## PATENTS IN INTERNATIONAL COMPARISON C 5

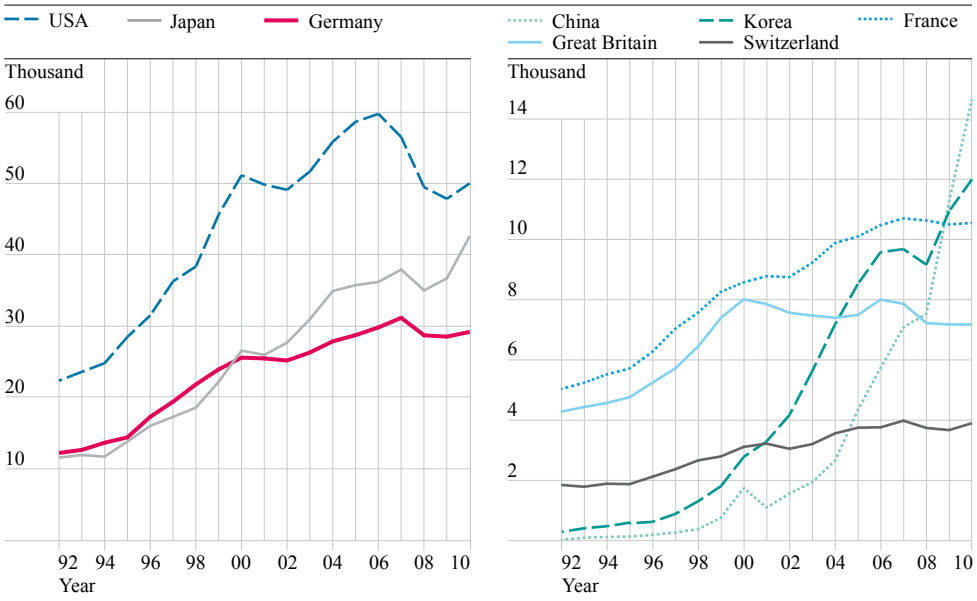
Patents are industrial property rights for new technical inventions. A patent confers on its holder the right to exclude third parties from utilising the protected invention for a certain period of time. Patents represent considerable application-oriented R&D output and can be interpreted as an indicator of the codified knowledge and technological potential of companies, regions or entire countries. Since filed patents provide not only technical details on the invention itself, but also additional information on the inventor, the patent applicant, and the date and place of registration, patent statistics are a valuable source for documenting the scientific and technological performance of national economies.

In its analyses of the patenting activities of selected countries, the Commission of Experts for Research and Innovation relies on transnational patents. These are patents or patent families[395] that comprise at least one application filed with the World Intellectual Property Organisation (WIPO) via the Patent Cooperation Treaty Procedure (PCT)[396] or an application filed with the European Patent Office (EPO). These patents usually comprise inventions of high technical and economic importance that are to be marketed internationally. Transnational patents thus provide a solid empirical basis for comparing economic systems in terms of their scientific and technological performance. The Expert Commission has analysed the patent activities of selected countries based on absolute trends and growth rates, and also on the basis of patent intensities and specialisation indices[397] which reflect patent activities in relation to the size of a country or for specific fields of technology, respectively.[398]

Based on the absolute number of transnational patent applications (C 5–1), it appears that the downward trend experienced by most countries,[399] which started in late 2007 as a result of the financial and economic crisis, came to an end in 2010. Thus, in most countries the number of transnational patent applications was at a similar level as in the years before the crisis. After the United States and Japan, Germany continues to be one of the world's leading economies with regard to transnational patent applications. However, in terms of growth rates, the strongest positive dynamics throughout the last decade were recorded in China and Korea. When considering the number of patent applications in relation to the size of the country (patent intensity), smaller countries such as Switzerland, Sweden and Finland are at the top (C 5–2). Here Germany comes fourth in international comparison and third in the area of high technology.

Patent activities in the field of high technology provide further insights into a country's scientific and technological performance. This area includes all those industries that invest more than 2.5 percent of their revenue in R&D activities (R&D intensity). High technology comprises the areas of high-value technology (R&D intensity > 2.5 and max. 7 percent) and cutting-edge technology (R&D intensity > 7 percent).[400] As regards Germany, the patent statistics indicate a strong specialisation in high-value technology (C 5–3). Due to its traditional strengths in the automotive industry, mechanical engineering and the chemical industry, Germany is in second place after Japan when compared internationally. In the field of cutting-edge technology, however, Germany is still poorly positioned, remaining well behind leading countries such as China, Korea and the United States (C 5–4). Some of these countries are able to compensate for their lower-than-average patent activity in the area of high technology through their successful specialisation in cutting-edge technology, while Japan even takes a leading position in both high-value technology and cutting-edge technology.

C 5–1 **Development of numbers of transnational patent applications over time, for selected countries**




Transnational patent applications comprise applications in the form of patent families that include at least one application filed with the World Intellectual Property Organization (WIPO), via the Patent Cooperation Treaty (PCT) procedure, or an application filed with the European Patent Office.

Source: EPA (PATSTAT), calculations by Fraunhofer ISI, December 2012.

C 5–2 **Transnational patent applications in the field of high technology: absolute number, intensity and growth rates in 2010**

| | Absolute | Intensity | Intensity, high technology | Total growth* in percent | Growth* in high technology, in percent |
|---|---|---|---|---|---|
| **Total** | **211,711** | – | – | **133** | **131** |
| Switzerland | 3,903 | 861 | 400 | 125 | 119 |
| Finland | 1,898 | 773 | 355 | 102 | 107 |
| Sweden | 3,477 | 771 | 352 | 105 | 99 |
| *Germany* | *29,284* | *755* | *382* | *114* | *109* |
| Japan | 42,722 | 681 | 401 | 160 | 165 |
| Korea | 12,001 | 511 | 280 | 431 | 475 |
| Netherlands | 3,384 | 393 | 187 | 91 | 78 |
| France | 10,555 | 393 | 204 | 123 | 128 |
| USA | 50,123 | 358 | 213 | 98 | 98 |
| EU-27 | 71,694 | 329 | 162 | 115 | 112 |
| Great Britain | 7,178 | 249 | 125 | 90 | 87 |
| Italy | 5,404 | 235 | 104 | 119 | 121 |
| Canada | 3,774 | 224 | 117 | 142 | 130 |
| China | 14,649 | 19 | 8 | 836 | 527 |

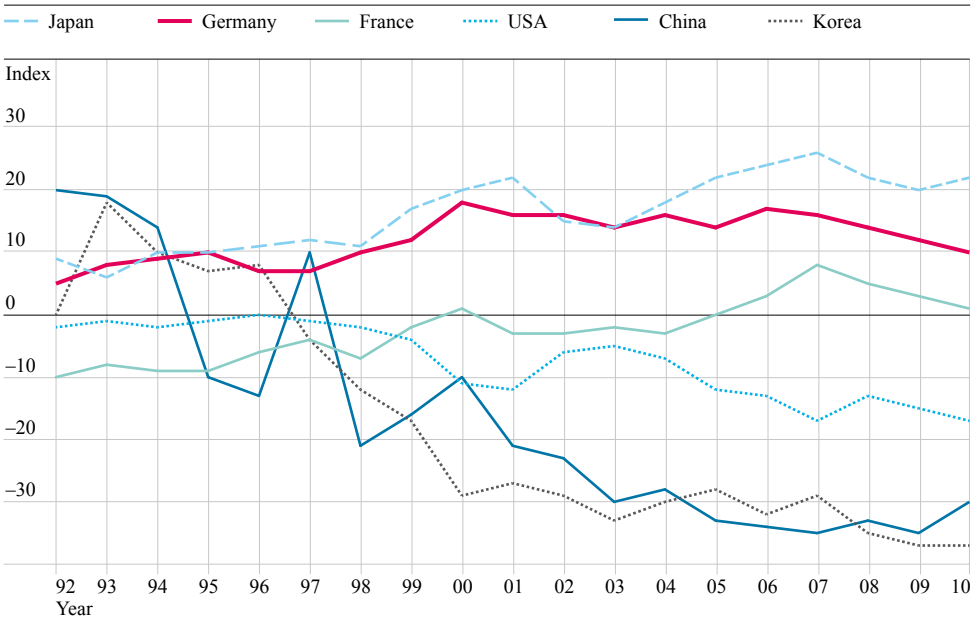
The high technology industry sector comprises industry areas that invest more than 2.5 percent of their revenue in research and development. "Intensity" refers to the number of patents per one million gainfully employed persons.

*Index: 2000 = 100
Source: EPA (PATSTAT). OECD (MSTI). Calculations by Fraunhofer ISI, December 2012.

**Development of the high-value technology specialisation index over time, for selected countries**

C 5–3

The specialisation index is calculated on the basis of all transnational patent applications worldwide. Positive or negative values indicate if the surveyed country's level of activity in a given field is disproportionately high or disproportionately low in comparison to the global average.

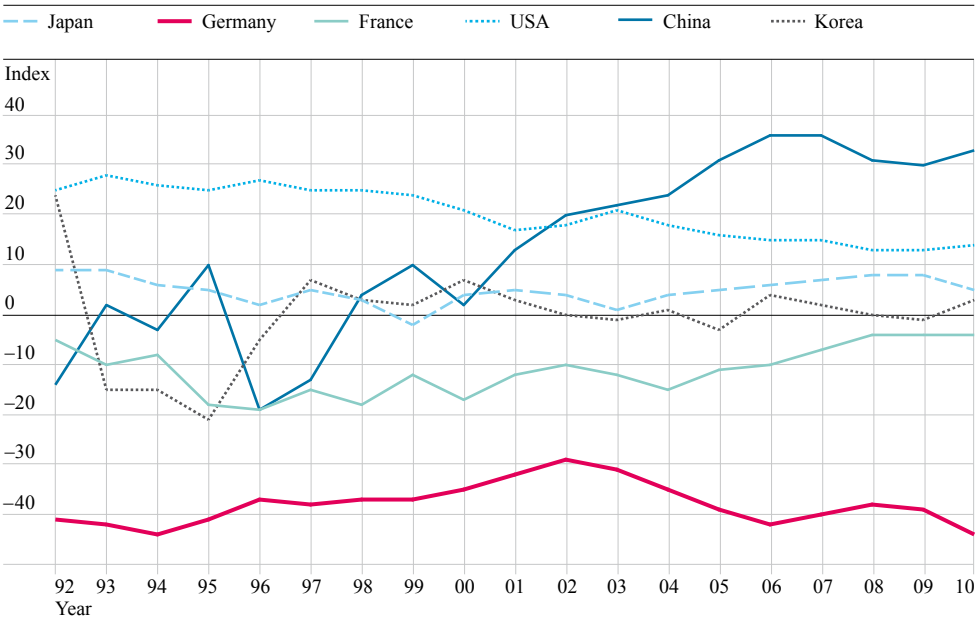



Source: Questel (EPPATENT, WOPATENT). EPA (PATSTAT). Calculations by Fraunhofer ISI. December 2012.

**Development of the cutting-edge technology specialisation index over time, for selected countries**

C 5–4

The specialisation index is calculated on the basis of all transnational patent applications worldwide. Positive or negative values indicate if the surveyed country's level of activity in a given field is disproportionately high or disproportionately low in comparison to the global average.




Source: Questel (EPPATENT, WOPATENT). EPA (PATSTAT). Calculations by Fraunhofer ISI. December 2012.