

Patents³⁴⁵

C 6

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

While the USA was in the lead in terms of the absolute number of applications in 2017, it was not among the frontrunners when it came to patent intensity (i.e. patent applications per million of the working population) (C 6-2). Here, the leaders were 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 technology. This sector is made up of industries that invest more than three 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 three and nine percent) and cutting-edge technology (R&D intensity over nine 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. Germany has the highest specialization rate in high-value technology in the reference group.

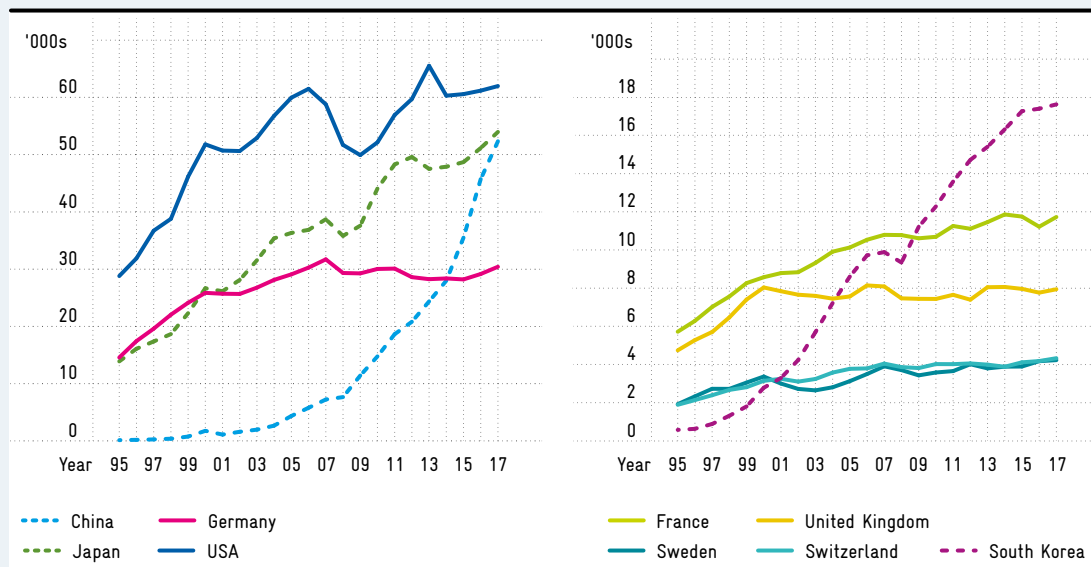
By contrast, China, Sweden, South Korea and the USA are more specialized in cutting-edge technology (C 6-4).

Fig. C 6-1

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Development of the number of transnational patent applications in selected countries 1995–2017

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. (2020)
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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 2017¹⁾

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 (2007 = 100) ¹⁾	growth in R&D-intensive technology (2007 = 100)
Total	289,834	-	-	136	135
China	52,320	69	47	723	689
Germany	30,409	730	423	96	98
EU-28	79,355	349	199	103	103
Finland	1,962	793	454	101	87
France	11,729	436	255	109	107
United Kingdom	7,942	248	147	98	100
Italy	5,735	249	118	92	90
Japan	53,949	826	494	139	128
Canada	3,374	183	112	85	79
Netherlands	4,903	570	310	114	113
Sweden	4,231	843	594	108	119
Switzerland	4,331	934	480	107	100
South Korea	17,627	660	413	178	161
USA	61,960	404	264	105	104

¹⁾ Figures refer to all industries.

Source: EPO (PATSTAT), OECD (MSTI), World Bank. Calculations by Fraunhofer ISI in Neuhäusler et al. (2020)

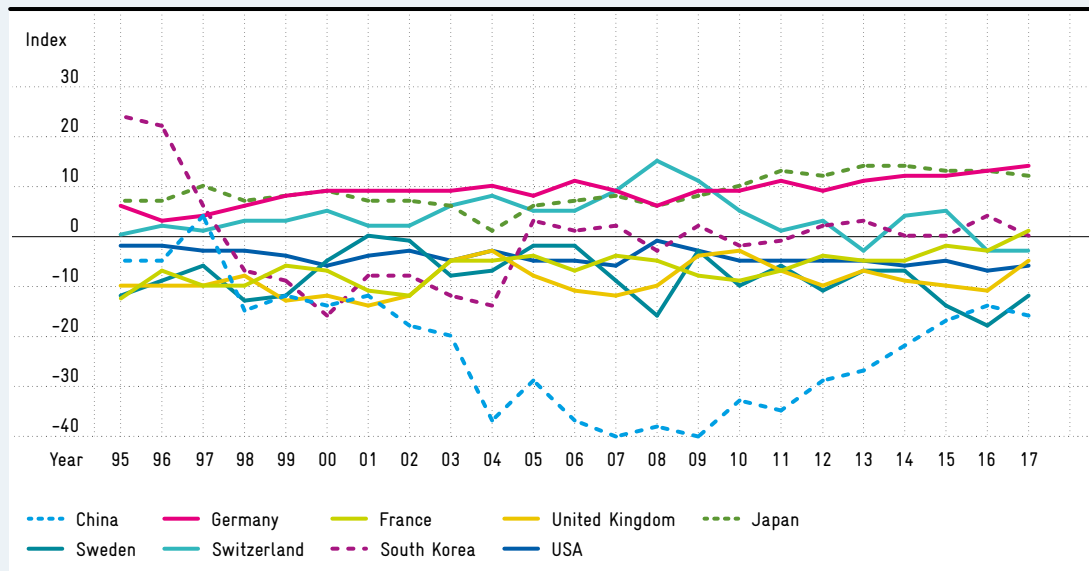
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Development of the specialization index in selected countries over time in the field of high-value technology 1995–2017

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.



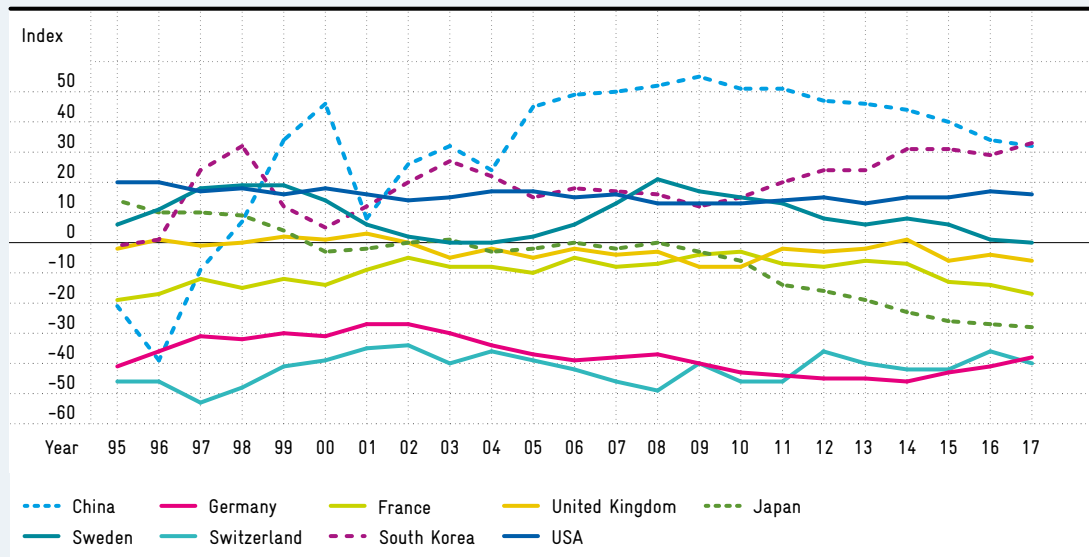
Source: EPO (PATSTAT), OECD (MSTI), World Bank. Calculations by Fraunhofer ISI in Neuhäusler et al. (2020)
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Development of the specialization index in selected countries over time in the field of cutting-edge technology 1995–2017

Fig. C 6-4

Download data

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), OECD (MSTI), World Bank. Calculations by Fraunhofer ISI in Neuhäusler et al. (2020)
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