SCIENTIFIC PUBLICATIONS AND PERFORMANCE C 6

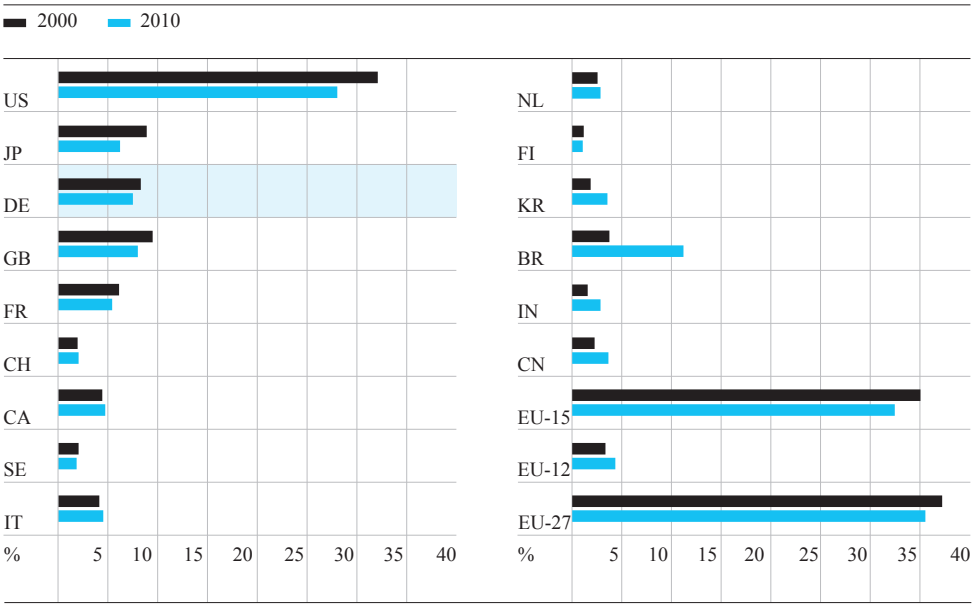
A growing number of technologies and services is knowledge-based and provides the basis of entire industrial sectors. The training of qualified professionals and the creation of an excellent scientific basis for future technological developments are a key contribution of science to the national innovation system. Scientific publications and the frequency of citations are used as indicators for research performance and have been increasingly used in recent years as a means of assessing performance of research institutions and scientists.

When looking at the shares of selected countries and regions in Web of Science (WoS) publications[394], it becomes clear that the major industrialised nations have suffered substantial relative losses in favour of the emerging economies of China, India, Brazil and Korea, as well as the new EU member states (EU-12) (Figure C 6 – 1). Despite this decline, about one quarter of all publications in 2010, and thus the biggest share of publications, can still be assigned to authors from the United States. In addition to Germany, countries such as Japan, France, Sweden, Finland and Great Britain have also recorded a decline. As opposed to this, publication shares of most emerging economies have at least doubled over the past 10 years. It is also worth noting that Switzerland, Canada, Italy and the Netherlands managed to keep their shares stable or even slightly increased their shares over the same period of time.

However, these significant changes in relation to publication activities become less drastic if one considers the indicators relating to publication quality. Thus, for example, the journal-specific scientific regard (SR) index (C 6 – 3) suggests that, in terms of quality of publications, the emerging economies and Japan still have a lot of catching up to do to meet the level of Western industrial nations. Nevertheless, considerable progress in quality could be observed in these countries, most notable with regard to Chinese publications. Switzerland remains to be at the forefront, albeit the fact that the quality measured between 2000 and 2008 has decreased marginally. The same can be said for Great Britain, Sweden and Canada. Germany's level of influence is similar to that of these countries, and the positive trend described in the EFI Annual Report 2011 still continued in 2008. In terms of scientific regard, Germany has in fact managed to surpass the United States.

Another quality indicator is the international alignment (IA) index of a country's scientific publications (C 6 – 2). Here, the current results confirm the dominant role of Switzerland, the United States and the Netherlands, all of which, when compared with the global average, frequently publish in renowned, internationally visible journals. One of the reasons for the increase observed in industrial nations is the fact that in these countries, a publication in eminent journals has become more relevant for academic careers. Here, the emerging countries occupy an unfavourable position compared with the industrial nations. Yet China, India and Korea still increasingly succeed in placing a growing number of publications in internationally visible journals. These countries have already caught up with the EU-12 countries, or have even managed to surpass them.

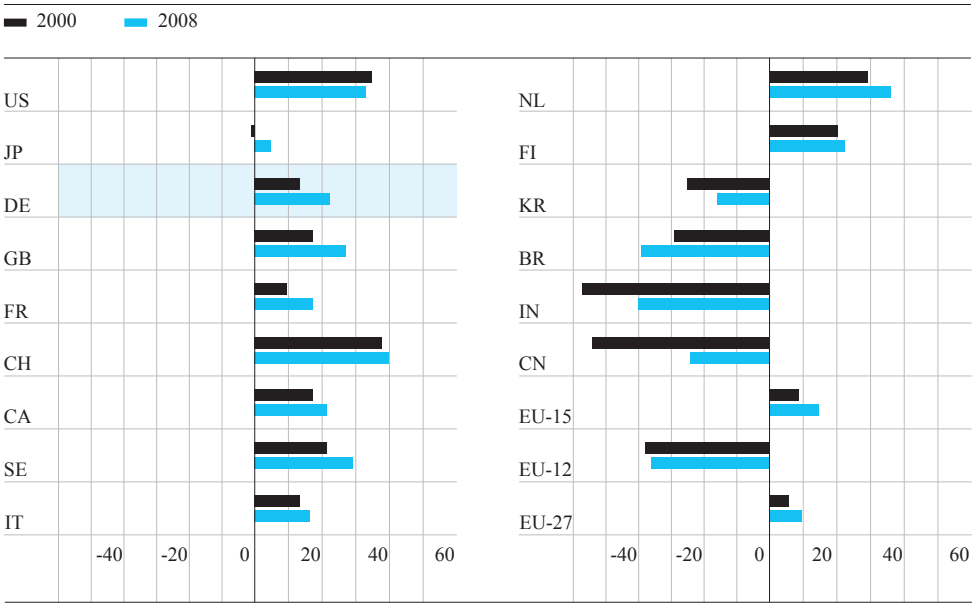
C 6–1 **Shares of selected countries and regions for all Web of Science publications 2000 and 2010** (figures in percent)



Source: Web of Science (WoS). Research and calculations by Fraunhofer ISI.

In order to take account for changes in the collection of publication data – continuous expansion in particular – countries' shares of publications, and not absolute numbers of publications, are considered.

C 6–2 **International alignment of selected countries and regions for Web of Science publications 2000 and 2008**



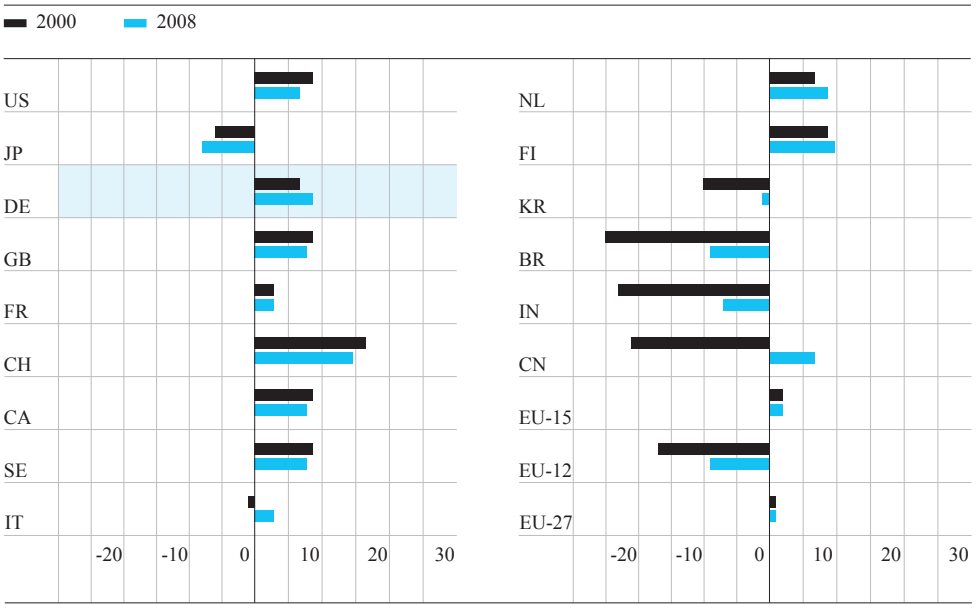
Source: Web of Science (WoS). Research and calculations by Fraunhofer ISI.

The IA index shows the extent to which a country's authors, in comparison to the world average, are publishing in internationally renowned journals and less-renowned journals. Positive values are indicative of above-average international alignment; negative values are indicative of below-average international alignment.

Scientific regard for Web of Science publications from selected countries and regions 2000 and 2008

C 6–3

The SR index shows whether a country's scientific articles are cited more or less frequently than average articles in specific journals. Positive values are indicative of above-average SR; negative values are indicative of below-average SR. Index calculations do not include self-citations.



Source: Web of Science (WoS). Research and calculations by Fraunhofer ISI.