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The Netherlands

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THE NETHERLANDS

The Netherlands is one of the world's most advanced economies, its long-term development underpinned by entrepreneurship and innovation. The economy has not fully recovered from the crisis, however. Dutch exporters have benefited less than others from an expansion into emerging markets. While levels of productivity are high, productivity growth has been rather weak. Strengthening investment in knowledge and innovation is a key to future growth and competitiveness and is necessary to address social challenges. The top sectors approach, a new form of industrial policy announced in 2011, focuses public resources on specific sectors and fosters co-ordination of activities in these areas by businesses, knowledge institutions and government.

Hot issue 1: Improving the framework conditions for innovation and competitiveness. The Netherlands scores high on indicators of overall framework conditions (Panel 1^{j, n}) and skills for innovation (Panel 1^{s, u, v}). Some indicators of private investment in R&D and innovation, however, are closer to the OECD median than to leading innovators (Panel 1^{d, h, k}). The government has set targets to reduce administrative burdens and compliance costs for enterprises and improve transparency and provision of public services. It is concerned about sector-specific regulatory obstacles in the top sectors. The Netherlands Enterprise Agency (RVO), established in 2014 following a merger of agencies, offers help with EU and national grants, finding international business partners and know-how and facilitates compliance with laws and regulations.

Hot issue 2: Strengthening public R&D capacity and infrastructure. Public R&D expenditure has a high share of GDP (Panel 1^a). Dutch universities are well placed in global rankings, and science has a strong global impact (Panel 1^{b, c}). Universities and PRIs attract a high share of industry funding for their R&D (Panel 1^o). While project-based funding has increased in importance, most public R&D funding is disbursed as institutional block funding (Panel 4), of which general university funds (GUF) represent approximately two-thirds. The government's vision for applied research foresees improved efficiency and effectiveness through greater national coherence and a tighter link between fund-

ing and quality and impact, particularly in the context of the top sectors.

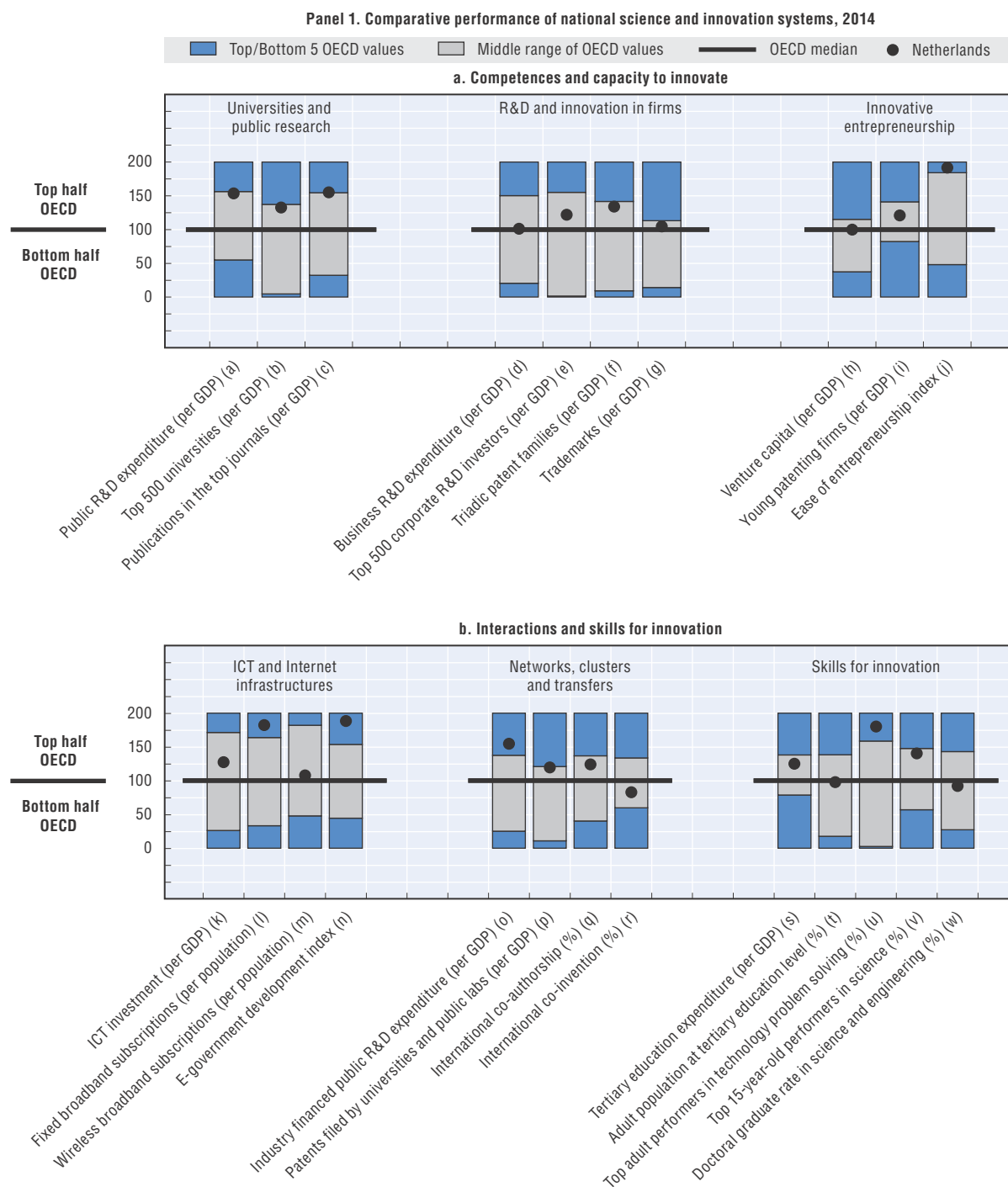
Hot issue 3: Encouraging innovation in firms and supporting entrepreneurship and SMEs. Business R&D expenditure is at the OECD median (Panel 1^d), owing in part to structural features of the Dutch economy. Yet, the Netherlands performs above the OECD median in patenting (Panel 1^f), owing in part to large corporate R&D spenders (Panel 1^e). Support for business innovation is part of enterprise policy, with instruments for public-private partnerships in the top sectors and generic support for all businesses. Tax incentives are the primary means of financial support for business R&D (Panel 4). The largest innovation policy instrument is the R&D payroll tax allowance (WBSO), which is very beneficial for SMEs; it was complemented in 2012 by a tax allowance for investment in R&D. Together, they amounted in 2013 to over USD 1.2 billion (EUR 1 billion). Based on experience so far and to better reflect social challenges, efforts are made to simplify and harmonise top-sector instruments: the Top Consortia for Knowledge and Innovation (TKI) and the SME Innovation Support Top Sectors (MIT) scheme. The MIT scheme, introduced in 2013 with a budget of USD 24.1 million (EUR 20 million), promotes SMEs' participation in top-sector exploitation initiatives, through collaborative R&D projects, feasibility studies, innovation vouchers, hiring of experts, networking and coaching. The TKI allowance, with USD 100 million (EUR 83 million) in 2013, promotes public-private R&D consortia in top sectors. Efforts are under way to strengthen the representation of SMEs in the top sectors.

Hot issue 4: Targeting priority areas/sectors. Nine top sectors have been chosen for preferential support: agri&food, horticulture and propagating stock, high-technology systems and materials, energy, logistics, creative industry, life sciences, chemicals and water. Knowledge institutions, companies and the government co-operate to strengthen the competitiveness of top sectors and address social challenges. While research and innovation dominate top-sector programming, there is also concerted action concerning STEM-educated human resources. Dedicated funding for top-sector instruments is only some USD 128 million (EUR 106 million) a year, but considerable amounts of public research (of which about

Key figures, 2013

Economic and environmental performance	NLD	OECD	Gross domestic expenditure on R&D	NLD	OECD
Labour productivity			GERD		
GDP per hour worked, USD PPP, 2013	61.5	47.7	Million USD PPP, 2012	15 661	1 107 398
(annual growth rate, 2008-13)	(-0.2)	(+0.8)	As a % of total OECD, 2012	1.4	100
Green productivity			GERD intensity and growth		
GDP per unit of CO ₂ emitted, USD, 2011	3.6	3.0	As a % of GDP, 2012	2.16	2.40
(annual growth rate, 2007-11)	(+1.4)	(+1.8)	(annual growth rate, 2007-12)	(+3.4)	(+2.0)
Green demand			GERD publicly financed		
NNI per unit of CO ₂ emitted, USD, 2011	3.5	3.0	As a % of GDP, 2011	0.73	0.77
(annual growth rate, 2007-11)	(+0.7)	(+1.6)	(annual growth rate, 2007-11)	(+1.4)	(+2.8)

Figure 9.32. Science and innovation in the Netherlands



30% is privately financed) in universities and PRIs are being aligned with the approach, equal to about USD 1.2 billion (EUR 1 billion), excluding regional and EU funding.

Hot issue 5: Innovation to contribute to addressing societal challenges. The social challenges facing the Netherlands, including demographic change, energy supply and climate change, are an important factor in shaping top-sector agendas. Innovative responses to these challenges are strengthened by participation in the EU's Horizon 2020 programme, attention by the top sectors, and funding by the Netherlands Organisation for Scientific Research (NWO), which distributes a major share of competitive research funding to Dutch universities and other knowledge institutes.

Highlights of the Dutch STI system

Innovative entrepreneurship: The Netherlands ranks among the top countries on the OECD Ease of Entrepreneurship Index (Panel 1^j). While early-stage entrepreneurial activity is strong, recent empirical OECD work finds barriers to subsequent growth. In recent years the scarcity of bank lending, combined with the limited role of venture capital in risk financing (Panel 1^h), have been a limiting factor. In response, a number of policy instruments have special provisions for SMEs, including credit guarantees through the Qredits, MKB and GO facilities. The Seed Facility supports private equity firms investing in early stage start-up companies and the R&D credit goes to R&D projects.

Technology transfer and commercialisation: The government emphasises strengthening the commercialisation of public research (Valorisation Agenda of 2009). Dutch universities and knowledge institutes have strong links with the business sector, with a high share of industry funding for public research (Panel 1^o). To foster commercialisation and technology transfer, the Valorisation Programme was introduced in 2011 with a budget of USD 76 million (EUR 63 million) to support 12 consortia over six years. Valorisation is now part of performance agreements with universities. Collaboration

to exploit scientific research is a key objective of the top sectors.

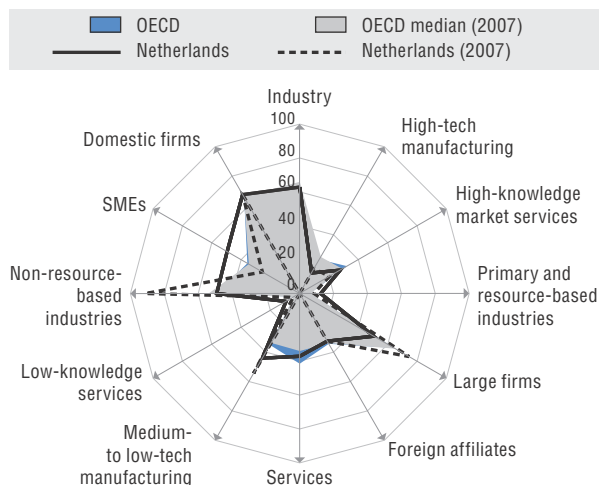
Clusters and smart specialisation: There is relatively little income inequality among Dutch regions owing in part to the poly-centricity of the Dutch economy. The aim of the Strong Regions initiative is to make the Randstad conurbation a leading sustainable, internationally competitive region, with an accessible and dynamic economy, high quality of life in an attractive living and working environment, and a climate-proof delta. To facilitate planning for the EU Structural Funds, Smart Specialisation Strategies have been drawn up for the North, East, West and South of the Netherlands, according to each region's comparative advantage.

Globalisation: The Netherlands is very open to international trade and investment. The science system, too, is highly internationalised, as reflected in international co-authorship (Panel 1^q), although international co-invention is below the OECD median. Dutch participation in European Framework Programmes is above the European average. The Ministry of Education, Culture and Science and the Ministry of Economic Affairs have developed national strategies to promote the international dimension of STI policies and programmes.

Skills for innovation: The Dutch workforce is well educated and has strong innovation skills overall, and education is of high quality (Panel 1^{u, v}), although adult tertiary education attainment and the rate of doctoral graduates in science and engineering could be improved (Panel 1^{b, w}). Current policy efforts focus on maintaining quality in tertiary education and responding to emerging labour market needs. The top sectors' human capital agendas encourage co-ordination to identify and prepare for emerging skill needs. In 2013, the government launched the 2020 National Technology Pact, involving major stakeholders. Co-operation between HEIs, vocational secondary education and the business sector is a main aspect of the Pact, which aims to increase the number of technically trained people.

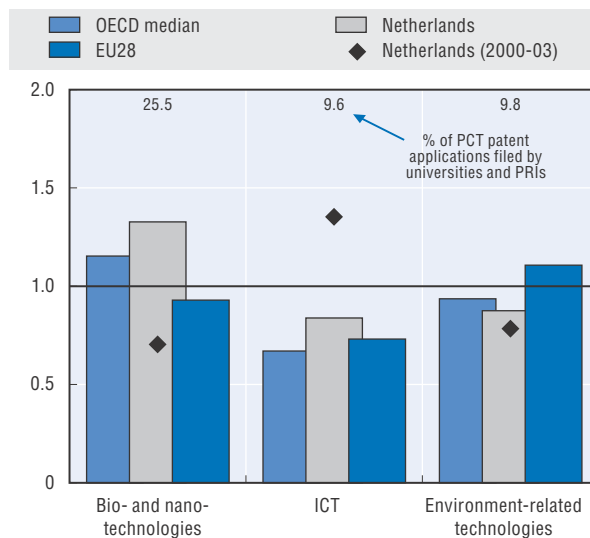
Panel 2. Structural composition of BERD, 2011

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

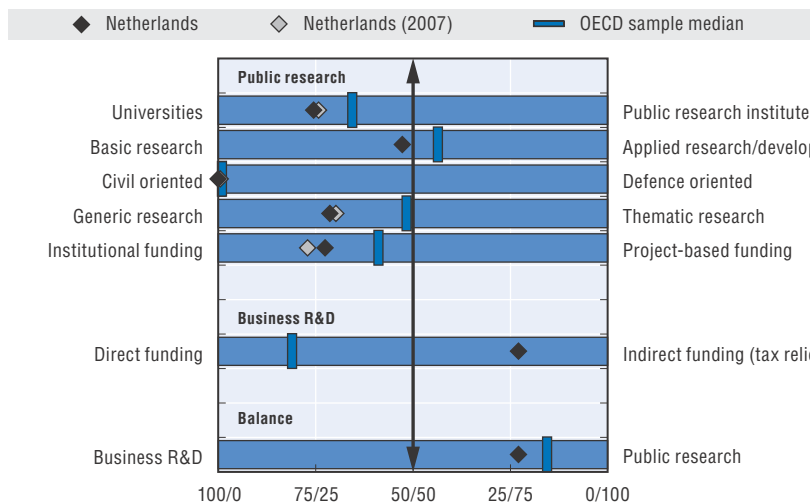


Panel 3. Revealed technology advantage in selected fields, 2009-11

Index based on PCT patent applications



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



Note: Policy information comes from country responses to the OECD STI Outlook policy questionnaires 2014 and 2012. The Netherlands' responses are available in the OECD STI Outlook Policy Database, edition 2014 at <http://qdd.oecd.org/Table.aspx?Query=C8D98511-C139-49BD-82AC-D6E6ADD45842>.

Source: See reader's guide and methodological annex.

StatLink <http://dx.doi.org/10.1787/888933152321>

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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