C 2 RESEARCH AND DEVELOPMENT

With a research intensity of 2.98 percent in 2012, Germany recorded the highest R&D intensity to date, while also reaching its own stated target of three percent.[481] In spite of this success, Germany continues to lag behind such countries as Korea (4.36 percent), Japan (3.34 percent) and Sweden (3.41 percent). The United States' R&D intensity increased slightly in 2012 to 2.79 percent, but did not regain the level of 2009 (2.82 percent). Overall, the United States account for approximately 41 percent of R&D expenditure within the OECD.

The budgets for civil R&D (C 2–2) show that public expenditure on R&D has increased in the last ten years in all of the comparative countries. The development during the period 2002–2012, however, is heterogeneous. R&D investment in France increased only slightly up until 2008 and even decreased over some of the years. Sweden, Switzerland and, especially, Korea continuously increased their R&D efforts over the surveyed period. In the United States, public investment in R&D increased only slowly between 2002 and 2008 but was stepped up considerably as part of the 2009 stimulus programme.

The distribution of gross domestic expenditure on R&D by performing sector (C 2–3) developed in disparate ways in the comparison countries between 2001 and 2011. It is noteworthy that in the Asian economies, the private sector's share in R&D expenditure increased between 2001 and 2011, while the European economies and the United States recorded a decline. In Germany, the private sector's share in gross domestic expenditure on R&D decreased from 70 percent in 2001 to 68 percent in 2011.

The figure on the German federal states' R&D intensity (C 2–4) shows that there are no significant differences between the eastern, northern and southern German federal states with regard to public R&D facilities. However, the R&D intensity of the private sector shows major differences across Germany's federal states. The states of Bavaria, Baden-Württemberg and Hesse recorded by far the highest values of all federal states. In Baden-Württemberg and Hesse, the R&D intensity of the private sector has also increased significantly compared to 2001.

The share of Germany's public sector's funding of private R&D activities is low when compared to other countries. The breakdown of private internal R&D expenditure by source of funding (C 2–5) for the year 2011 shows that the state financed approximately 4 percent of the total R&D activities conducted by private businesses. Two years earlier this share amounted to 3.6 percent, and four years earlier it had amounted to 3.1 percent. Public R&D funding is particularly important for small enterprises: in 2011, the government's share of financing for companies with less than 100 employees amounted to almost 15 percent.

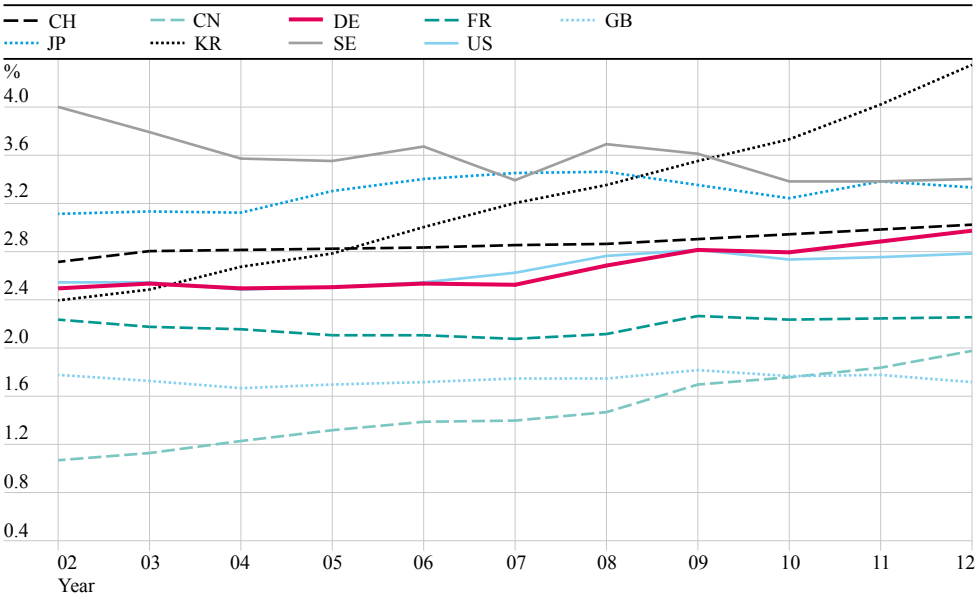
The breakdown of R&D expenditure according to industry, as measured by internal R&D expenditure relative to revenue from domestic products (C 2–6), shows that most industries once again increased their R&D intensity in 2012 compared to the preceding year (2011). Only in the pharmaceutical industry and in other transport equipment did R&D intensity experience a slight downturn. Overall, the manufacturing sector's R&D intensity increased to 3.2 percent in 2012 compared to 3.1 percent in the preceding year.

R&D intensity in selected OECD countries and China
(figures in percent)

C 2–1

R&D intensity: share of expenditure on research and development of an economy's gross domestic product.

DATA DOWNLOAD



Source: OECD, *SV Wissenschaftsstatistik*.
Calculations and estimates by NIW. In: Schasse et al. (2014).

State budget estimates for civil R&D

C 2–2

R&D budget estimates: budget resources available for the financing of R&D as specified in the state budget.

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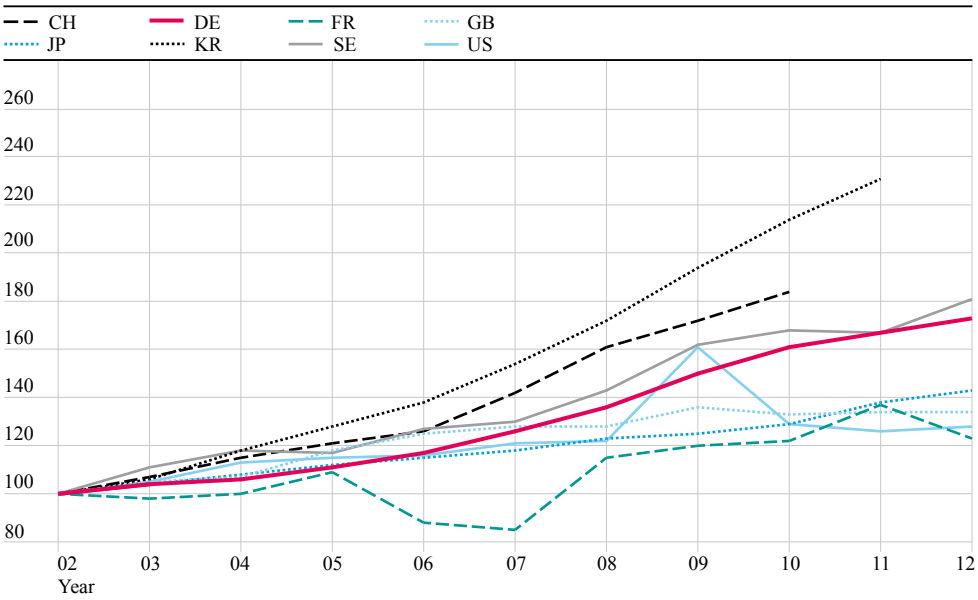

Index: 2002 = 100, data partially based on estimates.
Source: OECD, EUROSTAT. Calculations and estimates by NIW. In: Schasse et al. (2014).

C 2–3 Distribution of gross domestic expenditure on R&D (GERD) by performing sector 2001 and 2011

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Gross domestic expenditure on R&D (GERD) refers to expenditure on research and development in the private sector, higher education sector and the public sector.

Countries	2001					2011				
	GERD in million USD[1]	of which … was performed by … (in %)				GERD in million USD[1]	of which … was performed by … (in %)			
		private sector	higher education sector	public sector	not defined		private sector	higher education sector	public sector	not defined
DE	54,426	69.9	16.4	13.7	–	93,987	67.7	17.8	14.5	–
FR	35,804	63.2	18.9	16.5	1.4	51,891	63.4	21.2	14.1	1.2
GB	29,179	65.5	22.7	10.0	1.8	39,627	61.5	26.9	9.3	2.4
JP	103,718	73.7	14.5	9.5	2.3	146,537	77.0	13.2	8.4	1.5
KR	21,259	76.2	10.4	12.4	1.0	59,890	76.5	10.1	11.7	1.6
SE	10,374	77.5	19.6	2.8	0.1	13,216	69.3	26.0	4.3	0.3
CH[2]	5,766	73.9	22.9	1.3	1.9	10,525	73.5	24.2	0.7	1.6
US	278,239	72.6	12.1	11.3	4.0	415,193	68.3	15.2	12.1	4.3
CN	31,744	60.4	9.8	29.7	–	208,172	75.7	7.9	16.3	–

[1] 2000 instead of 2001, and 2008 instead of 2011. [2] GERD in USD according to PPP.
Not defined: share of GERD not explicitly performed in the "private", "higher education" or "public" sectors; this share is often included in the "public" sector.
Source: OECD, Eurostat (figures as of 13/11/2013), *SV Wissenschaftsstatistik.* In: Schasse et al. (2014).

C 2–4 R&D intensity of Germany's federal states between 2001 and 2011 (figures in percent)

DATA DOWNLOAD

R&D expenditure: share of the federal states' R&D expenditure as a percentage of their GDP, according to performing sectors.

Federal states	2001				2011			
	Total	private sector	public sector	higher education sector	Total	private sector	public sector	higher education sector
Baden-Württemberg	3.86	3.05	0.40	0.41	5.08	4.10	0.43	0.55
Bavaria	3.07	2.46	0.24	0.37	3.15	2.41	0.30	0.44
Berlin	3.94	2.15	1.01	0.78	3.55	1.39	1.24	0.92
Brandenburg	1.47	0.54	0.65	0.28	1.68	0.54	0.78	0.36
Bremen	2.14	1.05	0.56	0.53	2.78	1.00	1.00	0.78
Hamburg	1.40	0.72	0.33	0.34	2.24	1.26	0.47	0.51
Hesse	2.37	1.92	0.15	0.30	3.01	2.35	0.23	0.44
Mecklenburg-West Pomerania	1.17	0.18	0.48	0.51	2.09	0.68	0.73	0.67
Lower Saxony	2.49	1.79	0.31	0.39	2.88	1.97	0.40	0.51
North Rhine-Westphalia	1.74	1.09	0.28	0.38	2.01	1.21	0.31	0.49
Rhineland-Palatinate	1.96	1.48	0.14	0.34	2.07	1.46	0.18	0.44
Saarland	1.02	0.38	0.22	0.42	1.49	0.54	0.43	0.52
Saxony	2.44	1.22	0.60	0.61	2.91	1.26	0.88	0.77
Saxony-Anhalt	1.28	0.34	0.40	0.54	1.49	0.43	0.57	0.49
Schleswig-Holstein	1.15	0.53	0.31	0.32	1.43	0.69	0.36	0.37
Thuringia	2.11	1.13	0.44	0.53	2.22	1.03	0.54	0.65
Germany	**2.47**	**1.73**	**0.34**	**0.41**	**2.89**	**1.96**	**0.42**	**0.51**

Source: *SV Wissenschaftsstatistik, Statistisches Bundesamt.*
Calculations by NIW. In: Schasse et al. (2014).

C 2–5

DATA DOWNLOAD

Internal R&D expenditure of companies according to source of funding, sectors, size, and technology categories 2011

Internal R&D: research and development that is conducted inside the company, either for the company's own purposes or commissioned by a third party.

Internal R&D expenditure	Total	of which … was funded by			
		private sector	public sector	other domestic entities	foreign entities
	in EUR	in percent			
All companies active in research	**50,804,210**	**91.7**	**4**	**0.3**	**4**
Manufacturing industries	**43,733,376**	**93.1**	**3.2**	**0.2**	**3.6**
Chemical industry	3,296,674	95.3	2	–	2.7
Pharmaceutical industry	4,069,729	97.9	0.4	–	1.6
Plastics, glass and ceramic industries	1,224,873	93.3	2.5	0.5	3.8
Metal production and processing	1,242,073	80.5	7.4	–	12.1
Electrical engineering/electronics	8,165,077	94.8	3.2	0.1	1.9
Mechanical engineering	4,902,500	94.8	1.9	–	3.2
Vehicle equipment	18,914,281	91.5	4	0.3	4.3
Other manufacturing industries	1,918,170	91.2	3.3	–	5.5
Remaining sectors	**7,070,835**	**83.3**	**9.3**	**0.8**	**6.6**
less than 100 employees	2,864,072	81	14.9	0.5	3.6
100 to 499 employees	5,147,816	89.3	5.3	0.4	5
500 to 999 employees	3,027,362	87.5	7.1	0.1	5.3
1000 employees and more	39,764,960	93.1	2.8	0.2	3.8
Technology categories in industry					
Cutting-edge technology (> 9 percent of revenue expended on R&D)	13,092,505	90.6	6.9	–	2.5
High-value technology (2.5 – 9 percent of revenue expended on R&D)	25,497,475	95	1.3	0.2	3.6

Source: *SV Wissenschaftsstatistik.* In: Schasse et al. (2014).

C 2–6 **Internal R&D expenditure relative to revenue from domestic products 2010, 2011, 2012**

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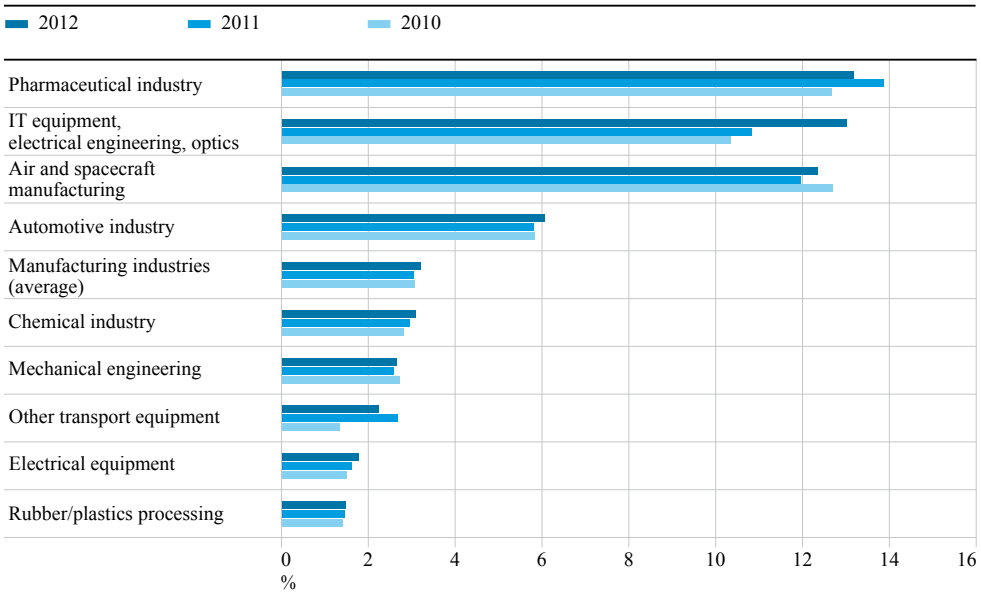

Figures net, without input tax
Source: *SV Wissenschaftsstatistik. Statistisches Bundesamt, Unternehmensergebnisse Deutschland.* Calculations by NIW. In: Schasse et al. (2014).

Internal R&D: research and development that is conducted inside the company, either for the company's own purposes or commissioned by a third party.