

## C 8 Production, Value Added and Employment<sup>481</sup>

The specialization pattern of a country in foreign trade can be measured with the help of the RCA indicator.<sup>482</sup> It records the export/import ratio of a product group in relation to the export/import ratio of the processed industrial goods as a whole. As in recent years, Germany had a comparative advantage in trade in R&D-intensive goods in 2020 (C 8-1). R&D-intensive goods consist of high-value technology goods and cutting-edge technology goods. However, a closer look at these two groups of goods shows that Germany's comparative advantage was only positive for trade in high-value technology goods, while it was negative for trade in cutting-edge technology goods. France, the United Kingdom, Switzerland, South Korea and the USA recorded positive values of the RCA indicator in the area of cutting-edge technology; China and Japan showed a negative RCA indicator here over the entire period under review. Sweden has recorded negative values since 2010.

The share of research-intensive and knowledge-intensive industries in a country's value added allows conclusions to be drawn about its technological performance in an international comparison (C 8-2). The development in Germany has been characterized by a decreasing dynamic for several years. The share of value added has increased only slightly since around 2015 and has even decreased at the current margin. While Germany had the highest share of value added in the area of high-value technology relative to the countries considered in 2019 (8.7 percent), in the area of cutting-edge technology Germany was well behind the leaders Switzerland (9.5 percent) and South Korea (9.2 percent) at 2.8 percent. Knowledge-intensive services contributed significantly more to national value added than research-intensive industries in all countries considered. Yet with a value added share of 25.5 percent, they played a smaller role in Germany in 2019 compared to the other countries considered (exception: South Korea).

Gross value added has risen continuously in Germany since 2009 (C 8-3). At 3.6 percent, growth in knowledge-intensive services was higher in 2019 than in the previous year (3.2 percent). In the knowledge-intensive manufacturing sector, on the other hand, the increase in value added in 2019 was 0.4 percent, lower than in 2018 (1.1 percent).

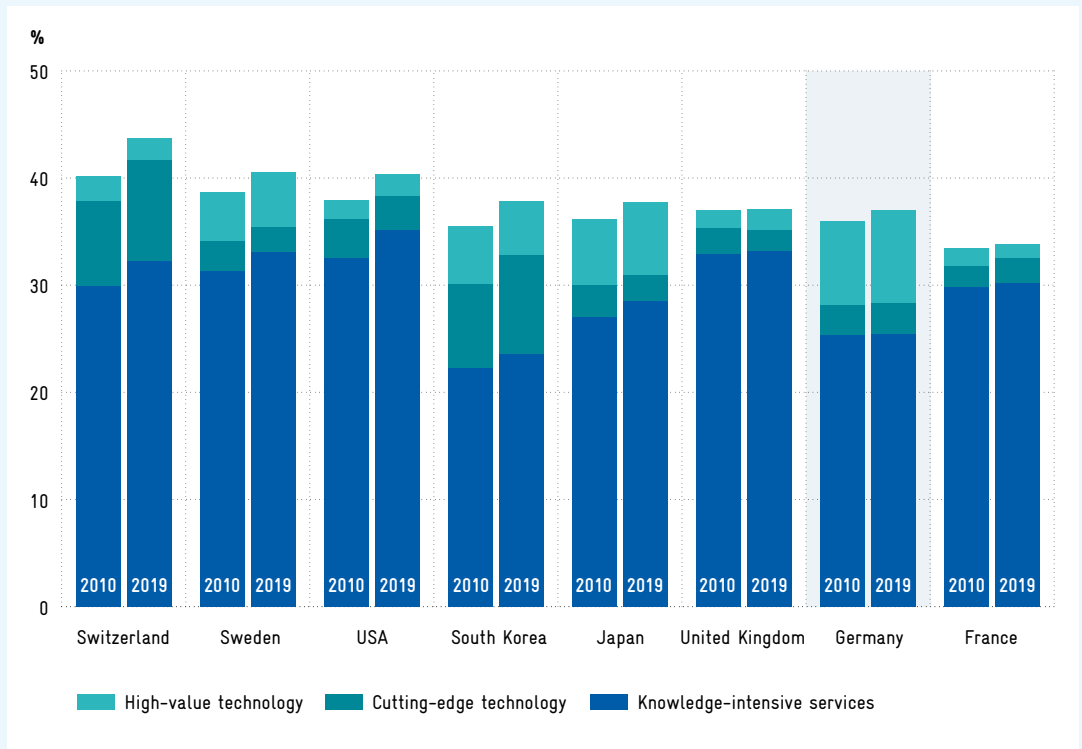
The increase in employment subject to social security contributions in various commercial sectors of the economy in Germany between 2010 and 2020 is mainly due to the service sector (C 8-4). In the knowledge-intensive services, employment subject to social security contributions increased by 28.3 percent during this period. In the knowledge-intensive manufacturing sector, employment subject to social security contributions increased by 13.6 percent.

**Tab. C8-1 Revealed comparative advantage (RCA) of selected countries in foreign trade in R&D-intensive goods 2005–2020 (index values)**

Year	China*	Germany	France	United Kingdom	Japan	Sweden	Switzerland	South Korea	USA
<b>R&amp;D-intensive goods</b>									
2005	-29	10	7	14	42	-1	18	17	17
2010	-27	12	6	11	33	-6	22	19	1
2015	-27	13	5	3	31	-5	28	13	2
2020	-29	8	3	20	26	-1	38	8	-1
<b>High-value technology goods</b>									
2005	0	27	6	4	75	-2	24	11	-5
2010	-16	30	-2	15	61	-3	21	7	-10
2015	-3	27	-6	1	63	1	21	13	-14
2020	4	19	-6	18	62	7	24	1	-11
<b>Cutting-edge technology goods</b>									
2005	-53	-34	8	33	-14	1	4	24	55
2010	-35	-35	20	1	-22	-11	25	33	22
2015	-46	-23	21	8	-35	-22	41	12	27
2020	-54	-19	20	23	-44	-25	66	15	14

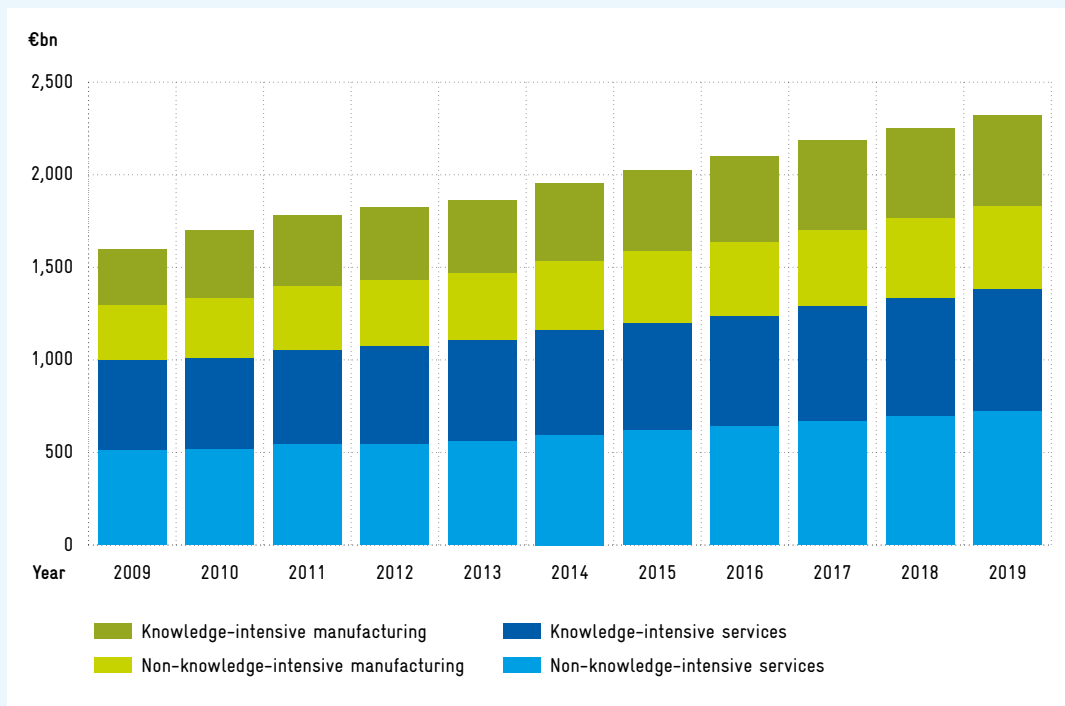
R&D-intensive goods comprise high-value technology goods and cutting-edge technology goods.  
 A positive RCA value means that the exp./imp. ratio for this product group is higher than for manufactured industrial goods as a whole.  
 \* incl. Hong Kong.  
 Source: UN COMTRADE database, research August 2021. Calculations and estimates by CWS in Schiersch et al. (2022).  
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**Fig. C8-2 R&D-intensive industries and knowledge-intensive services in selected countries as a percentage of value added in 2010 and 2019**



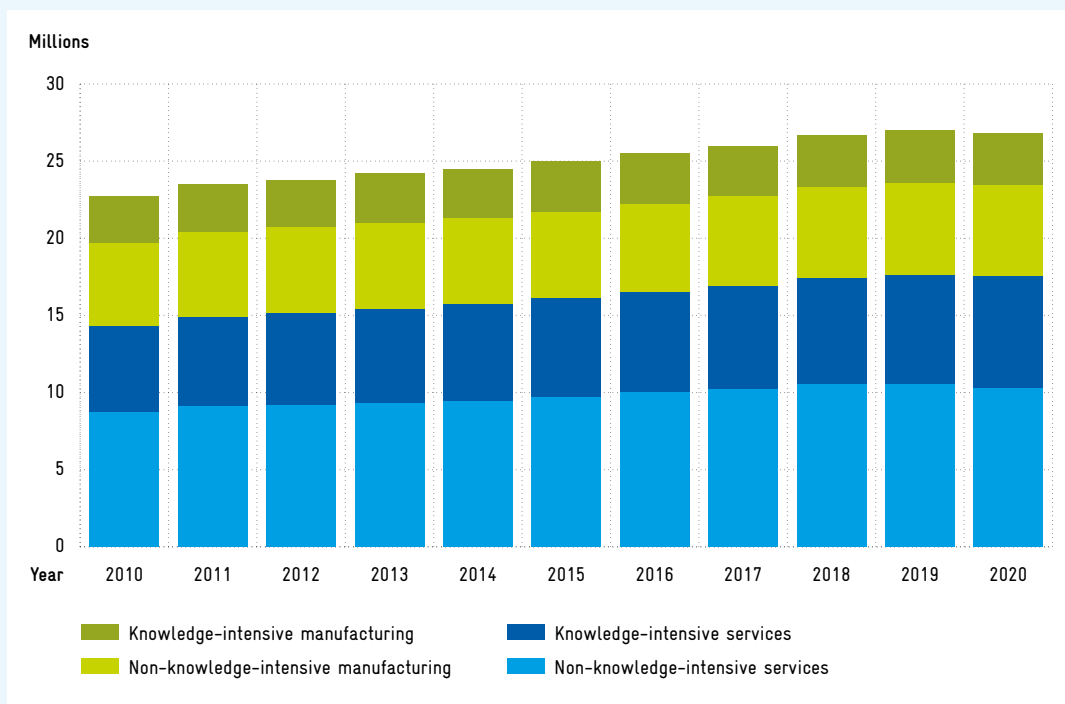
R&D-intensive industries (high-value technology and cutting-edge technology) have an above-average R&D intensity. Knowledge-intensive services are characterized by an above-average proportion of employees with tertiary education qualifications.  
 Source: OECD-NA, OECD-STAN, OECD-SBS, Eurostat-NA, Eurostat-SBS, EU KLEMS. Calculations and estimates by DIW Berlin in Schiersch et al. (2022).  
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**Fig. C8-3** Gross value added in different industrial business sectors in Germany 2009–2019 in billion euros



Gross value added is the difference between the total value of all goods and services produced and the intermediate inputs received from other companies for their production.  
Industrial business sectors excluding agriculture, forestry, fisheries, public administration and services, real estate and housing, education, private households, social insurance, religious and other organizations, associations and trade unions.  
Source: Federal Statistical Office, Fachserie 18, Reihe 1.4, calculation status August 2021. Calculations by CWS in Schiersch et al. (2022).  
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**Fig. C8-4** Number of employees subject to social security contributions in different industrial business sectors in Germany 2010–2020 in millions



Industrial business sectors excluding agriculture, forestry, fisheries, public administration and services, real estate and housing, education, private households, social insurance, religious and other organizations, associations and trade unions.  
Source: Federal Employment Agency. Calculations by CWS in Schiersch et al. (2022).  
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