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Action CRECE: an initiative of the Federation of Spanish Scientific Societies (COSCE)

Spain at a crossroads: Europe is the objective

Spain is at a crossroads. It must decide whether its future will be built on a knowledge-based economy, in line with the agreements made by the European Council at Lisbon, in 2000, or whether it will renounce this path and, with it, the opportunity to play a leading role in Europe and in the world in the next few decades. The Spanish scientific community has long been aware of the need to improve its commitment to science and technology. Therefore, in 2004, it decided to bring its most representative scientific societies together into a higher body: The Federation of Spanish Scientific Societies (Confederación de Sociedades Científicas de España, COSCE) [www.cosce.org]. The objectives of the COSCE are: to contribute to scientific and technological developments in Spain; to act as a qualified and unified interlocutor for scientists, communicating with civil society and representative authorities; to promote the role of science and contribute to its recognition as an essential cultural ingredient.

COSCE currently has 54 member scientific societies, which represent more than 30,000 Spanish scientists (Table 1). The federation fully represents the Spanish scientific community and can therefore act as its interlocutor. It also aims to provide knowledge that may be of use to different economic, social, and political agents. COSCE approaches science from a global, practice-oriented perspective, rather than one that is merely academic or theoretical. It is capable of generating expert information that can be applied to actively promote, support, and contribute to developing initiatives—in both the public and private sectors—aimed at strengthening the role of science as a component of Spanish economic and social progress. In view of this, COSCE has become a corporate instrument capable of:



Confederación de Sociedades Científicas de España

encouraging research; improving science education; disseminating the scientific spirit; and promoting social appreciation for scientific values. COSCE's members strongly and actively support the declarations made by European leaders at the Lisbon 2000 summit: if Europe is to retain its position of privilege, the economies of its member countries must be based on the highly competitive acquisition and application of knowledge. For this to happen, European society as a

Table 1. Scientific societies that are members of the Federation of Spanish Scientific Societies (*Confederación de Sociedades Científicas de España*, COSCE)

Asociación Española de Andrología	Sociedad Española de Epidemiología
Asociación Española de Ciencia Política y de la Administración	Sociedad Española de Fertilidad
Asociación Española de Científicos	Sociedad Española de Fijación de Nitrógeno
Asociación Española de Economía	Sociedad Española de Física Médica
Asociación Española de Genética Humana	Sociedad Española de Fisiología Vegetal
Asociación Española de Historia Económica	Sociedad Española de Fitopatología
Asociación Española de Investigación sobre el Cáncer	Sociedad Española de Genética
Asociación Española de Leguminosas	Sociedad Española de Geomorfología
Asociación Española para el Estudio del Cuaternario	Sociedad Española de Inmunología
Federación Española de Sociología	Sociedad Española de Inteligencia Artificial
Real Sociedad Española de Física	Sociedad Española de Malherbología
Real Sociedad Española de Historia Natural	Sociedad Española de Matemática Aplicada
Real Sociedad Española de Química	Sociedad Española de Materiales
Real Sociedad Geográfica	Sociedad Española de Microbiología
Real Sociedad Matemática Española	Sociedad Española de Mineralogía
Sociedad de Biofísica de España	Sociedad Española de Neurociencia
Sociedad de Espectroscopia Aplicada	Sociedad Española de Óptica
Sociedad de Estadística e Investigación Operativa	Sociedad Española de Paleontología
Sociedad Española de Agroingeniería	Sociedad Española de Protección Radiológica
Sociedad Española de Astronomía	Sociedad Española de Proteómica
Sociedad Española de Biología Celular	Sociedad Española de Psicofisiología
Sociedad Española de Biometría	Sociedad Española de Psicología Experimental
Sociedad Española de Bioquímica y Biología Molecular	Sociedad Española de Virología
Sociedad Española de Cerámica y Vidrio	Sociedad Española para el Fomento de la Investigación en Materiales e Ingeniería de la Fabricación
Sociedad Española de Ciencias Fisiológicas	Sociedad Española para el Procesamiento del Lenguaje Natural
Sociedad Española de Ciencias Hortícolas	Sociedad Geológica de España
Sociedad Española de Cultivo In Vitro de Tejidos Vegetales	
Sociedad Española de Diabetes	

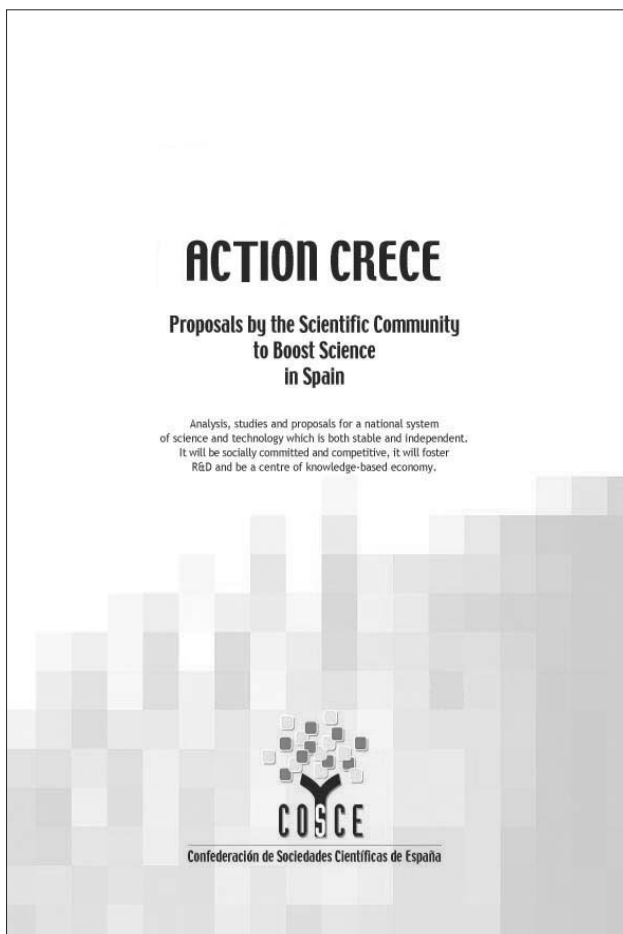
whole must be aware of the value of education and science as driving forces behind economic growth.

Science in Spain has made significant progress over the last 20 years. Nonetheless, a superficial analysis of the current situation suggests that this extremely positive growth has reached its limit, as confirmed by data obtained from several ministries and from different bodies devoted to assessing and monitoring progress in Spanish research. Analysis of these data leads to the conclusion that the system itself should be thoroughly reconsidered, taking into account the new circumstances in which reforms will be made. In response to these conclusions, the COSCE initiated the first of several major lines of action, i.e. establishing five large committees (Structures and instruments of science policy; Human resources in research; Science and the private sector; Spain in Europe; and Science and society) of experts to carry out Action CRECE ("it grows", in English; from *Comisiones de Reflexión y Estudio de la Ciencia en España*, i.e., Commissions for the Reflection and Study of Science in Spain).

The five committees have issued a joint report containing their main conclusions, which are summarized below (the

full text version of the reports is available at the COSCE website [<http://www.cosce.org/crece.htm#ponencias>]):

The structures and instruments of science policy. Universities and research centers are the two great pillars of research in Spain. Between them, there is considerable overlap, which will probably increase in the future, as well as many connections and interactions. It is therefore of great relevance that the basic principles of science policy be the same for both sets of institutions. The contraposition between universities and research centers should therefore be abolished. The joint report highlighted the need to increase the R+D budget, through the moderate use of loans; to achieve a stable framework for science policy; to introduce competitive awards in order to promote groups and centers of excellence; to provide public research centers with greater presence and independence for self management; and, finally, to update the research infrastructure (a "Renewal Plan"). It emphasized the urgent need to set up a Research Funding and Evaluation Agency, an independent body comprising offices of the Ministry of Education and Science that are



related to research, and to ensure its management capacity. The Committee also suggested setting up, in the Spanish Parliament, a permanent consulting committee to advise on issues related to science and technology.

Human resources in research. The European Union (EU) aims to become the region with the most competitive and dynamic knowledge-based economy in the world. Recent EU policy indicates that the number of researchers should be increased by 700,000. This measure should accompany an increase in research investment of up to 3% of GDP. In Spain, several factors hinder the goal of qualitatively and quantitatively increasing human resources devoted to research. These include: low motivation among professional researchers; the low level of research and innovation in Spanish companies, and the poor quality of scientific training available to Spanish students.

The report pointed out not only the deficits but also the increasing age of the research workforce in Spain. The deficit was attributed both to the lack of orientation of the Spanish primary and secondary education system towards science and

to professional uncertainties for would-be researchers. The Committee proposed the development of a career in R+D based on a tenure model, and the establishment of new salary schemes. In addition, it emphasized the need to attract younger generations into the professional research system through implementing measures in the educational system that encourage interest in science. The promotion of geographic mobility and the exchange of personnel between the public and private sectors were also recommended.

Science and the private sector. An awareness of innovation's strategic value, and of the connection between science research and business interests, gave rise to this committee's objective: to formulate a proposal that will contribute to boosting Spanish innovation. The following factors were taken as starting points: the conditions that define an effective ecosystem for innovation; the current condition of Spanish innovation, and the lessons learned from a series of practical cases involving attempts at innovation by Spanish companies and institutions.

The key factor for innovation is the connection between the two sectors, understood as the application of knowledge and technological developments generated by scientists to addressing the specific problems of business and the general needs of society. This is the link that allows technology and scientific knowledge to be converted into successful, productive achievements.

The Committee proposed creating a Meeting Forum (*Foro de Encuentro*), which would involve all components of the Spanish innovation system. In this forum, mechanisms and plans for collaboration and action would be drawn up that would enable Spanish innovation to take a qualitative and crucial step forward.

Spain in Europe. Since 1986, when Spain joined the EU, a system of collective institutions and mechanisms of action has developed that makes it impossible to consider Spanish reality outside of a European context. One of the areas in which the dynamics of European integration is obvious is that affecting research policy, technological development, and innovation.

In the European context, Spain is expected to become a key player in R+D aspects of the integration process. Spanish domestic R+D policies must therefore be considered within the European framework so that they become integrated into and take advantage of EU policies and actions. For example, implementation of the so-called Bologna reforms (from the joint declaration of the European Ministers of Education, which convened in Bologna on June 19, 1999) in Spanish universities will be crucial for European integration of young Spanish researchers.

Science and society. Action CRECE analyzed some of the controversial issues affecting the interaction between scientific advancements and social structures, especially how individuals and social groups (the “public”) in Spain react to scientific advancements. In addition, the report included a study of the influence that society’s appreciation of science exerts on science itself.

The Committee found that Spanish society at large is one of the most optimistic and least reserved regarding science and technology in Europe. At the same time, however, it shows low appreciation and knowledge of scientific facts and achievements. The report proposed increasing the public’s interest in science and stimulating the choice by young people of a scientific vocation. It also emphasized that the scientific community should commit itself to disseminating knowledge of science and to establishing channels of communication with the general public. The report called for a greater presence of science in the media. It also set forth a series of recommendations aimed at increasing the presence of women in high-level positions of responsibility in the Spanish education and research system. Scientific research, technological development, industrial innovation, academic education, and professional training will lead to the development of new ways of thinking, working, and living. These factors will, in turn, determine the citizen’s capacity for social participation.

The role of the CRECE committees

The committees were charged with evaluating science in Spain from a totally independent position. Based on this evaluation, they proposed actions that should contribute to strengthening the science–technology system in Spain and its links to all social agents. Action CRECE generated a series of conclusions that were made concrete in the form of clear and workable proposals for revitalizing, reforming and, if found necessary, introducing structural changes to the Spanish scientific system. These proposals affect both fundamental aspects of the system and aspects related to its economic and social impact. Clearly, CRECE’s conclusions and proposals are aimed at ministries in the government that are involved in

the Spanish R+D system; as they are responsible for setting priorities, creating funding instruments, and developing assessment methods to ensure that resources are allocated appropriately. The conclusions and proposals of the committees are also directed at scientists themselves; as they propose and carry out scientific research and directly manage the allotted finances. In addition, Action CRECE’s proposals are addressed to other participants in the system, especially business people and educators, and to society in general. This broadly directed approach is intended to ensure that scientific progress and technological innovation will have a greater presence in Spain.

Scientists, professionals, and experts in a wide range of scientific fields have participated in the CRECE project. Their knowledge, experience, and prestige have enriched the project’s findings, and provided the soundness and depth that CRECE’s objectives need to guarantee the support and collaboration of Spain’s public and private sectors. The leadership skills of the committee members and their ability to act have made Action CRECE one of the strongest initiatives ever undertaken by the scientific community. This venture’s first success was that a group of scientists was able to offer practical solutions to the current problem of updating the Spanish science and technology system. However, Action CRECE goes beyond this: it tackles the ambitious and strategically important task of strengthening and sustaining Spanish science as a cultural factor and an economic driving force during a time of great international competition.

Concluding remarks

Successful efforts by the COSCE has enabled scientists, with broad public support, to offer practical recommendations to updating the role and the abilities of science and technology in Spain. Nevertheless, the aims of Action CRECE extend even further: by recognizing the great strategic significance of a knowledge-based economy, Action CRECE effectively seeks approaches to the sustainable development of Spanish science—approaches that will succeed within an environment of strong worldwide competition.

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