



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

Access the complete publication at:  
[http://dx.doi.org/10.1787/sti\\_outlook-2014-en](http://dx.doi.org/10.1787/sti_outlook-2014-en)

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## Latvia

**Please cite this chapter as:**

OECD (2014), "Latvia", in *OECD Science, Technology and Industry Outlook 2014*, OECD Publishing.  
[http://dx.doi.org/10.1787/sti\\_outlook-2014-61-en](http://dx.doi.org/10.1787/sti_outlook-2014-61-en)

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## LATVIA

Latvia is a small EU member state, whose economy has returned to positive growth since 2011 after having contracted between 2008 and 2010. It has undergone changes in many policy areas in recent years. It has several STI priorities.

**Hot issue 1: Improving overall human resources, skills and capacity building.** Latvia has a reasonably good human resource base in terms of the tertiary-educated adult population, and its expenditure on tertiary education is at the OECD median (Panel 1<sup>v</sup>, l). However, brain drain and the ageing of the STI workforce are important challenges. Improvements in human resources and capacity building are top priorities in Latvia's Guidelines for Science, Technology Development and Innovation (2014-20). They are also priorities in Latvia's Smart Specialisation Strategy. The EU Structural Funds have programmes for the improvement of human resources and capacity building in science. The EU-funded Attracting Human Resources to Science (2007-13) addressed researcher brain drain and sought to attract young scientists to PRIs. To deal with the ageing of the STI workforce, employment quotas for young scientists have been introduced in government programmes and projects. Major reforms of HEIs have been carried out to introduce a new model of accreditation, new funding models and the internationalisation of HEIs, and education programmes have been revised to meet needs and trends in the job market.

**Hot issue 2: Encouraging innovation in firms and supporting entrepreneurship and SMEs.** The Guidelines on National Industrial Policy (NIP) for 2014-20, approved in June 2013, identify innovation as a key pillar for improving competitiveness, productivity and exports. Initiatives include support for co-operation between industry and academia and commercialisation of research results, new product and technology development and the expansion of innovative and technology-oriented companies as well as new financial instruments (e.g. seed and venture capital) for innovative companies, especially SMEs at their different stages of growth. To improve Latvian industry's ability to innovate, the EU Structural Funds have supported programmes, including the innovation voucher programme launched in 2012, to attract private investment in R&D for new prod-

ucts and technologies and their commercialisation. Competence centres seek to increase the competitiveness of businesses and to facilitate research-industry co-operation on industrial R&D for new products and technology.

**Hot issue 3: Reforming the public research system and strengthening public R&D capacity and infrastructure.** Government expenditure on R&D, at 0.51% of GDP, is at the bottom of the OECD mid-range (Panel 1<sup>a</sup>). No Latvian universities rank among the world's leaders (Panel 1<sup>b</sup>). Large-scale reforms of HEIs and PRIs are under way to improve the quality and relevance of public R&D. As part of this process, research institutions and science and innovation system have been assessed by international experts, in co-operation with the Nordic Council of Ministers and NordForsk. EU Structural Funds have been allocated to strengthen the research infrastructure and human resources for public research. The Baltic inter-ministerial expert group on research infrastructure and the Baltic-Nordic co-operation on research infrastructure are regional platforms for co-operation and assistance.

**Hot issue 4: Improving returns to and impact of science.** Commercialisation of research results and technology transfer are considered to improve the returns and impact of science. To this end, six competence centres and nine state research centres foster industry-science co-operation, and technology transfer contact points have been established for the commercialisation of public research. The Law on Scientific Activity has been amended to ensure more efficient legal protection of public research results, their commercialisation and the transfer of knowledge.

### Highlights of the Latvian STI system

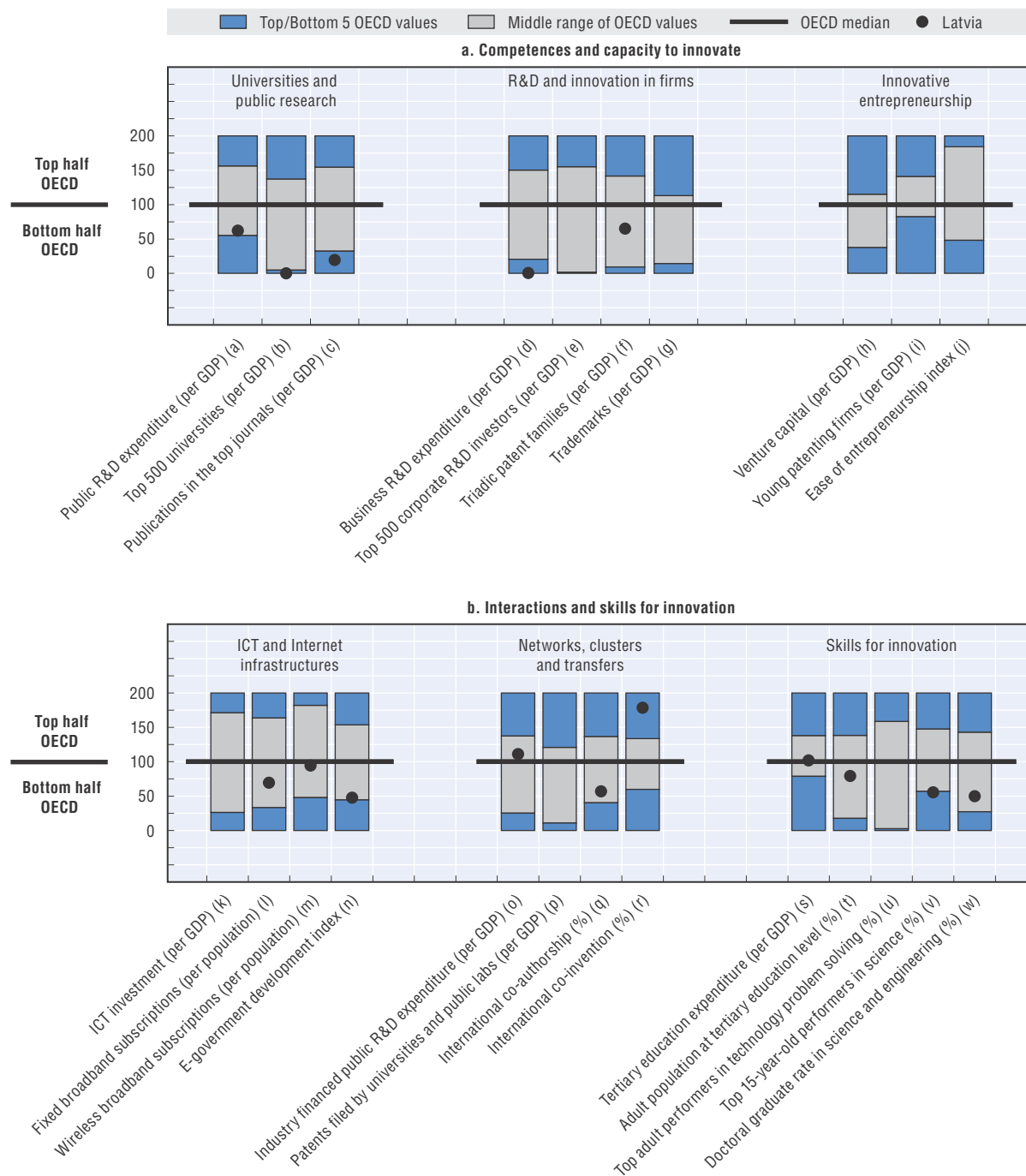
**STI policy governance:** Latvia has no high-level national council for STI policy. The Ministry of Education and Science and the Ministry of Economics share responsibility for innovation policy. A lack of human resources in the state administration and bureaucracy are considered barriers to policy co-ordination. Latvia participates in the joint Baltic political co-ordination expert group established in 2013. Research programmes are evaluated on completion of each programming period. Fundamental and applied research

### Key figures, 2013

Economic and environmental performance	LVA	OECD	Gross domestic expenditure on R&D	LVA	OECD
<b>Labour productivity</b>			<b>GERD</b>		
GDP per hour worked, USD PPP, 2013	n.a.	47.7	Million USD PPP, 2011	274	1 107 398
(annual growth rate, 2008-13)	n.a.	(+0.8)	As a % of total OECD, 2011	0.0	100
<b>Green productivity</b>			<b>GERD intensity and growth</b>		
GDP per unit of CO <sub>2</sub> emitted, USD, 2011	4.0	3.0	As a % of GDP, 2012	0.66	2.40
(annual growth rate, 2007-11)	(-0.8)	(+1.8)	(annual growth rate, 2007-11)	(-0.6)	(+2.0)
<b>Green demand</b>			<b>GERD publicly financed</b>		
NNI per unit of CO <sub>2</sub> emitted, USD, 2011	4.7	3.0	As a % of GDP, 2012	0.17	0.77
(annual growth rate, 2007-11)	(+9.2)	(+1.6)	(annual growth rate, 2007-11)	(-17.5)	(+2.8)

Figure 9.27. **Science and innovation in Latvia**

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).

grants are evaluated regularly. Market-oriented projects whose aim is innovative commercial products are assessed following the project's completion. According to the Law on Scientific Activity, PRIs are to be evaluated every six years. The latest research assessment exercise was performed by international experts in co-operation with the Nordic Council of Ministers and NordForsk in 2013. In order to facilitate the commercialisation of public research, a recent amendment to the Law on Scientific Activity assigns IPR on inventions from publicly funded research to the relevant scientific institutions.

**Innovative entrepreneurship:** The World Bank's Ease of Doing Business Index suggests that Latvia has a conducive business environment. Seed money, grants, loans and venture capital are available to help finance technology start-ups and fast-growing companies. In 2012, the Baltic Innovation Fund (BIF) was launched by the European Investment Fund in close co-operation with the Governments of Latvia, Lithuania and Estonia to boost equity investments in Baltic SMEs with high growth potential.

**Clusters and smart specialisation:** Latvia has participated in the EU effort to develop a Smart Specialisation Strategy and

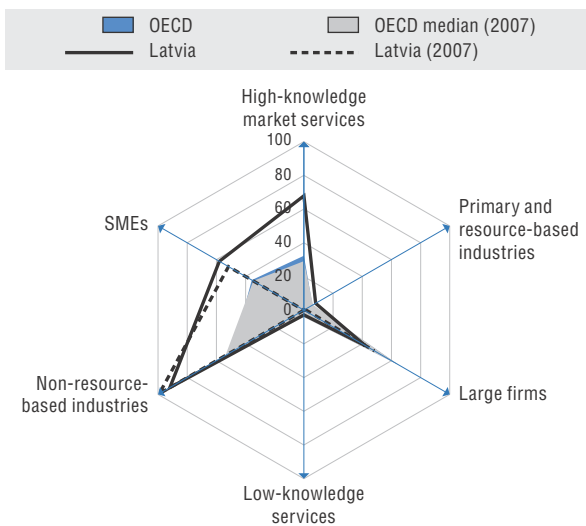
has involved several government ministries in partnership with industry, research institutions and trades unions. Since 2009 the industry-driven cluster initiatives have received support in order to promote collaboration between unrelated companies, research, educational and other institutions and to improve the competitiveness of enterprises, increase export volumes and promote innovation and development of new products.

**ICT and Internet infrastructures:** Relative to its income level, Latvia has advanced ICT infrastructures. Wireless broadband subscriptions are just below the OECD median, and the fixed broadband subscriptions and e-government development indexes are in the mid-range of OECD countries (Panel 1<sup>m, l, n</sup>).

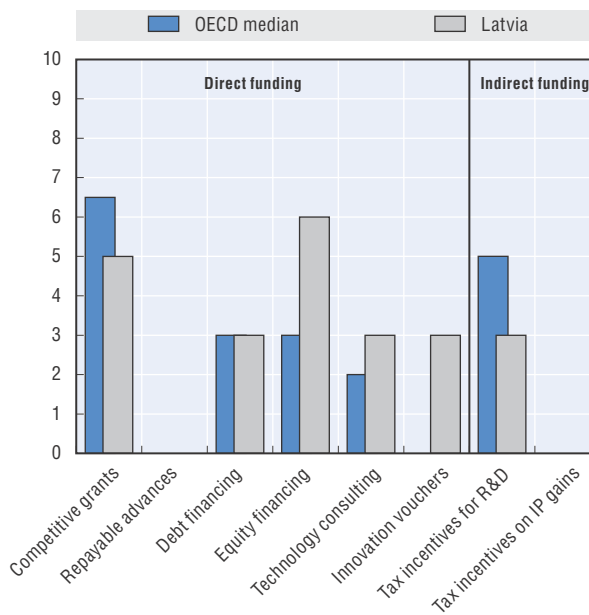
**Recent developments in STI expenditures:** GERD accounted for only 0.7% of GDP in 2011 and 0.66% in 2012 and has been declining in recent years. Publicly funded GERD has decreased even more dramatically, with the government budget for R&D down from approximately USD 120 million (LVL 36 million) in 2008 to USD 58.3 million (LVL 17.5 million) in 2011-13. The National Reform Programme for implementation of the EU Europe 2020 strategy sets a target for GERD of 1.5% of GDP by 2020.

**Panel 2. Structural composition of BERD, 2011**

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




**Panel 3. Most relevant instruments of public funding of business R&D, 2014**



Note: Policy information comes from country responses to the OECD STI Outlook policy questionnaire 2014. Latvia's response is available in the OECD STI Outlook Policy Database, edition 2014 at <http://qdd.oecd.org/Table.aspx?Query=CB8F5A08-514F-4474-BF57-5480EA02463C>.

Source: See reader's guide and methodological annex.

StatLink  <http://dx.doi.org/10.1787/888933152273>

## 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.

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