

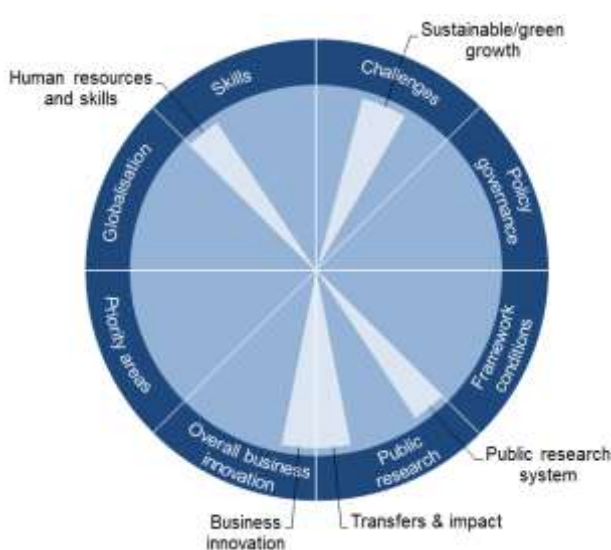
PORTUGAL

The Portuguese economy contracted in the wake of the global financial crisis, with investment in S&T decreasing in recent years. Significant action restored the sustainability of the public finances and stimulated growth from 2014 onward. For 2016 and 2017, moderate GDP growth is projected. However, job creation remains sluggish, and weak bank conditions have been holding back investment. In order to cope with these challenges, the new government, elected in October 2015, intends to make several adjustments to STI governance. Ongoing reforms are designed in line with the Commitment to Knowledge and Science agenda, approved by the Council of Ministers in 2016. Its four main dimensions address human resources, institutions, innovation systems and regional economic development.

Table 1. Gross domestic expenditure on R&D (GERD)

	PRT	OECD
GERD		
USD million PPP, 2014	3 850	1 181 495
As a % of total OECD, 2014	0.3	100
GERD intensity and growth		
As a % of GDP, 2014	1.29	2.38
(annual growth rate, 2009-14)	(-2.1)	(+2.3)
GERD publicly financed		
As a % of GDP, 2013	0.67	0.61
(annual growth rate, 2008-13)	(+0.03)	(+2.5)

Figure 1. Major STI policy priorities, 2016





Hot issues

Strengthening the public research system

Over the past decade, the public R&D budget increased steadily until 2010, decreasing significantly in 2012.. Portugal's public R&D expenditure and its share of top 500 universities relative to GDP are both slightly below the OECD median, whereas scientific publications over GDP exceed it (figure 5^{a,b,c}). Strengthening the public research system has been an STI policy priority for a long time. While earlier emphasis was put on expansion, policy emphasis has shifted in recent years, under conditions of budgetary constraints, toward economic impact and the promotion of excellence in research. However, recent changes propose to return to the previous focus on expansion and diversification. Academic public research institutions (PRIs) will be evaluated in 2017, through an international peer-review process, as part of the regular evaluation exercise, which is under review. Embedding research activities in the economy and society also remains one of the top challenges at national level. The National Research and Innovation Strategy for Smart Specialisation (ENEI) 2014-20 promotes scientific and technological knowledge, co-operation between the public and the private sector, investment in tradable goods and services, entrepreneurship and the transition to a low-carbon economy.

Improving the transfer of science and its returns and impacts

The exploitation of public research results is a major bottleneck, as Portugal lacks a tradition of linking scientific research with innovation. Industry-financed public R&D is among the lowest among OECD countries (figure 5^g). Actions for bridging the transfer gap include the Collective Actions Support Scheme within the Portugal-EC Partnership Agreement 2014-20, that aims to reinforce the transfer of scientific and technological knowledge to the business sector. Deepening the interactions of the current network of R&D units at the territorial level could boost the economic value of R&D outcomes. The national S&T funding agency (Fundação para a Ciência e a Tecnologia [FCT]), through initiatives such as the Portuguese Technology Transfer Initiative, launched in 2012 in partnership with IPN, promotes knowledge diffusion from large European agencies (e.g. CERN, ESO, ESA) to Portuguese firms, with a focus on the space industry. The International Partnerships Programmes, with leading international universities (Faculty Exchange Programme), have focused on the promotion of the transfer and circulation of knowledge between universities and the business sector. Additionally, priority is given to the creation of technology-based firms and the employment of researchers in the private sector.

Encouraging business innovation and innovative entrepreneurship

Portugal's business R&D expenditure and innovation output performance are below the OECD median (figure 5^{d,e,f,g}), owing to the country's specialisation in low- and medium-low-technology industries and to the small share of investment in R&D by large companies compared with other European countries. Policies have promoted technology-based entrepreneurship, fiscal incentives for R&D (Law n°64/2015), and the development of venture capital funding, which is at the OECD median (figure 5^h). The IAPMEI, the Portuguese Agency for Competitiveness and Innovation, and PME Investimentos launched several credit lines since 2008 to facilitate SME access to funding and will allocate, in the coming years, USD 2.9 billion PPP (EUR 1.7 billion) to SMEs in the form of government-guaranteed credit lines and USD 172.2 million PPP (EUR 100 million) in the form of mezzanine funding to fast-growth firms. A dedicated cluster policy has been promoted in some critical areas, such as marine technologies, and it is expected to be re-activated. Moreover, the internationalisation of firms with innovative potential is of critical relevance for Portuguese enterprises. Portuguese business expenditure on R&D (BERD) as a percentage of GDP fell from 0.75% to 0.59% of GDP between 2009 and 2014. The Portugal 2020 Partnership Agreement includes several major financing initiatives to stimulate business R&D and innovation; to foster co-operation among STI actors; and to encourage the development of entrepreneurship and innovation in strategic sectors. Additional financing is being provided to promote the internationalisation and competitiveness of SMEs.





Improving overall human resources and skills

The country's expenditure on tertiary education is slightly below the OECD median, and the share of tertiary-educated adults is well below (figure 5⁵⁴). Promoting higher education and advanced research training has been at the top of the research policy agenda for many decades. The main challenges lie in the need to 1) provide conditions and opportunities for job creation for PhD holders, 2) ensure the diversity of university training and 3) ensure an adequate level of funding for research and higher education. As part of its National Catalogue of Qualifications (NCQ), the government has taken steps to reorganise vocational and education training, with 40 areas of education and training and 288 non-higher qualification standards in 2015. To improve the supply of a high-level STI workforce, the FCT agency has for a long time funded PhD studies and postdoctoral training. Since 2012 funding has been granted not only to individual PhD fellowships but also PhD programmes, with the possible participation of foreign organisations. The FCT's Investigator Programme (2012-15) supported the recruitment of 797 national and non-resident talented researchers to work in Portuguese research centres under five-year contracts. In June 2016, a new Incentive to Scientific Employment programme has been approved to promote the employment of PhD holders. In higher education, a new status for international students was approved in 2014 that provides an adapted application process for the enrolment of foreign students in higher education institutions.

Fostering sustainable / green growth

Achieving the acceleration towards greener growth is a main challenge facing the Portuguese economy. The Ministry of Environment, Spatial Planning and Energy published the Green Growth Commitment (GGC) in April 2015, recommending common policies and listing 14 quantified objectives with two timeframes (2020 and 2030) in three overarching areas: 1) to stimulate green sectors of activity, 2) to promote the efficient use of resources, and 3) to contribute to sustainability. Among the specific objectives are reducing CO₂ emissions, endorsing renewable energies, increasing water and energy efficiency, raising the productivity of materials, incorporating waste management systems, favouring urban rehabilitation and public transport, and promoting biodiversity. The GGC is in line with other global public policy instruments, such as the ENEI and the Strategy of Industrial Promotion for Growth and Jobs (EFICE, 2014-20).



Some key STI performance indicators

Figure 2. Economic performance

Labour productivity, GDP per hour worked,
index 2005=100

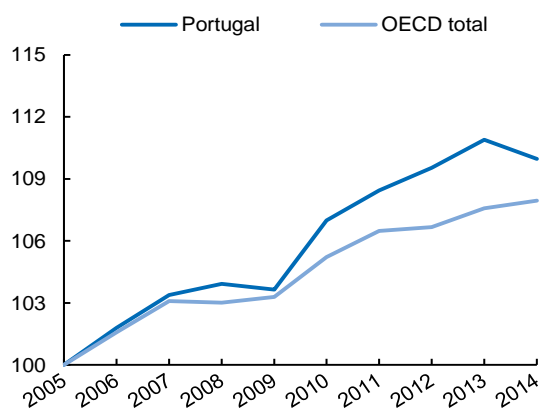


Figure 3. Environmental performance

Green productivity, GDP per unit of CO₂
emitted, index 2005=100

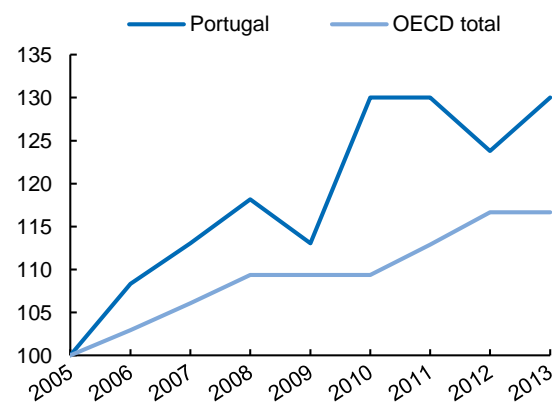
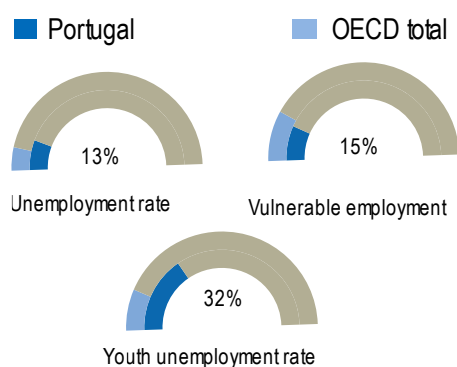


Figure 4. Unemployment

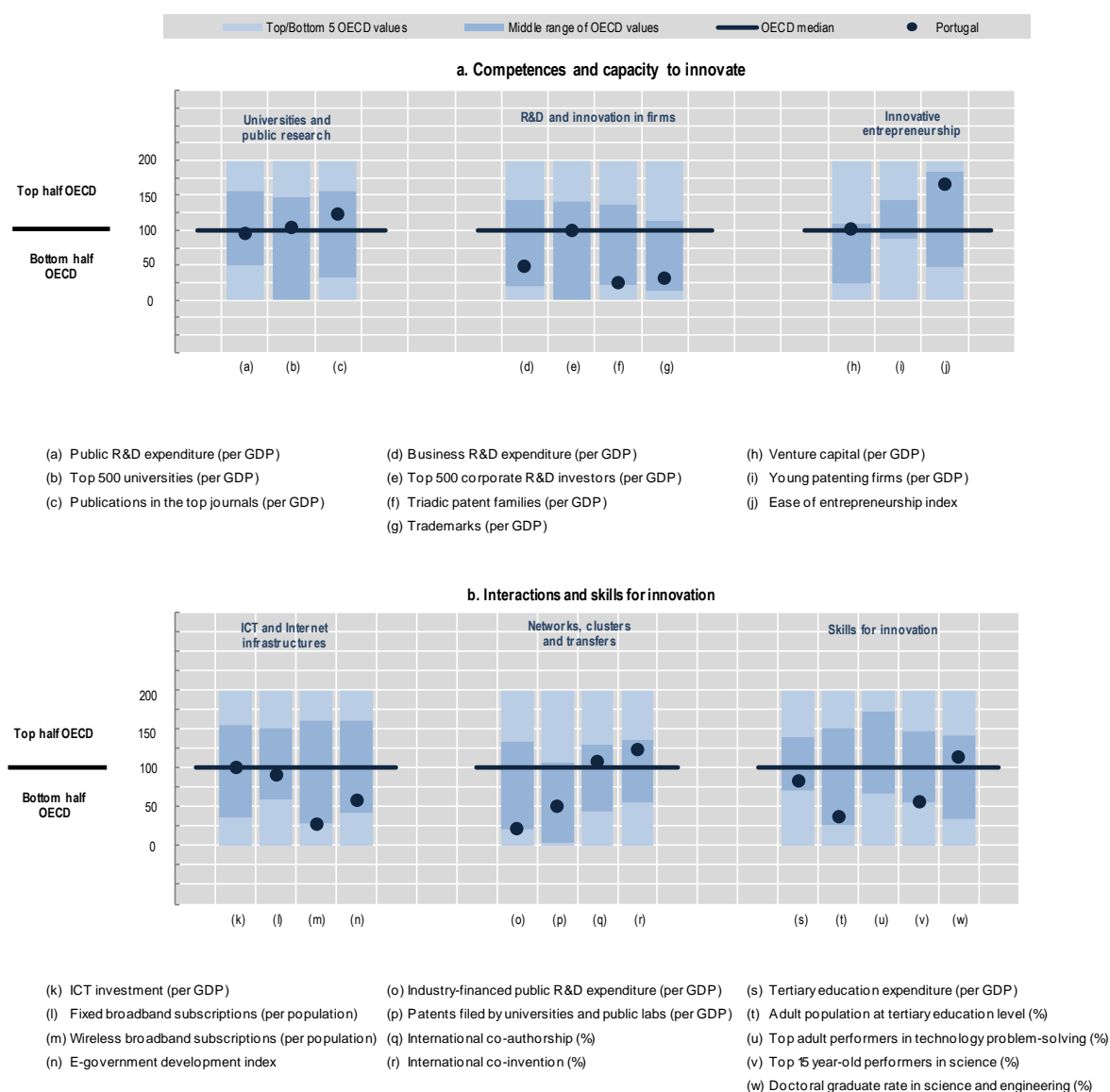
2015 or latest year available
Percentage of total



Benchmarking national STI systems

Figure 5. Science and Innovation in Portugal

Comparative performance of national science and innovation systems, 2016





Highlights of the Portuguese STI system

New challenges

Although Portugal's employment rates rose since 2013, high unemployment, especially among youth, remains a major societal challenge. Improving higher education training for the youth, and developing conditions and opportunities for job creation for highly qualified human resources, namely PhD holders, are central challenges in this regard. The modernisation and diversification of the higher education system, the development of research and innovation strategic agendas, and the territorial dimension of knowledge are important additional challenges.

Innovation policy governance

Policy co-ordination was reorganised in 2011 with the creation of two high-level advisory councils for research and innovation: the National Council for Science and Technology (CNCT) and the National Council on Entrepreneurship and Innovation (CNEI), both chaired by the prime minister. The government approved the ENEI in December 2014, providing multi-level governance mechanisms at national and regional levels and co-ordinating research and innovation efforts around strategic areas/sectors and different innovation actors with a view to better translating research results into innovative goods, services and processes. The ENEI includes three pillars: the first provides the results of the strategy at national level; the second addresses the regional level approaches in the five regions of mainland Portugal and the autonomous regions of Madeira and the Azores islands; and the third relates to the multi-level elements of the strategy, i.e. the policy mix, matrix of territorial dimensions of thematic priorities, governance model, and monitoring and evaluation instruments. A working group created in 2013 co-ordinates the implementation of the strategy by the Ministry of Economy and the Ministry of Science, Technology and Higher Education, through ANI, in collaboration with sectoral ministries and regional agencies, including the IAPMEI, FCT and COMPETE. All the expected quantitative analyses and multi-level approaches were applied.

Innovative entrepreneurship

Various initiatives are focused on supporting business innovation, entrepreneurship and SMEs, which accounted for 99.7% of enterprises in Portugal in 2012. The business environment recovered after the challenging 2009-11 period and can now be considered as generally conducive to entrepreneurship. The provision of venture capital rose by 268% between 2011 and 2014 and is slightly above the OECD median. A general tendency between 2007 and 2014 has been a shift from indirect to direct funding instruments of business R&D (figure 9). The share of government-guaranteed loans in total loans to SMEs grew significantly from 5.4% in 2009 to 7.8% in 2014. Among the most important instruments are innovation and R&D vouchers (figure 9) and the aforementioned financing incentives for the internationalisation and competitiveness of SMEs, which finance up to 75% of the eligible expenditures. **To increase the country's attractiveness for foreign investment, the Corporate Income Tax (CIT) Reform of 2015 reduced the CIT rate from 23% to 21%.** Furthermore, investments in start-ups are 100% tax-deductible during the first three years. In 2013, the government launched the INOVA, Creative Youngsters: Entrepreneurs for the 21st century programme to develop an environment that favours innovation and creativity in primary and secondary schools. **The programme seeks to foster youngsters' analytical capabilities and the mind-sets needed to identify business opportunities, take risks and face competition.**





ICT and Internet infrastructures

While Portugal's ICT investment as a share of GDP is at the OECD median (figure 5^b), its levels of public and private use of ICT infrastructures lag behind (figure 5^{l,m}). During 2013-20, the Early Bird projects of the Carnegie Mellon Portugal Programme give priority to research in ICT, enabling technologies and applications. The FCT plays a central role in the implementation of an open access policy for all projects it funds, by providing a range of relevant services and supporting an active open access community around the Scientific Open Access Repository of Portugal (RCAAP). The guidelines for a National Open Access Policy have been recently approved by the Council of Ministers, and this National OA Policy is expected to be publicly announced in 2017.

Clusters and regional policies

In 2015, the government's Regulation for the Recognition of Competitiveness Clusters (Decree 2909/ 2015) launched a new approach to cluster policy. Competitiveness clusters are defined as aggregating platforms of knowledge and capacities embedding collaborative partnerships and networks of companies, universities and other knowledge institutions. Providing a budget of USD 29 million PPP (EUR 17 million), the decree aims at creating new competitiveness clusters and examining the status of existing ones. New competitiveness clusters must demonstrate that, compared to previous ones, they are more resilient in economical, entrepreneurial, innovation and knowledge-based terms and more integrated in sectoral terms, while addressing a larger range of value chains. Simultaneously, the management teams of new cluster organisations will have to demonstrate higher levels of strategic management and governance skills.

Globalisation

Portugal performs above OECD median on international co-patenting and the international co-authorship of S&T publications (figure 5^{r,q}). AICEP Portugal and the country's universities signed a protocol intended to make it more attractive to foreign students and to support its university services in international markets. Measures have been designed to overcome barriers to better international co-operation, such as the weak participation of SMEs and large companies in European initiatives and the lack of co-ordination among national actors on joint actions at the European and international level.



Structural aspects and specialisation

Figure 6. Structural composition of BERD, 2013 or latest year available

As a % of total BERD or sub-parts of BERD

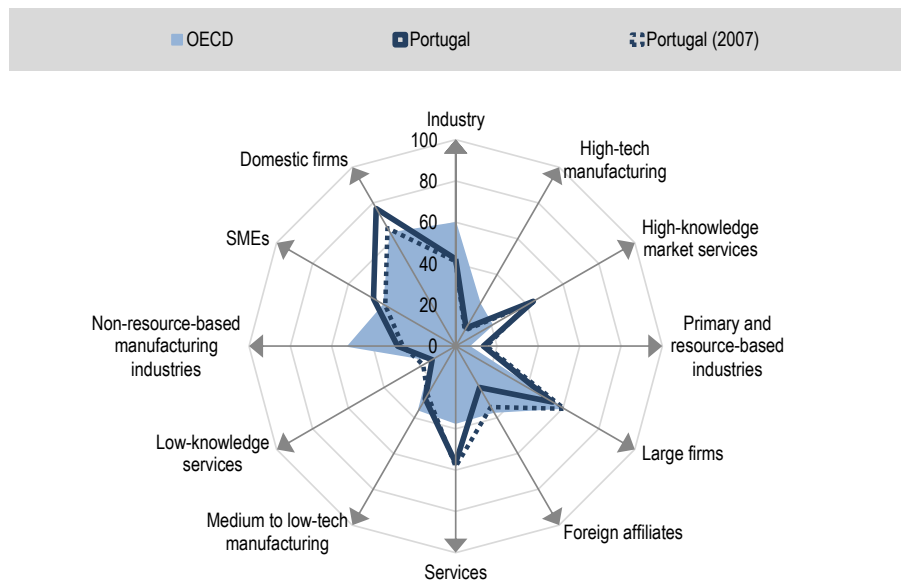
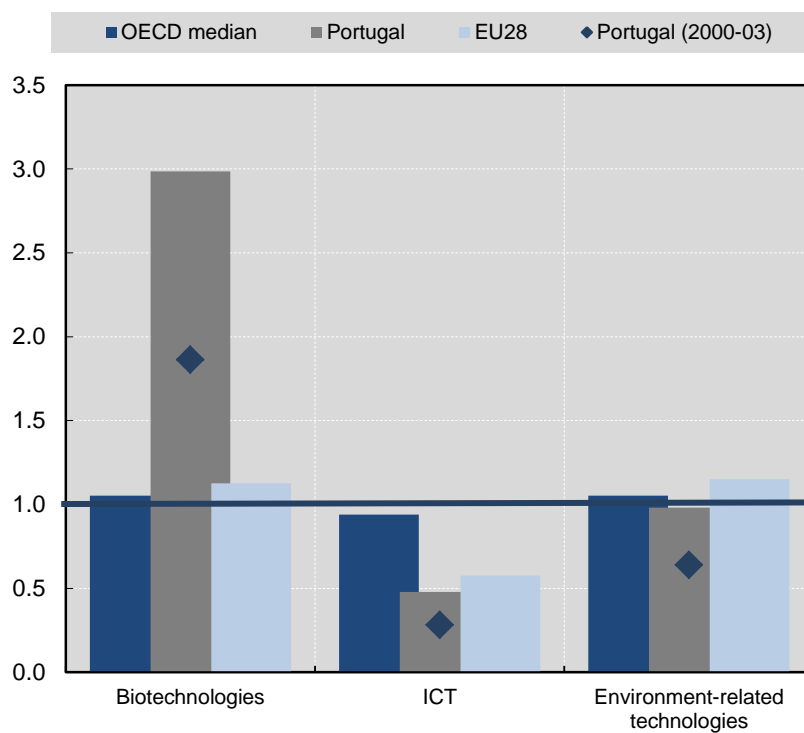


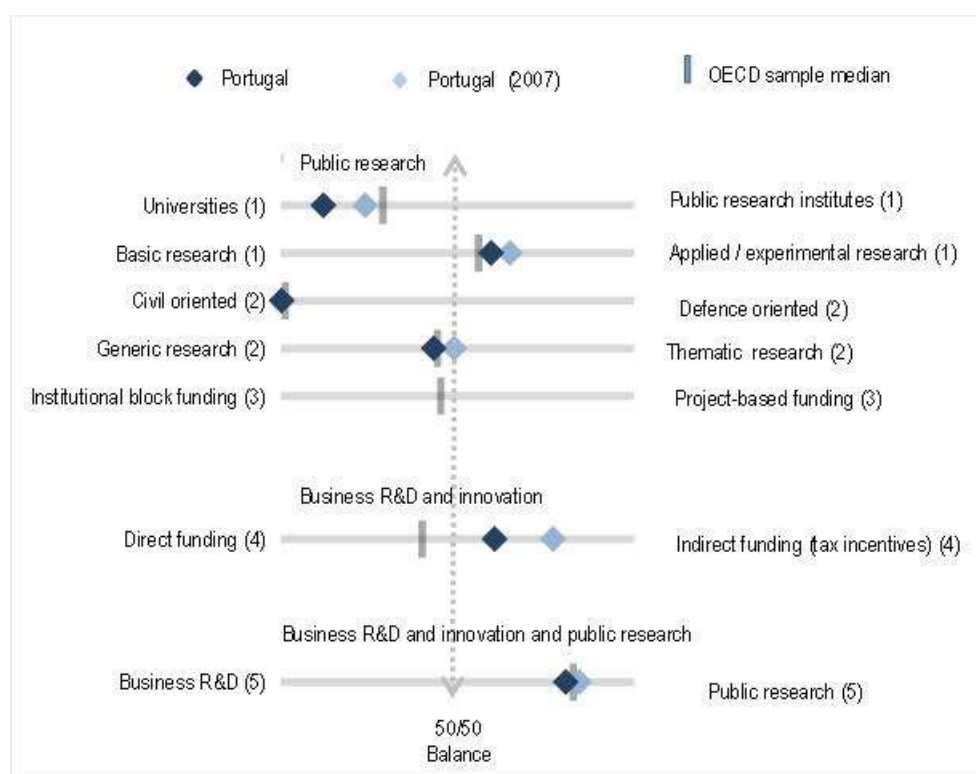
Figure 7. Revealed technology advantage in selected fields, 2011-13

Index based on IP5 patent families applications



National STI policy mix

Figure 8. Allocation of public funds to R&D, 2014 or latest year available
By sector, type of R&D and mode of funding



(1). Balance as a share of both higher education (HERD) and government (GOVERD) R&D expenditure.

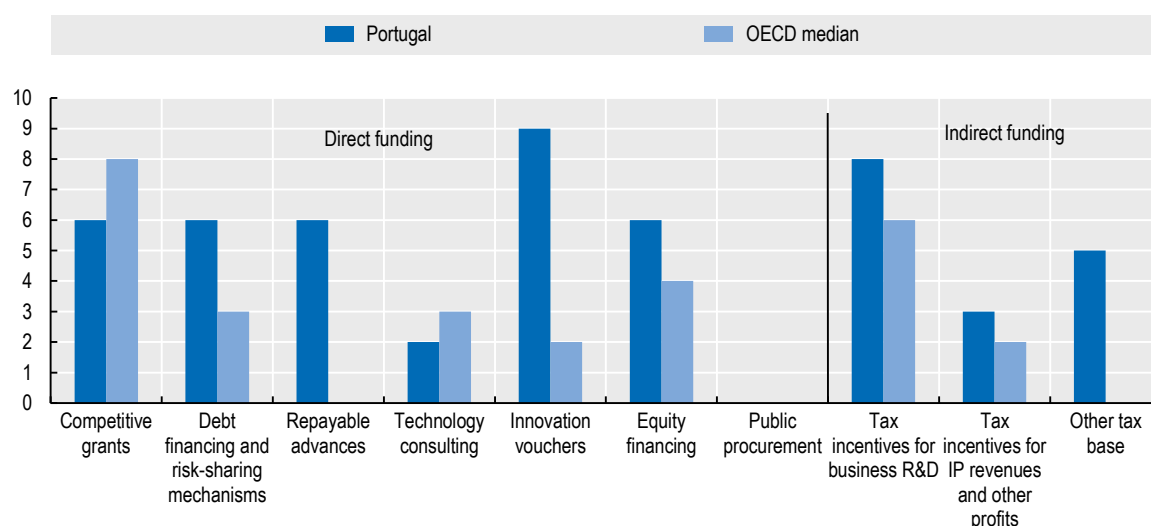
(2). Balance as a share of total government budget appropriations and outlays for R&D (GBAORD).

(3). Balance as a share of total funding to national performers.

(4). Balance as a share of both indirect funding (through R&D tax incentives) and direct funding (through grants, procurement, loans, etc.).

(5). Balance as a share of publicly-funded HERD and GOVERD and components of (4).

Figure 9. Most relevant policy instruments of funding for business R&D, 2016
Country self-assessment, index (9 = high and increasing relevance to 0 = not used)



Note: Policy information comes from country responses to the EC/OECD International Survey on STI Policies (STIP) 2016 and 2014. Portugal's responses are available in the EC/OECD International Database on STI Policies, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/PRT...STIO_2016.

Source: See the reader's guide and methodological annex.

StatLink <http://dx.doi.org/10.1787/888933434026>

References

General references

- Dernis H., Dosso M., Hervás F., Millot V., Squicciarini M. and Vezzani A. (2015), World Corporate Top R&D Investors: Innovation and IP bundles, A JRC and OECD common report, Luxembourg, Publications Office of the European Union.
- EC (European Commission) (2015), EU R&D Scoreboard: The 2015 EU Industrial R&D Investment Scoreboard, European Commission, Luxembourg, <http://iri.jrc.ec.europa.eu/scoreboard.html>, accessed 4 October 2016.
- Flanagan, K., E. Uyarra and M. Laranja (2010), "The policy mix for innovation: rethinking innovation policy in a multilevel, multi-actor context", Munich Personal RePEc Archive (MPRA) No. 23567, July.
- IEA (2015), CO₂ Emissions from Fuel Combustion 2015, OECD Publishing, Paris, DOI: http://dx.doi.org/10.1787/co2_fuel-2015-en
- Kergroach, S. (2010), "Monitoring innovation and policies: developing indicators for analysing the innovation policy mix", internal working document of the Directorate for Science, Technology and Industry (DSTI), OECD, Paris.



- Kergroach, S., J. Chicot, C. Petroli, J. Pruess, C. van Ooijen, N. Ono, I. Perianez-Forte, T. Watanabe, S. Fraccola and B. Serve, (forthcoming-a), "Mapping the policy mix for innovation: the OECD STI Outlook and the EC/OECD International STIP Database", *OECD Science, Technology and Industry Working Papers*.
- Kergroach, S., J. Pruess, S. Fraccola and B. Serve, (forthcoming-b), "Measuring some aspects of the policy mix: exploring the EC/OECD International STI Policy Database for policy indicators", *OECD Science, Technology and Industry Working Papers*.
- OECD (Organisation for Economic Co-operation and Development) (2016), Education at a Glance 2016: OECD Indicators, OECD Publishing, Paris, <http://dx.doi.org/10.1787/eag-2016-en>.
- OECD (2016), OECD Economic Outlook, Volume 2016 Issue 1, OECD Publishing, Paris, http://dx.doi.org/10.1787/eco_outlook-v2016-1-en.
- OECD (2016), OECD Country Reviews of Innovation Policy, www.oecd.org/sti/inno/oecdreviewsofinnovationpolicy.htm.
- OECD (2015), Pensions at a Glance 2015: OECD and G20 indicators, OECD Publishing, Paris, http://dx.doi.org/10.1787/pension_glance-2015-en.
- OECD (2015), OECD Skills Outlook 2015: Youth, Skills and Employability, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264234178-en>.
- OECD (2015), OECD Science, Technology and Industry Scoreboard 2015: Innovation for growth and society, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_scoreboard-2015-en.
- OECD (2015), OECD Digital Economy Outlook 2015, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264232440-en>.
- OECD (2015), Entrepreneurship at a Glance 2015, OECD Publishing, Paris, http://dx.doi.org/10.1787/entrepreneur_aag-2015-en.
- OECD (2015), National Accounts at a Glance 2015, OECD Publishing, Paris, http://dx.doi.org/10.1787/na_glance-2015-en.
- OECD (2015), The Innovation Imperative: Contributing to Productivity, Growth and Well-Being, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264239814-en>.
- OECD (2014), Measuring the Digital Economy: A New Perspective, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264221796-en>.
- OECD (2014), OECD Science, Technology and Industry Outlook 2014, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_outlook-2014-en.
- OECD (2011), Towards Green Growth: Monitoring Progress: OECD Indicators, OECD Green Growth Studies, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264111356-en>.
- OECD (2010), "The Innovation Policy Mix", in OECD Science, Technology and Industry Outlook 2010, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_outlook-2010-48-en.
- OECD (2010), Measuring Innovation: A New Perspective, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264059474-en>.
- OECD and SCImago Research Group (CSIC), (2014), Compendium of Bibliometric Science Indicators 2014, <http://oe.cd/scientometrics>.
- Van Steen, J. (2012), "Modes of public funding of R&D: Towards internationally comparable indicators", OECD Science, Technology and Industry Working Papers, No. 2012/4, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5k98ssns1qzs-en>.





Databases and data sources

- Academic Ranking of World Universities (2016), "Shanghai ranking academic ranking of World universities", www.shanghairanking.com, accessed 4 October 2016.
- Bureau Van Dijk (2011), ORBIS Database, Bureau Van Dijk Electronic Publishing.
- EC/OECD (forthcoming), International Database on Science, Technology and Innovation Policies (STIP), edition 2016, www.innovationpolicyplatform.org/ecoecd-stip-database.
- Elsevier B.V. (2014), Elsevier Research Intelligence, www.elsevier.com/online-tools/research-intelligence/products-and-services/scival, accessed 4 October 2016.
- Eurostat (2016), Education and Training Databases, June, <http://ec.europa.eu/eurostat/web/education-and-training/data/database>, accessed 4 October 2016.
- Eurostat (2016), Total intramural R&D expenditure (GERD) by sectors of performance and source of funds, April, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=rd_e_gerdfund&lang=en, accessed 4 October 2016.
- Graham, S., G. Hancock, A. Marco and A. Myers (2013), "The USPTO Trademark Case Files Dataset: Descriptions, Lessons, and Insights", SSRN Working Paper, <http://ssrn.com/abstract=2188621>.
- IEA (International Energy Agency) (2015), CO2 Emissions from Fuel Combustion Database, [/www.iea.org/publications/freepublications/publication/name_43840.en.html](http://www.iea.org/publications/freepublications/publication/name_43840.en.html).
- ILO (International Labour Organization) (2016), Key Indicators of the Labour Market database, www.ilo.org/global/statistics-and-databases/research-and-databases/kilm/lang--en/index.htm, accessed 4 October 2016.
- IMF (International Monetary Fund) (2016), World Economic Outlook (WEO) Databases, July, www.imf.org/external/pubs/ft/weo/2016/01/weodata/index.aspx, accessed 4 October 2016.
- ITU (International Telecommunication Union) (2016), World Telecommunication/ICT Indicators 2016, www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx, accessed 4 October 2016.
- OECD (2016), Activity of Multinational Enterprises (AMNE) Database, August, www.oecd.org/industry/ind/amne.htm.
- OECD (2016), ANBERD Database, July, www.oecd.org/sti/anberd.
- OECD (2016), OECD Annual Labour Force Statistics Database, July, www.oecd.org/employment/labour-stats/.
- OECD (2016), Broadband Portal, August, www.oecd.org/sti/broadband/oecdbroadbandportal.htm.
- OECD (2016), OECD Education Databases, September, <http://gpseducation.oecd.org/>
- OECD (2016), Entrepreneurship Financing Database.
- OECD (2016), Educational Attainment and Labour Force Status Database, <https://data.oecd.org/education.htm>.
- OECD (2016), OECD Income Distribution Database, www.oecd.org/social/income-distribution-database.htm.
- OECD (2016), Main Science and Technology Indicators (MSTI) Database, June, www.oecd.org/sti/msti.
- OECD (2016), OECD National Accounts Databases, September, www.oecd.org/std/na/.
- OECD (2016), OECD/NESTI data collection on R&D tax incentives, July, www.oecd.org/sti/rd-tax-stats.htm.
- OECD (2016), Patent Database, June, www.oecd.org/sti/inno/oecdpatentdatabases.htm.
- OECD (2016), Productivity Database, September, www.oecd.org/std/productivity-stats.
- OECD (2016), Programme of International Students Assessment (PISA) Database, OECD Education Statistics, June, www.pisa.oecd.org.





- OECD (2016) Programme for the International Assessment of Adult Competencies (PIAAC) Database, OECD Education Statistics, June www.oecd.org/skills/piaac/surveyofadultskills.htm.
- OECD (2016), Research and Development Statistics (RDS) Database, April, www.oecd.org/sti/rds.
- OECD (2016), STI Micro-data Lab: Intellectual Property Database, June, <http://oe.cd/ipstats>.
- OECD (2014), Product Market Regulation (PMR) Database, March, www.oecd.org/economy/pmr.
- OECD (2013), “Modes of public funding of R&D: Interim results from the second round of data collection on GBAORD”, internal working document of the Working Party of National Experts on Science and Technology Indicators (NESTI), OECD, Paris.
- UIS (UNESCO Institute for Statistics) (2016), Education Database, June, http://data.uis.unesco.org/Index.aspx?DataSetCode=EDULIT_DS, accessed 4 October 2016.
- UIS (2016), Science, Technology and Innovation Database, July, http://data.uis.unesco.org/Index.aspx?DataSetCode=SCN_DS, accessed 4 October 2016.
- UN (United Nations) (2016), UN e-Government Survey, United Nations, NY. <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2016> (accessed 4 October 2016).
- World Bank (2016), World Development Indicators (WDI) Databank, <http://wdi.worldbank.org>

© OECD, 2016. This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

<http://oe.cd/STIOutlook> – STIPolicy.data@oecd.org –  @OECDInnovation – <http://oe.cd/stinews>





From:

OECD Science, Technology and Innovation Outlook 2016

Access the complete publication at:

https://doi.org/10.1787/sti_in_outlook-2016-en

Please cite this chapter as:

OECD (2016), "Portugal", in *OECD Science, Technology and Innovation Outlook 2016*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/sti_in_outlook-2016-82-en

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at info@copyright.com or the Centre français d'exploitation du droit de copie (CFC) at contact@cfcopies.com.