



SPANISH SCIENCE,  
TECHNOLOGY AND  
INNOVATION STRATEGY  
2013-2020  
EXECUTIVE SUMMARY

## EXECUTIVE SUMMARY

Science, technology, and innovation elevate the well-being of all individuals by promoting social, economic, and business development of a country. Despite the evolution of R+D+I in the country over the last few decades, the Spanish System of Science, Technology and Innovation needs to improve its efficiency in order to optimise the level of social and economic benefits it creates. In this context, Spain needs to improve the perceived relevance of scientific and technological research, from the most basic to the most applied, in order to achieve real international leadership in R+D+I, promote participation from the private sector in funding and carrying out R+D+I, create a flexible and efficient framework for the development of science and innovation without administrative or regulatory barriers, maximise the development of new sources of funding, and improve job placement and mobility of human resources and talent, so as to generate new knowledge that is directly transferable to a productive result.

Since 2008, Spain has suffered the consequences of an unprecedented economic and financial crisis and of the accumulation of profound imbalances in the financial system, the magnitude and severity of which cannot be overstated. The high rates of unemployment, depressed business activity, a growing field of international competition, and the progressive deterioration of our

*"Science is the soul of prosperity of nations and the living source of all progress."*

The words of Louis Pasteur define what is and should be the driving force for scientific and technological advancement: service to society

competence in innovative materials are just a few of the manifestations of our current economic predicament. In order to overcome this downward trend, we must develop ambitious political projects that support the development of scientific and technological innovation, its application in tangible products and social benefits, and the development of innovations for modernising the country and maximising the potential of its citizens.

In light of the fact that funding is one of the keys for developing large R+D+I projects, the STRATEGY suggests the need for fomenting programmes of collaboration between public and private sectors as well as co-financing by the various Administrations and the European Union.



In the elaboration of the SPANISH STRATEGY developed by the Ministry of Economy and Competitiveness, through the Department of Research, Development and Innovation, various public, business, and social actors have collaborated with the participation of all R+D+I components in Spain. In addition, the collaboration among the different departments of state and autonomous communities has made the SPANISH SCIENCE, TECHNOLOGY AND INNOVATION STRATEGY 2013-2010 the optimal framework for optimising the capacities of all actors in the Spanish System of Science, Technology and Innovation. The STRATEGY is a comprehensive guide to the goals and objectives established, as well as what reforms are required and in which sectors. The role of this Strategy is not based on deciding which instruments should be developed or how resources should be distributed, which would be the responsibility of scientific, technological and innovation research plans. Rather, the SPANISH STRATEGY refers to the major challenges that the country faces in terms of materials for research and innovation in order to optimise both fields for development as a true living source of progress.

The Spanish Strategy sets "market-based" priority areas that cover the entire process of development and application of scientific and technological research.

At the same time, the STRATEGY allows for establishing Spanish policies based on the goals set by the European Union in the field of R+D+I, as defined in the "Union for Innovation," and the new programme that provides the framework for financing these activities, "Horizon 2020," thus facilitating the collaboration and participation of actors within the Spanish System of Science, Technology and Innovation in the European community in a natural, consistent, and growing manner, without losing sight of the specific needs and characteristics of the Spanish System. With this in mind, we must contribute to the consolidation of the European Research Initiative from the framework of the Spanish System of Science, Technology, and Innovation.





## TALENT, OUR GREATEST ASSET

The human resources directed towards R+D+I are at the highest priority in the SPANISH SCIENCE, TECHNOLOGY AND INNOVATION STRATEGY 2013-2010. Human resources are the foundation upon which all scientific and technological capacities of a country are based, serving to generate talent and facilitate the transfer of knowledge into business applications. Although the number of doctors, researchers, and technically trained personnel dedicated to R+D+I activities in Spain has increased by 65% in the last decade, the ratio of employed professionals as compared to the total population remains below the average value for nearby countries, primarily due to the low rate of hiring by companies, which would also help explain the lack of innovation in the production sector.

In order to increase the incorporation of human talent into the Spanish System of Science, Technology and Innovation, researchers must eliminate uncertainties regarding professional development in their activities by establishing a better definition of the career path of the researcher, this also being one of the main objectives of the STRATEGY.

With the goal of facilitating employment in R+D+I activities, the first step will be to offer predoctoral education through measures such as the creation of industrial doctorate

programmes, thus allowing universities and businesses to share the responsibilities of overseeing the thesis research of doctoral candidates while facilitating professional contacts for future R+D+I job placement in the business sector.

The STRATEGY also covers the mobility of doctors, technologists, and R+D+I personnel within the public and private sectors, as well as international mobility as a key factor for increasing the strength of the Spanish System. To this end, the STRATEGY provides an impulse for the necessary framework so that measures such as recognition of temporary job positions and business contracts do not present an obstacle to the promotion and development of professional careers.

However, the ultimate goal of the Strategy, in addition to adding to our knowledge base, is to provide Spanish R+D+I professionals with a greater potential for employment – a capacity not only for reaching a position in the workforce and maintaining it, but also to be able to match and surpass the qualities and capabilities of any other professional in the field – thus facilitating insertion into the workforce and making our professionals more competitive and in demand by institutions, research centres, and business at the national and international level.

## PROMOTION OF EXCELLENCE IN SCIENTIFIC AND TECHNOLOGICAL RESEARCH

The SPANISH SCIENCE, TECHNOLOGY AND INNOVATION STRATEGY 2013-2010 devotes an entire chapter to this subject due to the importance of excellence for scientific, social, and economic progress in terms of generating scientific and technological advancements through basic and applied research. The progress of ideas, the great scientific advancements of the future, the development of emerging and vanguard technologies, and many opportunities for innovation are born in the so-called "frontier of knowledge," which frequently requires a multidisciplinary approach with collaboration from various sectors. The STRATEGY will foment programmes, activities, and measures deemed necessary to consolidate the leadership of our institutions, researchers, and research groups on the international stage, thus attracting national and foreign talent, all with the intent of strengthening our capacity as a true "country of science and environment of innovation."

Scientific and technical knowledge is without a doubt one of the most important assets that Spain has access to for innovating and creating wellness and wealth for the entire society. In addition, creativity and entrepreneurship, key characteristics for guaranteeing dynamism in our society and economy, are essential components in transferring the results of basic research carried out by our scientists.

As such, the Spanish Strategy represents a commitment in terms of policy that governs science, technology and innovation in Spain through public funding of research, with a particular focus on generating unique knowledge that, due to its nature as a public resource, constitutes the basis for development in our society. Along with the incorporation of new funding options, structural reforms will be put into place under the framework of the STRATEGY including a transformation of the governing models for public institutions under the Spanish System of Science, Technology and Innovation. We are still bogged down by a complex and obsolete legislative, bureaucratic, and administrative framework that wastes resources, impedes efficiency, and prevents the System from progressing.





## BUSINESS LEADERSHIP IN R+D+I

The Achilles' heel of scientific and technological development in Spain continues to be business participation, above all that of SME, both in terms of contribution to the funding of R+D+I activities and capacity for executing R+D+I and incorporating the resulting innovations into the products and services offered. This deficiency detracts from the competitiveness of Spanish businesses in the international market, the generation of employment, and the translation of these components into advancing society. In this context, the STRATEGY seeks to promote applied research, which yields social and economic benefits from the scientific knowledge generated through public/private collaboration, as well as providing incentives for R+D+I through new forms of funding for business R+D+I programmes which are underdeveloped in Spain. The STRATEGY also seeks to stimulate funding options that are optimised for the characteristics of our internal production, in particular for the field of SME, without forgetting the importance of developing new demand-based instruments such as public purchases for innovation. As such, the goal is not focused so much on maximising the commercial productivity of R+D+I programmes in the business sector, but rather on promoting a greater level of investment by businesses in the development of their R+D+I initiatives.

In order for businesses to introduce scientific and technological innovation into their business models in a direct and sustainable manner, the State must eliminate many of the bureaucratic, administrative, and regulatory barriers that still persist in the system. With this in mind, we will develop a regulatory and financial framework that will favour public/private collaboration and business investment in R+D+I, identify strategic sectors and commercial niches for development in other countries, and create a distinction for accrediting "innovative SME."

The STRATEGY uses various methods for the promotion of public/private collaboration, the development of an efficient framework for managing intellectual property rights, and systematic incorporation of a professional management programme for R+D+I in public research centres and businesses. All of these strategies are essential for facilitating the ability of these scientific and technological advancements to be adequately adapted and incorporated into processes, products, and services that can generate economic value.

## SOCIETAL CHALLENGES

As highlighted at the start of this executive summary, it is not possible to comprehend the process of generating scientific knowledge and its applications without taking into account the problems currently facing our society. The applied research initiatives delineated by the STRATEGY in order to find solutions to societal challenges are predicated on basic research, technological development, and innovation, and are characterised as being multidisciplinary in nature. This outlook comprehends the entire process from discovery to application, with multidisciplinary participation by scientists and technologists capable of using their unique perspectives for approaching the path that spans the entire process of evolution, from the materialisation of an idea to its application in the form of a process, service, or product.

As such, the STRATEGY identifies and designates priority areas as societal challenges, which does not imply empowering job sectors and fields of research as separate and isolated factions. The results-based solution to these challenges will depend upon multidisciplinary collaboration among the various sectors contained within the Spanish System of Science, Technology and Innovation.

R+D+I activities will be focused on reaching 8 challenges that apply to the global population and that of Spain in particular: health, demographic changes, and well-being; food safety and quality, productive and sustainable agricultural production, sustainability of natural resources, and marine, maritime, and aquatic research; safe, sustainable, and clean energy; intelligent, sustainable, and comprehensive transportation systems; climate change, natural resources, and raw materials; social changes and innovation; digital economy and society; and safety and protection of citizens' rights and freedoms.



## INTERNATIONAL APPLICATION OF THE SYSTEM

The references and actions compiled by the internationalisation of the Spanish System of Science, Technology and Innovation are found throughout the SPANISH SCIENCE, TECHNOLOGY AND INNOVATION STRATEGY 2013-2010 as its driving framework. Scientific and technological activities take place within an international field of competition, and our System and its actors must be completely integrated into the elite ranks of this field. In addition, the ability of the Spanish economy to be highly competitive depends largely on this position of leadership. In this context, Spanish science and innovation must become more visible outside of the country, thus making Spanish R+D+I products a more attractive brand.

In a globalised world, scientific/technological and business-based collaboration gains special significance in the context of the European Union and other countries formally associated with the R+D+I programme framework. The STRATEGY also sets a special objective of collaborating with world leaders in the materials of science and innovation, as well as with countries of particular strategic relevance for Spain, with whom recent collaboration and development

efforts have waned. In addition, the STRATEGY provides a framework for State policy in foreign countries so as to best optimise our capacities for research and innovation. At the same time, the STRATEGY promotes incentives and formulas so that Spanish businesses can become providers of the products and services in high demand in growing foreign markets.

Finally, this STRATEGY is the "guidebook" that must serve as an articulate reference for all actors within the System of Science, Technology and Innovation, as well as contribute to resolving the problems facing our society, create the conditions necessary to meet future challenges head-on through a stable planning and funding plan for the System, and strengthen dialogue between science, innovation, and society. Along with the aspects described here, and in order to make the proposed transformations feasible, we require the entire Spanish population to share the need for esteeming and appreciating the value of new ideas, creativity, and the transformation of new knowledge into products, services, and processes; or in other words: progress.



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