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Lithuania

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LITHUANIA

Following a 15% plunge in GDP in 2009, the Lithuanian government launched broad economic reforms. Combined with spending cuts and tax rises, these led to a quick recovery in 2010. Since then Lithuania has been one of the fastest-growing EU economies, with GDP rising by 3.6% a year on average over 2010-13. It has launched a National Innovation Development Programme (NIDP) 2014-20 to support competitiveness and economic growth through innovation. Implementation of the programme is being prepared.

Hot issue 1: Improving the governance of the innovation system and policy. Creating a coherent R&D and innovation system is a long-term challenge and a strategic goal for NIDP 2014-20. Until recently, lack of co-ordination of R&D and innovation policy by the responsible ministries led to fragmented and incompatible policies and weakened outcomes. In 2013, the Strategic Council for Research, Development and Innovation, led by the prime minister, was formed to co-ordinate STI policy and to manage the setting of priorities. The Science Council has become the Research Council, which is actively involved in competitive research funding, and an Agency for Science, Innovation and Technology (MITA) was established to foster industry-science co-operation and to create a friendly environment for business innovation. The recent preparation for smart specialisation strategies (RIS3) is an example of improved governance, with enhanced evidence-based decision-making and the involvement of all stakeholders.

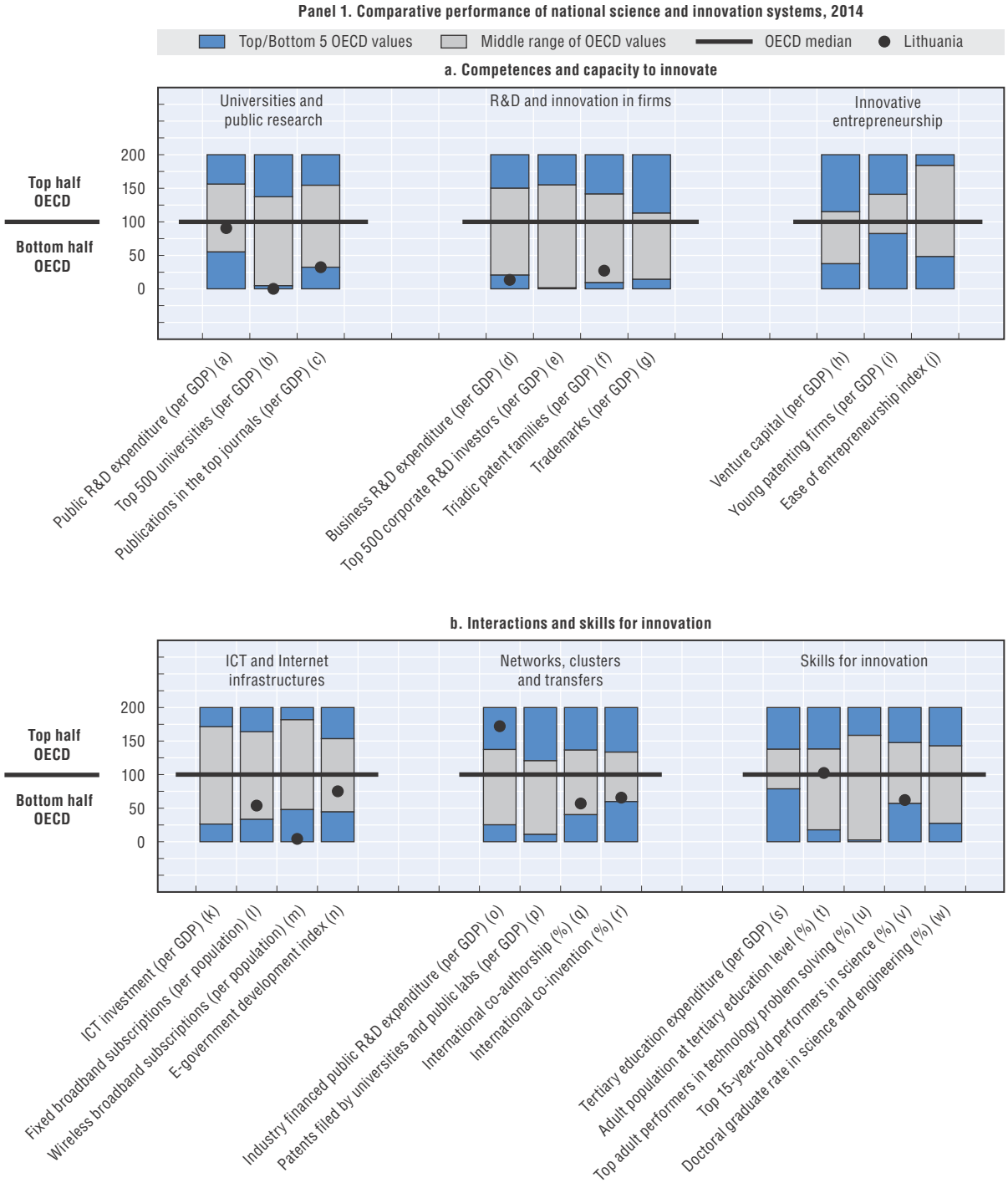
Hot issue 2: Encouraging innovation in firms and supporting entrepreneurship and SMEs. BERD is very low as a share of GERD (26.6%) and of GDP (0.24%). Lithuania has few large corporate R&D investors (Panel 1[e]). It ranks 17th on the World Bank's Ease of Doing Business Index (2014), ahead of many OECD economies. Since 2007 it has promoted private-sector R&D activities through the Intellect and Intellect+ programmes, with USD 299 million (LTL 479 million) over 2007-13. Since 2010 it has encouraged business-science co-operation and commercialisation of public research results through the innovation voucher programme with USD 4.4 million (LTL 7 million), and since 2012 it has strengthened technology transfer through MITA with USD 12.8 million (LTL 20.5 million). Public support for business R&D totalled USD 315.4 million (LTL 504.6 million) over 2007-13. Such instruments are expected to continue under NIDP 2014-20. The Entrepreneurship Promotion Programme 2014-20 is being prepared and will contain objectives for the development of innovative entrepreneurship by improving access to finance and implementing various initiatives.

Hot issue 3: Addressing STI globalisation and increasing international co-operation. Lithuania's connection to global R&D and innovation networks is below the OECD median, as suggested by its international co-authorship and co-invention (Panel 1[q, r]). Since 2007, it has addressed international STI co-operation by promoting various types of clusters. In particular, MITA's promotion of the internationalisation of business-science partnerships, with USD 2.3 million (LTL 3.7 million) over 2007-13, led to the formation of ten clusters. The initiative that promotes the development of networks and co-operation in the Baltic Sea Region (BSR) focuses on the internationalisation of SMEs. Through the BSR Innovation Express Call in 2013, 28 new international collaboration projects were established,

Key figures, 2013

Economic and environmental performance	LTU	OECD	Gross domestic expenditure on R&D	LTU	OECD
Labour productivity			**GERD**		
GDP per hour worked, USD PPP, 2013	n.a.	47.7	Million USD PPP, 2011	598	1 107 398
(annual growth rate, 2008-13)	n.a.	(+0.8)	As a % of total OECD,	0.0	100
Green productivity			**GERD intensity and growth**		
GDP per unit of CO_2 emitted, USD, 2011	4.2	3.0	As a % of GDP, 2012	0.90	2.40
(annual growth rate, 2007-11)	(+1.6)	(+1.8)	(annual growth rate, 2007-11)	(+1.5)	(+2.0)
Green demand			**GERD publicly financed**		
NNI per unit of CO_2 emitted, USD, 2011	4.4	3.0	As a % of GDP, 2012	0.86	0.77
(annual growth rate, 2007-11)	(+4.6)	(+1.6)	(annual growth rate, 2007-11)	(-0.6)	(+2.8)

Figure 9.28. **Science and innovation in Lithuania**



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

StatLink http://dx.doi.org/10.1787/888933152289

involving more than 900 SMEs. It attracted 47 applications from cluster organisations and business networks in the six funding partner countries. Four of these applications involved Lithuanian undertakings, all of which were approved.

Hot issue 4: Reforming and improving the public research system (including university research). Although Lithuania has few leading universities (Panel 1[b]), higher education institutions account for 53.7% of GERD and the government sector for 19.7%. In 2009, the Parliament adopted a Law on Higher Education and Research to reform and restructure the higher education and research system. Reforms have focused on improving quality, accessibility, competitiveness and efficiency. A shift towards programme-based competitive funding increased the share of competitive R&D funding to one-third of overall R&D funding. The reorganisation and consolidation of HEIs and PRIs introduced new governance mechanisms in universities and colleges and increased their accountability, and external and independent evaluations were introduced. IPR frameworks were developed for inventions made in HEIs and PRIs. Adopted in December 2012, the National Programme for the Development of Studies, Research and Experimental Development for 2013-20 outlines further objectives for developing higher education, research and innovation systems.

Hot issue 5: Strengthening public R&D capacity and infrastructure. Over 2007-13, the R&D Programme for Co-operation between Public R&D and the Business Sector – Integrated Research, Higher Education and Business Centres was implemented to improve R&D infrastructure and research capacities through the integration of R&D, education and business innovation. Five integrated science, education and business centres have been created, with a total investment of USD 670 million (LTL 1 099.7 million) in material science and electronics; biotechnology, environment and ICTs; bioenergy, forestry and food technologies; marine environment and technologies. Public R&D capacities have also been promoted by strengthening the skills of researchers, through the Researchers Career Programme with a total of USD 391.9 million (LTL 627.2 million) over 2007-13.

Highlights of the Lithuanian STI system

New sources of growth: In 2013, the Strategic Council for Research, Development and Innovation identified six priority areas: energy and sustainable environment; inclusive and creative society; agro-innovation and food technology; new materials and technologies; health and biotechnology; transport, logistics and ICTs. The Programme on the Implementation of the Priority Areas of Research and Development and Innovation (Smart Specialisation) was adopted in 2014, with 20 R&D and innovation priorities.

New challenges: Several national programmes focus on green innovation. These include the Lithuanian National Strategy for Sustainable Development and the Green Industry Innovation Programme (funded by the Norwegian Financial Mechanisms 2009-14). In 2013, the Ministry of Education and Science launched new national research programmes on social challenges: *Modernity in Lithuania*; Welfare society; Towards future technologies; Healthy ageing; and Sustainability of agro, forest and water ecosystems.

Clusters and smart specialisation: Two major programmes implemented during 2007-13, InnoCluster LT and InnoCluster LT+, focused on the promotion of clusters. With USD 48.7 million (LTL 78 million) over 2007-13, these programmes created 30 clusters and invested in R&D infrastructure. The government launched the process of identifying smart specialisation priorities in 2012, involving key stakeholders; they will involve the above-mentioned six priority areas. A project launched in 2013 also aims at fostering the internationalisation of SMEs, clusters and science partnerships and networking activities (Klaster.LT).

Globalisation: The Ministry of Education and Science has developed an Action Plan for Promoting the International Dimension in Higher Education for 2013-16. The Research Council of Lithuania supports application for and participation in EU Framework Programmes and has developed scientific exchange programmes with EU members and Switzerland. The Ministry of Economy has several programmes to promote the internationalisation of SMEs and clusters, such as initiatives in co-operation with Norway, Israel and the Baltic Sea Region countries.

Skills for innovation: Lithuanian has a well-educated population: 31% of adults have completed higher education and 15-year-olds perform reasonably well in science, with a Pisa score between the United States and Hungary. The 2012-16 national priorities include a strong focus on the development of mathematics and informatics skills and curricula. Various programmes support researchers' career development, promote top-performing international researchers, encourage researcher and student mobility, develop skills training and the hiring of skilled personnel in firms, and disseminate knowledge about science and technology among students. Several new projects for the promotion of innovative start-ups and spin-offs have recently been launched by the Agency for Science, Innovation and Technology. They include the new technological entrepreneur-

ship projects Innovative Business Promotion and Technostart, which promote the commercialisation of research results and create opportunities for young researchers to develop their ideas and establish new technological businesses in Lithuania. The projects bring together the largest Lithuanian universities, S&T parks, and other research institutions

Recent developments in STI expenditures: GERD increased over the last five years to USD 640.6 million (LTL 1 025.5 million) and accounted for 0.9% of GDP in 2012. Most of the increase came from funding from abroad, largely from the EU. Government spending on R&D in 2012 was USD 255.6 million (LTL 408.9 million), a 6% increase from 2009. The government's goal is GERD at 1.9 % of GDP by 2020.

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 (Δ) 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 entrepreneur-ship 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	Δ	Δ	○	○	○	○	○			
Australia	AUS	▲	▲	▲	▲	Δ	Δ	▲	Δ		▲
Austria	AUT	▲	★	▲	▲	▲	▲	Δ	Δ	★	▲
Belgium	BEL	Δ	▲	▲	▲	Δ	▲	Δ	▲	Δ	Δ
Brazil	BRA		Δ	○		Δ	○	○			Δ
Canada	CAN	▲	▲	▲	Δ	Δ	▲	★	★	○	▲
Chile	CHL	○	Δ	○	○	○	○	Δ			Δ
China	CHN	Δ	Δ	○	▲	Δ	Δ	○			○
Colombia	COL	○	○	○	○						
Costa Rica	CRI	○	○	○	○	○					
Czech Republic	CZE	▲	Δ	Δ	Δ	Δ	Δ	Δ	○		Δ
Denmark	DNK	★	▲	★	▲	★	▲	▲	▲		▲
Estonia	EST	▲		▲	▲	○	Δ	Δ	▲		▲
Finland	FIN	★	★	▲	★	★	★	▲	★	★	▲
France	FRA	▲	Δ	Δ	▲	▲	▲	▲	▲	Δ	▲
Germany	DEU	★	▲	Δ	▲	▲	★	▲	▲	★	▲
Greece	GRC	○	Δ	Δ	○	Δ	○	○	○		Δ
Hungary	HUN	○	Δ	Δ	Δ	Δ	Δ	○	Δ		Δ
Iceland	ISL	★	○	★	▲	▲	Δ	★			Δ
India	IND	Δ	○	○	○	○	Δ	○			○
Indonesia	IDN		○	○	○		○	○			Δ
Ireland	IRL	Δ	▲	▲	Δ	▲	▲	▲	★	○	Δ
Israel	ISR	Δ	★	▲	★	▲	▲	▲	★		○
Italy	ITA	Δ	Δ	Δ	Δ	Δ	Δ	Δ	○	▲	★
Japan	JPN	▲	Δ	○	★	▲	★	Δ	Δ	○	▲
Korea	KOR	▲	Δ	Δ	★	▲	▲	▲	▲		Δ
Latvia	LVA	Δ	○	○	○		Δ				
Lithuania	LTU	Δ	○	○	○		Δ				
Luxembourg	LUX	○	○	Δ	Δ	★	▲	★	Δ		Δ
Malaysia	MYS	Δ	Δ	○	Δ	Δ					
Mexico	MEX	○	○	○	○	○	○	Δ			○
Netherlands	NLD	▲	▲	★	▲	▲	▲	▲	▲	▲	★
New Zealand	NZL	Δ	★	▲	Δ	Δ	Δ	★	Δ		★
Norway	NOR	▲	▲	Δ	Δ	▲	Δ	Δ	Δ	▲	Δ
Poland	POL	Δ	Δ	Δ	○	○	Δ	○	○		○
Portugal	PRT	Δ	▲	▲	Δ	Δ	Δ	Δ	Δ		▲
Russian Federation	RUS	Δ	○	○	Δ	Δ	○	○	Δ		Δ
Slovak Republic	SVK	Δ	○	○	○	○	○	○			★
Slovenia	SVN	Δ	▲	▲	▲	Δ	Δ	Δ	Δ		Δ
South Africa	ZAF	○	Δ	○	Δ	Δ	Δ	Δ	Δ		○
Spain	ESP	Δ	Δ	Δ	Δ	Δ	Δ	Δ	○	○	○
Sweden	SWE	★	★	★	★	★	★	▲	▲	★	Δ
Switzerland	CHE	▲	▲	★	▲	★	★	★	▲	★	▲
Turkey	TUR	Δ	○	○	Δ	Δ	○	○			○
United Kingdom	GBR	Δ	▲	▲	Δ	▲	▲	▲	▲	Δ	▲
United States	USA	▲	Δ	Δ	▲	▲	▲	▲	★	○	★
EU28	EU28	▲	▲	★	▲	Δ	▲	Δ	▲	▲	

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 (Δ) 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		○	○	○	○		Δ	★	▲	○		○	○
Australia	AUS	▲	Δ	★	▲	▲	▲	Δ	Δ	▲	▲	▲	★	▲
Austria	AUT	▲	Δ	▲	Δ	▲	Δ	★	▲	Δ	Δ	Δ	Δ	▲
Belgium	BEL	▲	▲	Δ	Δ	▲	▲	★	★	Δ	▲		▲	▲
Brazil	BRA		○	Δ	○		Δ	○	Δ	○	○		○	○
Canada	CAN	Δ	▲	Δ	▲	▲	▲	Δ	▲	★	★	▲	▲	▲
Chile	CHL		○	○	Δ	○	Δ	▲	Δ	★	○		○	○
China	CHN		○	○	○	▲	Δ	○	○		○			○
Colombia	COL		○	○	Δ			▲	Δ	★	Δ		○	
Costa Rica	CRI		○	○	○			★	★		Δ		○	
Czech Republic	CZE	Δ	Δ	Δ	○	Δ	Δ	Δ	▲	Δ	Δ	Δ	Δ	Δ
Denmark	DNK	★	★	★	★	Δ	★	▲	▲	▲	Δ	★	Δ	▲
Estonia	EST		Δ	▲	Δ	Δ		▲	★	▲	▲	○	★	Δ
Finland	FIN	Δ	▲	★	▲	★	▲	▲	Δ	★	▲	★	★	★
France	FRA	Δ	★	Δ	▲	Δ	★	▲	Δ	▲	Δ		▲	▲
Germany	DEU	Δ	▲	Δ	▲	★	▲	Δ	Δ	Δ	Δ	▲	▲	★
Greece	GRC	○	Δ	Δ	Δ	Δ	○	Δ	▲	▲	Δ		○	Δ
Hungary	HUN		Δ	○	Δ	▲	○	▲	▲	○	Δ		Δ	○
Iceland	ISL		▲	▲	Δ	★		★	▲	○	▲		Δ	Δ
India	IND		○	○	○		Δ	○	▲	○				
Indonesia	IDN		○	○	○			▲	★	○	○		○	○
Ireland	IRL	○	Δ	▲	Δ	○	★	▲	▲	▲	▲	○	▲	▲
Israel	ISR		Δ	Δ	▲	▲	★	Δ	Δ	▲	★		Δ	▲
Italy	ITA	Δ	Δ	Δ	Δ	○	Δ	Δ	○	○	○		Δ	Δ
Japan	JPN	★	▲	▲	▲	Δ	▲	○	○	▲	★	▲	★	Δ
Korea	KOR	▲	★	★	★	▲	★	○	○	★	★	○	▲	Δ
Latvia	LVA		Δ	Δ	Δ	▲		Δ	★	▲	Δ		○	Δ
Lithuania	LTU		Δ	○	Δ	★		Δ	Δ		▲		Δ	
Luxembourg	LUX	○	▲	▲	▲	Δ	Δ	★	★	○	▲		▲	
Malaysia	MYS		○	○	Δ			Δ	Δ	★	○		○	
Mexico	MEX	○	○	○	○	○	○	Δ	▲	Δ	○		○	○
Netherlands	NLD	▲	★	▲	★	★	▲	▲	Δ	▲	Δ	★	▲	Δ
New Zealand	NZL	★	▲	▲	▲	★	Δ	▲	Δ	▲	▲		★	▲
Norway	NOR		▲	▲	▲	▲	Δ	▲	Δ	▲	▲	★	Δ	▲
Poland	POL		○	▲	○	Δ	Δ	○	★	Δ	Δ	○	▲	○
Portugal	PRT	▲	Δ	○	Δ	○	Δ	▲	▲	Δ	○		○	Δ
Russian Federation	RUS		○	Δ	Δ	★	○	○	Δ	Δ	★		○	○
Slovak Republic	SVK	○	○	Δ	○	Δ		Δ	▲	○	Δ	○	Δ	▲
Slovenia	SVN	Δ	Δ	Δ	Δ	▲	Δ	Δ	Δ	Δ	Δ		▲	▲
South Africa	ZAF		○	○	○	Δ	Δ	Δ	Δ	○	○			○
Spain	ESP	Δ	Δ	Δ	Δ	▲	▲	Δ	Δ	Δ	Δ		Δ	Δ
Sweden	SWE	★	▲	★	▲	▲	○	▲	Δ	▲	▲	★	Δ	★
Switzerland	CHE	★	★	Δ	▲		▲	★	★	Δ	▲		▲	★
Turkey	TUR		○	○	○	▲	○	○	○	Δ	○		○	○
United Kingdom	GBR	▲	▲	▲	★	Δ	▲	Δ	▲	Δ	▲		▲	★
United States	USA	▲	▲	▲	★	Δ	▲	○	○	★	★	Δ	Δ	Δ
EU28	EU28	Δ	▲	▲		Δ	▲	▲	▲		Δ		Δ	▲

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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