C 7 Scientific publications[542]

A large proportion of new technologies and services are based on developments and results from science. Bibliometric indicators and metrics are regularly used as yardsticks for evaluating scientific achievements to estimate the performance of a research and science system in both quantitative and qualitative terms.

The bibliometric database Web of Science (WoS) covers worldwide publications in scientific journals, as well as citations from these publications. The research affiliation of scientists referenced in the database makes it possible to assign individual publications to a specific country. Fractional counting is employed in cases where several co-authors from different countries contribute to a publication. Indicators on the quantity and quality of scientific publications can be used to assess the performance of a research and science system.

Significant changes can be identified in individual countries' and regions' shares of all publications in Web of Science (C 7-1) when comparing the years 2007 and 2017. Most countries' publication shares have declined, including the major western European nations of Germany, France and the United Kingdom as well as the USA. Germany's share of publications fell from 5.6 to 4.4 percent, the UK's fell from 6.1 to 4.6 percent, France's fell from 4.0 to 2.8 percent and the USA's tumbled from 25.7 to 19.4 percent. In contrast, China achieved enormous growth in its share, which rose from 8.1 to 18.4 percent. Only a handful of European countries have been able to increase their share of publications. Denmark, for instance, increased its share from 0.6 to 0.7 percent from 2007 to 2017, while the Polish share rose from 1.2 to 1.3 percent over the same period.

The international alignment (IA) of selected countries and regions in relation to Web of Science publications (C 7-2) is an indicator of the quality of scientific publications. In this regard, it is clear that the quality of German authors' publications increased between 2007 and 2015. According to this indicator, publications from Switzerland, the USA and the Netherlands are of the highest quality. China has significantly improved the quality of its publications, though this figure remains below average.

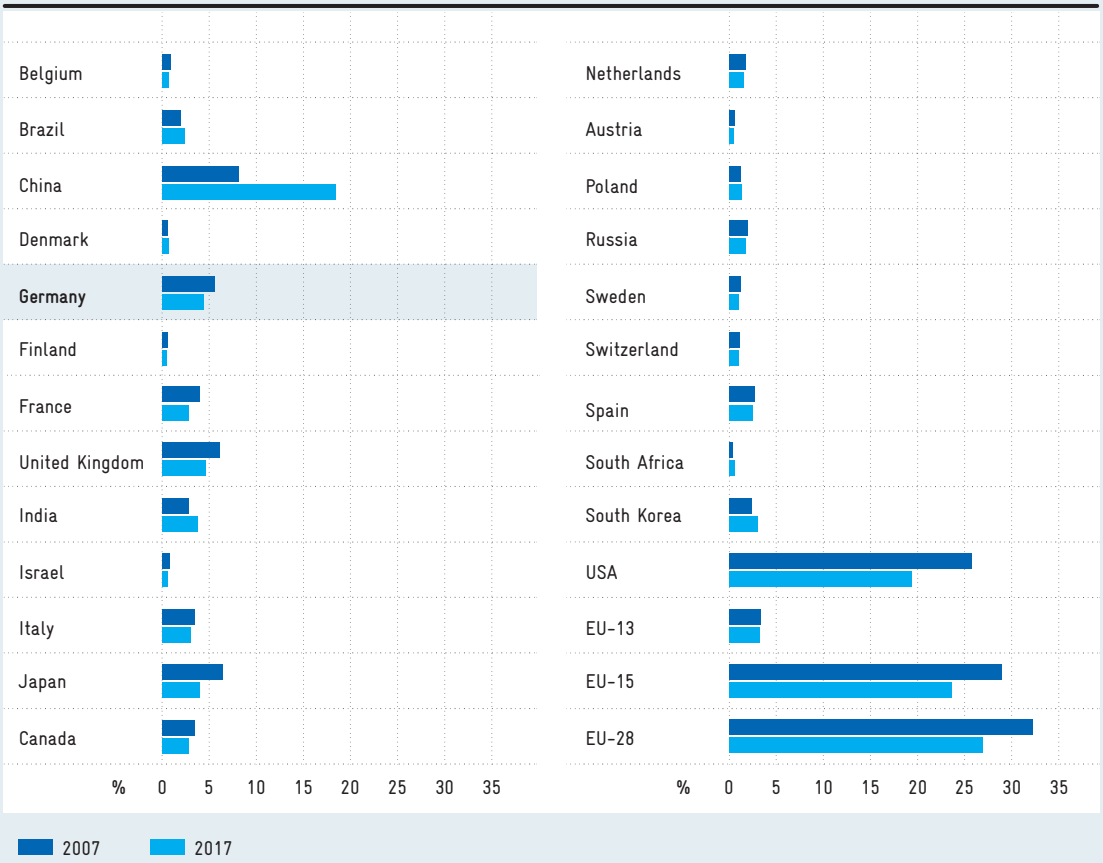
The scientific regard (SR) of specific countries and regions for publications in Web of Science (C 7-3) shows that the index value for articles authored in Germany has fallen from 9 to 4. Nevertheless, articles authored in Germany were cited more often in 2015 than other articles in the same journals. This prominence has, however, reduced in comparison to 2007.

Fig. C 7-1

Download data

Percentages of all publications in the Web of Science from selected countries and regions in 2007 and 2017

The analysis concentrates on countries' shares, rather than on absolute figures, to compensate for changes, especially the ongoing expansion of data collection.



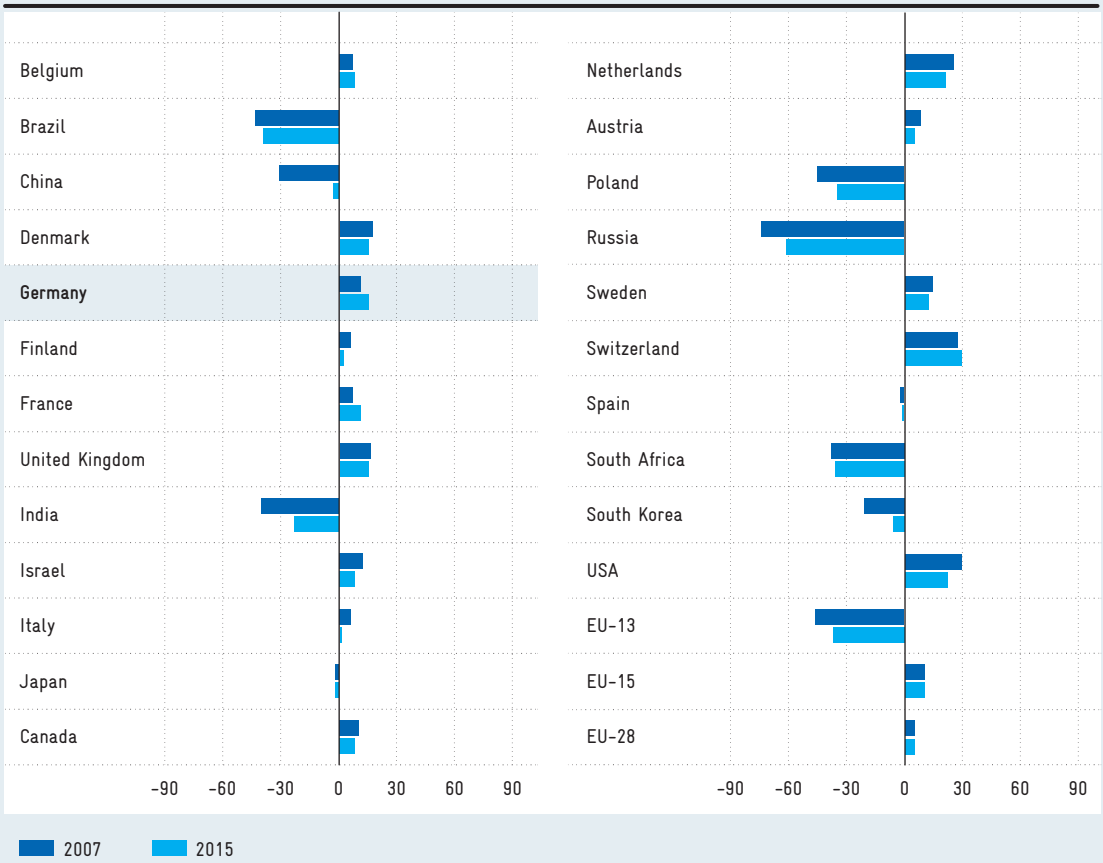
Fractional counting.
Source: Web of Science. Research an calculations by the DZHW in Stahlschmidt et al. (2019).

Fig. C 7-2

Download data

International alignment (IA) of publications in the Web of Science from selected countries and regions in 2007 and 2015 (index values)

The IA index indicates whether a country's authors publish in internationally more highly recognized or less highly recognized journals relative to the world average. Positive or negative values indicate an above-average or below-average IA.



Fractional counting.
Source: Web of Science. Research an calculations by the DZHW in Stahlschmidt et al. (2019).

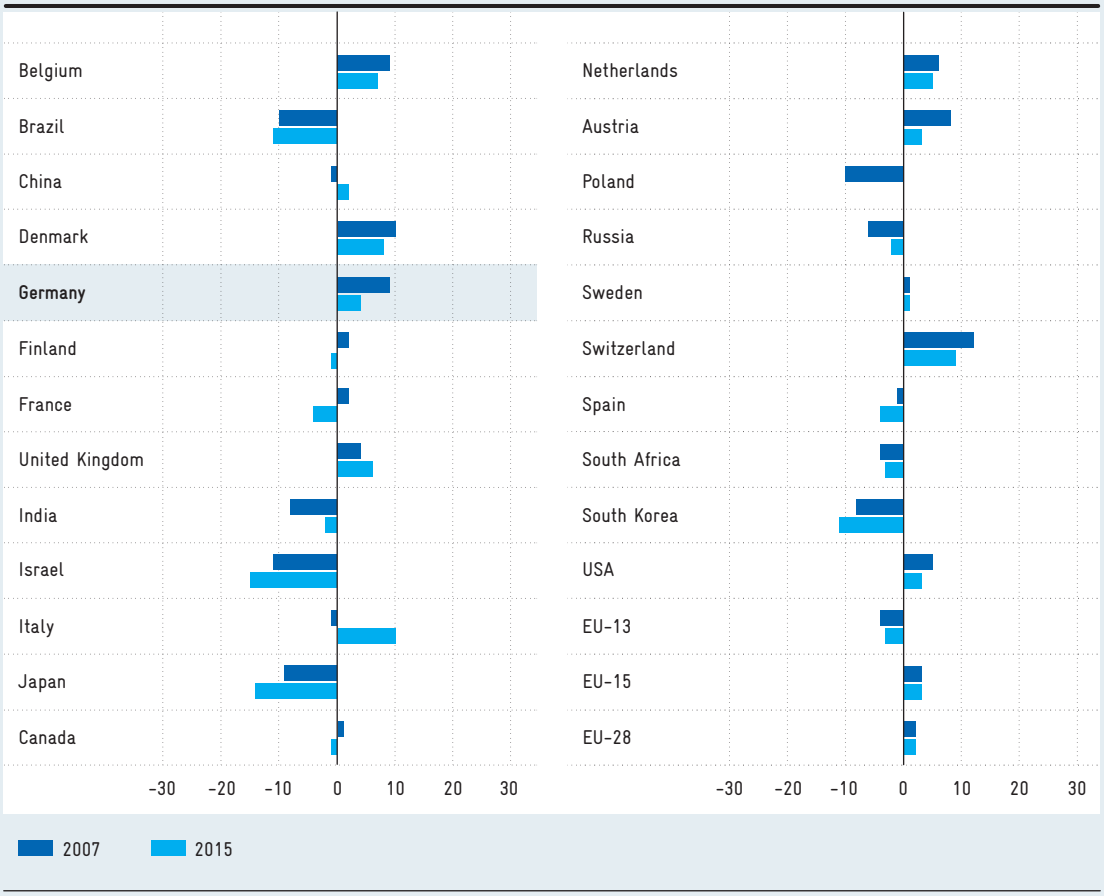
C

Fig. C 7-3

Download data

Scientific regard (SR) of publications in the Web of Science from selected countries and regions in 2007 and 2015 (index values)

The SR index indicates whether a country's articles are cited on average more frequently or more seldom than other articles in the journals in which they appear. Positive or negative values indicate an above-average or below-average scientific regard. The index is calculated without self-citations.



Fractional counting.
Source: Web of Science. Research and calculations by the DZHW in Stahlschmidt et al. (2019).