

## SPAIN

### Hot STI issues

- Improving the quality of human resources at all levels.
- Maintaining support for R&D and innovation despite difficult budgetary conditions.
- Helping small innovative companies to grow and increasing the innovativeness of larger firms.
- Building on the dynamism in emerging technologies and improving the connection between Spanish research and global innovation networks.

**General features of the STI system:** Over the past decade Spain has made significant efforts to modernise and upgrade its traditional manufacturing and services sectors (*e.g.* food, textiles, chemicals, metal products, machinery and equipment, transport equipment, tourism) and to expand into more knowledge-intensive industries. BERD was 0.71% of GDP in 2010, below the OECD average of 1.62% (2009) (Panel 1<sup>(d)</sup>). It has expanded less than total GERD during 2005-09. Furthermore, data from the Spanish Statistical Office show that the number of companies carrying out R&D activities in 2010 fell by 15.6% from 2009, continuing a trend from 2008. International comparisons of business innovation indicators (top companies, patenting, trademarks) point to a weak competitive position (1<sup>(e)(f)(g)</sup>), and SMEs outperform larger firms in terms of contribution to R&D and innovation expenditure (Panel 2). Spanish efforts have resulted in an increase in the number of researchers and in scientific production, although figures for 2010 show that Spain accounts for only 3.6% of OECD scientific publications and 0.5% of OECD triadic patent families. The rate of patents filed by universities and public labs is on a par with the OECD median (1<sup>(p)</sup>). Spain has deepened its RTA in emerging technologies, although its position in ICTs remains relatively weak (Panel 3). For human resources, Spain's performance is low in terms of 15-year-olds performing well in science, doctorates in S&E and S&T occupations (1<sup>(t)(u)(v)</sup>).

**Recent changes in R&D expenditures:** Between 2005 and 2010, GERD expanded at an annual average 5.3% from 1.12% to 1.39% of GDP. The public sector has made most of the effort. Publicly financed GERD expanded by an annual 8.6% during 2005-09. However, in 2010 GBAORD fell from USD 10.3 billion to USD 9.8 billion in real terms. The weak fiscal outlook for 2012 may strengthen this trend and the government finances a larger share of BERD (17.1% in 2009) than in most OECD countries (average of 8.9% in 2009).

**Overall STI strategy:** The State Innovation Strategy (E2i) for 2010-15 aims to change Spain's production model by promoting and creating structures to improve the use of scientific knowledge and technological development. The Act on Science, Technology and Innovation (STI Act), which entered into force in December 2011, replaces a 1986 science law and explicitly aims to integrate technology and innovation activities with scientific research. The new governance framework defined by the STI Act will be supported by the Spanish Strategy for Science and Technology 2013-20, which is being developed, and the recently drafted State Plan for Scientific and Technological Research.

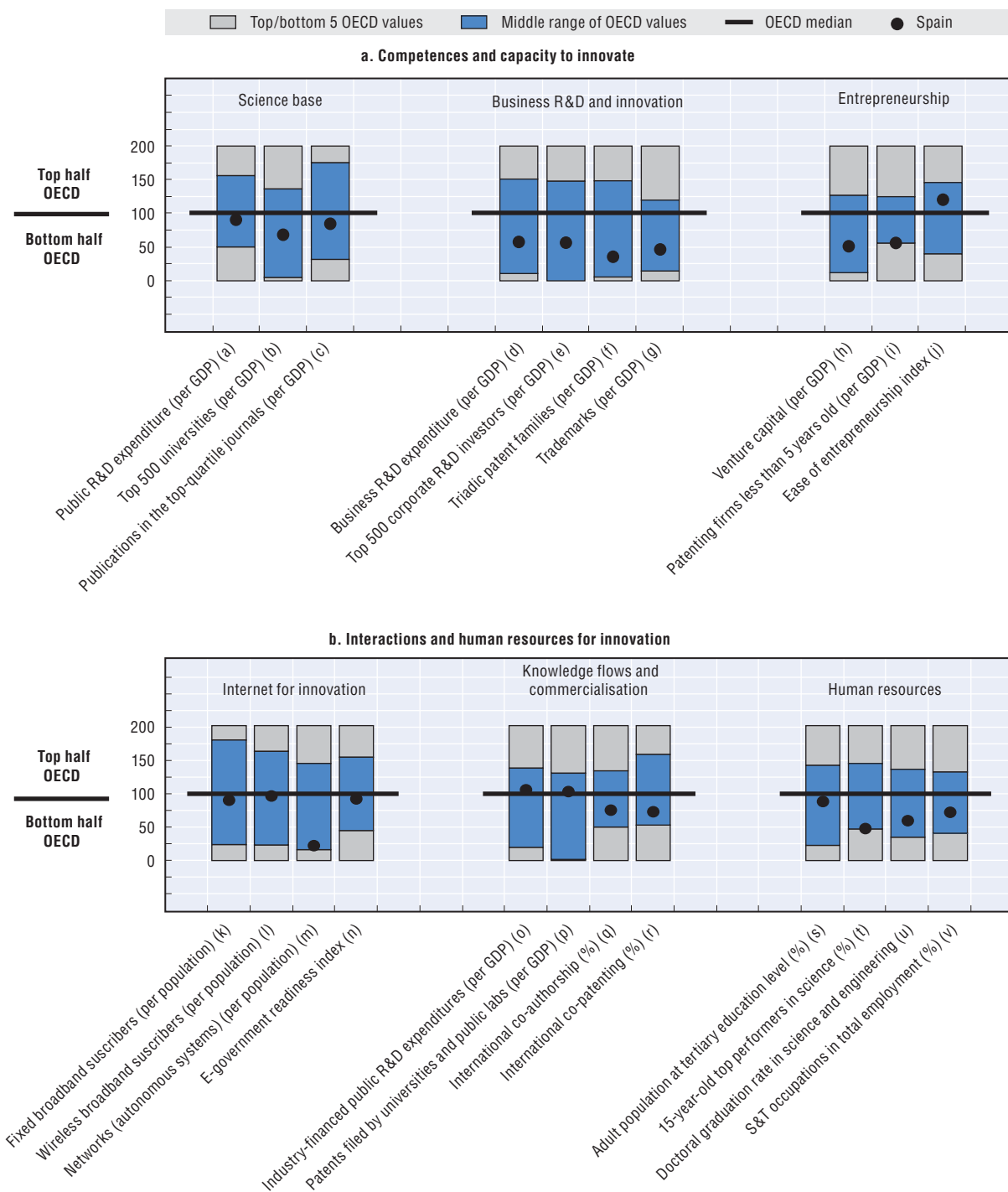
**STI policy governance:** The STI Act creates a new research funding and governance structure for the Spanish STI system with the creation of the State Research Agency (a funding body) and

### Key figures

<b>Labour productivity, GDP per hour worked in USD, 2010</b> (annual growth rate, 2005-10)	<b>47.2</b> (+1.6)	<b>GERD, as % of GDP, 2010</b> (annual growth rate, 2005-10)	<b>1.39</b> (+5.3)
<b>Environmental productivity, GDP per unit of CO<sub>2</sub> emitted in USD, 2009</b> (annual growth rate, 2005-09)	<b>5.22</b> (+5.9)	<b>GERD publicly financed, as % of GDP, 2009</b> (annual growth rate, 2005-09)	<b>0.70</b> (+8.6)

Figure 10.38. **Science and innovation in Spain**

Panel 1. Comparative performance of national science and innovation systems, 2011



Note: Normalised index of performance relative to the median values in the OECD area (Index median = 100).

comprehensive reform of PRIs. The Act defines new governance mechanisms to ensure co-ordination of central and regional governments (*e.g.* a STI information system to share information among central and regional administrations). The Centre for Development of Industrial Technology (CDTI) remains responsible for funding industrial and innovative activities nearer to the market. In addition, the new government, formed in December 2011, created a new Ministry for Economy and Competitiveness which took over the competences of the Ministry of Science and Innovation.

**Science base:** The most challenging tasks for Spain are to increase the quality of its scientific publications and to enhance the contribution of public research to the economy and society. The University 2015 Strategy aims to increase universities' contribution to social and economic needs and to improve their competitiveness. It includes an evaluation system, with international assessment, to monitor and measure universities' progress.

**Business R&D and innovation:** The government continues to improve the environment for business R&D and innovation and has seen significant increases in the number of innovative and R&D-performing firms even if current performance is weak. The government's corporate tax deduction for innovative activities was recently raised from 8% to 12%, and the *Sustainable Economy Act* raised the upper limit for global R&D and innovation activities from 50% to 60% of gross taxes. The CDTI also offers information services to companies interested in developing R&D projects (*e.g.* PIDI network). The State Innovation Strategy seeks to increase business expenditure on R&D and innovation by USD 8.3 billion a year by 2015, the number of innovative companies by 40 000, and the number of employees in medium- and high-technology companies by half a million.

**Entrepreneurship:** Venture capital is below the OECD median (1<sup>h</sup>), despite programmes to support start-up phases, such as INNVIERTE (USD 422 million

for 2011-14). The rate of young patenting Spanish firms less than five years old is at the lower end of the middle range (1<sup>h</sup>). The *InnoEmpresa* programme for 2007-13 specifically targets SMEs and includes regional projects and supra-regional projects in which SMEs from several regions participate.

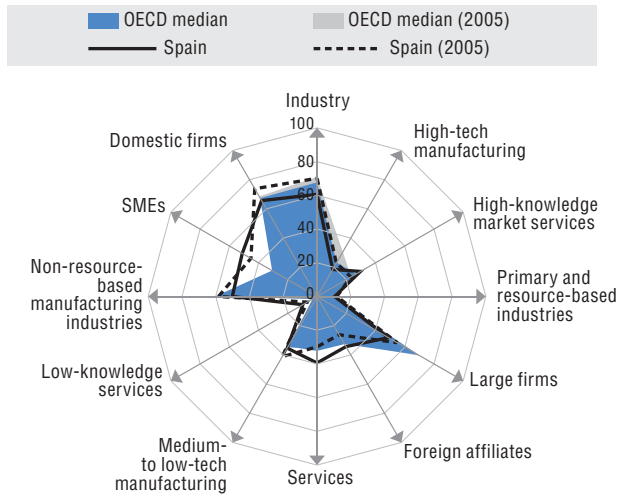
**ICT and scientific infrastructures:** Spain has developed a strong ICT infrastructure but has weak networking facilities. It has scientific and technological structures which are open to the entire national and international scientific, technological and industrial community. The *Plan Avanza2* for 2011-15 has a budget of some USD 6 billion to promote ICTs in public administration, health care, welfare and education and to extend the telecommunications network. Recent efforts at national level include improving and upgrading existing ICTs with a budget of about USD 160 million for 2007-15.

**Human resources:** In spite of overall improvements in education and human capital, including increases in the number of PhDs, there is a lack of high-quality human capital with strong links to industry. The new STI Act promotes higher levels of research mobility among public institutions and between public and private organisations.

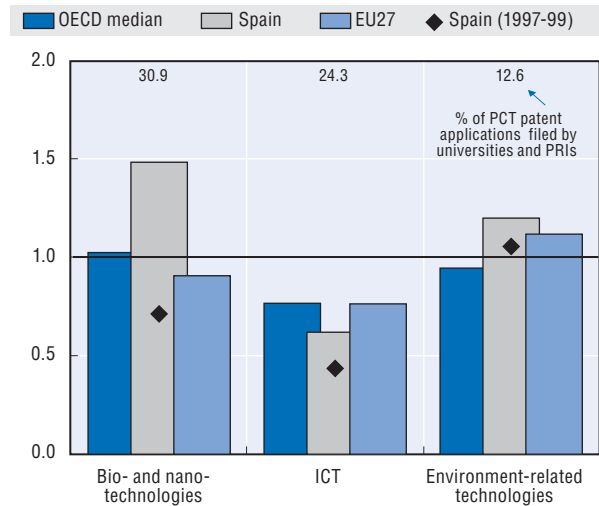
**Emerging technologies:** Spain is investing in enabling technologies, notably ICTs and biotechnology, which are important for areas such as health sciences and energy, but also in space-related technologies. It has targeted programmes and public-private partnerships (*e.g.* CIBER, RETICS) for ICTs and biotechnology and research excellence projects in biomedicine and health. GENOMA, Spain's Technology Portfolio, develops and funds patents and the creation of spin-offs. Data on PCT applications reveal an RTA in environment-related technologies, biotechnology and nanotechnologies.

**Green innovation:** Green innovation remains a major focus, not least in renewable energy technologies. To support green growth Spain has created an Environmental Technology Platform (PLANETA) to promote co-operation on environmental technologies by public and private research organisations.

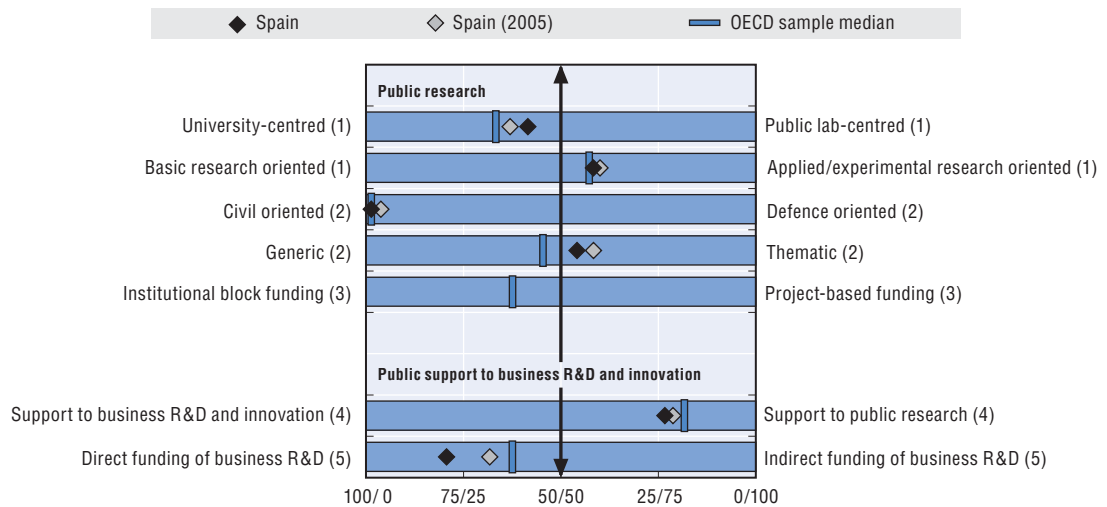
**Panel 2. Structural composition of BERD, 2009**  
As a % of total BERD



**Panel 3. Revealed technology advantage in selected fields, 2007-09**  
Index based on PCT patent applications



**Panel 4. Overview of national innovation policy mix, 2010**



1. Balance as a percentage of the sum of HERD and GOVERD.
2. Balance as a percentage of total GBAORD.
3. Balance as a percentage of total funding to national performers.
4. Balance as a percentage of the sum of HERD and GOVERD funded by government and higher education and components of (5).
5. Balance as a percentage of the sum of indirect funding of business R&D and innovation through R&D tax incentives and direct funding of BERD through grants, contracts and loans.

Source: See reader's guide and methodological annex.

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