

Patents⁵⁴¹

C 6

Since the mid-2000s, transnational patent applications have been stagnating both in Germany and in other major European economies such as the UK, Sweden and Switzerland (C 6-1). By contrast, China, South Korea and Japan in particular have recorded high growth rates. China has overtaken Germany and is now one of the leading nations in transnational patent applications together with Germany, the USA and Japan.

While the USA is in the lead in terms of the absolute number of applications in 2016, it is not among the frontrunners with regard to patent intensity (i.e. patent applications per million of the working population (C 6-2)). In this regard, the leaders are Switzerland, Sweden and Japan, followed by Finland, Germany and South Korea. Patents are an important tool for securing market shares in the context of the international technology trade. A high patent intensity therefore reflects both a strong international orientation and a pronounced export focus on the part of the respective economy.

Further conclusions on a country's technological performance can be drawn from patent activities in the field of R&D-intensive technologies. This sector is made up of industries that invest more than 3 percent of their turnover in R&D (R&D intensity). R&D-intensive technology comprises the areas of high-value technology (R&D intensity between 3 and 9 percent) and cutting-edge technology (R&D intensity over 9 percent).

International comparisons show that Germany is highly specialized in high-value technology (C 6-3) as a result of its traditional strengths in the automotive, mechanical-engineering and chemical industries. Together with Japan, Germany records the highest figure in this regard among the comparison countries.

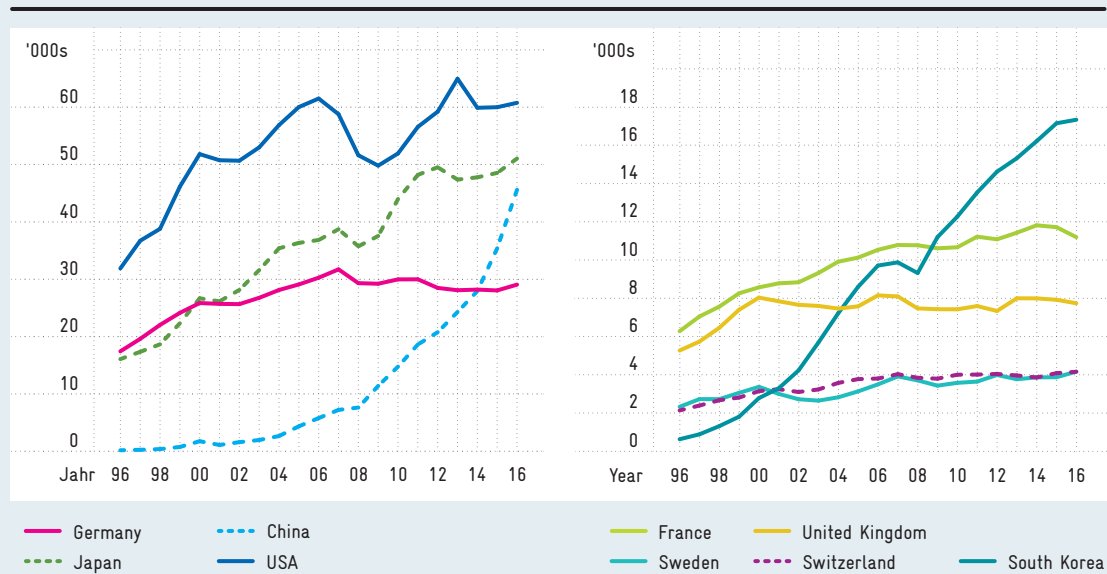
By contrast, China, Sweden, South Korea and the USA are particularly specialized in cutting-edge technology (C 6-4).

Fig. C 6-1

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Development of the number of transnational patent applications in selected countries over time

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 one application filed with the European Patent Office.



Source: EPO (PATSTAT). Calculations by Fraunhofer ISI in Neuhäusler et al. (2019).

Tab. C 6-2

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Absolute number, intensity and growth rates of transnational patent applications in the field of R&D-intensive technology in 2016¹⁾

The R&D-intensive technology sector comprises industries that invest more than three percent of their turnover in research and development. Intensity is calculated as the number of patents per million gainfully employed persons.

	absolute ¹⁾	intensities ¹⁾	intensities in R&D-intensive technology	growth (2006 = 100) ¹⁾	growth in R&D-intensive technology (2006 = 100)
Total	275,011	-	-	132	132
China	45,589	60	42	787	771
Germany	29,055	704	405	96	97
EU-28	76,374	341	193	102	102
Finland	1,876	766	423	96	79
France	11,196	421	245	106	105
United Kingdom	7,739	245	143	95	94
Italy	5,758	253	121	92	89
Japan	51,030	789	480	138	129
Canada	3,471	192	117	88	79
Netherlands	4,464	530	284	102	98
Sweden	4,165	848	570	119	126
Switzerland	4,158	903	478	109	107
South Korea	17,337	656	422	178	167
USA	60,742	401	265	99	99

¹⁾ Figures refer to all industries.

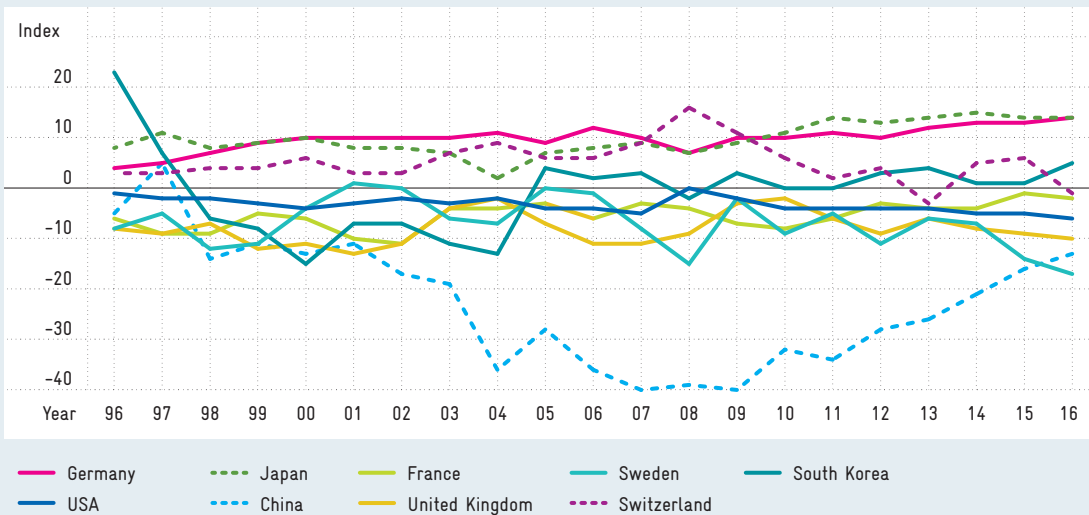
Source: EPO (PATSTAT), OECD (MSTI), World Bank, calculations by Fraunhofer ISI in Neuhäusler et al. (2019).

Development of the specialization index in selected countries over time in the field of high-value technology

Fig. C 6-3

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



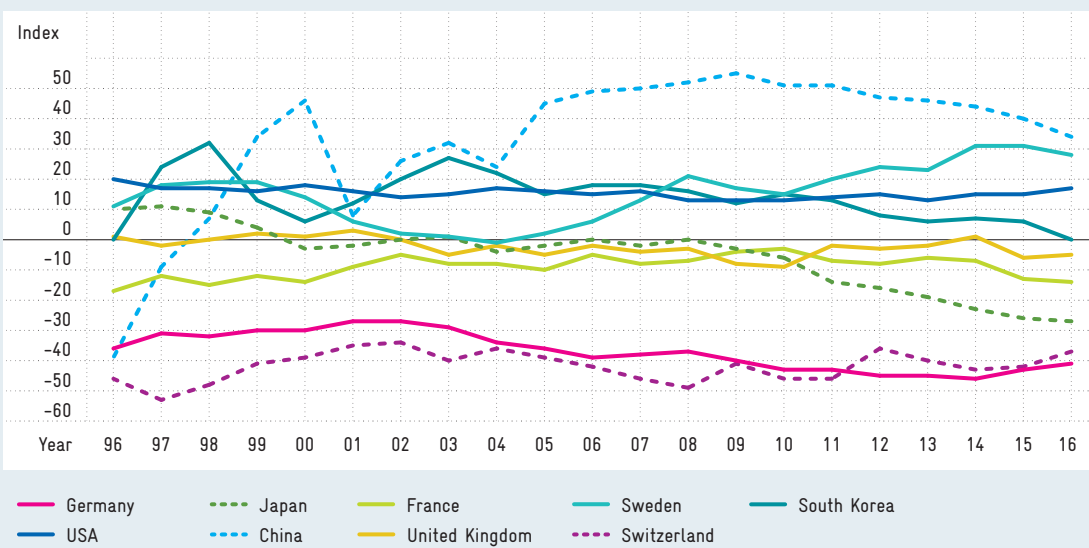
Source: EPO (PATSTAT). Calculations by Fraunhofer ISI in Neuhäusler et al. (2019).

Development of the specialization index in selected countries over time in the field of cutting-edge technology

Fig. C 6-4

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



Source: EPO (PATSTAT). Calculations by Fraunhofer ISI in Neuhäusler et al. (2019).