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

Science, innovation and the digital revolution

- In 2016, there were 152.4 mobile broadband connections per 100 inhabitants in **Japan**, the highest in the OECD [Scoreboard fig. 1.2 - see below].
- During the period 2012-15, five key economies accounted for between 69% and 98% of patents relating to the 20 top emerging ICT technologies; **Japan** is a major contributor to the accelerating development of all ICT technologies - accounting for between 10% and 33% of patenting activities in these fields between 2012 and 2015 [fig. 1.5].
- **Japan** accounted for 30% of AI-related patent applications during 2010-15, down from 36% in 2000-05 [fig. 1.7].
- The development of AI technologies is geographically concentrated: R&D-performing corporations based in **Japan**, Korea, Chinese Taipei, and China account for about 70% of all AI-related inventions belonging to the world's 2 000 top corporate R&D investors and their affiliates, and US-based companies for 18%. Firms headquartered in **Japan** accounted for 33% of all AI-related inventions [fig. 1.25 - see below].
- Out of the top 50 firms with IP5 patent families, 30 are headquartered in Asia, of which 19 are located in **Japan** [fig. 1.22].

Growth, jobs and the digital transformation

- In 2015, **Japan** was a leader (just behind Korea) in terms of robot intensity i.e. the industrial stock of robots divided by manufacturing value added; robot intensity in **Japan** is more than twice the OECD average [fig. 1.28 - see below].
- **Japan** was among the few OECD countries where multifactor productivity growth from 2009 to 2015 was greater than in both the previous six-year periods (1995 to 2001 and 2001 to 2007) [fig. 1.46].
- In 2014, about 19% of jobs in the business sector in **Japan** were sustained by foreign demand, up from 15% in 2004; this is the lowest in the OECD apart from the United States [fig. 1.38].
- Women in **Japan** earn, on average, almost 30% less than men, even after individual and job-related characteristics are taken into consideration, the largest gender wage gap in the OECD [fig. 1.41].
- **Japan** was the fifth-most important hub for IT manufacturing in 2011, after China, the United States, Korea, and Germany; down from 2nd place in 1995 [fig. 1.56].
- More than 98% of persons aged 16-74 in **Japan** used the Internet in 2015, up from 76% in 2006 [fig. 1.57]; 99% of 16-24 year olds used the Internet in 2015 compared to 77% in the 55-74 year age group [fig. 1.58].

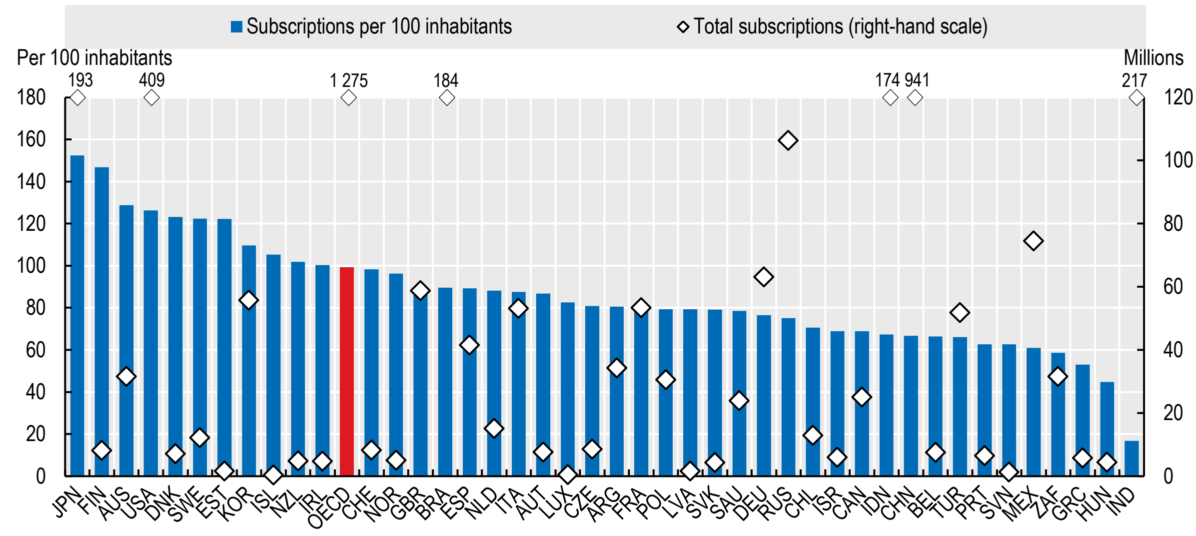
Innovation today - Taking action

- **Japan** is among the OECD countries that spend more than 3% of GDP on R&D, rising from 2.6% of GDP in 1995 to 3.3% in 2015 [fig. 1.14].

- 7.9% of domestic scientific documents with authors affiliated to institutions in **Japan** were in the world top-10% most cited, just ahead of China (7.6%), but behind the United States (13.9%) and the European Union (11.9%)[fig. 1.12].
- In 2012-15, of patents with inventors located in **Japan**, 7% of those inventors were women, compared to 10% in the United States and 7% in the EU [fig. 1.61].
- **Japan** has one of the lowest levels of international collaboration in science and innovation among OECD countries, with 1% of patents involving co-invention, and 24.4% of scientific publications involving international co-authorship [fig. 1.68 - see below].
- Experimental indicators on the international mobility of scientific authors, based on bibliometric data for 2002 to 2016 show that **Japan** has lost more authors than it has attracted; over the 15 years to 2016, almost 8 000 more scientific authors left **Japan** than entered [fig. 1.69].

Figure 1.2 Mobile broadband penetration, OECD, G20 and BRIICS, 2016

Total subscriptions and per 100 inhabitants

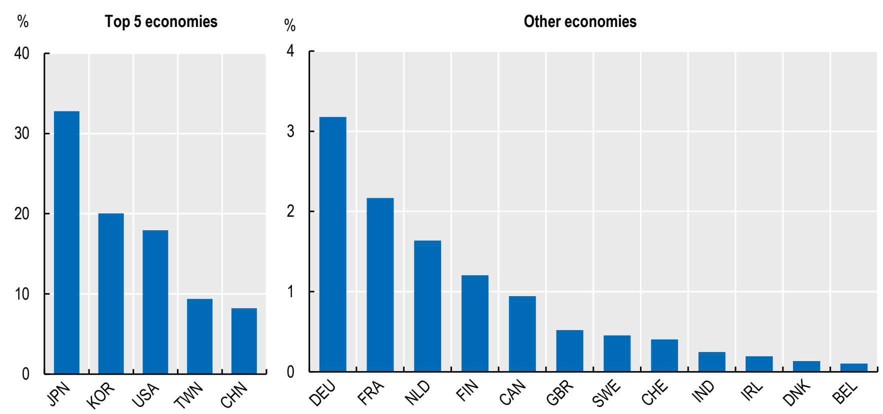


StatLink http://dx.doi.org/10.1787/888933616883

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 1.25 Artificial intelligence patents by top R&D companies, by headquarters' location, 2012-14

Share of economies in total AI-related IP5 patent families owned by top 2 000 R&D companies

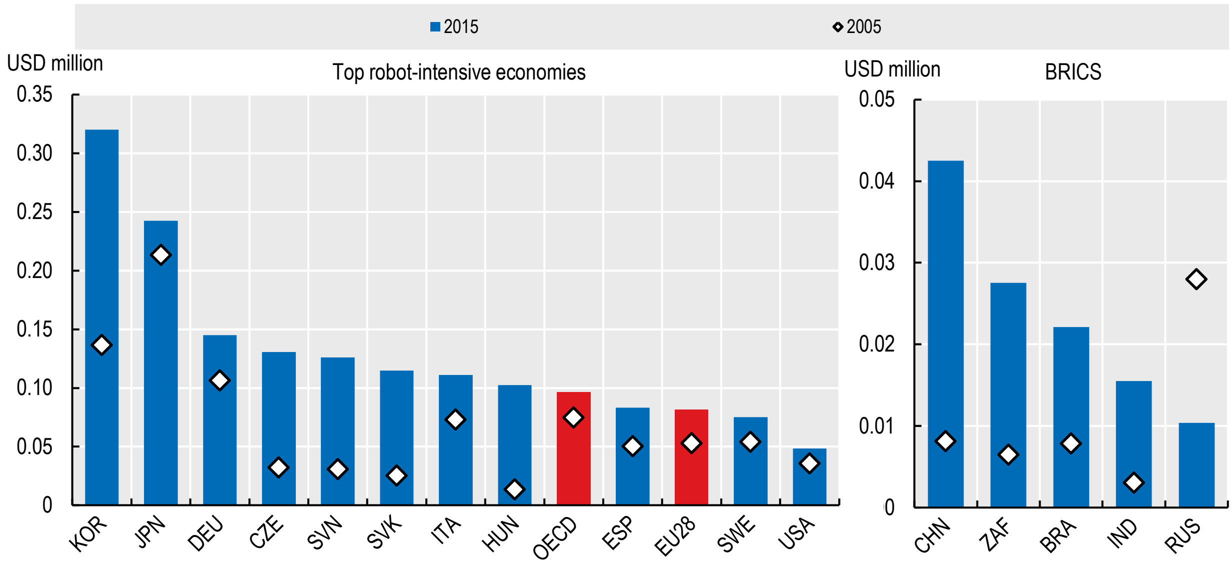


StatLink http://dx.doi.org/10.1787/888933617320

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



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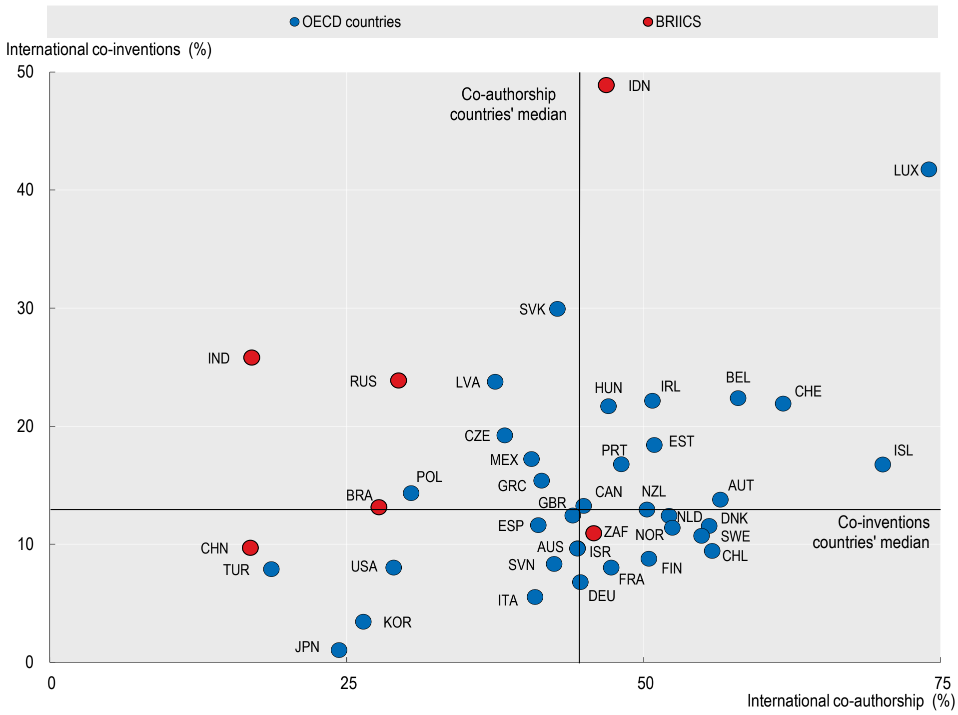
Source: OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_scoreboard-2017-en.

Figure 1.68 Co-authorship and co-invention as a percentage of scientific publications and IP5 patent families



StatLink http://dx.doi.org/10.1787/888933618137

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