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Belgium

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BELGIUM

Belgium is a small EU economy and is very open to international trade and FDI. Its economy is strongly service-oriented and it has some internationally competitive technology sectors (e.g. pharmaceuticals and chemicals).

Hot issue 1: Improving overall human resources, skills and capacity building. While Belgium's labour-force skills are reasonably strong (Panel 1^{s, t, v, w}), the demand for engineers exceeds the number of graduates in certain areas. The federal government offers tax deductions to increase the employment of researchers, and it raised the deduction on the withholding tax on researchers' salaries from 75% to 80% in July 2013. This tax incentive amounted to USD 759 million (EUR 630 million) in 2012, up from USD 675 million (EUR 560 million) in 2011. In 2012, Flanders launched the STEM Action Plan in combination with a science communication plan to increase the number of secondary and higher education students in STEM. Wallonia's Beware Fellowships support researcher mobility and promote awareness of S&T among youth by supporting actors in the field.

Hot issue 2: Improving the returns to and impact of science. Belgium has a sound science base and seven of the world's top 500 universities. Universities and PRIs publish and patent actively (Panel 1^{b, c, p}). Industry-science relations are good and the business sector finances a relatively high share of public R&D (Panel 1^o). Transfer of knowledge is a major concern at all government levels. Commercialisation of research is a key part of the federal government's strategy and resulted in USD 258 million (EUR 219 million) in tax deductions on revenues from commercialisation of patented inventions in 2010. The Brussels Capital Region (BCR) supports the creation of university spin-offs through financing and technology transfer offices. The Flanders Holding Company manages the Transformation and Innovation Acceleration Fund (TINA), with a budget of USD 235 million (EUR 200 million) in 2010. It provides risk capital financing for innovation projects and acts as "entrepreneur" and facilitator. Since 2012 the Spin-off Financiering instrument supports the setting up of spin-off companies from research results. Wallonia supports the technology transfer offices co-ordinated by the Agency for Technology Promotion. Its Technological Innovation Part-

nership encourages collaborative research, with new mechanisms (e.g. collective research calls) to improve collaboration by SMEs and research centres. It is launching a new Green Impulse Fund for young innovative companies.

Hot issue 3: Addressing the challenges of STI globalisation and increasing international co-operation. Belgium seeks to create a favourable environment for business innovation and to attract foreign investment in R&D and innovation. It has a well-developed and productive science base and a strong international reputation in R&D in certain technological fields and in patenting (Panel 1^f). Belgian STI activities are well integrated internationally (Panel 1^{q, r}) and foreign affiliates account for more than half of BERD (Panel 2). Attracting inward FDI continues to be a major priority of the Belgian governments. To this end, they support national research infrastructures, active participation in international scientific and industrial research initiatives, and the integration of Belgian scientists in the European Research Area.

Hot issue 4: Targeting priority areas/sectors. Each region has identified its own priority areas. There is some overlap. The BCR focuses on certain sectoral niches and on R&D and innovation to meet societal challenges. The priority sectors identified in the new BCR Innovation Plan are ICT, health care and the environment. Funding schemes have been prepared along with a cluster initiative to foster a growth ecosystem and critical mass in the priority sectors. The Flanders Policy Note 2009/2014 on Scientific Research and Innovation identifies similar priorities, and the Flanders 2011 Concept Note on Innovation Centre stresses the role of innovation in addressing grand societal challenges through thematic "innovation hubs". Initiatives include the setting up of living labs and thematic initiatives (e.g. Energyville, ICleantech, a call for social innovation, the establishment of the Centre for Medical Innovation).

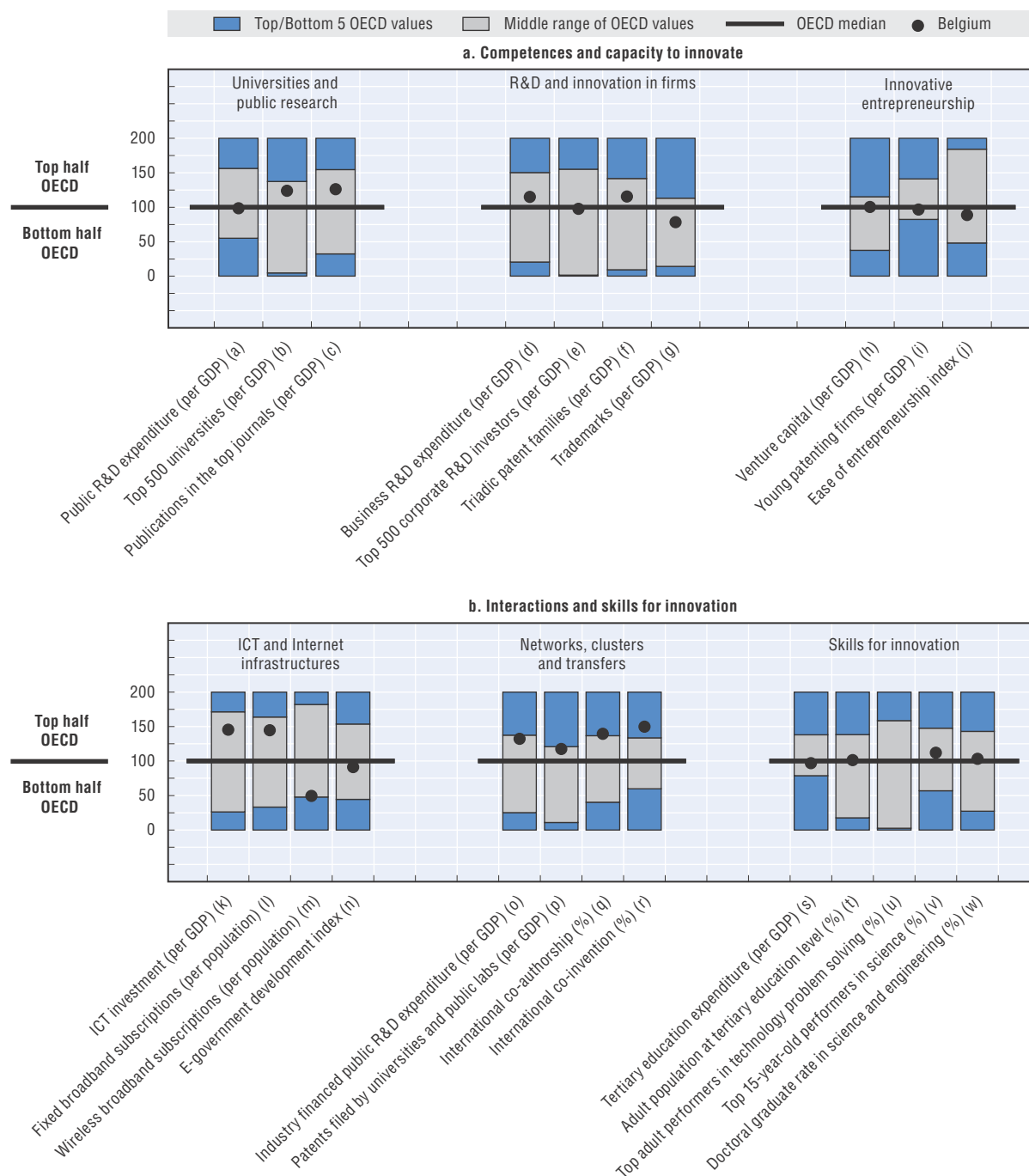
Wallonia's Research Strategy 2011-15 identifies priorities linked to societal needs; six sector-oriented clusters (*pôles de compétitivité*) were created with government support as part of the Marshall plan, updated to Marshall Plan 2 Green, to help raise competitiveness and stimulate innovation

Key figures, 2013

Economic and environmental performance	BEL	OECD	Gross domestic expenditure on R&D	BEL	OECD
Labour productivity			GERD		
GDP per hour worked, USD PPP, 2013	64.3	47.7	Million USD PPP, 2012	10 095	1 107 398
(annual growth rate, 2008-13)	(0.0)	(+0.8)	As a % of total OECD, 2012	0.9	100
Green productivity			GERD intensity and growth		
GDP per unit of CO ₂ emitted, USD, 2011	3.3	3.0	As a % of GDP, 2012	2.24	2.40
(annual growth rate, 2007-11)	(+1.3)	(+1.8)	(annual growth rate, 2007-12)	(+3.8)	(+2.0)
Green demand			GERD publicly financed		
NNI per unit of CO ₂ emitted, USD, 2011	3.3	3.0	As a % of GDP, 2011	0.58	0.77
(annual growth rate, 2007-11)	(+1.0)	(+1.6)	(annual growth rate, 2007-11)	(+6.0)	(+2.8)

Figure 9.4. Science and innovation in Belgium

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).

with initiatives for green technologies, health, energy and social innovation. Wallonia also has specialised life science and sustainable development funds. The federal level mainly targets the space sector; more than USD 240 million (EUR 200 million) a year go to the European Space Agency.

Hot issue 5: Improving framework conditions for innovation (including competitiveness). Belgium's business environment and financing for entrepreneurship are at or slightly below the OECD median (Panel 1^h, j). Innovative entrepreneurship has been integrated in the BCR's research and innovation system. The BCR's BRUSTART II fund targets small innovative companies, and its new VC fund supports "pre-commercial" research. BCR's funding agency IMPULSE also provides support to young innovative companies for business planning, technical-economic monitoring, legal and financial matters, and search for partners. In Flanders, in addition to the TINA fund, the Vinnof fund invests in innovative growing companies and the ARKimedea fund invests in start-ups and fast-growing SMEs with innovation mezzanine, seed and early-stage funding. In Wallonia the public investment companies (Investis, Novallia) invest in spin-offs and start-ups. The Creative Wallonia Action Plan launched in 2011 aims to stimulate the creative economy and to support an innovation culture throughout the economy.

Highlights of the Belgian STI system

STI policy governance: Belgium is a federal country composed of three Communities (Flemish, French and German-speaking) and three regions (Brussels-Capital Region, Flanders and Wallonia). STI competences are distributed across all of these. The Communities are the main source of scientific research support, and the regions of innovation and business R&D support. Since 2010, greater intergovernmental co-operation on R&D and innovation has been discussed among all relevant policy actors and governments.

New challenges: Many initiatives address global and societal challenges. In 2014 the BCR is developing Smart City Mobility in conjunction with innovative public procurement for transport. The Walloon Marshall Plan 2 Green emphasises environmental issues and industrial ecology, and in 2011 Wallonia launched a competitiveness cluster for green technologies, which supports several energy research programmes and launched the Employment-Environment Alliance to promote sustainable construction. Flanders' two major measures are the Flemish Climate Policy Plan 2013-20

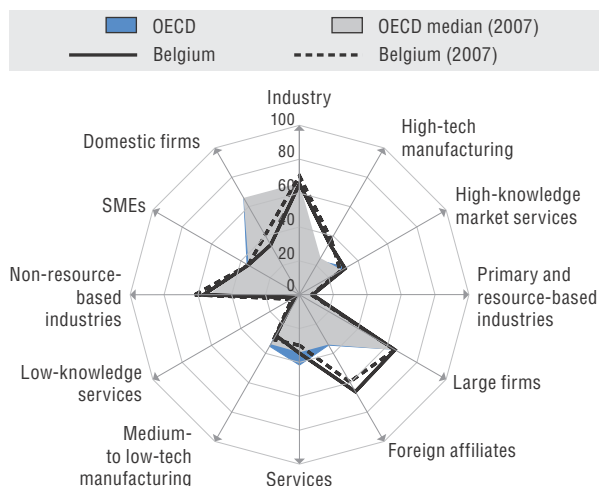
and the Flemish Second Energy Efficiency Action Plan (2011-16), which has adopted new energy standards, especially in construction and housing, aimed at building energy-neutral buildings by 2021. The federal level has focused on societal challenges by launching BRAIN, an important research programme.

Innovative entrepreneurship: The development of research and innovation in SMEs is a policy priority at the federal as well as the regional level. SMEs have received a wide range of support for improving their innovation capabilities (training, consultancy, funding, business angels, etc.). The federal government has increased the reduction on the advance tax payment for all research and technical staff in young innovative companies from 50% to 75%. In addition to instruments for SMEs such as the SME Wallet and the innovation voucher, BCR has developed new instruments in conjunction with EU initiatives aimed at SMEs. In Flanders, support for innovation in SMEs reached a record 58% of total direct innovation support for businesses in 2013. Recent initiatives include Sprint projects, which target large companies that conduct middle-large development projects, or VIS-trajecten IV aimed at "innovation-follower" companies. The Walloon government's overall budget for direct support of business R&D and innovation increased by more than 70% over the last five years to USD 144 million (EUR 120 million) in 2013. Novallia is a USD 53 million (EUR 46 million) scheme that promotes SMEs' innovation projects via loans at fixed interest rates. Wallonia has also developed several schemes to promote research and innovation in SMEs through the Walloon Small Business Act and Creative Wallonia Plan.

Clusters and smart specialisation: Discussions were launched in all regions in 2011 on a "smart specialisation strategy" to reshape innovation policy instruments and governance. The BCR innovation plan (2013-20) is aligned both with the EU's Strategy 2020 and with the region's smart specialisation strategy. The Flemish government launched several calls in 2012-13 to stimulate demand-driven initiatives, such as proposals for key enabling technologies, for testing the trajectories of a cluster-oriented policy, and for projects from co-operating businesses to develop a roadmap for a new industrial entrepreneurship. Cluster policy is the backbone of Wallonia's smart specialisation strategy, which focuses on innovation and creativity, greening, internationalisation, and SMEs.

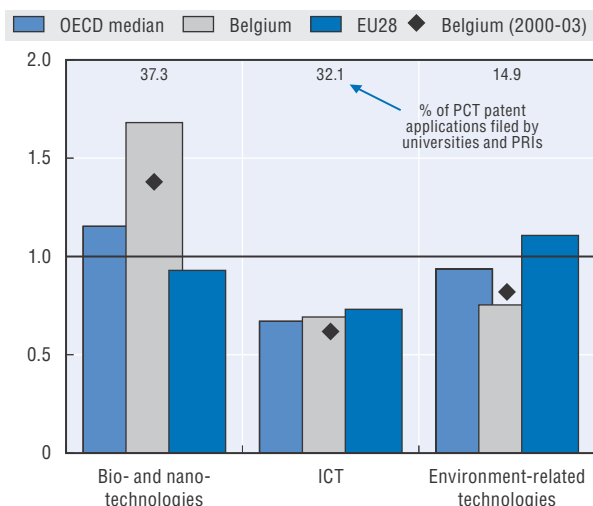
Panel 2. Structural composition of BERD, 2011

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

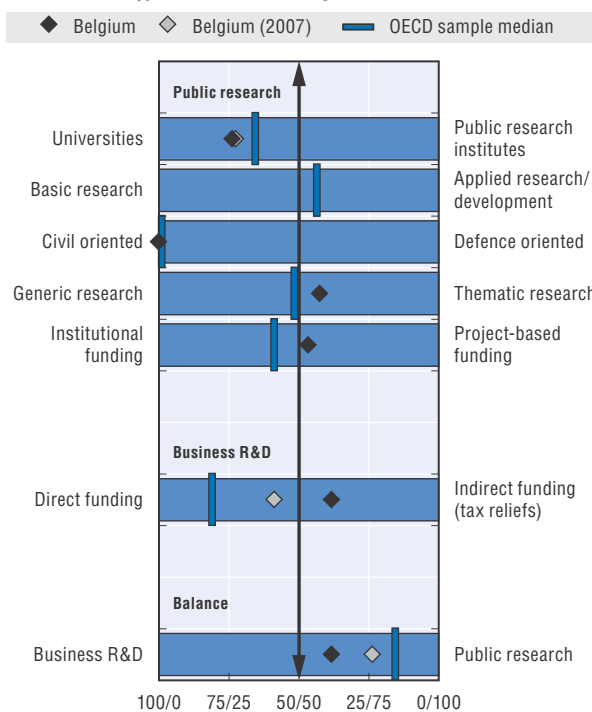


Panel 3. Revealed technology advantage in selected fields, 2009-11

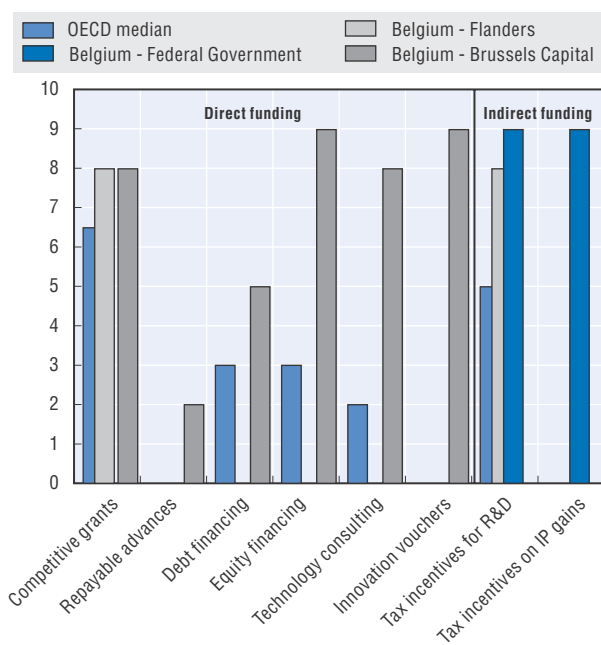
Index based on PCT patent applications



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. Belgium's responses are available in the OECD STI Outlook Policy Database, edition 2014 at <http://qdd.oecd.org/Table.aspx?Query=7534DEC8-6D3D-4D19-B320-69E375B75D82>.
Source: See reader's guide and methodological annex.

StatLink <http://dx.doi.org/10.1787/888933152044>

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 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	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 (△) 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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