

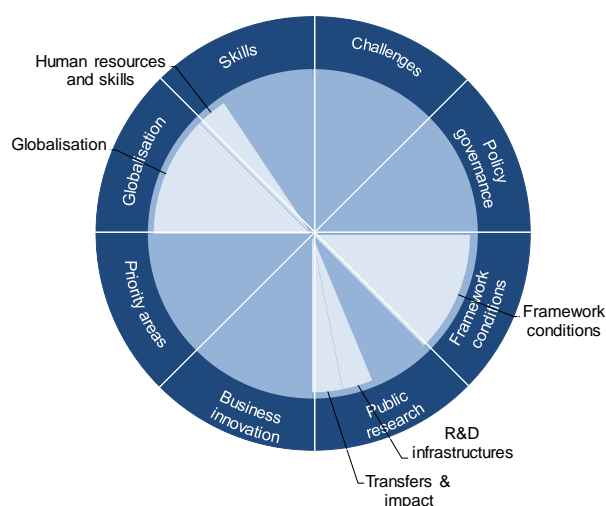
GREECE

Greece has undergone a pronounced and protracted economic recession since 2008. Fiscal consolidation, a growing public debt burden, negative inflation and uncertainty additionally weighed on investment and economic performance. Labour productivity is low in terms of OECD standards. Poverty and inequality have risen during the recession and persistent youth unemployment has repeatedly exceeded 50% in the last years, while private consumption declined by almost 30% between 2008 and 2014. In response, the Greek government has embarked on deep fiscal adjustments and wide-ranging structural reforms. A Memorandum of Understanding on financial assistance was signed with the European Stability Mechanism (ESM) in 2015. The ESM granted disbursements of up to USD 113 billion PPP (EUR 86 billion) until 2018 to boost confidence and rebound investment. Growth is expected to turn positive in the second half of 2016. A national strategy for the period 2014-20 addresses the weaknesses in the innovation system and aim at regaining competitiveness and sustainable growth: The National Research and Innovation Strategy for Smart Specialisation 2014-20.¹

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

	GRC	OECD
GERD		
USD million PPP, 2014	2 447	1 181 495
As a % of total OECD, 2014	0.2	100
GERD intensity and growth		
As a % of GDP, 2014	0.84	2.38
(annual growth rate, 2009-14)	(+0.8)	(+2.3)
GERD publicly financed		
As a % of GDP, 2014	0.47	0.61
(annual growth rate, 2009-14)	(+3.3)	(+2.5)

Figure 1. Major STI policy priorities, 2016



¹ The provisions of this strategy were incorporated in the National Strategic Plan for Research, Technological Development and Innovation that was introduced with Law 4310/2014.



Hot issues

Strengthening public R&D capacity and infrastructure

The pressures for fiscal consolidation have imposed far-reaching cuts on public institutional funding of research in recent years. Although R&D intensity increased (from 0.67 in 2008 to 0.84 in 2014 and 0.96 in 2015), cross-country comparison places Greece at the lower ranks of GERD among OECD countries (figure 5^a). The revision of the investment law, initially adopted in 2011, is expected to increase national GERD in the future, enhancing R&D in business sector. On the other hand, the higher education sector accounts for 40% of total GERD; its performance in terms of international publications is at the OECD median while its **presence among the world's top 500 universities is rather low** (figure 5^b). To cope with this, the government emphasises efficient use of limited resources. The Roadmap for Research Infrastructures was finalised by the General Secretariat for Research and Technology (GSRT) in 2014. It intends to upgrade existing infrastructures instead of investing in new ones in order to enhance their extroversion, competitive orientation and critical mass. Facilitating networks between research centres, universities, the business sector, and European research infrastructures is a major pillar of the roadmap. Based on Law 4310/2014, the Greek government introduced the National Strategic Plan for Research, Technological Development and Innovation to promote research excellence and transparency at all levels that is implemented through the National R&I Strategy for Smart Specialisation. It also strengthens research ecosystems, increases performance based funding models, promotes linkages between academia and the business sector, and leverages funding of public research. Open access policies regarding publications and data have been formulated, and the largest-ever programme for the documentation, grouping and re-use of over two million cultural objects is being carried out by the National Documentation Centre.

Improving transfers, returns and impact of science

While interactions between education and research are strong and vivid, the public research system as a whole is largely insulated from the productive sector. PRIs and universities do not tend to commercialise their research results, as indicated by their extremely low number of patents (figure 5^c). A recent shift in public research from universities towards PRIs did not change this fact (figure 7). Although the business sector underperforms in R&D activities and HEIs –which are public entities in Greece- are the main R&D performers, the share of industry-financed public R&D is still low (figure 5^d). The law for Research, Technological Development and Innovation aims not only to simplify procedures for subsidising research centres, but also to establish a link between the latter, universities and the industry. Similarly, the Technology Forum, inaugurated as an annual event in 2014, promotes synergies between PRIs and IT industries. The event addresses the existing gap of technology transfer between sectors and therefore aims to reward partnerships and provide incentives for technological cooperation. In addition to supporting commercialisation by improving framework conditions for innovative, new entrepreneurship, the Ministry of Education has funded until 2015 the operation of Innovation and Entrepreneurship Units in each university and technological educational institute. Continuous efforts have been made to increase the protection and exploitation of IPR resulting from public research and to support alternative models of knowledge exploitation. Furthermore, open data policies will be implemented with a view to stimulating research and growth by increasing the return to and impact of public research.

Addressing challenges of STI globalisation and increasing international cooperation

Pressures on national budgets have reinforced the importance of international co-operation on STI, which is also viewed as an opportunity to tap into external funding and infrastructures and profit from international transfers of knowledge. Funding from abroad was 13.2% of GERD in 2014, with the European Union being the most important external funder of R&D activities. Over the last years, the Greek government has focused on supporting bilateral scientific co-operation (e.g. with Germany, China, Romania), and on encouraging further





participation by PRIs and business in international (especially European) programmes, such as the Framework Programs for Research and Technological Development and the ERA-NET scheme.

Improving overall human resources and skills

Although Greece's expenditure on higher education is at the OECD median, its share of tertiary-qualified adult population is low (figure 5^{si}). The economic recession has caused a loss of human resources for S&T, as austerity measures applied to pension rights have led many senior researchers to retire early, while wage cuts and recruitment freezes have driven a growing number of young scientists out of the country. In 2014, the European Social Fund (ESF) invested USD 2.6 billion PPP (EUR 1.9 billion) within the National Strategic Reference Framework 2007-2013 that has contributed to higher employment rates for researchers and R&D personnel in 2014-2015. The Operational Programme for Human Resources Development, Education and Life Long Learning (2014-20) aims to tackle unemployment with a view to creating quality education opportunities, skills upgrading and sustainable employment. The recent reform of higher education (laws 4009/2011, 4076/2012 and 4115/2013) has introduced major changes in governance and funding mechanisms to boost university autonomy and to improve the quality of teaching and services for students. The latest reforms (i.e. laws 4093/2012 and 4111/2013) have rationalised the legal framework of post-secondary education and introduced new provisions for the recognition of higher education degrees earned from other EU member states.

Improving the framework conditions for innovation

Greece's framework conditions for innovation are far from favourable as indicated by the lack of venture capital and the low Ease of Entrepreneurship Index, compared to the OECD median (figure 5^{hj}). Improving conditions for entrepreneurship is considered critical for Greece's economic recovery, and the government has introduced some measures (e.g. the new institutional framework for research, technology and innovation) to improve framework conditions for innovation as a way to restore competitiveness, growth and job creation. Measures implemented include also the support of alternative innovation models (including social and open innovation), as well as the institutionalisation of R&D + Innovation metrics' production on a more reliable, stable and efficient base, delegating this activity to the National Documentation Centre. To develop e-infrastructures, the Greek Research and Technology Network (GRNET), co-funded by the EU, offers cloud services to Greek universities. Furthermore, structural reforms have been undertaken in the competition framework, the labour market and the tax system. A main initiative of the Greek government is the establishment of the Hellenic Foundation for Research and Innovation (ELIDEK) that was founded in 2016, in order to fund basic research. The European Investment Bank has agreed to provide EUR 180 million, along with 60 million provided by the Greek government, to support the creation and first operations of ELIDEK. The Foundation will manage the evaluation and financing of research projects, academic positions and investment in scientific equipment. This will raise research funding in Greece and ensure that research jobs can be created for young scientists and doctoral students, who might otherwise leave the country (brain drain). Another major initiative is under the way: The establishment of a new development fund (Fund of Funds) with strong emphasis on equity and venture capital schemes supporting corporate research and new technologies endeavours.



Some key STI performance indicators

Figure 2. Economic performance

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

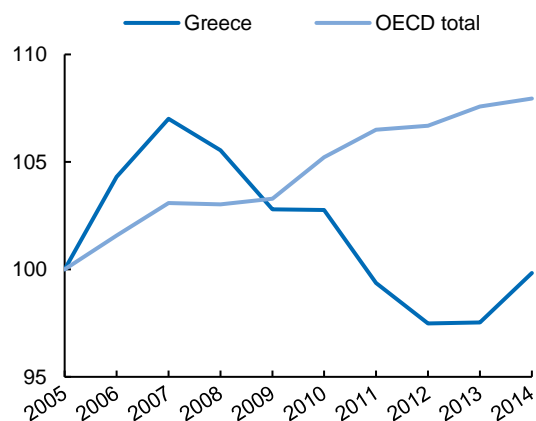


Figure 3. Environmental performance

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

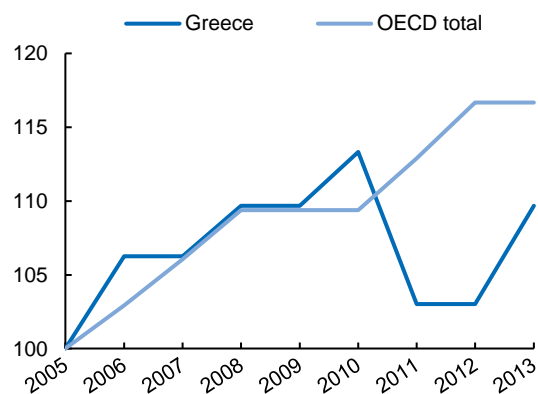
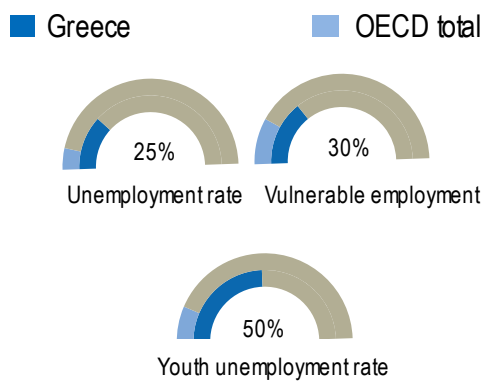


Figure 4. Unemployment

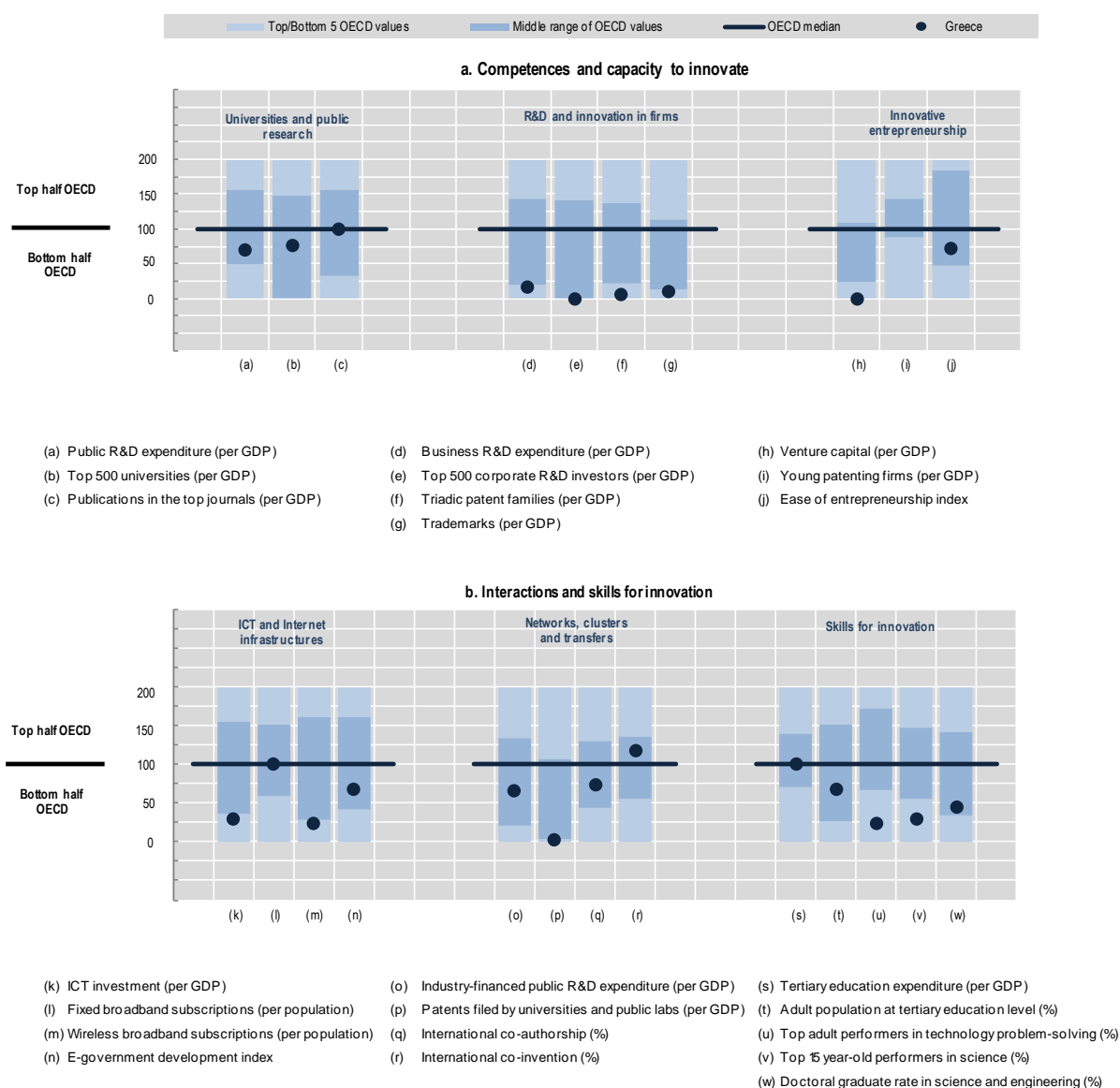
2015 or latest year available, percentage



Benchmarking national STI systems

Figure 5. Science and Innovation in Greece

Comparative performance of national science and innovation systems, 2016





Highlights of the Greek STI system

Innovation in firms

Greece lacks world-leading corporate R&D investors (figure 5^a), and the low values of innovation output indicators (figure 5^{f,g}) are the mirror image of the low innovation input of Greek firms. BERD accounts for 0.28 in 2014, well below the OECD median (figure 5^d). In terms of funding instruments the government relies on a mix of indirect and direct mechanisms. While tax incentives and competitive grants have already been widely applied in 2014, the relevance of technology consulting has risen considerably over the last two years (figure 8). To stimulate innovation output, supporting mechanisms for SMEs have attracted increasing attention. Three recent initiatives can be highlighted in this context: The Enterprise Europe Network-Hellas (EEN-Hellas) provides initial support to innovative enterprises wishing to enter global value chains. The network targets SMEs, academic and research centres in becoming more export-oriented by using knowledge from third parties, building commercial partnerships, and increasing the level of patenting and licensing. Similarly, the Operational Programme Competitiveness, Entrepreneurship and Innovation, established in 2014, provides grants and subsidies to support knowledge-intensive activities and to create new jobs in firms. It has a sectoral focus on health, ICT, energy, transport, construction, and life sciences, to name just a few. Greek structural fund authorities allocated USD 1.6 billion PPP (EUR 1.1 billion) and the EU USD 5.9 billion PPP (EUR 3.6 billion) to the programme. Finally, the Institution for Growth (IfG) was established in 2014 providing debt or equity financing and guarantees for SMEs and infrastructure projects. The IfG will distribute funds with the help of accredited banks. A key objective is to provide SMEs with improved access to investment loans and working capital to help foster economic growth.

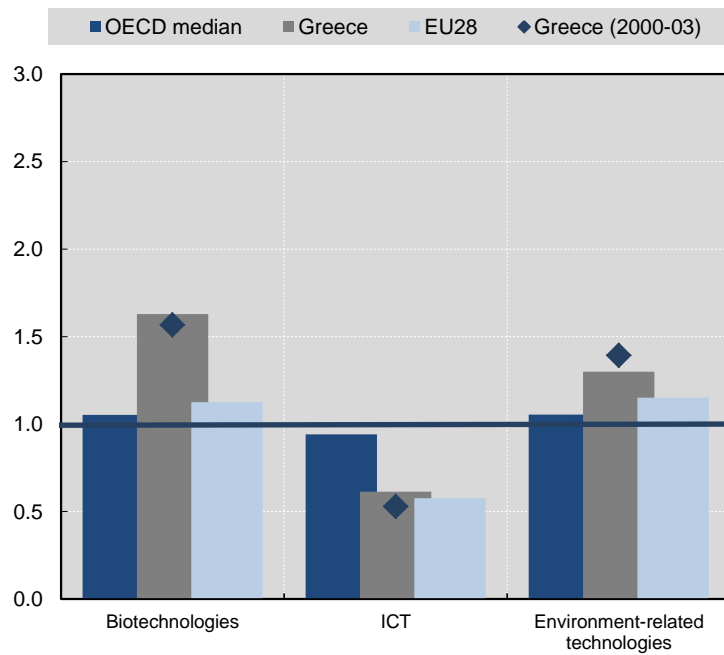
Clusters and regional policies

The government intends to strengthen existing and establish new innovative clusters in key sectors. Similar to the Operational Programme Competitiveness, Entrepreneurship and Innovation, those address priority sectors ICT, energy, environment, agrofood, culture-tourism-creative industries, transport, advanced materials, life sciences, and health-medicines. Evaluation of previous cluster initiatives (Corallia-Phase I) provided evidence to expand clusters in the programming period 2014-20. So far Phase II (on microelectronics) was complete, while Chorus Cluster for Green Energy, SI-Cluster (Space), GI-Cluster (Gaming) and BIONIAN Cluster (Health) were also funded. Since the beginning of 2012, smart specialisation strategies have been elaborated both at the national and regional level. National innovation platforms have been set up since 2013 in the framework of the EU's Research and Innovation Strategy for Smart Specialisation (RIS3) for 2014-20. The National Research and Innovation Strategy for Smart Specialisation (NRISS) 2014-20 is an integrated, region specific economic transformation agenda that addresses the needs of SMEs and aims to increase investments in knowledge and excellence and dissemination of new technologies. Regional Operational Programmes – managed by Regional authorities – finance RDI-related investment. The Ministry of Economy and Development appointed the Smart Specialisation Strategy Board in 2015 to advice on the approval, monitoring and review of the NRISS.



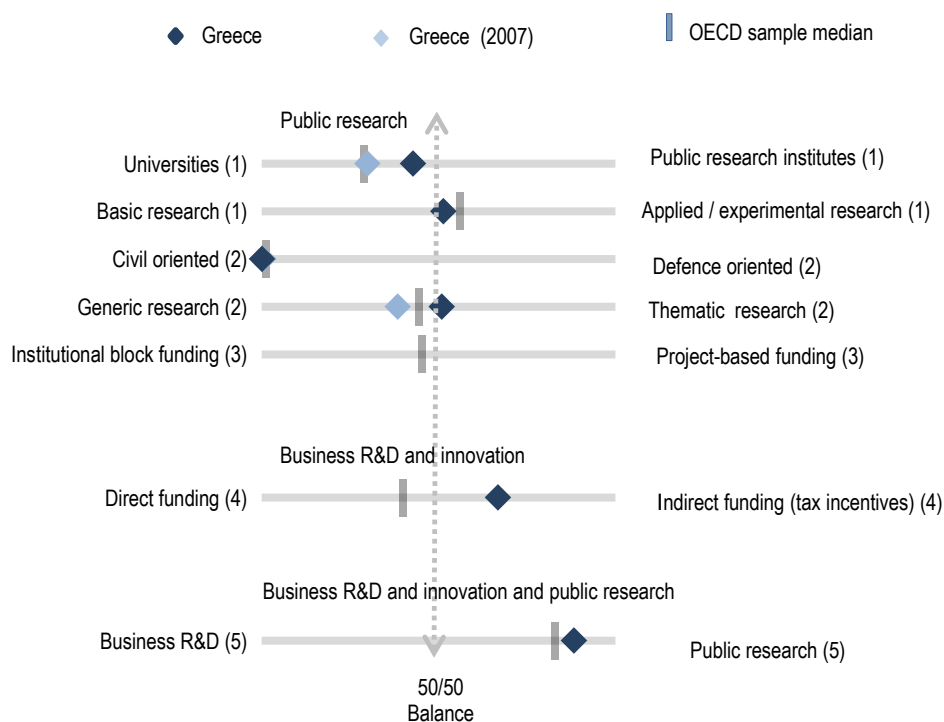
Structural aspects and specialisation

Figure 6. Revealed technology advantage in selected fields, 2011-13
Index based on IP5 patent families applications



National STI policy mix

Figure 7. 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.

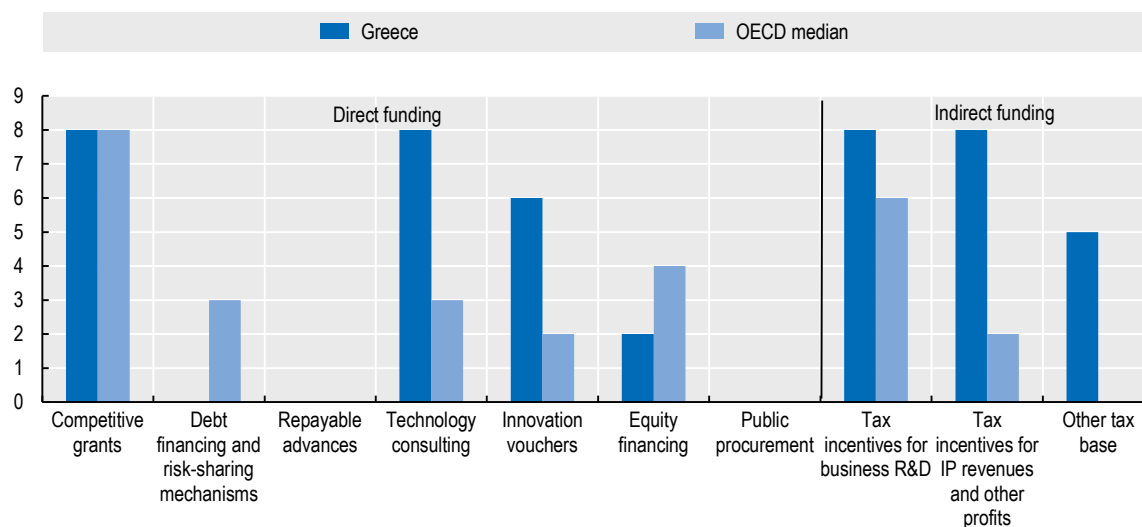
(2). Balance as a share of total government budget appropriations and outlays for R&D (GBAORD).

(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 8. 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 STI Policy Survey 2016 and 2014. Greece's responses are available in the EC/OECD STI Policy Database, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/GRC...STIO_2016.

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

StatLink <http://dx.doi.org/10.1787/888933433825>

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.



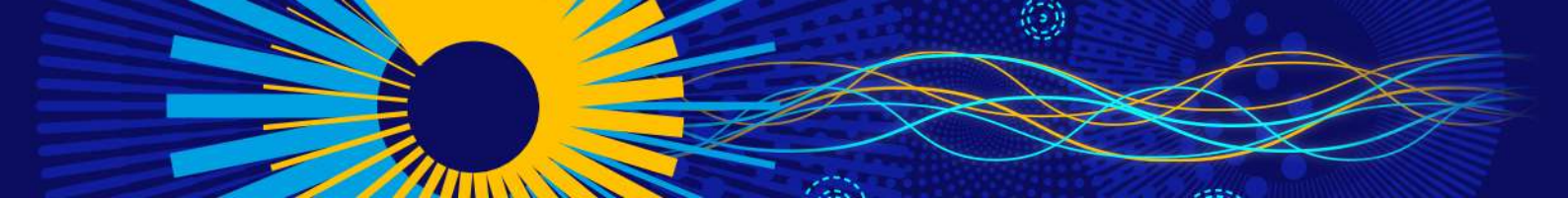
- Kergroach, S., J. Chicot, C. Petroli, J. Pruess, C. van Ooijen, N. Ono, I. Perianez-Forte, T. Watanabe, S. Fraccola and B. Serve, (forthcoming-a), "Mapping the policy mix for innovation: the OECD STI Outlook and the EC/OECD International STIP Database", *OECD Science, Technology and Industry Working 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.
- 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), "Greece", in *OECD Science, Technology and Innovation Outlook 2016*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/sti_in_outlook-2016-62-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.