C 6 Patents[349]

Since the mid-2000s, Germany's transnational patent applications have stagnated, as have those of other large European economies such as the UK and France (C 6-1). In contrast, China, South Korea, and Japan in particular show high growth rates here. China has now overtaken Germany and Japan and ranks second behind the USA in transnational patent applications.

While the USA is the leader in absolute applications in 2018, it does not occupy any top rank in terms of patent intensity (patent applications per million of the working population) (C 6-2). Here, Switzerland, Sweden and Japan are in the lead, followed by Finland, South Korea, and Germany. Patents are an important instrument for securing market shares in the context of international technology trade. A high patent intensity therefore reflects both a strong international orientation and a pronounced export focus of the respective economy.

Further conclusions about a country's technological performance can be drawn from patent activities in R&D-intensive technology. This area includes industry sectors 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 above 9 percent).

An international comparison reveals Germany's strong specialization in high-value technology (C 6-3), which can be explained by Germany's traditional strengths in the automotive industry, mechanical engineering, and the chemical industry. Germany records the highest value of the comparison group here.

In contrast, China, Sweden, and the USA specialize in cutting-edge technology (C 6-4), an area in which Germany underperforms.

Number of transnational patent applications in selected countries 1997–2018

Fig. C 6-1

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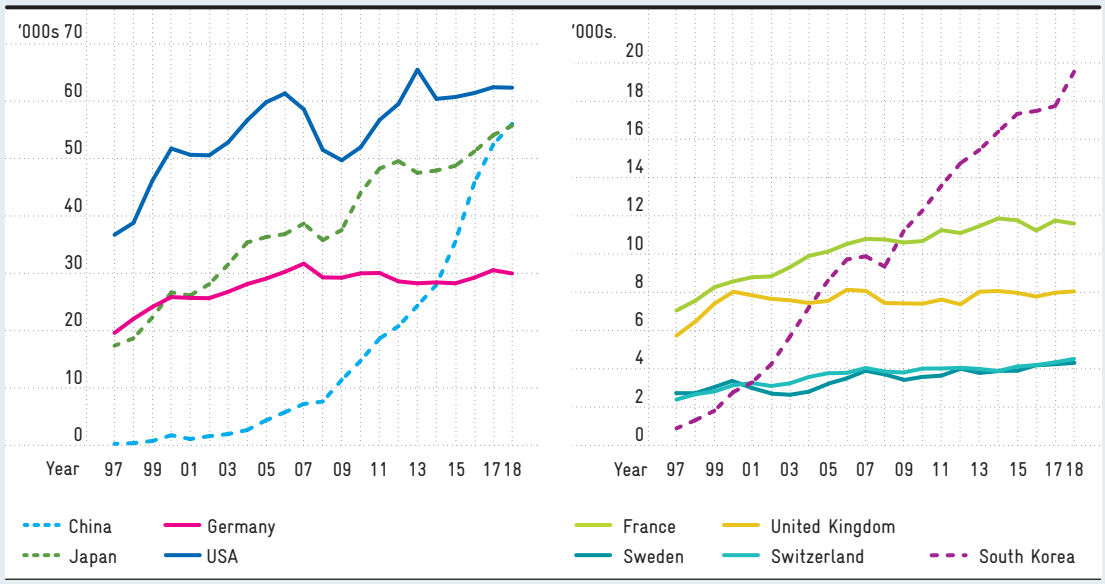


Transnational patent applications comprise applications in the form of patent families that include at least one application filed with the World Intellectual Property Organization (WIPO) via the Patent Cooperation Treaty (PCT) procedure, or one application filed with the European Patent Office.

Source: EPO (PATSTAT). Calculations by Fraunhofer ISI in Neuhäusler et al. (2021).

Number, intensity and growth rates of transnational patent applications in the field of R&D-intensive technology in selected countries in 2018

Tab. C 6-2

Download data

	Number*	Intensity*	Intensity in R&D-intensive technology	Growth (2008 = 100)*	Growth in R&D-intensive technology (2008 = 100)*
Total	**299,636**	**–**	**–**	**152**	**151**
China	56,035	73	51	733	699
Germany	**29,959**	**715**	**416**	**102**	**107**
EU-28	79,699	356	204	108	110
Finland	1,962	772	437	107	95
France	11,595	428	255	108	109
United Kingdom	8,048	249	148	108	110
Italy	5,900	254	121	100	95
Japan	55,727	836	490	156	141
Canada	3,653	196	118	108	100
Netherlands	4,959	564	297	116	112
Sweden	4,311	846	572	116	123
Switzerland	4,517	966	488	117	105
South Korea	19,531	728	445	209	192
USA	62,335	400	261	121	120

The R&D-intensive technology sector comprises industries that invest more than 3 percent of their turnover in research and development. Intensity is calculated as the number of patents per million gainfully employed persons.

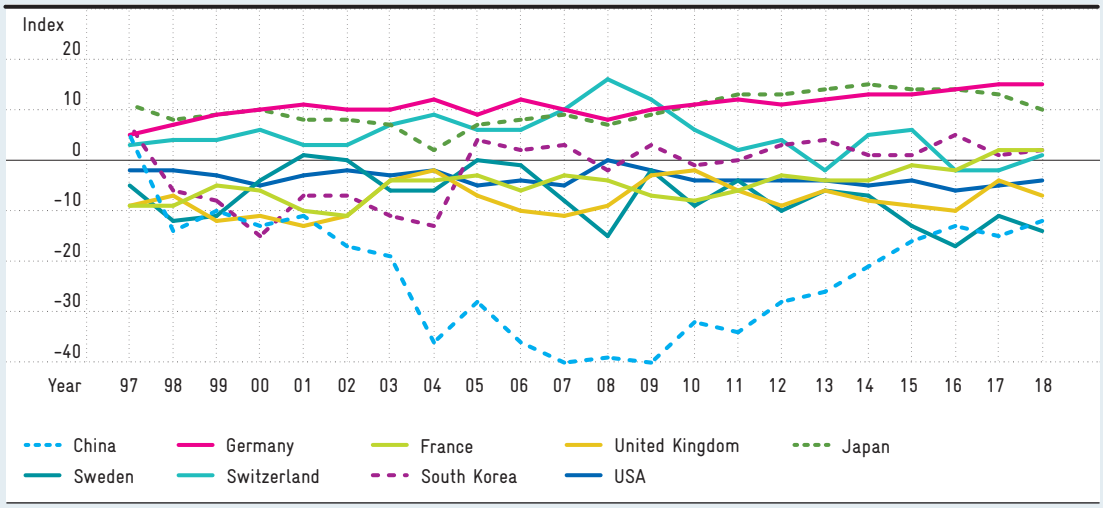
* Figures refer to all industries.

Source: EPO (PATSTAT), OECD (MSTI), World Bank. Calculations by Fraunhofer ISI in Neuhäusler et al. (2021).

Fig. C 6-3

Download data

Specialization index in selected countries in the field of high-value technology 1997–2018

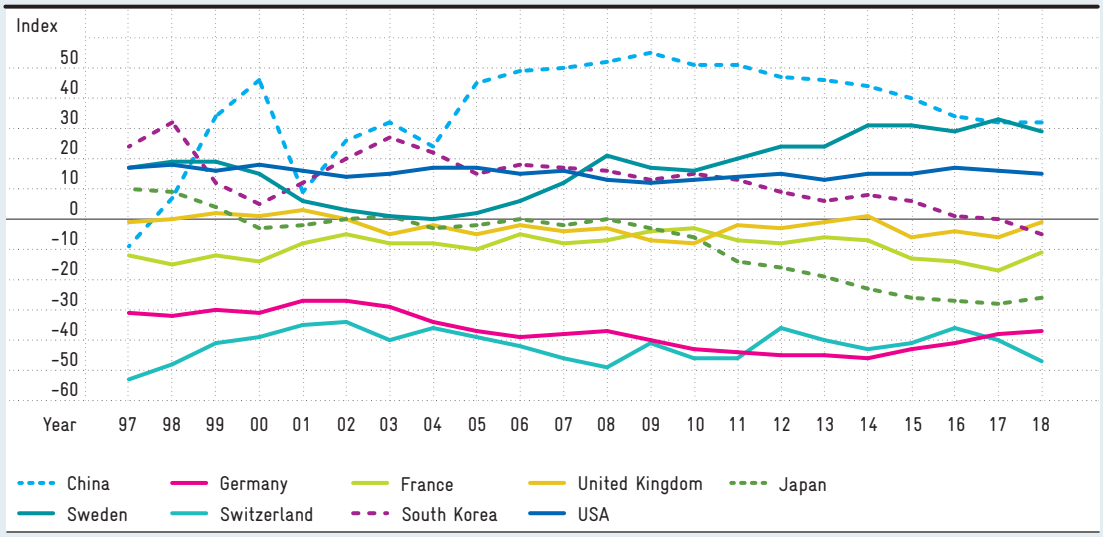


The specialization index is calculated based on all transnational patent applications worldwide. Positive or negative values indicate whether the surveyed country's level of activity in each field is disproportionately high or low compared to the global average.
Source: EPO (PATSTAT). Calculations by Fraunhofer ISI in Neuhäusler et al. (2021).

Fig. C 6-4

Download data

Specialization index in selected countries in the field of cutting-edge technology 1997–2018



The specialization index is calculated based on all transnational patent applications worldwide. Positive or negative values indicate whether the surveyed country's level of activity in each field is disproportionately high or low compared to the global average.
Source: EPO (PATSTAT). Calculations by Fraunhofer ISI in Neuhäusler et al. (2021).