the influence of market structure on costs and the cost of government intervention.

The extent of the market, the number of competitors in the industry, and the industry cost structure are market structure issues. Technology transfer is more likely to take place when it is perceived that a dependable, sizable market exists, and market stability is greater in the case of an oligopolistic market rather than a competitive market. Also, for any given market structure the TOT is encouraged by the organizational form and strategic choices of the firm.

Further, the cost of technology transfer is dependent upon government intervention and is increased or decreased depending on the extent and intent of government intervention, and it includes information control, governmental funding and regulation. Government participates by making direct purchases, research grants, planning collaborative research and development activities and supporting research institutions. Strategic government intervention can encourage, support and build businesses that would not otherwise exist.

Benefits of technology transfer

The technology transfer process can lead to reduction in the cost of the organization's R&D effort or increase the productivity by avoiding duplication of effort and improved efficiency. It can considerably shorten the time between the development of a technology and its first successful application in a new field, thereby reducing the cost and increasing the effectiveness of all R&D programs.

The cost of technology transfer is dependent upon the cultural distance between the transferring and receiving parties and the movement from product-embodied technology to process embodied and person-embodied technology increases the importance of cultural distance. It is felt that another dimension of culture is the teaming ability of a society and in today's global market place the only sustainable advantage is the competitive advantage appropriated through the learning capacity of the organisation. The organisations that master new competencies more quickly than others will device greater benefits from technology transfer. It increases the probability of selecting the best technology for the task. Also, it opens channels of communication between the organization and the market, providing more entries for the future.

Technology transfer process

The components of transfer process are interrelated and therefore, must be managed as a complete system. The technology transfer process consists of the following five steps:-

1. To characterize and catalogue the organisation's resources, both internal and external. An organisation must first look at its capabilities by systematically cataloguing its resources in terms of units of resources, which may be technical, marketing or production reports.
2. To identify the market place problems of potential customers and promising technologies and determine ultimate approaches for their solutions. If the project begins with recognition of a need, then it is necessary to determine alternative technological approaches that might satisfy the need and simultaneously identifying market areas that may benefit from the technology.
3. To systematically search the resource base in order to identify those approaches that are relevant
4. To evaluate the alternatives and select the best technology in terms of product characteristics, anticipated cost, marketability, profit potential and so on.
5. Finally, to develop and pursue a plan for its exploitation.

Thereby, if the technology transfer process is carried out in a systematic and efficient manner, it

can benefit the recipient tremendously and aid in building infrastructure and generation of employment.

Effectiveness of transfer of technology

There are various parameters to judge the effectiveness and efficiency of transfer of technology process. Transfer of telecommunication technology, if efficient, always results in the industralization of the country, not only in the telecommunication production field but also in the field of infrastructure industry for general electronics in the country. This is very important in the case of developing countries. In fact, in India the effective transfer of indigenous technology to about 30 manufacturers and to about 500 vendors resulted in the creation of good telecom production capacity in the country. It also resulted in the setting up of infrastructure industries manufacturing hybrids, PCBs, relays and connectors in the country. This helped greatly the general electronic industry growth in India.

For the successful TOT process, the recipient should be able to easily absorb the technology and be able to set up the production unit with minimum capital investment, maximum production per employee and the maximum value addition in his plant. The dependence on the technology provider should be the minimum possible for continuing the production.

The documentation about the technology and the production processes has to be very exhaustive and without any ambiguity. This should include the list of sources for supplying equipment, machinery and testers required for the production. Multiple sources for all components should also be part of this documentation. The technology developer should restrict customized components to the barest minimum if not completely avoidable. Even these customized components should be available from multiple sources.

The designers of this technology should have periodic interactive meetings with the production agencies for sorting out problems faced in manufacturing. As the technology is changing very fast in the field of telecommunication, it is necessary that constant upgrades be supplied for eliminating the problems due to component obsolescence. For the production unit to support the installations in the field, it is necessary that the technology provider should bring out functional upgrades as and when required.

Case analysis

Following is the case study of the transfer of telecom technology in India by one research and development institute, which was founded by a group of 50 like-minded people. C-DOT was established as an autonomous scientific society in 1984 to develop a family of switching systems and to set up a distributed manufacturing infrastructure for its bulk productionization. Since inception, C-DOT has successfully delivered a wide range of digital switching products. The emphasis has been on commonality of hardware across the products. Beginning with a 128P small-capacity rural exchange, the C-DOT family of switching systems includes a number of exchanges. The largest of these supports 40,000 lines. More than ten million lines have been delivered to the Department of Telecommunications in India in the last fifteen years.

Besides, rural exchanges have been exported to twelve countries. The majority of these products have been deployed in rural areas and are designed for working in non-air-conditioned environment. This means that the exchange deployment and operation is not dependent upon the availability and maintenance of air-conditioning systems. C-DOT has also delivered a number of radio and satellite transmission products. More than one thousand 10-channel digital UHF terminals and second and third order digital multiplexers are operational in the Indian Telecom network.

All the C-DOT products comply with ITU-T standards. In the absence of a comprehensive ITU-T standard for certain requirements, ETSI guidelines have been followed. In order to keep the products in line with changing technology, constant upgradations are made. New features and facilities are incorporated and the capability of the equipment is enhanced to meet the changing customer requirements. This has been done in order to enable other developing countries to make use of developmental efforts of C-DOT. For the same reason, the use of customized components has been kept to a minimum. Wherever it became necessary, such customized components have also been brought into the public domain so that the recipient of the technology does not remain dependent upon C-DOT. The product is always kept competitive in comparison to some of the contemporary technologies by minimizing the cost through repetitive value engineering.

Productionization

One of the main goals of C-DOT was to establish a distributed manufacturing base for the productionization of the products developed by it. For successful productionization of its designs, C-DOT laid stress on the need for ease of production. Considering that a deviation from the conventional production infrastructure was being attempted by simultaneously inducting a large number of manufacturing units, the investment in the establishment of infrastructre was a sensitive issue. Costly capital equipment would have resulted in large investments lowering down the "Production Turnover" to "Investment Ratio". C-DOT, therefore, decided in favour of developing customized testers. These testers were fabricated by manufacturers themselves using standard components. With the complete know-how of the testers being delivered to the manufacturers, C-DOT could achieve capital sensitivity leading to labour intensiveness as compared to the conventional manufacturing plans using costly automated testers, and in the process generating employment.

As against vertical integration of manufacturing facilities to turn the raw material into components, components into subassemblies and subassemblies into systems, C-DOT adopted assembly-oriented production. No in-house fabrication of components was required. In order to make sure that the manufacturers face no component procurement difficulties, C-DOT undertook the task of vendor development as well as vendor qualification. It was also envisaged that some of the manufacturing might need to migrate from the obsolete technology to C-DOT technology. It was therefore recognized that the assembly and testing line being recommended to the manufacturers must be simple enough for the low-skilled manpower to quickly adapt to through retraining.

In order to make sure that the production philosophy advocated by C-DOT was readily accepted by a large number of manufacturers, C-DOT established an in-house pilot production plant. This plant fulfilled the need of a standard manufacturing facility for fabrication of pilot production models. At the same time, it also helped C-DOT in ensuring the adequacy of the production plant.

The plant is also used for complementing the needs of the manufactures whenever a bottleneck is encountered. It also helps in providing online assistance to manufactures in sorting out their production-related problems. The customer, therefore, got full advantage of the competition.

Transfer of technology process

C-DOT believes in transfer of "Know-how" and "Know-why" of the technology. The technology transfer is achieved through comprehensive technology documentation, phased training programs and ongoing technical assistance. The assistance is imparted in the form of periodic interactive meetings, one-to-one interaction with individual manufacturers and in-plant assistance.

The technology recipients are chosen by C-DOT based on certain key factors such as infrastructure availability, financial status, past performance, geographical location, category (public, private of joint sector), the projected demand and the market share for each manufacture. The selected manufacturers sign an agreement with C-DOT for the Technology Transfer. C-DOT collects a nominal technology transfer fee in three or four instalments spread over various stages of technology transfer process. Royalties as a percentage of the sales value of the product are also charged.

The technology transfer is accomplished by releasing the technology transfer package. The package consists of design documents, manufacturing documents, testing and validation documents and the quality control documents. In order to achieve standardization across a large number of manufacturers, C-DOT exercises strict control in ensuring that the manufacturers adhere to the set quality norms while establishing the manufacturing infrastructure. Similarly, C-DOT advises the manufacturers to procure components from a set of approved component vendors. All the manufacturers are required to follow the same batch acceptance procedure, sampling plan, inward goods inspection procedure and the Accepted Quality Level (AQL). C-DOT also educates the manufacturers on the workmanship standards and the factory inspection procedures in order to ensure that the infrastructure and the quality of the production is above an accepted threshold. In order to ensure that the manufacturers adhere to the Standards and the Quality plan, periodic surveillance is also scheduled. This has resulted in consistently high product quality from all the 30 manufacturers.

The effectiveness of the transfer of technology process can be better appreciated by the fact that none of the 30 manufacturers under horizontal technology transfer from C-DOT has ever objected to mixing up of the hardware during the routine maintenance carried out by the field personnel. A PCB fabricated by one manufacturer can migrate to the subsystems of another manufacturer, or similarly the sub-systems of a man-

ufacturer may migrate to a system supplied by another manufacturer. Expansions and retrofits on an existing system can be carried out using the hardware supplied by a different manufacturer. Such a possibility of swapping the hardware is unique to the C-DOT technology and is a direct result of a high degree of standardisation. The customer, therefore, got full advantage of the competition.

Technology transfer achievements

As a result of the unique production philosophy and technology transfer process described previously, C-DOT has been able to achieve a very high success rate in the productionization of its designs. More than 90% of the manufacturers entering into transfer of technology agreements with C-DOT were able to get the Quality Assurance approval of the customer. About three million lines per annum production capacity assuming single shift operations could be established. The manufacturers are scattered all over the country. They are not located only at some preferred locations or states, implying their non-dependence on C-DOT. Instead of having a couple of manufacturers with very high manufacturing capacity, C-DOT could create a distributed manufacturing base with appropriate investment level. The efficacy of the technology transfer process can also be assessed from the fact that every manufacturer could successfully enter the bulk production stage after C-DOT had evaluated the infrastructure and the production model and recommended it to be considered by the customers' quality assurance wing for type approval.

C-DOT also believes in promoting local R&D at the manufacturing units. In order to promote local R&D, C-DOT had transferred the source code and gave the green hand to the manufacturers to upgrade, enhance and manage the technology for one of its products. C-DOT also strived to implement commonality, not only in the product design but also in the manufacturing infrastructure. It has been made possible for the manufacturers of small-capacity equipment to migrate to the large-capacity equipment production through minimal incremental investments.

The production philosophy and the technology transfer process have got specific relevance for the developing countries in Africa and Latin America.

With optimal investment it should be possible for them to establish manufacturing plants producing state-of-the-art products without having to install highly sophisticated equipment, as is the case with most of the contemporary telecom technology.

A comparison of the TOT process adopted by C-DOT with the one adapted by MNC to the same Indian manufacture illustrates the points covered above. This comparison summarizes the effectiveness of the TOT process developed by C-DOT.

TOT parameters	TOT from C-DOT	TOT from MNC
Capital investment	Rs. 130 million	Rs. 2000 million
Lines produced per 100 employees (per annum)	107 K	37.5 K
Lines produced on capital investment (per 10 million)	58 K	3.75 K
Technology documentation	Most comprehensive	Just sufficient
Testers	Cost-effective dedicated testers	Costly automated
Customized components	Few	Appreciable numbers
Periodic interactive meetings	Extensive and cost effective because of local technology provider	• Infrequent • Expensive
Speedy solutions for sub-unit/component obsolescence	• Advanced info. on obsolete components • Fast turnaround for upgraded H/W • Fast turnaround for new features	• Lengthy process • Sometimes not feasible
Basis of Transfer of Technology	Know-why	Know-how

Conclusion

C-DOT technology transfer process provides the most efficient productionization. C-DOT's commitment to the customers for providing field support during the lifetime of the product and its success in the last eight years of its operation in the Indian telecom network is indeed a creditable achievement. Over the period, C-DOT has successfully overcome obsolescence by constantly upgrading and enhancing the hardware. It has also met the expectations of the customers by incorporating new features and facilities as and when desired. This has helped not only in keeping the product current but also enabled it to live its full life in the field. This also helped the operator to get the full return for longer periods on his investments in the network. The capability of small-capacity products to work in unconditioned environments and their compliance to international standards has resulted in the deployment of C-DOT products in more than twelve Asian and African developing countries.

PALEXPO

DEV.7

Thursday, 14 October 1999	14:00 - 17:30

DEV.7	The future for Private Companies in the telecommunication markets of Developing Countries

Chairperson:

Mr. Hamadoun TOURÉ,
Director,
Telecommunication Development Bureau (ITU/BDT)

Moderator

Mr. Ronald DAVIDSON,
Director,
International, Final Analysis (U.S.A)

Keynote Speaker

Mr. Shuji KUSUDA,
Advisor, Nomura Research Institute (NRI) and
Chairman The Japan Committee of Pacific Telecommunication Council (Japan)

Panelists

Prof. Rohan SAMARAJIVA,
Associate Professor of Communication, Public Policy and Management,
The Ohio State University (U.S.A.)

Mr. Robert PHILLIPS,
Director,
Global Technology Resources, GTE (U.S.A.)

Mr. Bakary K. NJIE,
Managing Director,
Gambia Telecommunications Company Ltd. (Gambia)

Mr. Leonard S. DOLLEY,
Vice-President, External Affairs
(INTELSAT)
Opportunity Knocking: Private Telecommunications Business in the Developing Countries

Ms. Judith D. O'NEILL,
Chairman Telecommunications Practice Group,
Thelen Reid & Priest LLP (USA)

Mr. Gustavo ROOSEN
President, Chairman and Chief Executive Officer
CANTV (Venezuela)

Rapporteur/Right of Response

M. Dag NORRBY,
Information Manager,
TELIA SWEDTEL AB (Sweden)

PALEXPO

DEV.7

Thursday, 14 October 1999	14:00 - 17:30

DEV.7	The future for Private Companies in the telecommunication markets of Developing Countries

This panel will be an opportunity for the many representatives of private firms participating, visiting, or working at TELECOM 99+TELECOM Interactive 99 to have an opportunity to interact with the representatives of developing countries for the purpose of exploring the issues concerning investment in and development of emerging telecommunication markets. It would afford an ideal mechanism to bring the telecommunication companies of the industrialized and developing countries together. It would also facilitate companies and governmental representatives of developing countries to air their opinions, views, preoccupations, concerns and goals concerning investment in telecommunications in developing countries.

Ms. Judith O'NEILL
Chairman Telecommunications Practice Group,
Thelen Reid & Priest LLP (USA)

DEV.7

RISK FACTORS IN ORDER OF GRAVITY

- *RELIABILITY OF ENFORCEMENT MECHANISMS*
- *LEGAL-REGULATORY SYSTEM*
- *INDEPENDENCE OF REGULATORY SYSTEM*
- *NATIONAL ECONOMIC DIRECTION*
- *GLOBAL ECONOMIC TRENDS*
- *COMMERICAL SOPHISTOCATION OF POPULATION*
- *BUREAUCRACY IN COMMERCE*
- *POLITICAL STABILITY*
- *TECHNOLOGY*

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RELIABILITY OF ENFORCEMENT

- *STRONG LAWS WITH STRONG ENFORCEMENT*
- *STRONG ENFORCEMENT WITH WEAK LAWS*
- *STRONG LAWS WITH WEAK ENFORCEMENT*
- *WEAK LAWS WITH WEAK ENFORCEMENT*

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LEGAL REGULATORY RISK

NO LAWS GOOD LAWS BAD LAWS

ENFORCEDMENT

POLITICS AND REGULATION: IS INDEPENDENCE SUFFICIENT?

- REGULATORY INDEPENDENCE
  - **BUDGET SOURCE**
  - **BUDGET COMPETITION?**
  - **RULES AUTHORITY**
  - **ABILITY TO SEEK OUTSIDE EXPERTS**
  - **LEVEL OF STAFF**
  - **LEVEL OF LEGAL OVERSIGHT**

NATIONAL AND GLOBAL ECONOMY

- *NATIONAL ECONOMIC DIRECTION*
- *TRACK RECORD OF TREND*
- *STABILITY OF ECONOMIC POLICY*
- *GLOBAL ECONOMIC INDICATORS*
- *LEVEL OF NATIONAL INSULATION*
- *NATIONAL PLAN VIS-A-VIS GLOBAL TRENDS*

COMMERICAL SOPHISTOCATION OF MARKET

- *MARKET RESEARCH INDICATORS*
  - "LEARNING CURVE" ON SERVICE
  - LEVEL OF COMMERCIAL ACTIVITY
  - ABILITY TO PRESELL CAPACITY (like PPA deals)
  - POSSIB ILITY OF PROJECT VS CORPORATE FINANCE
  - POSSIBILITY OF NON-RECOURCE PROJECT FINANCE

BUREAUCRACY AND POLITICS: DO THEY INTERFERE?

- *BUREAUCRACY*
  - **impact on debt service and revenue generation**
  - **hedge in business plan**
  - **layers of licensing and permits**
  - **government support or anchor**
- POLITICS
  - **government respect for contracts**
  - **commitment to commerce**
  - **economic stimulation priority**
  - **access to foreign currency and ability to alienate profit**

TECHNOLOGY AND CONVERGENCE

- *ASSESSMENT OF IMPACT OF CONVERGENCE ON LICENCE RIGHTS AND BUSINESS PLAN*
- *FLEXIBILITY OF TECHNOLOGICAL SOLUTIONS*
- *DEPENDENCE OF BUSINESS PLAN ON SINGLE TECHNOLOGY: COMFORT WITH IT*

PRIVATE INVESTMENT SCORE SHEET

COUNTRY	COMPETITION ENVIRONMENT	LEVEL OF INVESTMENT	DIRECTION RELATIVE TO BASE-LINE
MEXICO	UNSURE	HIGH	STATIC
CHILE	HIGH COMPET.	HIGH	SLOW UPWARD
PERU	HIGH COMPET.	HIGH	FAST UPWARD
DOM. REP.	SOME COMPET.	MED	SLOW UPWARD

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PRIVATE INVESTMENT SCORE SHEET

COUNTRY	COMPETITION ENVIRONMENT	INVESTMENT LEVEL	INVESTMENT DIRECTION
ZIMBABWE	LOW	MED	MED. UPWARD
SOUTH AFRICA	MED-HIGH	HIGH	MED-UPWARD
GHANA	HIGH	HIGH	MED-UPWARD
KENYA	LOW	LOW	HIGH-CAUTIOUS UP

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PRIVATE INVESTMENT SCORE SHEET

COUNTRY	COMPETITION ENVIRONMENT	INVESTMENT LEVEL	INVESTMENT DIRECTION
INDIA	LOW	HIGH	CAUTIOUS-UP
CHINA	LOW	HIGH	LIMITED UP
INDONESIA	MED-LOW	HIGH	DOWN
THAILAND	MED.	HIGH	SLOW UP

PRIVATE INVESTMENT SCORE SHEET

COUNTRY	COMPETITION ENVIRONMENT	INVESTMENT ENVIRONMENT	INVESTMENT DIRECTION
OECS	LOW	MED	HIGH
PUERTO RICO	HIGH	HIGH	HIGH
JAMAICA	LOW-MED	MED	MED UP
BERMUDA	MED.-HIGH	MED-HIGH	HIGH

SELECT INVESTMENT PROFILE

COUNTRY	LONG DISTANCE	LOCAL EXCHANGE	CELLULAR	OTHER
MEXICO	AVANATEL; IUSATEL; OPERADORA PROTEL; MARCA TEL; ALESTRA; MIDITEL; BESTEL; TELEFONICA INALAMBRICA; PCM COM. AMARITEL; LADIMEX; UNION TEL. NAC	AMARTIEL; RED DE SERV. TEL; METRO NET; MEGACABLE COM (3 LIC); TELINOR; UNION TEL. NAC.	BAJA CEL; CELULAR DE TELEFONICA; COM. CELULARES DE OCCIDENTE;MOVAITEL DEL NORESTE; PORTATEL; SIST. TELEFONICOS PORTATILES CEL; TELCEL; TELECOM.DEL GOLFO; TEL. CEL. DEL NORTE	6 MIL NEW LINES PLANNED NEW PCS DEPLOYMENT 1.7 MIL CELL. SUBSCRIBERS IN 170 CITIES ABUNDANT VAS, ISP; PUB. TEL PERMITS

Mr. Gustavo ROOSEN
President, Chairman and Chief Executive Officer
CANTV (Venezuela)

DEV.7

Biography

Mr. Gustavo Roosen has been the President, Chairman and Chief Executive Officer of CANTV since June 1995. He was President of *Petróleos de Venuezuela S.A.* from 1992 to March 1994. He has served as President of the *Junta Interventora del Banco Latino* (the government-created committee charged with reorganizing *Banco Latino*) since March 1994, Special Commissioner for the Reform of the National Financial System since April 1994 and has served and continues to serve on the boards of directors of many Venuzuelan companies, including *Envases Venezolanos S.A.* and *Board Provencial S.A.I.C.A.* Mr. Roosen also served as General Coordinator of the Food Division of *Organización Polar*, an industrial holding company incorporated in Venezuela, from 1978 to 1989, as President of the Caracas Chamber of Commerce from 1986 to 1988 and as Vice President of the Banking Association from 1981 and 1983. Mr. Roosen was Minister of Education of the Republic of Venezuela from 1989 to 1992.

He received a law degree from the *Universidad Católica Andrés Bello* in 1966 and a Master in Comparative Jurisprudence ("MCJ") degree in Comparative Law from New York University School of Law in 1968.