

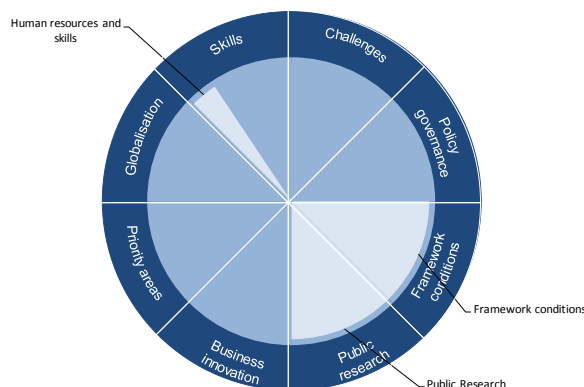
## SWITZERLAND

Switzerland is a small open economy, with high GDP per-capita (59712 USD in 2015) and high export levels (64% of GDP in 2014). The country has maintained outstanding strengths in science, technology and innovation, with a GERD of 3% and a BERD of 2% in 2014. The federal government's strategy document, Promotion of Education, Research and Innovation (ERI Dispatch), released every 4 years, aims to reinforce public R&D investment in order to maintain a leading position in global research and innovation. The government's Financial Plan stipulates that the ERI budget should grow at an above-average rate compared to other policy sectors. At the end of 2015, the ERI budget has been growing by 3% during the budgetary period 2013-2016 and the federal expenditure reached USD 18.7 billion PPP (CHF 23.8 billion). The exact target rate as well as total planned federal expenditure for the period 2017-2020 will be decided in response to the Federal Council Dispatch on ERI 2017-2020 by the Swiss Parliament.

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

	CHE	OECD
<b>GERD</b>		
USD million PPP, 2012	13 571	1 181 495
As a % of total OECD, 2012	1.2	100
<b>GERD intensity and growth</b>		
As a % of GDP, 2012	2.97	2.38
(annual growth rate, 2007-12)	(+3.1)	(+2.3)
<b>GERD publicly financed</b>		
As a % of GDP, 2012	0.79	0.61
(annual growth rate, 2007-12)	n.a.	(+2.5)

**Figure 1.** Major STI policy priorities, 2016



## Hot issues

### Strengthening the public research system

The evaluation of public research and public research institutions has received particular attention. In 2012, the Swiss National Science Foundation (SNSF)'s Council concluded a positive evaluation of the SNSF evaluation procedures. Some recommendations included a reform of the processes for external evaluations of funding applications, greater transparency through better documentation, and systematic reviews of funding schemes. Since 2014, Switzerland has completely revised the Federal Act on the Promotion of Research and Innovation (RIPA). This revision seeks to reinforce the existing legal framework for all types of research financed by the Federal government in order to ensure efficiency, accountability and quality



control. Moreover, the revised law provides the legal basis for the newly established Swiss innovation park. Finally, the federal act on funding and coordination of the Swiss higher education sector (Higher Education Act, HEDA) entered into force in 2015, with the scope of regulating the responsibilities of the Federal and Cantonal governments for the coordination and quality assurance of the higher education sector. Among other objectives, the HEDA aims at raising the profile of the higher education institutions and encourage competition, particularly with regards to research. The Swiss accreditation council and the Swiss Conference of Higher Education Institutions are two of the joint bodies of the Confederation and Cantons instituted by HEDA to achieve these objectives.

## Improving overall human resources and skills

A lack of specialists is perceived as an increasingly acute problem due to demographic developments. This issue may be exacerbated by restrictions on immigration, in particular following the popular referendum of February 9, 2014 demanding stricter control and limitation of immigration. In September 2014, the Federal Council decided to intensify and expand the set of measures launched initially in the September 2011 under the Specialists Initiative of the Federal Department of Economic Affairs (FDEA) to better meet the demand for specialists with Swiss human resources by 2020. The initiative includes encouraging the acquisition of new qualifications and the training of workers and unemployed. Specific measures to make easier for women to pursue a professional career are under consideration.

## Improving framework conditions for innovation

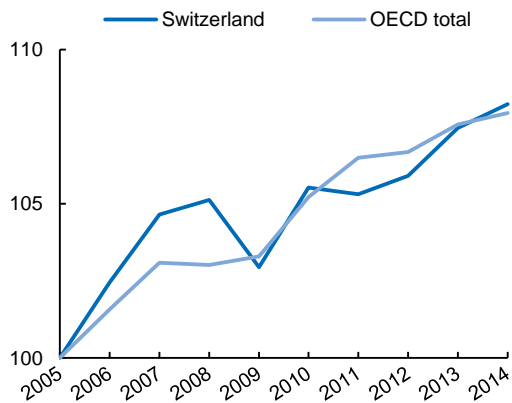
The Swiss government is committed to providing good framework conditions for innovation. Notably, since 2015, the Swiss National Innovation Park has begun operating, with two hub sites centred on the two federal institutes of technology in Zurich and Lausanne. The Park provides space, visibility and opportunities for industry-academia collaboration in order to attract private R&D investments. The Commission for Technology and Innovation (CTI) remains the main federal agency responsible for encouraging science-based innovation. CTI introduced a variety of programs to provide financing, professional advice and networks, in particular to start-ups and SMEs. Some important examples are: CTI Vouchers, with a budget of (CHF 1 million in 2014), helps SMEs to get an expert assessment of their innovation projects and to search for innovation partners; CTI grants for collaborative R&D projects, with a 2014 budget of CHF 117 million), financially supports joint projects between firms and HEIs; CTI National Thematic Networks (NTN), 2014 budget of USD 1.9 million (CHF 2,5 million), aims at providing SMEs with access to science-based research findings; CTI Innovation Mentors (IMS), 2014 budget of (CHF 1 million), provides mentorship to SMEs on innovation challenges and to search for innovation partners in academic institutions.



## Some key STI performance indicators

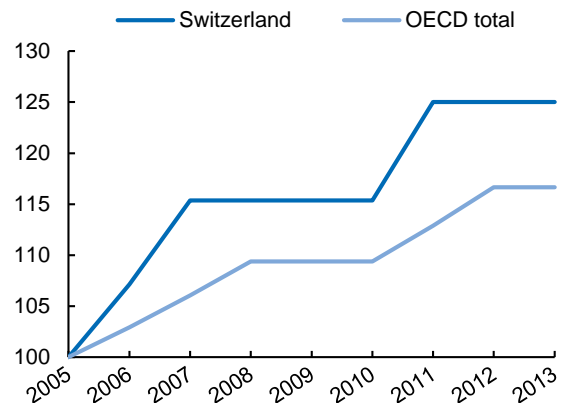
**Figure 2.** Economic performance

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



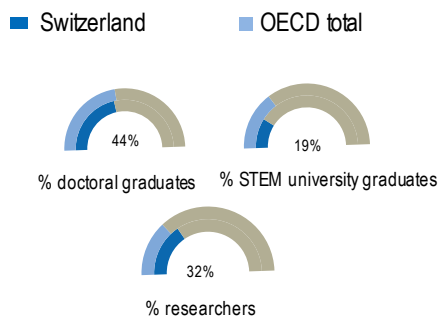
**Figure 3.** Environmental performance

Green productivity, GDP per unit of CO<sub>2</sub>  
emitted, index 2005=100



**Figure 4.** Women in science

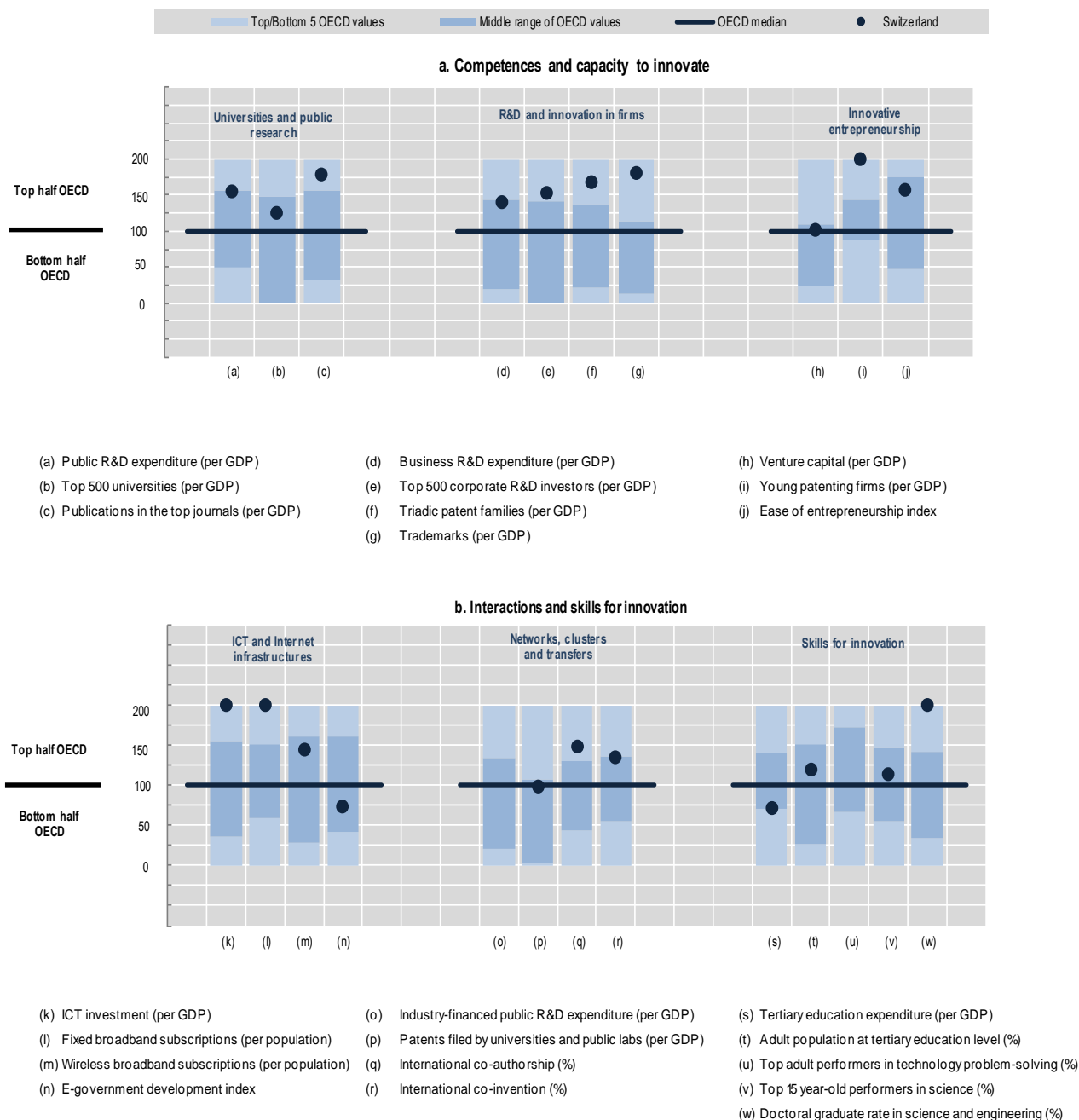
2014 or latest year available, percentages



## Benchmarking national STI systems

**Figure 5. Science and Innovation in Switzerland**

Comparative performance of national science and innovation systems, 2016







## Highlights of the Swiss STI system

### New challenges

The Federal Council significantly invests in innovative solutions for emerging societal challenges. As part of its new Energy Strategy 2050, it emphasises increased energy savings (energy efficiency), the expansion of new renewable energies, and fossil fuel-based electricity production (co-generation facilities, gas-fired combined-cycle power plants) and imports if necessary. Research on green energy is to play a strategic role in this context. It will receive an additional USD 153 million (CHF 202 million) over the period 2013-2016 to support energy-related research and to promote the “Energy” Programme and the inter-university Swiss Competence Centres for Energy Research. CTI dedicates grants for collaborative R&D projects specifically on energy related research with a budget of USD 35 million (CHF 46 million) over the period 2013-2016. Regarding other sectors, the Swiss Space Implementation Plan (SSIP) 2014 to 2023, as part of ERI policy framework, is meant to strengthen an innovative and competitive Swiss space sector and to encourage the use of space-based services and applications by public and private actors. Finally, since 2014, Switzerland is a full member of the Active and assisted living programme to address the challenges arising from demographic changes. The programme provides SMEs with opportunities for co-operation on, development and commercialisation of products and services for the so-called “Silver Market”.

### STI policy governance

Swiss governance of STI follows the federalist structure of the country and relies on bottom-up processes, with the Confederation and cantons sharing responsibility for research and higher education policy. Since 2013, the Federal Department of Economic Affairs (FDEA) has become the Federal Department of Economic Affairs, Education and Research (EAER). The State Secretariat for Education, Research and Innovation (SERI) at the EAER serves as the federal government's specialised agency for national and international matters concerning education, research and innovation policy. Since 2015, first, the Swiss Accreditation Council is devoted to the accreditation and quality assurance in the Swiss higher education sector. The Swiss Accreditation Council is formed by 18 independent members representing HEIs, the world of work, students, non-professional teaching staff and academic staff. Second, the Swiss Conference of Higher Education Institutions has been put into force to bring cantons and Confederation together in a common political body to coordinate Swiss higher education. For the newly established Swiss Innovation Park, a private foundation, acts as the national point of contact and is fully privately financed. While the Confederation facilitated the political process necessary for its creation, the Swiss Innovation Park is realized by the cantons, by the research institutions and universities and the private sector, and the role of the Confederation is subsidiary.

### Technology transfer and commercialisation

Switzerland strongly supports the creation of start-ups by university students and researchers. In addition to other CTI initiatives, CTI Start-up has established different programmes, whose overall objective is to support entrepreneurship (CTI Entrepreneurship, CTI Start-up Coaching, CTI Market Entry Camps, CTI Invest). In particular, since 2004, CTI Entrepreneurship, has encouraged and supported university graduates and young entrepreneurs to start up their firm by connecting them with start-up experts. The programme remains active in almost all universities, technical colleges and techno-parks and, from 2004 to 2013, more than 30000 students and start-ups used this opportunity. The programme budget for 2014 was USD 3.3 million (CHF 4,4 million).

### Globalisation

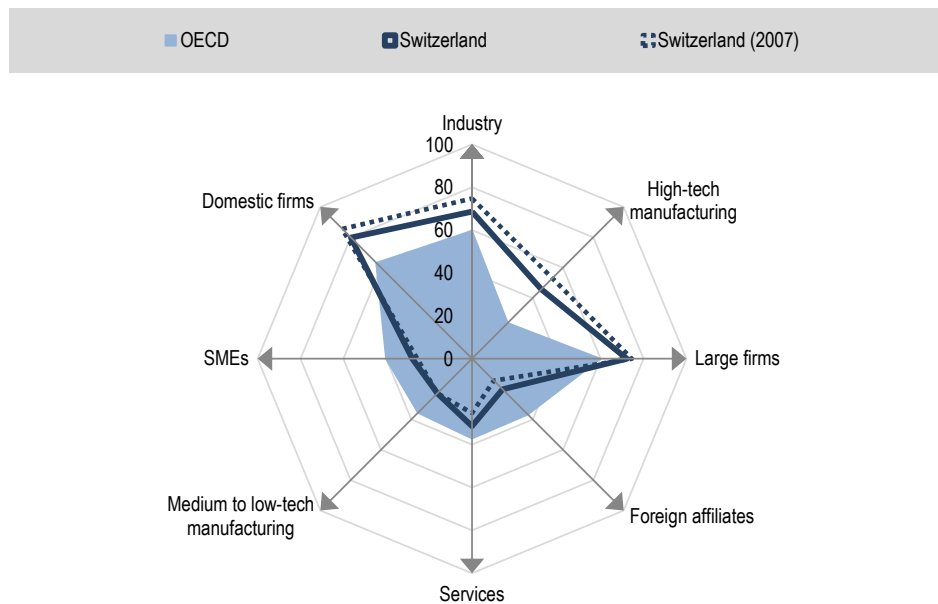
Swiss research and innovation has largely benefited from a high level of internationalization of human resources, both in businesses and universities, and favourable conditions to attract FDI. The SNSF, in particular, supports both outward and inward international scientific mobility through specific dedicated programmes (e.g. SNSF mobility grants and SNFS Ambizione). Until 2013, Switzerland was associated to the EU Research Framework Programmes (FP) and the EU Erasmus Programme. Following the referendum on 9 February 2014 aimed to limit immigration, the participation of Switzerland to EU Programmes has been

partly suspended. The participation of Swiss entities in calls under the non-associated parts of Horizon 2020 as well as learning mobility activities that are not funded within EU Erasmus Programme are funded by the Swiss government.

## Structural aspects and specialisation

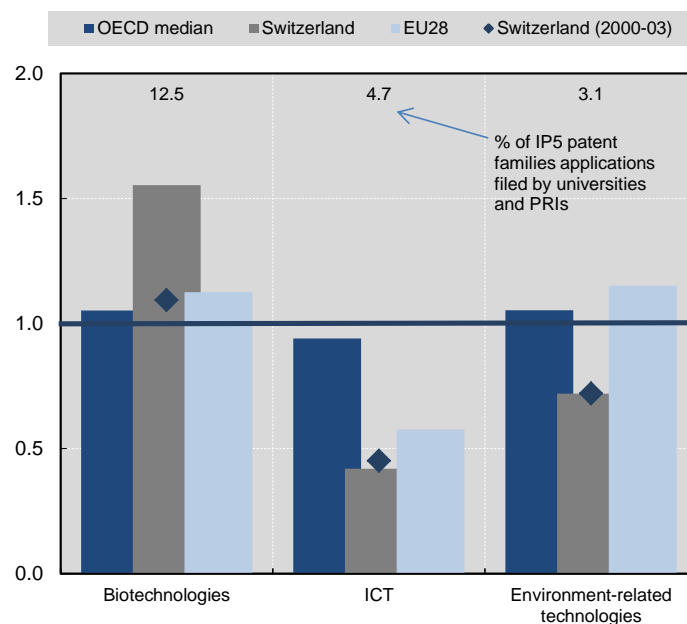
**Figure 6.** Structural composition of BERD, 2013 or latest year available

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



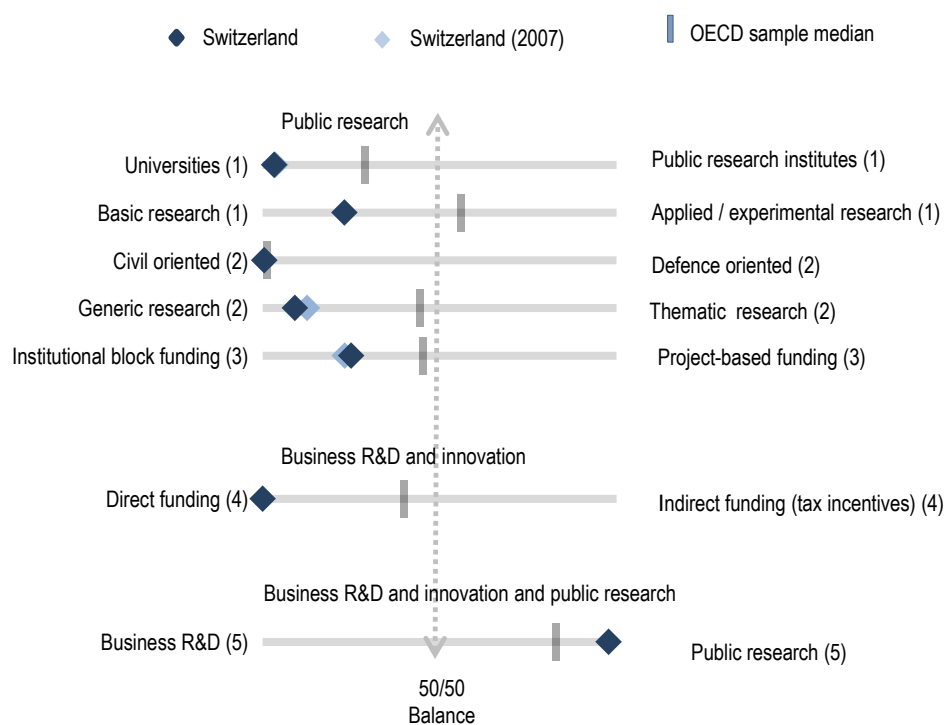
**Figure 7.** Revealed technology advantage in selected fields, 2011-13

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.

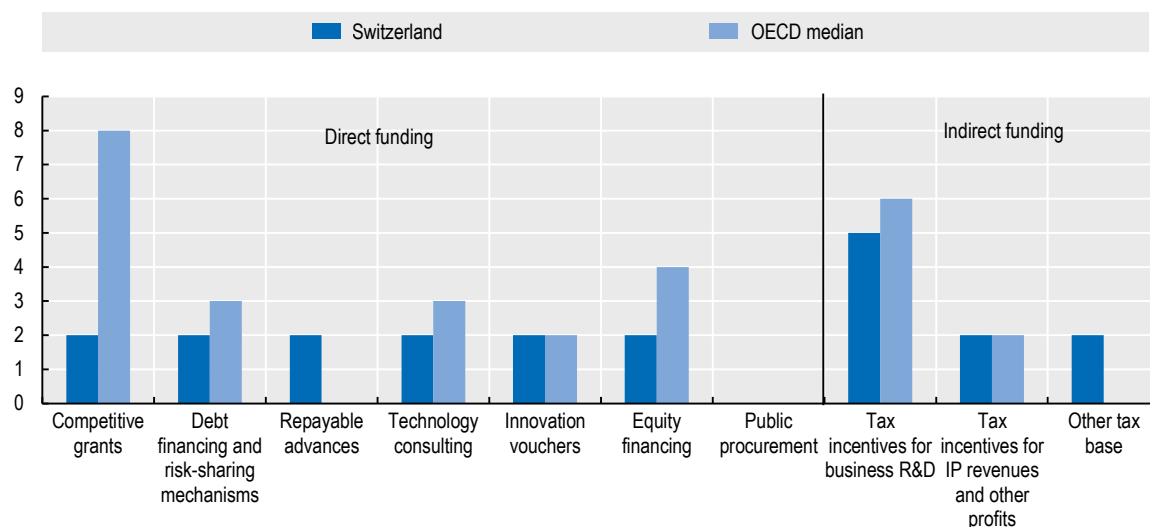
(2). Balance as a share of total government budget appropriations and outlays for R&D (GBAORD).

(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. Switzerland's responses are available in the EC/OECD International Database on STI Policies, edition 2016 at [http://qdd.oecd.org/DATA/STIPSurvey/CHE...STIO\\_2016](http://qdd.oecd.org/DATA/STIPSurvey/CHE...STIO_2016).

*Source:* See the reader's guide and methodological annex. StatLink  <http://dx.doi.org/10.1787/888933434093>

## 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](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. Petroliti, 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](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](http://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](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](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](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](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](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](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](http://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](http://www.innovationpolicyplatform.org/ecoecd-stip-database).
- Elsevier B.V. (2014), Elsevier Research Intelligence, [www.elsevier.com/online-tools/research-intelligence/products-and-services/scival](http://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](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/kiim/lang--en/index.htm](http://www.ilo.org/global/statistics-and-databases/research-and-databases/kiim/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](http://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](http://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](http://www.oecd.org/industry/ind/amne.htm).
- OECD (2016), ANBERD Database, July, [www.oecd.org/sti/anberd](http://www.oecd.org/sti/anberd).
- OECD (2016), OECD Annual Labour Force Statistics Database, July, [www.oecd.org/employment/labour-stats/](http://www.oecd.org/employment/labour-stats/).
- OECD (2016), Broadband Portal, August, [www.oecd.org/sti/broadband/oecdbroadbandportal.htm](http://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](http://www.oecd.org/social/income-distribution-database.htm).
- OECD (2016), Main Science and Technology Indicators (MSTI) Database, June, [www.oecd.org/sti/msti](http://www.oecd.org/sti/msti).
- OECD (2016), OECD National Accounts Databases, September, [www.oecd.org/std/na/](http://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](http://www.oecd.org/sti/rd-tax-stats.htm).
- OECD (2016), Patent Database, June, [www.oecd.org/sti/inno/oecdpatentdatabases.htm](http://www.oecd.org/sti/inno/oecdpatentdatabases.htm).
- OECD (2016), Productivity Database, September, [www.oecd.org/std/productivity-stats](http://www.oecd.org/std/productivity-stats).
- OECD (2016), Programme of International Students Assessment (PISA) Database, OECD Education Statistics, June, [www.pisa.oecd.org](http://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](http://www.oecd.org/skills/piaac/surveyofadultskills.htm).
- OECD (2016), Research and Development Statistics (RDS) Database, April, [www.oecd.org/sti/rds](http://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](http://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](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](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>

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