February 2018

OECD going digital

Highlights from the OECD Science, Technology and Industry Scoreboard 2017 - The Digital Transformation: European Union

Science, innovation and the digital revolution

- Machine-to-machine (M2M) sim card penetration, a key component of the "Internet of Things" (IoT) infrastructure and the development of the European Digital Single Market, more than doubled over the past five years in the **European Union** [Scoreboard fig. 1.3].
- The **EU area** accounted for 12% of AI-related inventions patented in the 5 top IP offices during 2010-15, down from 19% in 2000-05 [fig. 1.7].
- The **EU area** maintained its global share of high quality scientific production, accounting for about a third of the world's top 10% most-cited scientific publications, ahead of the United States and China [fig. 1.11 – see below]. The average "excellence" of **EU research,** at about 12%, is lower than in the United States, which maintains its status as the country with the highest domestic share of high-quality scientific research (14%) [fig. 1. 12].
- In 2015, domestic R&D expenditure was USD 386 billion PPP in the **EU area** - behind both the United States (USD 503 billion PPP) and China (USD 409 billion PPP) [fig. 1.10]. Over the past decade, government expenditure on R&D (GERD) as a percentage of GDP has remained relatively stable in the **EU area** as a whole [fig.1.14] as has the level of government R&D budgets [fig. 1.62 - see below] although there is notable variation across EU countries.

Growth, jobs and the digital transformation

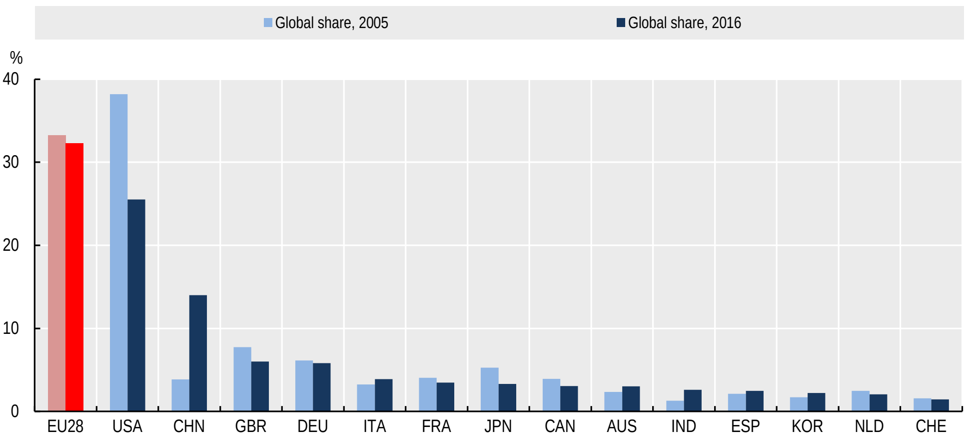
- Data on the deployment of industrial robot technologies show that the robot intensity i.e. the industrial stock of robots divided by manufacturing value added, has increased considerably for some **EU countries** between 2005 and 2015, especially in the Slovak Republic, the Czech Republic and Slovenia [fig. 1.28 - see below].
- From 2010 to 2016, the **EU area** experienced net employment gains of over 6.4 million jobs [fig. 1.34]. Net gains were the highest in Professional, scientific, technical and other business services, followed by Public administration, education, health and other services. Net losses were recorded in the Agriculture, forestry and fishing and Construction sectors.
- In 2014, 20.5% of jobs in the **EU business sector** were used in production to meet final demand in non-EU economies [fig. 5.7.1], up from 14.5% in 1995.
- Combining the value added generated by ICT industries with the non-ICT industry value added embodied in global demand for ICT goods and services can be considered as a first step towards defining an "extended ICT footprint". In 2011, the **EU area** accounted for 23% of the world's extended ICT footprint, slightly ahead of the United States [fig. 1.47].
- Evidence suggests that medium and high-skilled workers benefit most from firm-based training. On average, between 30% (the Russian Federation and Greece) and 76% (the Netherlands, Denmark and Finland) of workers receive some training from their employers. Among the **EU countries** included in the analysis, high-skilled workers account for between 25% (Austria) and 56% (Belgium) of those receiving training [fig. 1.40].

Innovation today - Taking action

- During 2012-15, 7% of IP5 patents with inventors from the **EU area**, involved women inventors; lower than comparable shares for the United States and Canada (10%) [fig. 1.61].
- Experimental indicators of international mobility of scientific authors (based on bibliometric data) reveal that the **EU area** became a net attractor for a short period in 2008-09, but registered a very significant deficit after 2011. Over the last 15 years, almost 36 000 more scientific authors left the **EU area** than entered. This is explained in part by the return mobility of individuals who arrived as students before becoming published scientists [fig. 1.69 - see below].
- ICT skills play a significant role in explaining the gender wage gap. Estimates suggest that returns on ICT tasks are larger for women than for men, especially in Ireland, Canada, Korea and Estonia. Training women and endowing them with additional ICT skills may therefore contribute to increasing their wages and help to bridge the gender wage gap [fig. 1.42].

Figure 1.11 Economies with the largest volume of top-cited scientific publications, 2005 and 2016

As a percentage of the world's top 10% most-cited publications

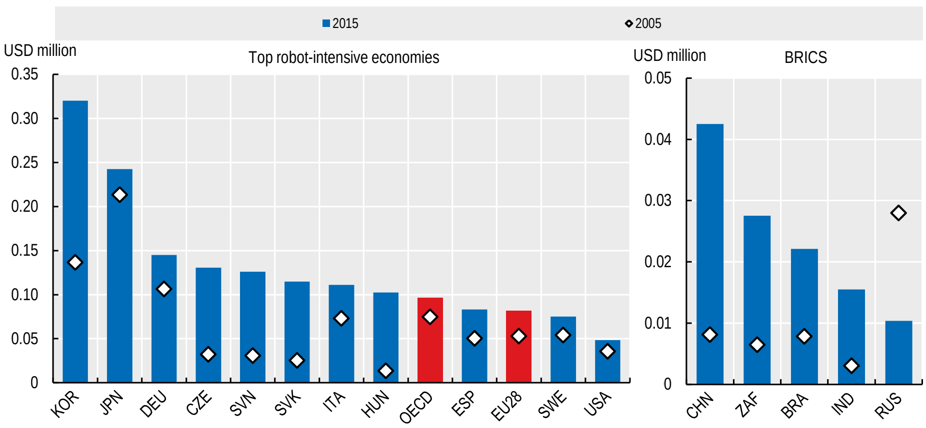


StatLink http://dx.doi.org/10.1787/888933617054

Source: OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_scoreboard-2017-en.

Figure 1.28 Top robot-intensive economies and BRICS, 2005 and 2015

Industrial robot stock over manufacturing value added, millions USD, current values

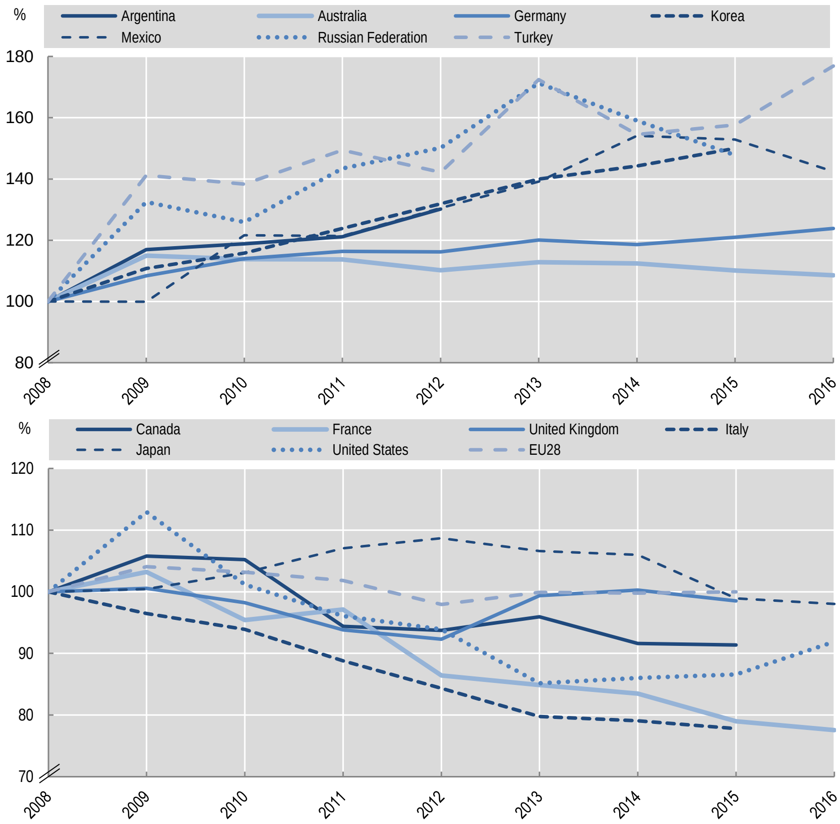


StatLink http://dx.doi.org/10.1787/888933617377

Source: OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_scoreboard-2017-en.

Figure 1.62 Government R&D budgets, selected economies, 2008-16

Constant price index (USD PPP 2008 = 100)

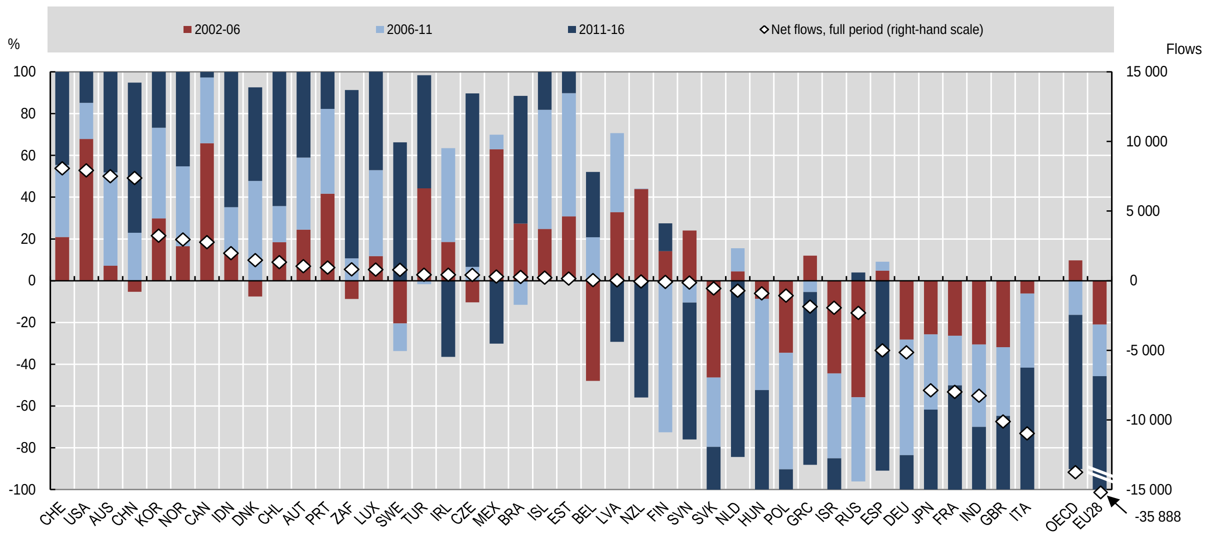


StatLink http://dx.doi.org/10.1787/888933618023

Source: *OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation*, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_scoreboard-2017-en.

Figure 1.69 International net flows of scientific authors, selected economies, 2002-16

Difference between annual fractional inflows and outflows, as a percentage of total flows



StatLink http://dx.doi.org/10.1787/888933618156

Source: *OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation*, OECD Publishing, Paris http://dx.doi.org/10.1787/sti_scoreboard-2017-en.

The OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation

The 2017 edition of the Scoreboard contains over 200 indicators showing how the digital transformation affects science, innovation, the economy, and the way people work and live.

The aim of the STI Scoreboard is not to "rank" countries or develop composite indicators. Instead, its objective is to provide policy makers and analysts with the means to compare economies with others of a similar size or with a similar structure, and monitor progress towards desired national or supranational policy goals.

It draws on OECD efforts to build data infrastructure to link actors, outcomes and impacts, and highlights the potential and limits of certain metrics, as well as indicating directions for further work.

The charts and underlying data in the STI Scoreboard 2017 are available for download and selected indicators contain additional data expanding the time and country coverage of the print edition. For more resources, including online tools to visualise indicators, see the OECD STI Scoreboard webpage (http://www.oecd.org/sti/scoreboard.htm).

The OECD Directorate for Science, Technology and Innovation

It is part of the DNA of the Directorate for Science, Technology and Innovation (DSTI) to constantly look for ways of better understanding where our economies and societies are today, and where they are going tomorrow. We pride ourselves on tackling topics at the boundaries of our scientific and technological understanding, such as using biotechnology and nanotechnology to alter modes of production, and how digital shifts like "big data," earth observation and digital platforms are changing our world.

Discover DSTI at www.oecd.org/sti and the OECD's Going Digital project at www.oecd.org/going-digital.

Further reading

OECD (2017), *OECD Digital Economy Outlook 2017*, OECD Publishing, Paris.
http://dx.doi.org/10.1787/9789264276284-en

OECD (2016), *OECD Science, Technology and Innovation Outlook 2016*, OECD Publishing, Paris.
http://dx.doi.org/10.1787/sti_in_outlook-2016-en