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MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD INFORMACIÓN COMERCIAL ESPAÑOLA Secretaría de Estado de Comercio

THE INDUSTRY OF SCIENCE, OPPORTUNITIES FOR SPAIN

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BALLESTERO DÍAZ, Fernando

Large research infrastructures: targets and role in technology progress

Abstract: Today's research requires a greater sophistication of tools and an enhanced data-processing capacity. Its characteristics and cost mean that a single institution or even a sole National Public Authority cannot take on the task alone, and therefore science policy managers of the most advanced countries decided to collaborate years ago, jointly creating large international research facilities or infrastructures where scientists can carry out experiments. The European Union has fostered new infrastructures or ESFRI. As well as facilitating research, the EU is boosting improvements and innovation that the centres and the companies working with them can implement, to allow researchers to make headway with their experiments and become a force driving innovation and technology progress. The article reviews large national infrastructures and the international efforts that Spain is part of, analysing the course of these innovations or technology improvements, and it concludes with reflections on the need to support science industry companies, underscoring the pursuance of an active role in the scope of research infrastructures, given their part as drivers of technology progress and innovation.

Key words: scientific programming, development, technology.

JEL classification: H54, O32, O38.

CÁCERES NÚÑEZ, Francisco Javier

The science industry: an approach to its markets

Abstract: The industrial sector of the Science Industry (SI) is depicted as the necessary partner of an efficient and sustainable science system, and as a key component of advanced industrial development. Its markets are moderate as far as volume is concerned, but significant in terms of technology and as industrial and economic drivers. The Spanish SI market is estimated at around 490.5 million euros; the European market at 9,557 million euros; and the global market at 40,093 million euros. Average growth amounts to 5.5 per cent per annum. Spain's SI is a pioneer in Europe, with significant public-private collaboration initiatives. The article also covers barriers to growth, trends and contributions to society by SI.

Key words: industrial sector, technology, science-industry collaboration, technology market.

JEL classification: I230, L600, O100, O300.

CORTÉS PULIDO, Juan Carlos

The European Space Agency and other large projects: the effect on industry

Abstract: The space sector has sustained big growth in recent years as an essential element for the economy across sectors. This means that, despite the crisis, there is a growing market for space systems and related services. In the European framework, the main institutional stakeholder in the implementation of space activities is the European Space Agency (ESA). Spain is a founding member of this agency, whose activities and programmes have allowed the development of an advanced, competitive and growing space sector.

Key words: space, space industry, CDTI.

JEL classification: F5, L3, L8, O2, O3.

FONT JAUME, Andrés

Methodology for the assessment and prioritisation of international science research infrastructures

Abstract: The evaluation and prospective prioritisation of international research infrastructures is an issue of considerable importance, because of the volume of research required and due to the strategic implications involved. Assessment difficulties stem from their intrinsic complexity, the variety of science areas involved and the lack of international standards recognised as a reference. This article's methodology was devised and developed with Spain in mind, considering qualitative and strategic components, following an analysis of components used in over 13 European countries.

Key words: scientific methodology, evaluation, research infrastructures.

JEL classification: A12, B41, H54.

GARCÍA BARRANCO M^a Carmen; PÉREZ MESA Juan Carlos and GALDEANO GÓMEZ, Emilio

Transport as a limiting factor for growth of perishable produce exports

Abstract: The Spanish horticultural sector currently faces one of its main challenges: improving logistical management. Dependency on land transport threatens feasibility. Cost increase trends and the future hurdles for transport use (environmental tax or limitation of transport) make it necessary to seek alternative methods such as, for instance, the use of maritime transport within the intermodal framework. This study sets out to seek arguments in favour of the strategic decision to support this change, revealing the consequences of transport cost increases for exports.

Key words: inter-modality, fruit and vegetables, truck, boat.

JEL classification: F14, Q17.

JIMÉNEZ CARVAJAL, José Miguel

The impact of industry on technological progress at frontier of science research centres. CERN's case

Abstract: The European Organization for Nuclear Research (CERN), an inter-governmental body, is a clear and tangible example of European integration. Its governance structure and financing mean that it has a prime position on a world level in basic physical research areas, and support its strong commitment to R&D and infrastructure maintenance and improvements. This assumed and sustained strategy allows it to operate a network of infrastructures of accelerators, detectors and computation centres that is unparalleled on a world scale and to lead, in collaboration with the national institutes, universities and industries, projects and studies that involve a conceptual challenge in various technology areas. The article reflects on the key factors of its success and highlights some of the major challenges ahead.

Key words: magnets, superconductivity, accelerators, particles, Hadron therapy.

JEL classification: D240, F680, I230, O310, O320.

MARTÍN BARBERO, Isaac; ALVAR VILLEGAS, Jorge and VIÑAS TORMO, Rocío

The potential of Spanish industry on international markets

Abstract: Leading technology industries, key to industrial development, are mostly cross-cutting and are generally applicable to diverse industries that can sometimes be diametrically different. Their use makes a difference in production processes, goods and services, and many of these innovations and technologies are engineered by companies belonging to science industries. The proposal of ICEX is to rethink traditional promotion targeted at specific sectors, integrating industries that do not fit into one sector alone. Analysing international markets, supported by our network of sales offices, we launched a strategy to promote these industries. Selecting promotion tools depending on the features of the companies, we supported their internationalisation efforts. Two years later, we have verified a greater number of companies in each activity, greater internationalisation and an enhanced image of Spanish science and industry and, therefore, the image of our country.

Key words: industrial integration, markets and science.

JEL classification: D45, F21, G15.

PILAT, Dirk and GALINDO-RUEDA, Fernando

From research to innovation

Abstract: Public funding of science research continues to be significant to support innovation and address global challenges, but it is not the only field in which the public sector can play a role. Open science is a core part of improving science efficiency and dissemination of knowledge. Several methods can be adopted to promote access and reuse of the results of this research: removing barriers and establishing appropriate incentives, developing infrastructures to foster and promote it, or adopting compulsory measures for the open dissemination of results reached with public funding. Open access involves costs and public institutions face the challenge of finding funds and sustainable business models. This article underlines the relevance of applying open science principles to material resources used by researchers wherever possible. Given that processes leading to research discoveries become ideas to sell, the core role of the Government is to establish institutional frameworks, basic principles and rules to reflect the public interest and provide the incentives required to all stakeholders involved.

Key words: open science, innovation, public policies.

JEL classification: O31, O32, O38.

PONCELA GARCÍA, María Luisa

The science industry and its implications for other industrial sectors

Abstract: Following a characterisation of the science industry sector, this article explains its significance as an activity driving technology innovation of overall industrial sectors leading at the forefront of technology. Details are provided on primary and secondary impacts of various natures, dealing with the complexity of the technology transfer process. Like no other industry, the science industry is an example of the goal (so desirable in theory but so difficult to attain in practice) that basic research is geared to the market, allowing subsequent technology developments to be used by industry, becoming part of an innovative range of goods and services. The example is further supported by specific examples, including details of the industrial promotion actions in Spain in this arena, highlighting its pioneering nature on an international level.

Key words: innovation, research and development, technology.

JEL classification: H54, L2, O32.

WAREHAM, Jonathan and CASTELLUCCI, Laura

The role of business schools and research centres as drivers of technology innovation

Abstract: The unlimited potential of science and technology is a core pillar to boost the economy, create employment and develop innovative products improving the quality of life of people. In this scenario, business schools, with a long record of accomplishment of innovation and entrepreneurship, have a key role in accelerating innovation processes and building bridges between research centres and industry. Boosting open innovation between the public sector and industry from business schools allows the reduction of time between the germination of an idea and its commercial use.

Key words: innovation, technology, research, public sector.

JEL classification: D73, H51, O32.

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