



From:
**OECD Science, Technology and Industry Outlook
2014**

Access the complete publication at:
http://dx.doi.org/10.1787/sti_outlook-2014-en

Turkey

Please cite this chapter as:

OECD (2014), "Turkey", in *OECD Science, Technology and Industry Outlook 2014*, OECD Publishing.
http://dx.doi.org/10.1787/sti_outlook-2014-78-en

This work is published on the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Organisation or of the governments of its 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.

TURKEY

Turkey is a large, fast-growing, middle-income OECD economy. It has industrialised rapidly in recent years, although growth has slowed in the last two years. It has made significant strides in building up its STI capacities, and GERD grew by 8.2% annually over 2007-12. Currently, Turkey is in the process of deploying the National Science, Technology and Innovation Strategy (UBTYS) 2011-16, approved by the Supreme Council for Science and Technology (SCST).

Hot issue 1: Targeting priority areas/sectors. Turkey's National Science, Technology and Innovation Strategy (UBTYS) (2011-16) has a sectoral focus, with nine national priority sectors: automotive, machinery and manufacturing technologies, energy, ICT, water, food, defence, aerospace, and health. A high-level prioritisation meeting was established for each priority sector to determine technological needs through a consultative and consensus-building process. These were followed by studies to prepare technology roadmaps for sub-fields in these nine sectors. Since 2012, there were some 100 calls within the priority fields being launched through the call-based programme of the Scientific and Technological Research Council of Turkey (TÜBİTAK). Landmark projects, such as the domestic electric vehicles, are also part of Turkey's target-oriented support system. As cross-cutting technologies, biotechnology and nanotechnology, as well as ICT software R&D and innovation strategy and action plans are being prepared by the Ministry of Science, Industry and Technology (MoSIT), in support of the priority areas of UBTYS 2011-16.

Hot issue 2: Improving the design and implementation of STI policy. Turkey considers an ecosystem approach centred on the business sector and entrepreneurs crucial for a well-functioning innovation system. A policy-making approach based on the ecosystem concept has been in place since 2011. The high-level prioritisation groups, the Delphi surveys of experts in the sector concerned and the focus groups combine strategic and bottom-up initiatives and both qualitative and quantitative measures to set future sectoral priorities. Through this approach, there is broad and active participation by non-state actors. The Co-ordination Council for R&D, Innovation and Entrepreneurship aims to ensure the various public actors' integrity, coherence and target-oriented approach to the support

mechanism. A special department has been set up in MoSIT for assessing the impact of Turkey's R&D and innovation support programme. TÜBİTAK has conducted an overall evaluation of the priority programmes from the supply-side perspective, using indicators to reveal strengths and weaknesses of different priority sectors. In 2014, MoSIT also published the Performance Index for Business Sector R&D Centres and Technoparks, which account for more than 60% of business R&D expenditure and employment.

Hot issue 3: Encouraging innovation in firms and supporting entrepreneurship and SMEs. Turkey's BERD was 0.42% of GDP in 2012, well below the OECD median (Panel 1^d). BERD has increasingly concentrated on knowledge services at the expense of high-technology manufacturing (Panel 2). According to the World Bank's Ease of Doing Business Index, entrepreneurship conditions could be significantly improved. Support for entrepreneurship and SMEs is one of the priorities of the Supreme Council for Science and Technology, and several policy initiatives have been put in place. These include the development in 2012 of the Entrepreneurial and Innovative University Index to boost entrepreneurial and innovative activities in universities and to promote knowledge and technology transfer; the launch of several TÜBİTAK support programmes, such as the Venture Capital (Private Equity) Funding Programme (1514), the Individual Entrepreneurship (Phased) Support Programme (1512), the Individual Entrepreneurship Multi-Phased Co-Financing Programme (1512/B), and the Capacity Building for Innovation and Entrepreneurship Support Programme (1601), etc. MoSIT started the Technological Products Promotion and Marketing Programme in 2013 and the Technological Products Investment Support Programme in 2014. Both target firms that have previously received public/international R&D and innovation support.

Highlights of the Turkish STI system

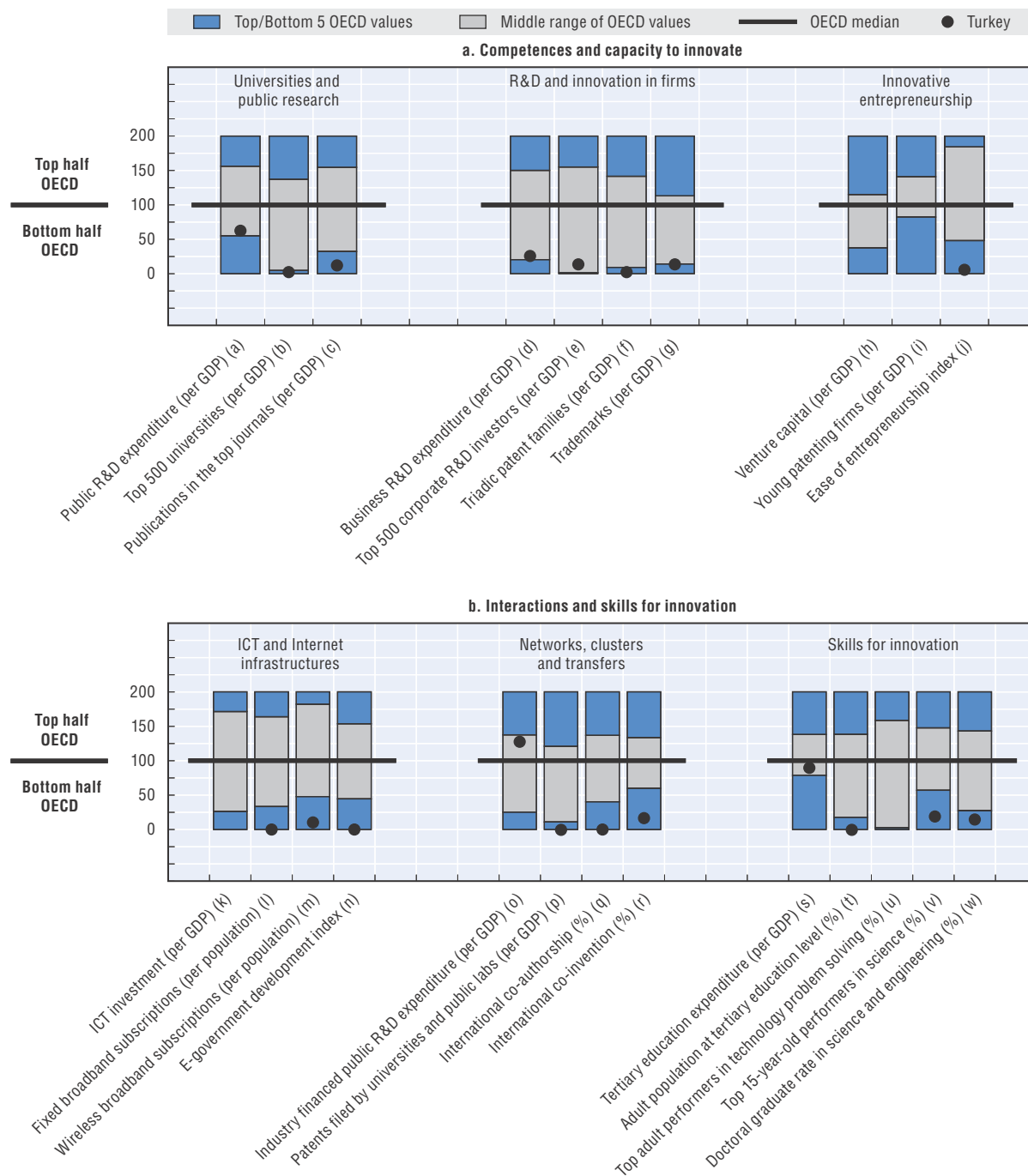
New challenges: The National Climate Change Action Plan (NCCAP) 2011-23 is Turkey's first green growth strategy. The goal of the Ministry of Energy is to reduce energy consumption by 20% per unit of GDP by 2023 (base 2011). The Technology Development Foundation of Turkey recently

Key figures, 2013

Economic and environmental performance	TUR	OECD	Gross domestic expenditure on R&D	TUR	OECD
Labour productivity			GERD		
GDP per hour worked, USD PPP, 2013	30.0	47.7	Million USD PPP, 2012	12 656	1 107 398
(annual growth rate, 2008-13)	(+0.5)	(+0.8)	As a % of total OECD, 2012	1.1	100
Green productivity			GERD intensity and growth		
GDP per unit of CO ₂ emitted, USD, 2011	3.4	3.0	As a % of GDP, 2012	0.92	2.40
(annual growth rate, 2007-11)	(+0.0)	(+1.8)	(annual growth rate, 2007-12)	(+8.2)	(+2.0)
Green demand			GERD publicly financed		
NNI per unit of CO ₂ emitted, USD, 2011	0.0	3.0	As a % of GDP, 2011	0.43	0.77
(annual growth rate, 2007-11)	n.a.	(+1.6)	(annual growth rate, 2007-11)	(+9.5)	(+2.8)

Figure 9.44. Science and innovation in Turkey

Panel 1. Comparative performance of national science and innovation systems, 2014



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

introduced a new Green Future Accelerator Fund with USD 10 million to step up the transfer of R&D results in green technology. Furthermore, under the coordination of TÜBİTAK, the Energy Efficiency Technology Roadmap was prepared, as one of the UBTYS's (2011-16) priority areas.

Universities and public research: Turkey's public research system is small (0.41% of GDP in 2012). It produces few international publications in top scholarly journals (Panel 1^c) and has only one world-class university (Panel 1^b). Public research is currently undergoing major reforms to improve its quality and relevance, to increase collaboration with the private sector, and to leverage private funding. Performance assessment has been reinforced in universities and PRIs, most notably based on a co-operation protocol signed between the Ministry of Development and TÜBİTAK to provide for the performance indicators, classification, and monitoring of current and future research centres. In 2013 TÜBİTAK introduced three new programmes to improve the efficiency of public research in universities. These include the Support Programme for Research, Technological Development and Innovation Projects in Priority Areas (1003), the Support Programme for Beginning Researchers (3001), and the Support Programme for National New Ideas and Products (1005). In addition, the Project Performance Award and the Incentive Programme for International Scientific Publications (UBYT) aim to reward successful projects and high-quality publications, respectively. In 2014, the SCST passed a new decree for a support programme that is open only to excellent research centres. MoSIT is preparing the University-Industry Cooperation Strategy and Action Plan, following 26 regional meetings of rectors, chambers of industry, researchers, SMEs and local stakeholders in 81 provinces during 2013.

Skills for innovation: Turkey has increased the number of full-time equivalent researchers three-fold since 2002 from a very low human resource base (Panel 1^s, ^t, ^v, ^w). The National Science and Technology Human Resources Strategy and Action Plan (2011-16) aims to increase the contingent of R&D personnel, to foster a research culture, and to develop researchers' skills, mobility and employability. The Turkish Qualifications Framework, which seeks to improve the quality of education and training and to develop the

qualifications required by the labour market, will be officially adopted in the second half of 2014. In addition, implemented by TÜBİTAK, the National Graduate Scholarship Programme supported 5 054 PhD students between 2000 and 2013, with 3 366 supported in 2013 alone, while the National Postdoctoral Research Fellowship Programme supported over 300 researchers over 2000-13. Ten international fellowships or grant programmes support the international mobility of Turkish and foreign students and researchers.

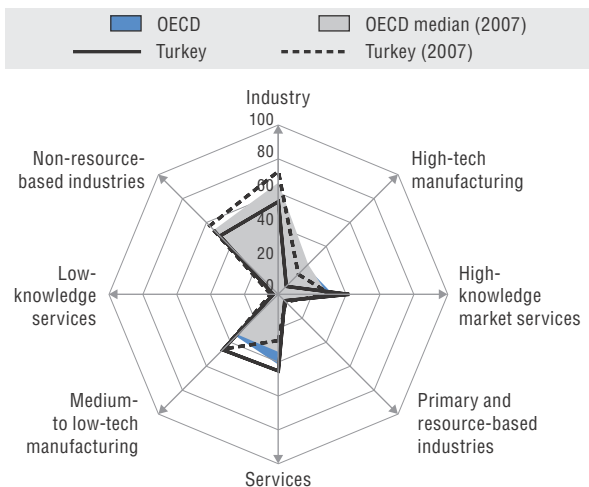
Clusters and smart specialisation: Smart specialisation and clustering have recently attracted policy attention. Provincial innovation platforms were set up in 2010 to stimulate co-operation and turn local knowledge into economic and social benefits. In 2011, TÜBİTAK launched a competitive funding programme to set up regional innovation platforms and local co-operation networks. The Law on Technology Development Zones fosters the creation of technology parks through support for infrastructure and tax incentives for companies and their R&D personnel in the parks. As of 2014, 55 zones have been established and 40 are in operation, whose performance is being monitored by MoSIT based on the Performance Index for Technoparks.

Technology transfer and commercialisation: By OECD standards universities and PRIs file few patents as a share of GDP (Panel 1^p). In 2012, some existing programmes were revised, and new programmes, including TÜBİTAK's Technology Transfer Office Support Programme, were launched to facilitate the commercialisation of university R&D results and increase their impact on and benefit to society. The Patent Application Promotion and Support Programme, implemented by TÜBİTAK, was updated in 2013, in accordance with the needs of different stakeholders, to improve the quality and the quantity of patent applications.

Recent developments in STI expenditures: GERD grew significantly faster than the OECD average between 2007 and 2012. Business R&D spending recovered rapidly after the economic crisis. In 2012, GERD was 0.92% of GDP, and industry funded 46.8% of GERD (0.43% of GDP), up from 41% in 2009 (0.35% of GDP). The government is committed to sustained investment in STI and sets the targets for GERD and BERD at 3% and 2% of GDP, respectively, by 2023.

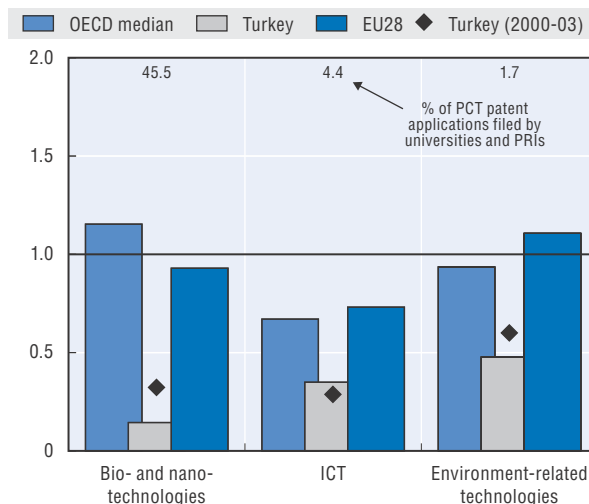
Panel 2. Structural composition of BERD, 2011

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

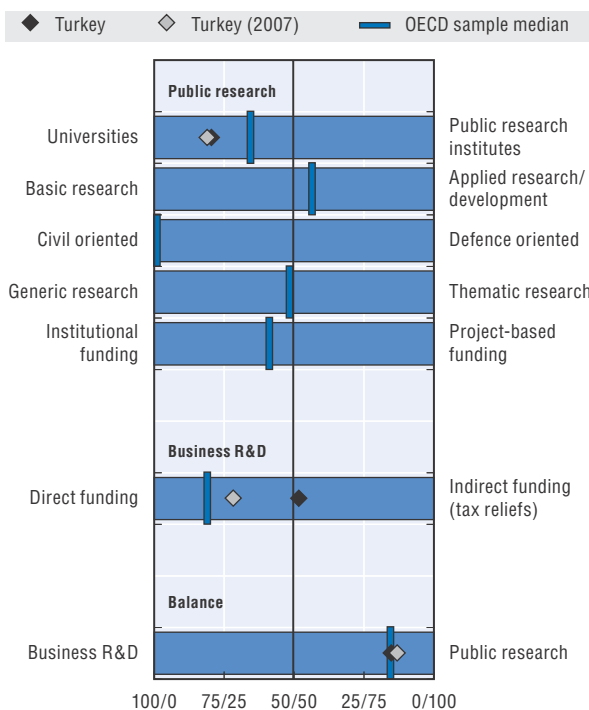


Panel 3. Revealed technology advantage in selected fields, 2009-11

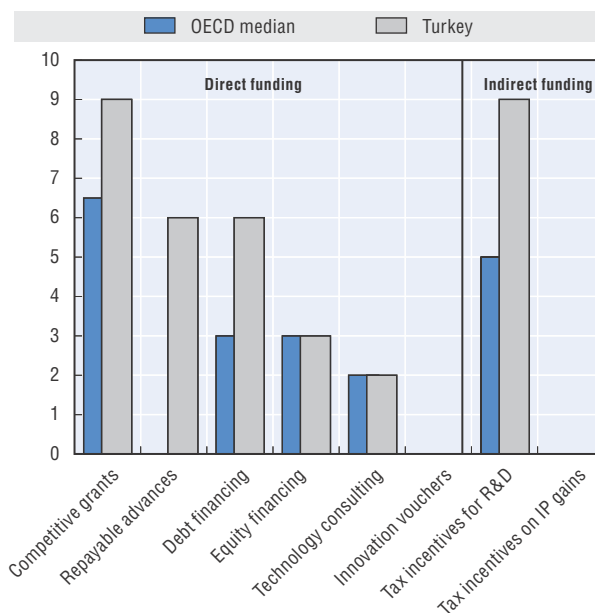
Index based on PCT patent applications



Panel 4. Allocation of public funds to R&D, by sector, type and mode of funding, 2012



Panel 5. Most relevant instruments of public funding of business R&D, 2014



Note: Policy information comes from country responses to the OECD STI Outlook policy questionnaires 2014 and 2012. Turkey's responses are available in the OECD STI Outlook Policy Database, edition 2014 at <http://qdd.oecd.org/Table.aspx?Query=1040551D-1182-4AB9-B2F2-BB4554354911>.
Source: See reader's guide and methodological annex.

StatLink <http://dx.doi.org/10.1787/888933152442>

STI country profiles reader's guide

The country profiles (CPs) in the 2014 *OECD STI Outlook* (STIO) are designed to provide a concise overview of science, technology and innovation (STI) policy and performance in OECD members and selected non-OECD economies. Each country profile is based on information gathered from the country's response to the OECD STIO policy questionnaires 2012 and 2014, as well as various additional OECD and non-OECD sources.

Headings in the country profiles are linked to the STIO policy profiles, which examine the main global STI policy trends across countries. Issues featuring in both the policy and country profiles are: i) innovation policy governance; ii) new sources of growth; iii) new challenges; iv) universities and public research; v) innovation in firms; vi) innovative entrepreneurship; vii) technology transfer and commercialisation; viii) clusters and smart specialisation; ix) globalisation; and x) skills for innovation.

The table of key figures presents indicators on the country's economic performance (labour productivity), environmental performance (green productivity and demand), the size of its R&D system as measured by gross domestic expenditure on R&D (GERD), the degree of public commitment to S&T as measured by the share of GERD that is publicly financed, and the changes in these indicators over the past five years. In the text, all amounts are given both in USD in purchasing power parities (PPP) of the relevant year (if available) and in national currencies.

Panel 1 contains a double figure that sheds light on the strengths and weaknesses of the country's STI performance. It uses indicators on the country's national innovation system and performance with respect to: universities and public research, business R&D and innovation, innovative entrepreneurship, information and communication technology (ICT) and Internet infrastructure, networks, clusters and transfers, and skills for innovation. The dot for each indicator positions the country relative to the OECD median and to the top and bottom five OECD countries. Non-OECD countries are also compared to the OECD benchmarks, and may fall out of the range indicated in the figure (e.g. below the lowest OECD country). All indicators are normalised (by GDP and population cohorts) to take account of the size of the economy and the relevant population cohorts, and are presented as indices (OECD median = 100) for benchmarking purposes.

Panel 2 shows the structural composition of business expenditure on R&D (BERD) in terms of performance of the main industry sectors, firm size and firms' national affiliation. It reflects the country's industry structure and its business innovation efforts. Panel 3 presents the country's revealed technological advantage (RTA), as measured by international patent applications filed under the Patent Cooperation Treaty (PCT) in three key technology fields (bio- and nano-technology, ICTs, and environment-related technologies). It also shows the number of patents filed by universities and public research institutions in these fields.

Panel 4 gives an overview of the country's policy mix for public R&D, i.e. the orientation and funding modes of public research. It also illustrates changes in the policy mix for R&D over the past five years. Finally, Panel 5, a new feature in STIO 2014, reflects the balance and relative importance of various government measures to support business R&D and innovation. It is based on the country's self-assessment in its reply to the OECD STIO 2014 policy questionnaire.

Further details on the methodology, data sources and descriptions of indicators used in the country profile are provided in Annex 9.A. Data, metadata as well as the original sources and databases of the indicators used in the STIO 2014 are accessible at the statistical portal IPP.Stat (cut-off date: 8 July 2014).

Abbreviations used in the country profiles

BERD:	Business expenditure on research and development
EU:	European Union
FDI:	Foreign direct investment
GDP:	Gross domestic product
GERD:	Gross expenditure on research and development
HEIs:	Higher education institutions
IPRs:	Intellectual property rights
MNEs:	Multinational enterprises
PRIs:	Public research institutes
R&D:	Research and development
S&E:	Science and engineering
SSS:	Smart specialisation strategy (also known as 3S)
STI:	Science, technology and innovation
S&T:	Science and technology
3S:	See SSS
STEM:	Science, technology, engineering and mathematics
USD:	United States dollars (converted using the purchasing power parities of the relevant year)
VC:	Venture capital

Synthetic table

Table 9.1. Comparative performance of national science and innovation systems, 2014

Country relative position: in the top 5 OECD or above (★), in the middle range on par or above OECD median (▲), in the middle range below OECD median (△) and in the bottom 5 OECD or below (○)

		Competences and capacity to innovate									
		Universities and public research			R&D and innovation in firms				Innovative entrepreneurship		
		Public R&D expenditure (per GDP)	Top 500 universities (per GDP)	Publications in the top-quartile journals (per GDP)	Business R&D expenditure (per GDP)	Top 500 corporate R&D investors (per GDP)	Triadic patent families (per GDP)	Trademarks (per GDP)	Venture capital (per GDP)	Young patenting firms (per GDP)	Ease of entrepreneurship index
		PUB_XGDP	UNI500_GDP	PUB25_GDP	BE_XGDP	CORPRD500_GDP	PTRIAD_GDP	TRDMRK_GDP	VC_XGDP	PTYG_GDP	EASE_I
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Argentina	ARG	△	△	○	○	○	○	○			
Australia	AUS	▲	▲	▲	▲	△	△	▲	△		▲
Austria	AUT	▲	★	▲	▲	▲	▲	△	△	★	▲
Belgium	BEL	△	▲	▲	▲	△	▲	△	▲	△	△
Brazil	BRA		△	○		△	○	○			△
Canada	CAN	▲	▲	▲	△	△	▲	★	★	○	▲
Chile	CHL	○	△	○	○	○	○	△			△
China	CHN	△	△	○	▲	△	△	○			○
Colombia	COL	○	○	○	○						
Costa Rica	CRI	○	○	○	○	○					
Czech Republic	CZE	▲	△	△	△	△	△	△	○		△
Denmark	DNK	★	▲	★	▲	★	▲	▲	▲		▲
Estonia	EST	▲		▲	▲	○	△	△	▲		▲
Finland	FIN	★	★	▲	★	★	★	▲	★	★	▲
France	FRA	▲	△	△	▲	▲	▲	▲	▲	△	▲
Germany	DEU	★	▲	△	▲	▲	★	▲	▲	★	▲
Greece	GRC	○	△	△	○	△	○	○	○		△
Hungary	HUN	○	△	△	△	△	△	○	△		△
Iceland	ISL	★	○	★	▲	▲	△	★			△
India	IND	△	○	○	○	○	△	○			○
Indonesia	IDN		○	○	○		○	○			△
Ireland	IRL	△	▲	▲	△	▲	▲	▲	★	○	△
Israel	ISR	△	★	▲	★	▲	▲	▲	★		○
Italy	ITA	△	△	△	△	△	△	△	○	▲	★
Japan	JPN	▲	△	○	★	▲	★	△	△	○	▲
Korea	KOR	▲	△	△	★	▲	▲	▲	▲		△
Latvia	LVA	△	○	○	○		△				
Lithuania	LTU	△	○	○	○		△				
Luxembourg	LUX	○	○	△	△	★	▲	★	△		△
Malaysia	MYS	△	△	○	△	△					
Mexico	MEX	○	○	○	○	○	○	△			○
Netherlands	NLD	▲	▲	★	▲	▲	▲	▲	▲	▲	★
New Zealand	NZL	△	★	▲	△	△	△	★	△		★
Norway	NOR	▲	▲	△	△	▲	△	△	△	▲	△
Poland	POL	△	△	△	○	○	△	○	○		○
Portugal	PRT	△	▲	▲	△	△	△	△	△		▲
Russian Federation	RUS	△	○	○	△	△	○	○	△		△
Slovak Republic	SVK	△	○	○	○	○	○	○			★
Slovenia	SVN	△	▲	▲	▲	△	△	△	△		△
South Africa	ZAF	○	△	○	△	△	△	△	△		○
Spain	ESP	△	△	△	△	△	△	△	○	○	○
Sweden	SWE	★	★	★	★	★	★	▲	▲	★	△
Switzerland	CHE	▲	▲	★	▲	★	★	★	▲	★	▲
Turkey	TUR	△	○	○	△	△	○	○			○
United Kingdom	GBR	△	▲	▲	△	▲	▲	▲	▲	△	▲
United States	USA	▲	△	△	▲	▲	▲	▲	★	○	★
EU28	EU28	▲	▲	★	▲	△	▲	△	▲	▲	

Table 9.1. **Comparative performance of national science and innovation systems, 2014 (cont.)**

Country relative position: in the top 5 OECD or above (★), in the middle range on par or above OECD median (▲), in the middle range below OECD median (△) and in the bottom 5 OECD or below (○)

		Interactions and skills for innovation												
		ICT and Internet infrastructures				Networks, clusters and transfers				Skills for innovation				
		ICT investment (per GDP)	Fixed broadband subscribers (per population)	Wireless broadband subscribers (per population)	E-government readiness index	Industry financed public R&D expenditure (per GDP)	Patents filed by universities and public labs (per GDP)	International co-authorship (%)	International co-invention (%)	Tertiary education expenditure (per GDP)	Adult population at tertiary education level (%)	Top adult performers in technology problem solving (%)	Top 15 year-old performers in science (%)	Doctoral graduate rate in science and engineering (%)
		ICTINV_XGDP	FBBAND_HAB	WBBAND_HAB	EGOV_I	PUB_BEF_XGDP	PATPRI_XGDP	INTCOA_XSA	COPAT_XPCT	TER_XGDP	ADTERPOP_XT	TOPAD_PST_XAD	TOP15_SCI_XT	PHDR_SCIENG_XCOH
		(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)
Argentina	ARG	○	○	○	○	○		△	★	▲	○		○	○
Australia	AUS	▲	△	★	▲	▲	▲	△	△	▲	▲	▲	★	▲
Austria	AUT	▲	△	▲	△	▲	△	★	▲	△	△	△	△	▲
Belgium	BEL	▲	▲	△	△	▲	▲	★	★	△	▲		▲	▲
Brazil	BRA		○	△	○		△	○	△	○	○		○	○
Canada	CAN	△	▲	△	▲	▲	▲	△	▲	★	★	▲	▲	▲
Chile	CHL		○	○	△	○	△	▲	△	★	○		○	○
China	CHN		○	○	○	▲	△	○	○		○			○
Colombia	COL		○	○	△			▲	△	★	△		○	
Costa Rica	CRI		○	○	○			★	★		△		○	
Czech Republic	CZE	△	△	△	○	△	△	△	▲	△	△	△	△	△
Denmark	DNK	★	★	★	★	△	★	▲	▲	▲	△	★	△	▲
Estonia	EST		△	▲	△	△		▲	★	▲	▲	○	★	△
Finland	FIN	△	▲	★	▲	★	▲	▲	△	★	▲	★	★	★
France	FRA	△	★	△	▲	△	★	▲	△	▲	△		▲	▲
Germany	DEU	△	▲	△	▲	★	▲	△	△	△	△	▲	▲	★
Greece	GRC	○	△	△	△	△	○	△	▲	▲	△		○	△
Hungary	HUN		△	○	△	▲	○	▲	▲	○	△		△	○
Iceland	ISL		▲	▲	△	★		★	▲	○	▲		△	△
India	IND		○	○	○		△	○	▲	○				
Indonesia	IDN		○	○	○			▲	★	○	○		○	○
Ireland	IRL	○	△	▲	△	○	★	▲	▲	▲	▲	○	▲	▲
Israel	ISR		△	△	▲	▲	★	△	△	▲	★		△	▲
Italy	ITA	△	△	△	△	○	△	△	○	○	○		△	△
Japan	JPN	★	▲	▲	▲	△	▲	○	○	▲	★	▲	★	△
Korea	KOR	▲	★	★	★	▲	★	○	○	★	★	○	▲	△
Latvia	LVA		△	△	△	▲		△	★	▲	△		○	△
Lithuania	LTU		△	○	△	★		△	△		▲		△	
Luxembourg	LUX	○	▲	▲	▲	△	△	★	★	○	▲		▲	
Malaysia	MYS		○	○	△			△	△	★	○		○	
Mexico	MEX	○	○	○	○	○	○	△	▲	△	○		○	○
Netherlands	NLD	▲	★	▲	★	★	▲	▲	△	▲	△	★	▲	△
New Zealand	NZL	★	▲	▲	▲	★	△	▲	△	▲	▲		★	▲
Norway	NOR		▲	▲	▲	▲	△	▲	△	▲	▲	★	△	▲
Poland	POL		○	▲	○	△	△	○	★	△	△	○	▲	○
Portugal	PRT	▲	△	○	△	○	○	△	▲	△	○		○	△
Russian Federation	RUS		○	△	△	★	○	○	△	△	★		○	○
Slovak Republic	SVK	○	○	△	○	△		△	▲	○	△	○	△	▲
Slovenia	SVN	△	△	△	△	▲	△	△	△	△	△		▲	▲
South Africa	ZAF		○	○	○	△	△	△	△	○	○			○
Spain	ESP	△	△	△	△	▲	▲	△	△	△	△		△	△
Sweden	SWE	★	▲	★	▲	▲	○	▲	△	▲	▲	★	△	★
Switzerland	CHE	★	★	△	▲	▲	▲	★	★	△	▲		▲	★
Turkey	TUR		○	○	○	▲	○	○	○	△	○		○	○
United Kingdom	GBR	▲	▲	▲	★	△	▲	△	▲	△	▲		▲	★
United States	USA	▲	▲	▲	★	△	▲	○	○	★	★	△	△	△
EU28	EU28	△	▲	▲		△	▲	▲	▲		△		△	▲

Note: Non-OECD countries are also compared to OECD countries and may therefore be out of range (e.g. lower than the lowest OECD country). They appear in this table with top five and bottom five OECD values

Israel: "The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law."

Source: See references and methodological annex of the OECD STI Outlook 2014 country profiles.

References

General references

- European Commission (EC) (2013), *Monitoring Industrial Research: the 2013 EU Industrial R&D Investment Scoreboard*, European Commission, Luxembourg, <http://iri.jrc.ec.europa.eu/scoreboard13.html>.
- International Energy Agency (IEA) (2013), *CO₂ Emissions from Fuel Consumption*, OECD Publishing, Paris, http://dx.doi.org/10.1787/co2_fuel-2013-en.
- 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 2010.
- OECD (2010a), *OECD Science, Technology and Industry Outlook 2010*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264083479-en>.
- OECD (2010b), "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.
- OECD (2010c), *Measuring Innovation: A New Perspective*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264059474-en>.
- OECD (2010d), *SMEs, Entrepreneurship and Innovation*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264080355-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 (2012), *OECD Internet Economy Outlook 2012*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264086463-en>.
- OECD (2013a), *OECD Science, Technology and Industry Scoreboard 2013: Innovation for Growth*, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_scoreboard-2013-en.
- OECD (2013b), *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264204256-en>.
- OECD (2014a), *OECD Economic Surveys*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/16097513>.
- OECD (2014b), *National Accounts at a Glance 2014*, OECD Publishing, Paris, http://dx.doi.org/10.1787/na_glance-2014-en.
- OECD (2014c), *Education at a Glance 2014: OECD Indicators*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/eag-2014-en>.
- OECD (2014d), *Entrepreneurship at a Glance 2014*, OECD Publishing, Paris, http://dx.doi.org/10.1787/entrepreneur_aag-2014-en.
- OECD (2014e), *Measuring the Digital Economy: A New Perspective*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264221796-en>.
- 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/10.1787/5k98ssns1gzs-en>.

Databases and data sources

- Academic Ranking of World Universities (ARWU) (2013), "Shanghai ranking" 2003-13, www.shanghairanking.com.
- Bureau Van Dijk (2011), *ORBIS Database*, Bureau Van Dijk Electronic Publishing.
- Elsevier B.V. (2014), *Elsevier Research Intelligence*, www.elsevier.com/online-tools/research-intelligence/products-and-services/scival (data retrieved online on 31 January 2014).
- Eurostat (2014), *Education and Training (ETR) Databases*, June, <http://epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database>.
- Graham, S. et al. (2013), "The USPTO trademark case files dataset: Descriptions, lessons, and insights", *SSRN Working Paper*, <http://ssrn.com/abstract=2188621>.
- International Energy Agency (IEA) (2013), *IEA CO₂ Emissions from Fuel Combustion Statistics*, <http://dx.doi.org/10.1787/co2-data-en>.

- International Monetary Fund (IMF) (2014), *World Economic Outlook (WEO) Database*, April, www.imf.org/external/pubs/ft/weo/2014/01/weodata/index.aspx.
- International Telecommunication Union (ITU) (2013), *World Telecommunication/ICT Indicators 2013*, www.itu.int/pub/D-IND-WTID.OL.
- National Science Foundation (NSF) (2014), “Academic research and development”, in *Science and Engineering Indicators 2014*, www.nsf.gov/statistics/seind14/index.cfm.
- OECD (2012), *STructural ANalysis (STAN) Database*, November, www.oecd.org/sti/stan.
- OECD (2013), *Activity of Multinational Enterprises (AMNE) Database*, October, www.oecd.org/industry/ind/amne.htm.
- OECD (2013), *Green Growth Indicators Database*, www.oecd.org/greengrowth/greengrowthindicators.htm.
- 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.
- OECD (2013), *OECD/NESTI data collection on R&D tax incentives*, April, www.oecd.org/sti/rd-tax-stats.htm.
- OECD (2013), “PISA: Programme for International Student Assessment”, *OECD Education Statistics*, December, www.pisa.oecd.org and <http://dx.doi.org/10.1787/data-00365-en>.
- OECD (2014), *Entrepreneurship Financing Database*.
- OECD (2014), *Main Science and Technology Indicators (MSTI) Database*, June, www.oecd.org/sti/msti.
- OECD (2014), *OECD ANBERD Database*, March, www.oecd.org/sti/anberd.
- OECD (2014), *OECD Broadband Portal*, June, www.oecd.org/sti/broadband/oecdbroadbandportal.htm.
- OECD (2014), *OECD Education Statistics*, June, <http://dx.doi.org/10.1787/edu-db-data-en>.
- OECD (2014), *OECD Educational Attainment Database*, June.
- OECD (2014), *OECD National Accounts Statistics*, April, <http://dx.doi.org/10.1787/naag-data-en>.
- OECD (2014), *OECD Product Market Regulation Database*, March, www.oecd.org/economy/pmr.
- OECD (2014), *OECD Productivity Database*, May, www.oecd.org/std/productivity-stats.
- OECD (2014), *OECD Patent Database*, March, www.oecd.org/sti/ipr-statistics.
- OECD (2014), *OECD Research and Development Statistics (RDS) Database*, March, www.oecd.org/sti/rds.
- OECD (2014), *OECD Science, Technology and Industry Outlook Policy Database*, <http://qdd.oecd.org/subject.aspx?Subject=a2ebc2a0-b8dc-4d1a-82be-3fea780b86a6>.
- UNESCO Institute for Statistics (UIS) (2014), *Education Database*, May, http://data.uis.unesco.org/Index.aspx?DataSetCode=SCN_DS.
- UIS (2014), *Science, Technology and Innovation Database*, June 2014, http://data.uis.unesco.org/Index.aspx?DataSetCode=EDULIT_DS.
- United Nations (UN) (2013), *UN e-Government Survey*, United Nations, NY, <http://unpan3.un.org/egovkb/Reports/UN-E-Government-Survey-2014>.
- World Bank (WB) (2014), *World Development Indicators (WDI) Databank*, <http://wdi.worldbank.org>.