



Federal Ministry
of Education
and Research

Education and Research in Figures 2017

Selected Information from the BMBF's Data Portal
www.datenportal.bmbf.de



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Foreword

Investment in education and research is investment in the future. Through education we enable people to contribute their talent and skills to society. Through research we are able to develop innovations which help to drive progress in our country.

This is why the Federal Government gives high priority to education and research. The budget of the Federal Ministry of Education and Research has been increased by a quarter to over 17 billion euros during the current legislative term. Expenditure on education rose by a billion euros in each of the last two years to reach a record 10 billion euros in 2016. This is money well spent: Our education system has become more effective and fairer; science and research in Germany are in an excellent position.

We want to maintain this successful trend. That is why we intend to keep increasing our expenditure on education and research. The Federal Government continues to contribute intensively to the funding of the education system. These contributions range from the renovation of school buildings to enabling the introduction of digital technology, and funding of continuing education to financial assistance for students and trainees. We are using the Excellence Strategy and the High-Tech Strategy to promote cutting-edge science and research and to strengthen our country's innovative capacity. In doing so, we want to make use of the opportunities offered by the digital transformation in education and research.

In order to pursue these ambitious goals, data and information are collected and analysed on a continuous basis. This brochure summarizes the key data. As well as extensive information about the various fields of education and research, this includes data on the expenditure of the Federal Government and the *Länder*.

These data and facts underline just how important education and research are in our society. At the same time they provide an incentive to continue this approach.

A handwritten signature in white ink on a blue background, reading 'Johanna Wanka'.

Prof. Dr. Johanna Wanka
Federal Minister of Education and Research

General overviews and structural data

To allow a better understanding of the detailed tables and graphs included in the chapters "Research and Innovation" and "Education", three general tables are provided at the beginning of the brochure. This structural data includes general information on population development for all of Germany and for each of the 16 *Länder*. The budget for education, research and science provides a general overview about national expenditure in these areas.



Fig. 1 Structural data of Germany (2011-2015)

		2011	2012	2013	2014	2015
Population	in 1,000	80,328	80,524	80,767	81,198	82,176
	f	51.2%	51.1%	51.0%	50.9%	50.7%
Employed persons	in 1,000	38,916	39,206	39,618	39,942	40,279
	f	46.3%	46.3%	46.5%	46.6%	46.6%
Unemployed persons	in 1,000	2,976	2,897	2,950	2,898	2,795
	r	7.1%	6.8%	6.9%	6.7%	6.4%
of which						
without completed vocational training	in 1,000	1,282	1,215	1,284	1,303	1,294
	r ³	19.8%	19.7%	20.0%	19.9%	20.3%
with in-company/ school training ¹	in 1,000	1,389	1,307	1,359	1,327	1,240
	r ³	5.1%	5.0%	5.1%	4.9%	4.6%
with university of applied sciences degree ²	in 1,000	68	66	72	75	75
	r ³	2.6%	2.6%	2.6%	2.7%	2.5%
with university degree	in 1,000	101	104	119	127	127
	r ³	2.3%	2.5%	2.4%	2.5%	2.4%
Pupils⁴	in 1,000	11,291	11,114	10,951	10,873	10,832
	f	48.1%	48.0%	48.0%	47.9%	47.8%
Apprentices	in 1,000	1,461	1,430	1,392	1,359	1,337
	f	39.3%	39.0%	38.6%	38.3%	38.1%
Students at higher education	in 1,000	2,381	2,499	2,617	2,699	2,758
	f	47.3%	47.4%	47.6%	47.8%	48.0%
Gross domestic product (in billions of euros)		2,703	2,755	2,821	2,916	3,026

Explanation of abbreviations/symbols: in 1,000 = in thousands; f = share of females; r = unemployment rate.

1) In-company training and training at full-time vocational schools (*Berufsfachschulen*) plus continuing education at trade, technical and master schools (*Fach-, Techniker- und Meisterschulen*).

2) Including colleges of public administration (*Verwaltungsfachhochschulen*).

3) According to calculations of the Institute for Employment Research. The figures differ from the unemployment statistics of the Federal Employment Agency because different basic values have been used.

4) Pupils at general and vocational schools.

Source: Federal Statistical Office (Fachserie 1 Reihe 4.1.1; Fachserie 11 Reihen 1, 2, 3, 4.1; GENESIS-Online Datenbank, Fortschreibung des Bevölkerungsstandes); Federal Statistical Office and the statistical offices of the Länder (Regional Accounts provided at www.vgrdl.de); Federal Employment Agency (special evaluation and calculations of the Institute for Employment Research)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-1

Additional data: www.datenportal.bmbf.de/en/0.1

Fig. 2 Structural data of the Länder (2015) – [1/2]

		BW	BY	BE	BB	HB	HH	HE	MV
Population	in 1,000	10,880	12,844	3,520	2,485	671	1,787	6,176	1,612
	f	50.4%	50.5%	51.0%	50.6%	50.7%	51.2%	50.7%	50.5%
Employed persons	in 1,000	5,653	6,715	1,656	1,204	304	912	3,050	743
	f	46.3%	46.4%	47.8%	47.3%	46.7%	48.5%	46.4%	47.4%
Unemployed persons	in 1,000	227	257	195	115	37	73	178	86
	r	3.8%	3.6%	10.7%	8.7%	10.9%	7.4%	5.5%	10.4%
of which									
without completed vocational training	in 1,000	107	107	98	33	23	38	95	23
	f	48.8%	47.2%	43.8%	44.2%	45.6%	44.3%	48.6%	42.5%
with in-company/ school training ¹	in 1,000	95	122	67	73	11	24	64	57
	f	45.3%	44.3%	41.8%	45.0%	42.3%	43.8%	44.1%	44.3%
with university of applied sciences degree	in 1,000	8	8	8	3	1	3	5	2
	f	41.5%	42.1%	47.6%	47.6%	43.3%	47.3%	40.0%	46.5%
with university degree	in 1,000	12	16	18	3	2	6	9	2
	f	49.5%	50.6%	51.6%	49.5%	48.7%	52.4%	48.2%	49.3%
Pupils²	in 1,000	1,536	1,651	426	275	91	243	814	176
	f	47.6%	47.4%	49.0%	48.5%	47.7%	48.1%	47.7%	48.7%
Apprentices	in 1,000	190	240	39	26	15	32	96	19
	f	38.7%	38.8%	44.2%	34.0%	42.8%	42.4%	38.2%	36.9%
Students at higher education	in 1,000	359	376	176	49	36	98	244	39
	f	47.0%	48.6%	49.9%	51.7%	47.4%	49.0%	47.3%	48.7%
Gross domestic product (in billions of euros)		461	549	124	65	32	109	263	40

Explanation of abbreviations/symbols: in 1,000 = in thousands; f = share of females; r = unemployment rate; for abbreviations of the Länder see glossary.

1) In-company training and training at full-time vocational schools (*Berufsfachschulen*) plus continuing education at trade, technical and master schools (*Fach-, Techniker- und Meisterschulen*).

2) Pupils at general and vocational schools.

Source: Federal Statistical Office (Fachserie 1 Reihe 4.1.1; Fachserie 11 Reihen 1, 2, 3, 4.1; GENESIS-Online Datenbank, Fortschreibung des Bevölkerungsstandes); Federal Statistical Office and the statistical offices of the Länder (Regional Accounts provided at www.vgrdl.de); Federal Employment Agency (special evaluation)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-2

Additional data: www.datenportal.bmbf.de/en/0.2

Fig. 2 Structural data of the Länder (2015) – [2/2]

		NI	NW	RP	SL	SN	ST	SH	TH
Population	in 1,000	7,927	17,866	4,053	996	4,085	2,245	2,859	2,171
	f	50.6%	50.9%	50.7%	50.9%	50.8%	50.7%	51.0%	50.5%
Employed persons	in 1,000	3,843	8,361	1,999	460	1,936	1,041	1,370	1,031
	f	46.5%	46.5%	46.0%	46.7%	47.4%	47.3%	47.1%	46.9%
Unemployed persons	in 1,000	256	744	113	37	174	119	98	85
	r	6.1%	8.0%	5.2%	7.2%	8.2%	10.2%	6.5%	7.4%
of which									
without completed vocational training	in 1,000	129	422	57	20	43	33	47	19
	f	46.9%	47.3%	48.0%	46.9%	42.6%	43.9%	44.5%	44.0%
with in-company/ school training ¹	in 1,000	107	266	48	14	115	76	43	59
	f	44.9%	43.2%	44.0%	42.8%	46.3%	46.9%	44.2%	46.6%
with university of applied sciences degree	in 1,000	6	15	3	1	6	3	2	3
	f	42.0%	41.9%	40.6%	35.5%	48.8%	48.3%	40.6%	46.0%
with university degree	in 1,000	10	26	4	1	8	3	3	3
	f	50.3%	47.8%	49.9%	47.4%	49.2%	46.7%	51.2%	49.6%
Pupils²	in 1,000	1,118	2,519	538	124	453	235	397	238
	f	47.8%	47.7%	47.7%	47.2%	49.0%	48.5%	47.7%	48.8%
Apprentices	in 1,000	143	304	67	17	47	27	49	26
	f	37.7%	37.7%	36.6%	37.2%	35.7%	34.4%	38.8%	33.4%
Students at higher education	in 1,000	200	752	121	31	113	55	57	50
	f	48.0%	47.4%	50.5%	48.9%	45.5%	49.2%	48.2%	48.9%
Gross domestic product (in billions of euros)		259	646	132	35	113	56	86	57

Explanation of abbreviations/symbols: in 1,000 = in thousands; f = share of females; r = unemployment rate; for abbreviations of the Länder see glossary.

1) In-company training and training at full-time vocational schools (*Berufsfachschulen*) plus continuing education at trade, technical and master schools (*Fach-, Techniker- und Meisterschulen*).

2) Pupils at general and vocational schools.

Source: Federal Statistical Office (Fachserie 1 Reihe 4.1.1; Fachserie 11 Reihen 1, 2, 3, 4.1; GENESIS-Online Datenbank, Fortschreibung des Bevölkerungsstandes); Federal Statistical Office and the statistical offices of the Länder (Regional Accounts provided at www.vgrdl.de); Federal Employment Agency (special evaluation)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-2

Additional data: www.datenportal.bmbf.de/en/0.2

Fig. 3 Budget for education, research and science¹, by expenditure areas, in billions of euros and by share of GDP (2005/2012-2015)

Expenditure area		2005	2012	2013	2014	2015	
A+B	Education ²	billions of euros	143.3	181.4	186.5	192.1	195.1
		share of GDP	6.2%	6.6%	6.6%	6.6%	6.4%
C	Research and development ³	billions of euros	55.9	79.1	79.7	84.2	90.0
		share of GDP	2.4%	2.9%	2.8%	2.9%	3.0%
D	Other education and science infrastructure	billions of euros	4.1	5.4	5.5	5.6	5.8
		share of GDP	0.2%	0.2%	0.2%	0.2%	0.2%
A+B+C+D	Total expenditure on education, research and science ⁴	billions of euros	193.9	251.9	257.4	267.0	275.8
		share of GDP	8.4%	9.1%	9.1%	9.2%	9.1%

Explanation of abbreviations/symbols: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development.

1) Expenditure pursuant to the performance concept. Demarcation pursuant to concept 2012. 2015 figures are preliminary.

2) For a more detailed overview of the education area see figure 22.

3) Calculated using research and development (R&D) statistical methods (Frascati Manual / OECD report).

4) The budget for education, research and science has been consolidated by the higher education expenditure on research and development, because this position is included in both, A and C.

Source: Federal Statistical Office (Budget für Bildung, Forschung und Wissenschaft 2014/2015)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-3

Additional data: www.datenportal.bmbf.de/en/1.9.1

Research and innovation

Research, development and innovation form the basis for Germany's prosperity and competitiveness. Viable solutions for environmentally friendly energy, efficient health care, sustainable mobility, secure communication and secure production in Germany cannot be developed without progress in science and technology. The challenges Germany is facing up to also concern other countries in Europe and across the world.

Germany has been investing more funds in research and development (R&D) in recent years than ever before. The Federal Government's expenditure on R&D rose by 9.0 billion euros between 2005 and 2017 to 17.2 billion euros (target) in 2017. This represents an increase of over 90%. According to provisional calculations, in 2015, the R&D expenditure of the German industry increased by 10% to 62.5 billion euros. State and industry together spent almost 90 billion euros on R&D in 2015. This represents approximately 3% of Germany's Gross Domestic Product (GDP). This means that Germany has achieved the target of the Europe 2020 Strategy of spending an annual 3% of GDP on R&D.

Germany accounts for 30% of all R&D expenditure in the European Union; five of Europe's ten most innovative companies come from Germany. Germany features as one of the world's leading locations of innovation in international ranking exercises. Both the European Innovation Scoreboard of the European Commission and the Global Innovation Index place Germany among the leading countries for innovation. Germany is also a worldwide leader in patent applications. Germany accounts for nearly twice as many patents with world market relevance per million citizens as the USA. Germany's good international position in terms of its excellence rate, which shows what proportion of its published research results are among the most cited, has been improving continuously in recent years.

Over the past decade, Germany's share of world trade in research-intensive goods has remained stable. In 2014, Germany's share was more than 12% and thus slightly higher than the USA's at around 12% and considerably higher than Japan's at 6%. Germany is also a leader among European countries in this trade.

It is essential to consider future trends and challenges in order to maintain Germany's strong international position in the long term. Digitalization is a decisive factor here as it offers new opportunities for fields of application such as artificial intelligence and human-technology interaction. Boosting the flagging innovative strength of small and medium-sized enterprises (SMEs) is another important aspect. Here the Federal Ministry of Education and Research is introducing structural measures such as the "10 Point Programme – Priority for SMEs".

Further information

Internet portal:

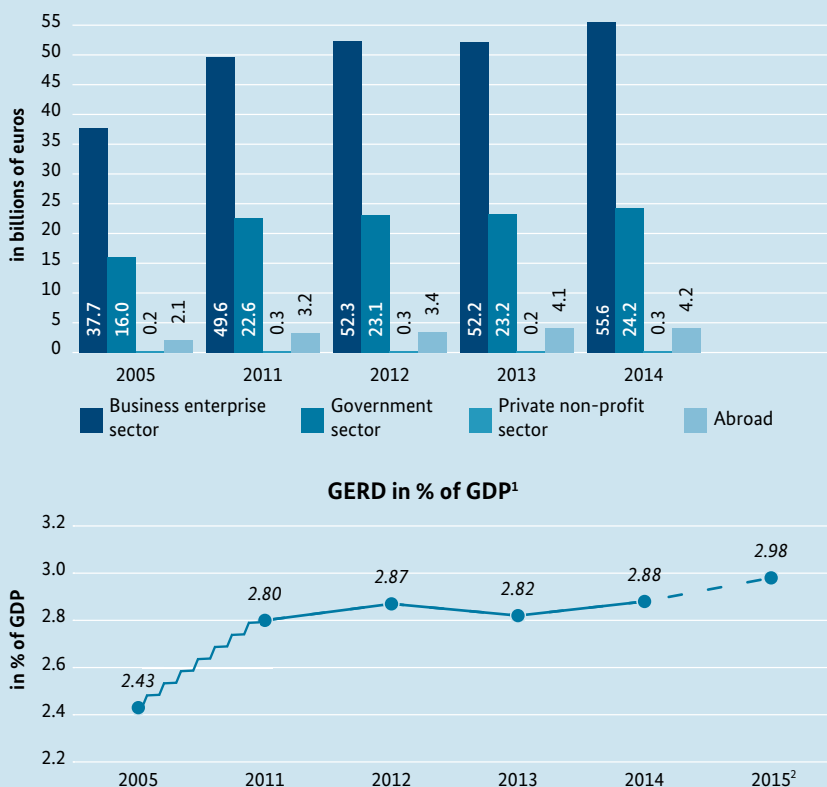
- High-Tech Strategy (www.hightech-strategie.de)

Publication:

- 2016 Federal Report on Research and Innovation (www.bmbf.de/de/bundesbericht-forschung-und-innovation-735.html)



Fig. 4 Gross domestic expenditure on research and development (GERD), by funding sectors (implementation view) and GERD in % of the gross domestic product (2005/2011-2015)



Explanation of abbreviations/symbols: GDP = gross domestic product.

Note: Figures for even years are estimates.

1) Revision November 2016.

2) Provisional figures.

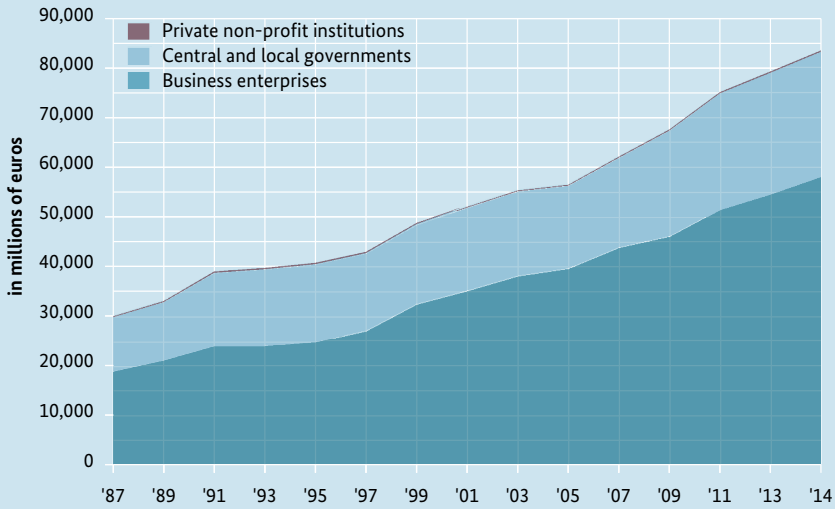
Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 1 (updated)

Data: Stifterverband Wissenschaftsstatistik; Federal Statistical Office; Federal Ministry of Education and Research

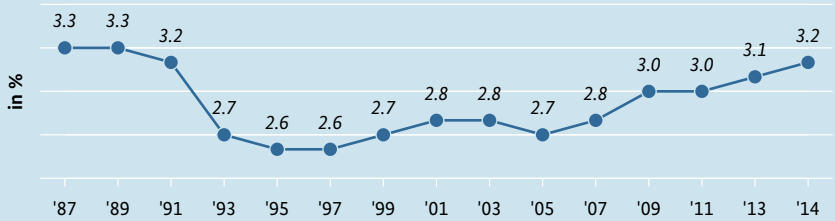
BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-4

Additional data: www.datenportal.bmbf.de/en/1.1.1

Fig. 5 R&D expenditure of the Federal Republic of Germany and funding thereof (1987-2014)



Share of the funding by central and local governments, in % of the overall government budget



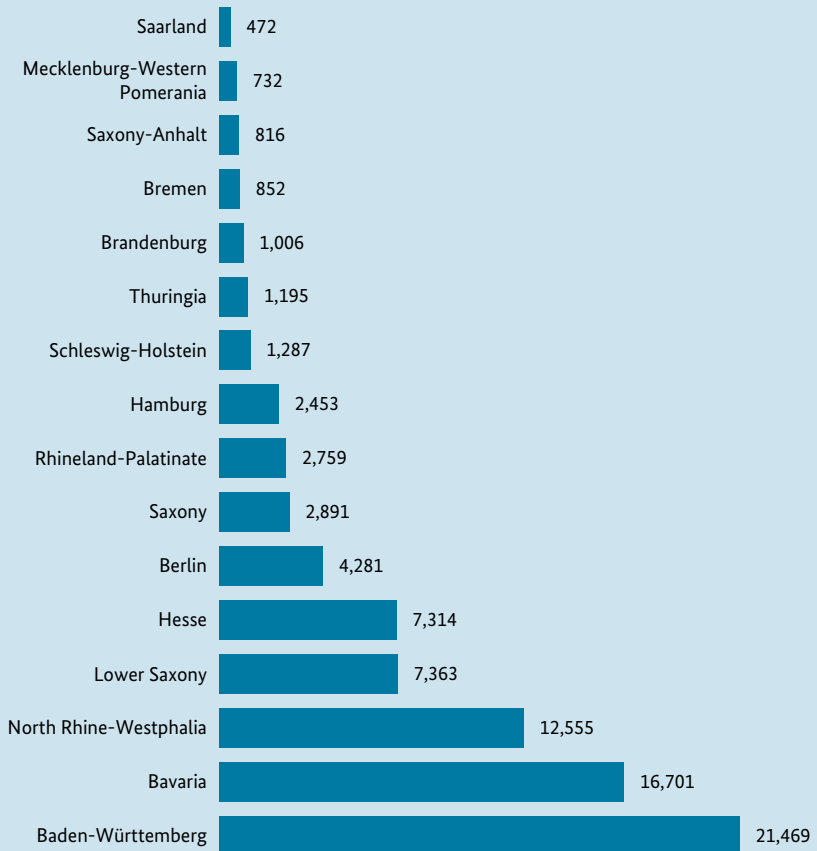
Explanation of abbreviations/symbols: R&D = research and development.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 2 (updated); **Data:** Federal Statistical Office; Stifterverband Wissenschaftsstatistik; Federal Ministry of Education and Research

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-5

Additional data: www.datenportal.bmbf.de/en/1.1.2

Fig. 6 Regional distribution of the R&D expenditure of the Federal Republic of Germany as a whole (implementation of R&D), in millions of euros (2014)



Explanation of abbreviations/symbols: R&D = research and development.

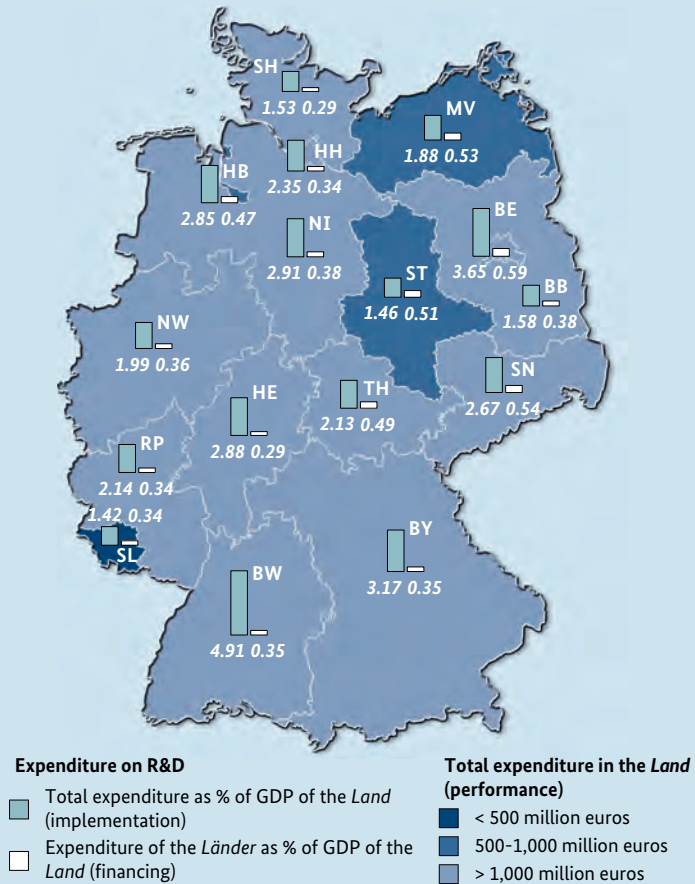
Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 3 (updated)

Data: Federal Statistical Office; Stifterverband Wissenschaftsstatistik; Federal Ministry of Education and Research

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-6

Additional data: www.datenportal.bmbf.de/en/1.1.3

Fig. 7 Regional expenditure on research and development (2014)



Explanation of abbreviations/symbols: R&D = research and development; GDP = gross domestic product; for abbreviations of the Länder see glossary.

Source: Stifterverband Wissenschaftsstatistik; Working group "Regional Accounts"; Federal Statistical Office; calculations of the BMBF; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-7
Additional data: www.datenportal.bmbf.de/en/1.1.11

In addition to the activities carried out by the Federal Government, the *Länder* also run a large number of specific funding measures in the areas of research policy, technology policy and innovation policy. They build on the specific strengths of the individual regions in technology, business and innovation as well as on existing geographical structures and characteristics. Such regional differences make a significant contribution to strengthen the German research and innovation system as a whole.

Fig. 8 Federal Government expenditure on R&D, by departments (2017 TARGET)

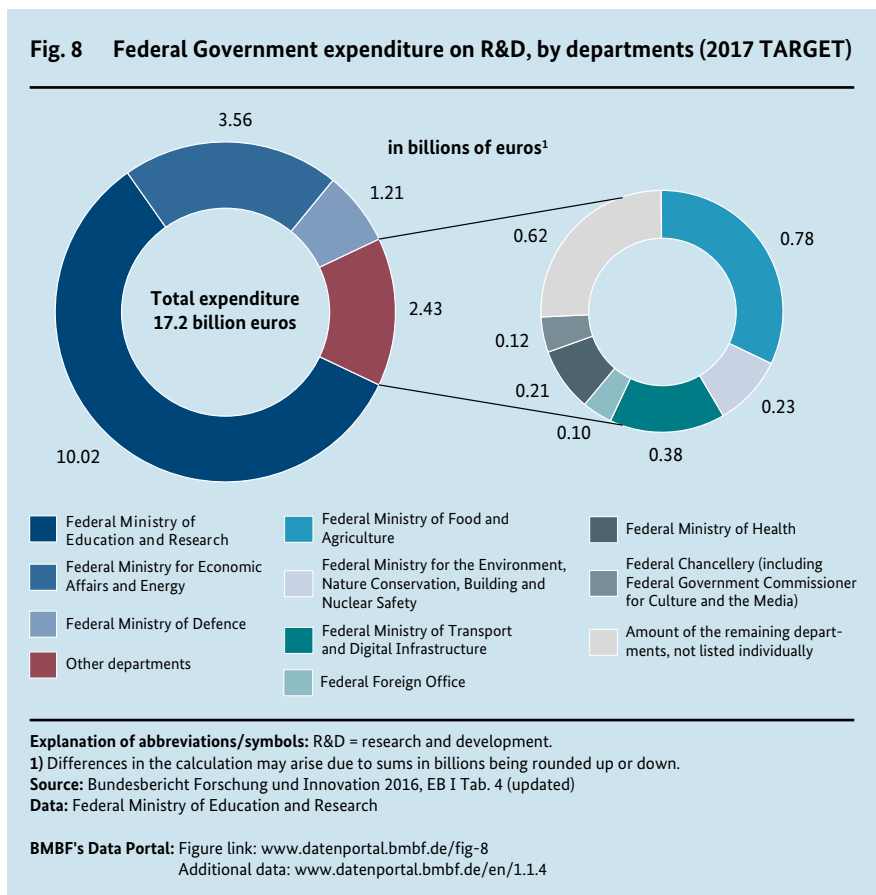


Fig. 9 Federal Government expenditure on science, research and development, by funding areas, in millions of euros (2016/2017)

Funding area ¹	2016 (TARGET) ^{2,3}		2017 (TARGET) ²	
	Total	R&D	Total	R&D
A Health research and health industry	2,523.6	2,273.8	2,657.2	2,419.1
B Bioeconomy	245.5	245.4	270.7	270.6
C Civil security research	108.2	102.6	106.3	100.6
D Nutrition, agriculture and consumer protection	914.5	786.9	1,058.2	923.5
E Energy research and energy technologies	1,733.6	1,307.2	1,936.7	1,482.9
F Climate, environment, sustainability	1,507.7	1,294.4	1,647.6	1,429.9
G Information and communication technologies	858.5	820.4	977.7	879.3
H Vehicle and traffic technologies including maritime technologies	487.5	386.4	479.1	374.3
I Aerospace	1,648.4	1,646.0	1,671.0	1,668.5
J Research and development to improve working conditions and in the service sector	153.5	95.1	165.8	107.3
K Nanotechnologies and materials technologies	684.8	655.7	727.3	697.8
L Optical technologies	209.6	205.3	214.0	209.6
M Production technologies	242.0	239.8	260.4	258.2
N Regional planning and urban development; construction research	148.5	115.3	176.4	123.2
O Innovations in education	950.9	464.2	1,068.1	564.2
P Humanities; economics and social sciences	1,407.3	1,082.2	1,529.4	1,170.7
Q Innovation funding for SMEs	1,140.9	1,130.8	1,214.5	1,204.2
R Innovation-relevant underlying conditions and other cross-cutting activities	496.9	388.4	574.2	460.8
T Funding organisations, restructuring of the research field in acceding areas; construction of universities and primarily university-specific special programmes	3,884.7	762.7	4,194.2	793.0
U Large-scale equipment for basic research	1,252.5	1,252.2	1,281.4	1,281.1
Z Global reduced expenditure; budget reserve	-260.2	-260.2	-384.4	-384.4
Total of civil funding areas	20,338.7	14,994.6	21,825.9	16,034.2
S Military scientific research	840.2	775.8	1,249.5	1,182.5
Total expenditure	21,178.9	15,770.4	23,075.4	17,216.7

Explanation of abbreviations/symbols: R&D = (of which) research and development; SMEs = Small and medium-sized enterprises.

1) According to the Federal Government's planning system 2009. Expenditure was implemented in accordance with the Federal Government's planning system 2009. Expenditure of non-university research organisations are distributed among funding areas and funding priorities.

2) Distribution among funding areas partly estimated or extrapolated. Including "Energy and climate fund" (*Energie- und Klimafonds*). Research promotion for electromobility is financed by the "Energy and climate fund". As of 2016, including future investments.

3) Differences from previously published documents due to subsequent changes in the allocation to R&D.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 5 (updated)

Data: Federal Ministry of Education and Research

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-9

Additional data: www.datenportal.bmbf.de/en/1.1.5

The Federal Government's activities make up the lion's share of government funding for research, development and innovation. The focus is the High-Tech Strategy, which was launched in 2006, and its updated version (the new High-Tech Strategy – Innovations for Germany) which prioritises future challenges: the digital economy and society, the sustainable economy and energy, the innovative workplace, healthy living, intelligent mobility and civil security. Activities that are important to society – such as educational research and research in the humanities – are also supported. The method applied here shows the R&D expenditure of the Federal Government as a whole, regardless of the Ministry which provided the funding, classified according to research subject.



Fig. 10 BMBF expenditure on science, research and development, by funding areas, in millions of euros (2016/2017)

Funding area ¹	2016 (TARGET) ²		2017 (TARGET) ²	
	Total	R&D	Total	R&D
A Health research and health industry	2,063.6	2,063.6	2,186.3	2,186.3
B Bioeconomy	245.3	245.3	270.4	270.4
C Civil security research	65.8	65.8	71.6	71.6
D Nutrition, agriculture and consumer protection	53.5	53.5	57.5	57.5
E Energy research and energy technologies	968.9	652.1	1,033.4	716.5
F Climate, environment, sustainability	1,068.9	1,068.9	1,143.3	1,143.3
G Information and communication technologies	679.6	667.4	720.1	657.4
H Vehicle and traffic technologies including maritime technologies	25.5	25.5	28.8	28.8
I Aerospace	93.7	93.7	98.8	98.8
J Research and development to improve working conditions and in the service sector	53.3	53.3	62.8	62.8
K Nanotechnologies and materials technologies	589.7	589.7	630.9	630.9
L Optical technologies	199.1	199.1	203.2	203.2
M Production technologies	229.7	229.7	247.9	247.9
N Regional planning and urban development; construction research	22.5	22.5	24.0	24.0
O Innovations in education	725.1	409.9	808.5	493.3
P Humanities; economics and social sciences	838.4	838.4	885.1	885.1
Q Innovation funding for SMEs	187.3	187.3	210.5	210.5
R Innovation-relevant underlying conditions and other cross-cutting activities	346.1	276.4	448.4	374.6
T Funding organisations, restructuring of the research field in acceding areas; construction of universities and primarily university-specific special programmes	3,719.8	734.1	4,000.5	760.3
U Large-scale equipment for basic research	1,251.8	1,251.8	1,280.7	1,280.7
Z Global reduced expenditure; budget reserve	-260.2	-260.2	-384.4	-384.4
Total expenditure	13,167.4	9,467.8	14,028.4	10,019.6

Explanation of abbreviations/symbols: BMBF = Federal Ministry of Education and Research; R&D = (of which) research and development; SMEs = Small and medium-sized enterprises.

1) According to the Federal Government's planning system 2009. Expenditure was implemented in accordance with the Federal Government's planning system 2009. Expenditure of non-university research organisations are distributed among funding areas and funding priorities.

2) Distribution among funding areas partly estimated or extrapolated.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 6 (updated)

Data: Federal Ministry of Education and Research

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-10

Additional data: www.datenportal.bmbf.de/en/1.1.6

Fig. 11 Federal Government expenditure on science, research and development, by recipient groups, in millions of euros (2014/2015)

Recipient group	2014 (ACTUAL) ¹		2015 (ACTUAL) ¹	
	Total	R&D	Total	R&D
1. Territorial authorities	6,852.1	2,885.4	6,786.7	2,914.7
1.1 Federal Government	2,307.0	1,146.5	2,313.4	1,127.0
1.1.1 Federal Government-owned research institutions	1,961.9	1,003.0	2,004.3	1,022.7
1.1.2 Other institutions of Federal administration	345.1	143.5	309.1	104.3
1.2 <i>Länder</i> and communities	4,545.1	1,738.9	4,473.3	1,787.7
1.2.1 Research institutions of the <i>Länder</i>	141.2	134.5	122.1	115.2
1.2.2 Universities and university hospitals	3,631.6	1,536.7	3,580.2	1,604.4
1.2.3 Other institutions of the <i>Länder</i>	732.3	32.8	731.1	29.0
1.2.4 Communities, local authority and special-purpose associations	40.1	35.0	39.9	39.0
2. Private non-profit organisations	8,332.3	7,860.0	8,950.1	8,483.1
2.1 Research funding organisations (e.g. MPG, FhG, DFG)	4,071.1	3,877.0	4,308.4	4,117.0
2.2 Helmholtz Association of German Research Centres (HGF)	2,990.0	2,905.3	3,261.2	3,200.5
2.3 Other non-profit science organisations	1,131.5	978.6	1,227.4	1,056.2
2.4 Other non-profit organisations	139.7	99.1	153.0	109.4
3. Business enterprise sector	2,407.3	2,217.5	2,501.6	2,302.2
3.1 Business enterprises	1,681.5	1,522.7	1,705.3	1,528.1
3.2 Services if rendered by companies and the professions	725.9	694.8	796.3	774.1
4. Abroad	1,286.6	1,226.0	1,368.9	1,304.3
4.1 Payments to business enterprises abroad	82.1	71.4	104.4	92.3
4.2 Contributions to international organisations and other payments to recipients abroad	1,204.5	1,154.6	1,264.4	1,212.0
5. Cross-group positions	0.7	-0.2	2.5	0.8
Total expenditure	18,879.1	14,188.7	19,609.8	15,005.2

Explanation of abbreviations/symbols: R&D = (of which) research and development; MPG = Max Planck Society; FhG = Fraunhofer Society; DFG = German Research Foundation.

1) Including "Energy and climate fund" (*Energie- und Klimafonds*). As from 2012, research funding in the area of electro mobility is financed by the "Energy and climate fund".

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 9 (updated)

Data: Federal Ministry of Education and Research

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-11

Additional data: www.datenportal.bmbf.de/en/1.1.8

Fig. 12 R&D expenditure of the Federal Government and the *Länder*, by research objectives, budget appropriations in millions of euros (2012-2016)

Research objective ¹	2012	2013	2014	2015	2016 ²
1. Exploration and exploitation of the earth	380,3	426.5	442,9	466,6	481,5
2. Environment	687.5	705.6	761.6	769.9	795.1
3. Exploration and exploitation of space	1,132.3	1,173.3	1,189.8	1,333.5	1,409.0
4. Transport, telecommunication and other infrastructures	358.1	374.4	376.7	380.4	439.8
5. Energy	1,062.8	1,313.3	1,323.4	1,260.4	1,314.3
6. Industrial production and technology	3,046.1	3,190.5	3,025.7	3,157.8	3,357.7
7. Health	1,266.1	1,272.4	1,342.1	1,384.6	1,431.5
8. Agriculture	691.2	719.1	728.2	812.9	894.6
9. Education	230.5	266.9	308.2	387.3	353.2
10. Culture, recreation, religion and mass media	301.2	299.9	287.9	303.1	346.2
11. Political and social systems, structures and processes	396.9	454.7	484.4	508.9	451.6
9.-11. Total of education, culture, recreation, religion, mass media, political and social systems, structures and processes	928.7	1,021.6	1,080.5	1,199.3	1,150.9
12. General advancement of knowledge: R&D financed from General University Funds (GUF)	9,609.1	10,137.5	10,249.1	10,719.3	11,091.5
13. General advancement of knowledge: R&D financed from other sources than GUF	4,150.4	4,331.2	4,366.9	4,625.3	4,686.3
Non-apportionable funds ³	-169.1	-239.2	-346.3	-404.2	-260.2
Total civil R&D expenditure	23,143.4	24,426.1	24,540.8	25,705.9	26,792.0
14. Defence	926.8	944.9	977.4	827.0	766.1
Total	24,070.2	25,371.0	25,518.2	26,532.8	27,558.1

Explanation of abbreviations/symbols: R&D = research and development.

1) In keeping with the nomenclature for the analysis and comparison of scientific programmes and budgets (NABS) – edition 2007. As of 2012, on the part of the Federal Government including "Energy and climate fund" (*Energie- und Klimafonds*).

2) Provisional figures.

3) Global reduction in the expenditure of the Federal Ministry of Education and Research (BMBF) which cannot be assigned to research objectives 1 to 13 until ACTUAL figures are available as well as competition funds for the Leibniz Association (WGL) from the Federal Government and the *Länder*.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 16 (updated)

Data: Federal Ministry of Education and Research, Federal Statistical Office

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-12

Additional data: www.datenportal.bmbf.de/en/1.2.3

Fig. 13 Intramural R&D expenditures and R&D personnel of the economy, by industry sectors (2013-2015)

Economic activity ¹	Intramural R&D expenditures (in millions of euros)			R&D personnel (in full-time equivalents)		
	2013	2014	2015 ²	2013	2014	2015 ²
A 01-03 Agriculture, forestry and fishing	144	137	153	1,338	1,466	1,518
B 05-09 Mining and quarrying	15	12	15	161	162	160
C 10-33 Manufacturing	46,049	49,482	52,903	298,838	310,533	332,047
10-12 Food products, beverages and tobacco products	315	318	335	2,654	2,663	2,627
13-15 Textiles, apparel, leather	113	115	127	1,350	1,271	1,621
16-18 Wood products, paper products, printing	227	224	206	1,766	1,816	1,794
19 Coke and refined petroleum products	94	119	135	309	318	354
20 Chemicals and chemical products	3,347	3,629	3,846	21,481	22,795	24,048
21 Basic pharmaceutical products and pharmaceutical preparations	4,075	4,035	3,999	18,767	19,259	18,589
22 Rubber and plastic products	970	1,014	1,105	7,782	8,275	8,272
23 Glass, ceramics and non-metallic mineral products	292	302	336	2,841	2,982	3,094
24 Basic metals	530	535	599	4,241	4,296	4,629
25 Fabricated metal products	743	750	833	7,217	7,323	8,017
26 Computer, electronic and optical products	7,342	7,507	7,650	56,346	57,630	62,077
27 Electrical equipment	2,130	2,172	2,243	19,859	19,534	20,865
28 Machinery and equipment	5,388	5,651	5,634	41,941	42,971	44,279
29 Motor vehicles, trailers and semi-trailers	17,187	19,678	21,741	92,815	99,946	109,725
30 Other transport equipment	2,018	2,068	2,009	11,607	11,691	11,834
31-33 Other manufacturing of products	1,279	1,367	2,107	7,861	7,763	10,222
D 35-39 Electricity supply; water supply, waste management	209	195	181	1,020	951	972
F 41-43 Construction	80	80	87	1,016	1,062	1,018
J 58-63 Information and communication	3,170	3,229	3,241	23,240	23,475	23,125
K 64-66 Financial and insurance activities	290	318	286	1,483	1,466	1,474
M 69-75 Professional, scientific and technical activities	3,201	3,134	5,008	29,069	28,493	50,591
Remaining categories	408	409	551	4,210	4,098	5,153
Total	53,566	56,996	62,425	360,375	371,706	416,059

Explanation of abbreviations/symbols: R&D = research and development.

1) Classification of economic activities, 2008 edition.

2) Preliminary results.

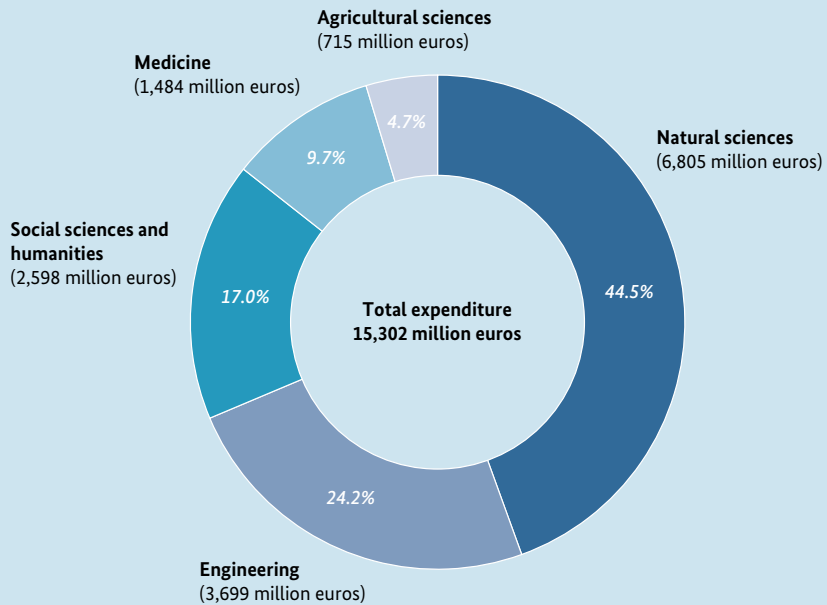
Source: Stifterverband Wissenschaftsstatistik (Forschung und Entwicklung in der Wirtschaft 2015, Tabelle 2)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-13

Additional data: www.datenportal.bmbf.de/en/1.5.1

www.datenportal.bmbf.de/en/1.7.4

Fig. 14 Expenditure of non-university science institutions, by fields of science (2014)



Note: Possible rounding differences.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 29 (updated)

Data: Federal Statistical Office; calculations of the DZHW

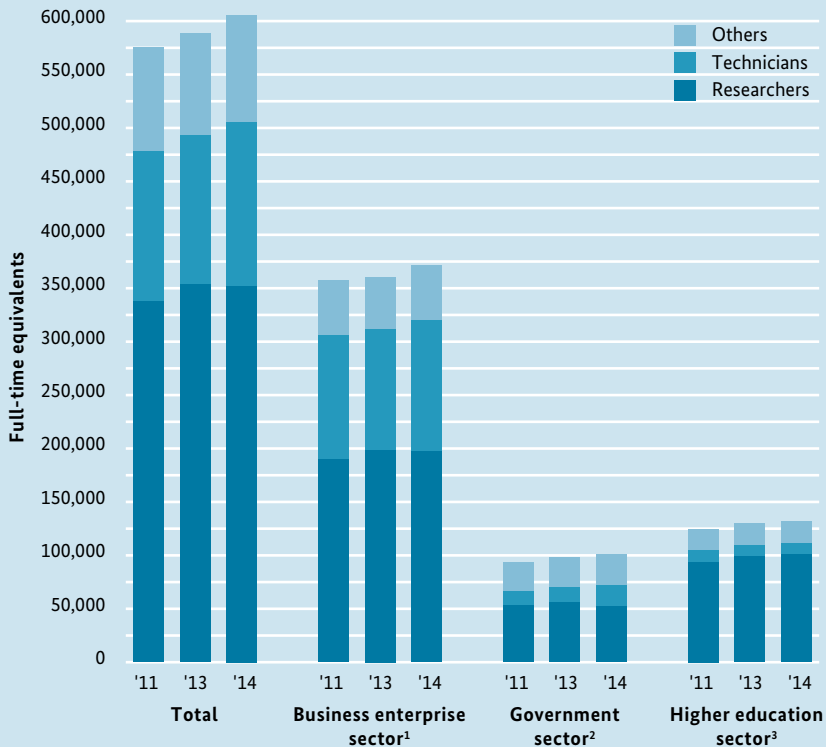
BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-14

Additional data: www.datenportal.bmbf.de/en/1.6.5



Alongside R&D expenditure, the number of people working in R&D is the most important indicator of R&D resources. About 600,000 people work in this area in Germany – in business, in research institutions and at universities. The significant increase in R&D personnel since 2007 makes it clear that R&D has risen considerably in importance. In total, there were approximately 99,000 more full-time R&D positions in 2014 than in 2007. According to provisional calculations, in 2015, the R&D personnel of the industry increased significantly by 12%. Nearly 44,400 persons more than in the previous year were employed in the R&D sectors of the industry in 2015. The present figures include people who conduct actual research work, but also groups of people who carry out technical or other supporting activities.

Fig. 15 R&D personnel, by personnel groups and sectors of employment, based on full-time equivalents (2011/2013/2014)



Explanation of abbreviations/symbols: R&D = research and development.

1) 2014: estimated data for technicians and other R&D personnel.

2) Government institutions and private non-profit organisations financed primarily by the government.

3) Figures for the higher education sector refer to full-time staff of private and state universities (ACTUAL), calculated in accordance with the procedure agreed on by the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany (KMK), the German Council of Science and Humanities, the Federal Ministry of Education and Research (BMBF) and the Federal Statistical Office.

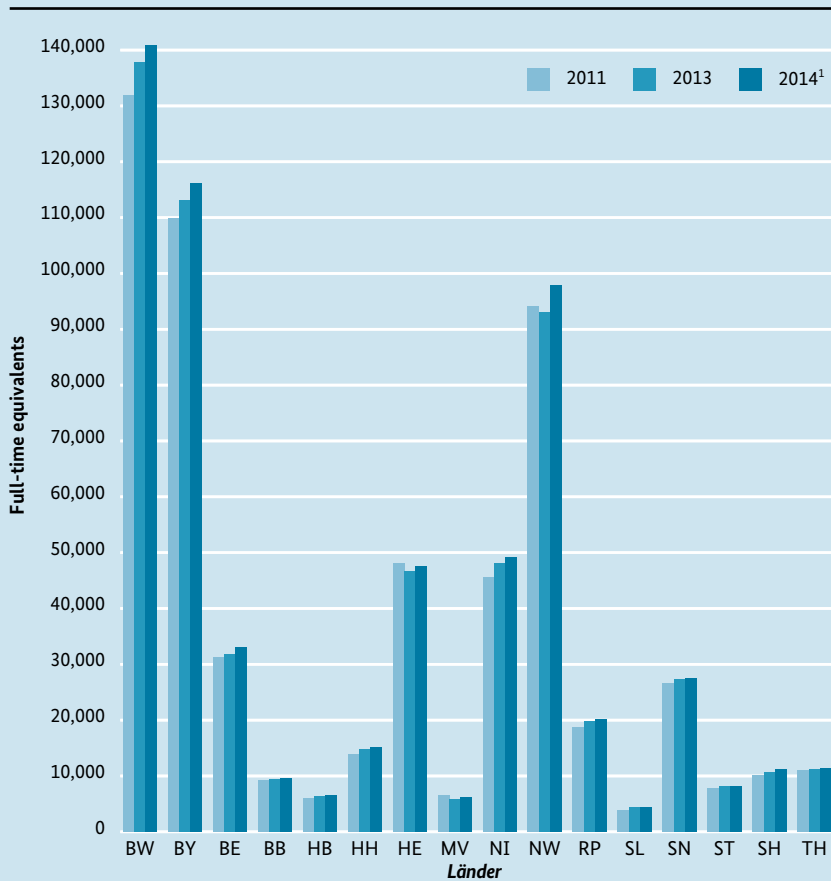
Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 31 (updated)

Data: Stifterverband Wissenschaftsstatistik; Federal Statistical Office

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-15

Additional data: www.datenportal.bmbf.de/en/1.7.1

Fig. 16 Regional breakdown of R&D personnel, based on full-time equivalents (2011/2013/2014)



Explanation of abbreviations/symbols: R&D = research and development; for abbreviations of the *Länder* see glossary.

1) R&D personnel of the business enterprise sector according to the regional breakdown of 2013.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 33 (updated)

Data: Federal Statistical Office; Stifterverband Wissenschaftsstatistik

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-16

Additional data: www.datenportal.bmbf.de/en/1.7.3

Fig. 17 Higher education expenditure on teaching and research, by types of higher education institution, in millions of euros (2012-2014 ACTUAL)

Expenditure ¹ on	Year	Total higher education expenditure ²	Universities ³ , colleges of education, theology and art	Medical facilities ⁴	Universities of applied sciences and colleges of public administration
Central institutions	2012	9,270.9	7,234.7	-	2,036.2
	2013	9,616.3	7,417.4	-	2,199.0
	2014	9,568.4	7,308.3	-	2,260.1
Natural sciences	2012	5,208.5	4,824.2	-	384.3
	2013	5,361.0	4,946.0	-	415.0
	2014	5,178.2	4,795.9	-	382.4
Engineering	2012	4,234.8	2,814.1	-	1,420.7
	2013	4,419.4	2,885.2	-	1,534.2
	2014	4,501.9	3,061.4	-	1,440.4
Medicine ⁵	2012	5,262.1	1.6	5,206.2	54.3
	2013	5,043.4	1.7	4,983.1	58.6
	2014	6,513.0	1.8	6,430.7	80.5
Agricultural sciences	2012	527.9	402.0	-	125.9
	2013	548.1	412.2	-	136.0
	2014	729.4	583.9	-	145.6
Social sciences and humanities	2012	6,434.7	4,824.2	-	1,610.5
	2013	6,685.2	4,946.0	-	1,739.1
	2014	6,312.9	4,643.4	-	1,669.5
Total	2012	30,938.8	20,100.8	5,206.2	5,631.8
	2013	31,673.4	20,608.5	4,983.1	6,081.8
	2014	32,803.8	20,394.7	6,430.7	5,978.4

Explanation of abbreviations/symbols: - = no figures or magnitude zero.

1) University expenditures, minus income for activities other than teaching and research (such as for treatment of patients in university clinics), and calculated on basis of university financial statistics (*Hochschulfinanzstatistik*).

2) Not including additional amounts for payments to civil servants, grant funding for support of (post-) graduates and other funds of the German Research Foundation (DFG).

3) Excluding medical facilities.

4) University clinics including the "human medicine" subject group at universities.

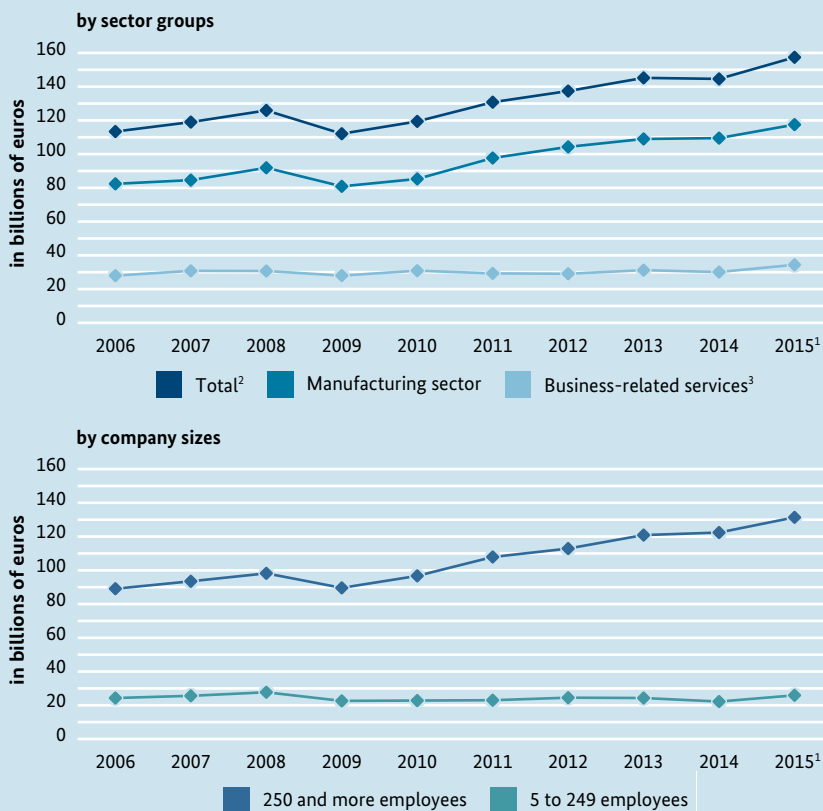
5) Including central institutions of university clinics.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 26 (updated); **Data:** Federal Statistical Office

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-17

Additional data: www.datenportal.bmbf.de/en/1.6.1

Fig. 18 Innovation expenditure of the German industry, by sector groups and company sizes (2006-2015)



1) Provisional figures.

2) Including mining/quarrying and energy/water/disposal.

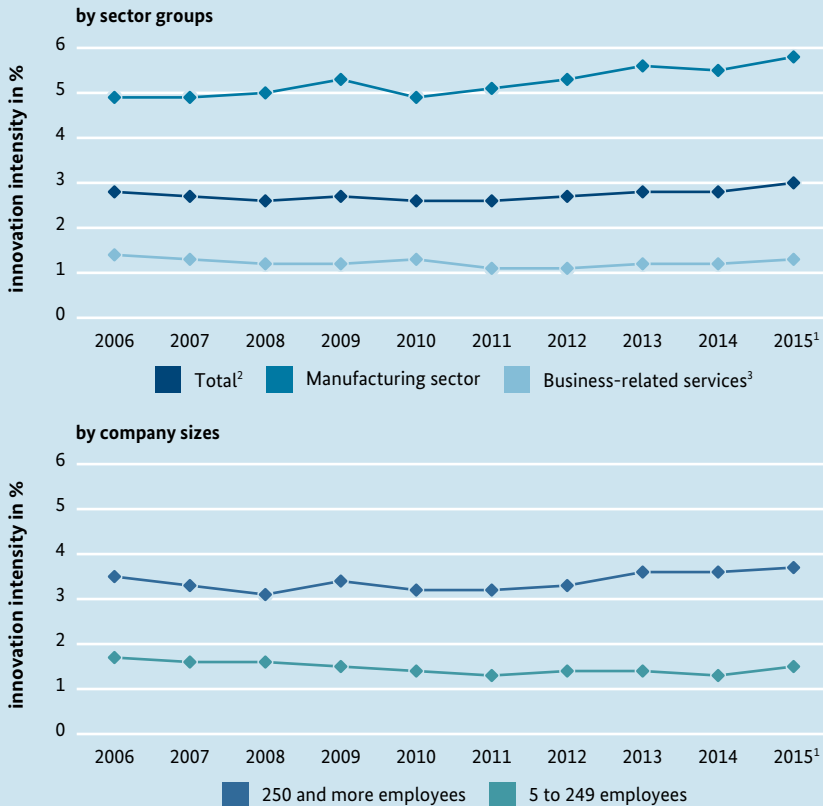
3) Wholesale trade, transportation/storage/post, media and financial services, computer activities/telecommunications, engineering services, scientific research and development, consultancy/advertising and other business services.

Source: Centre for European Economic Research – Mannheim Innovation Panel, special evaluation

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-18

Additional data: www.datenportal.bmbf.de/en/1.8.8

Fig. 19 Turnover share of the innovation expenditure of the German industry, by sector groups and company sizes (2006-2015)



1) Provisional figures.

2) Including mining/quarrying and energy/water/disposal.

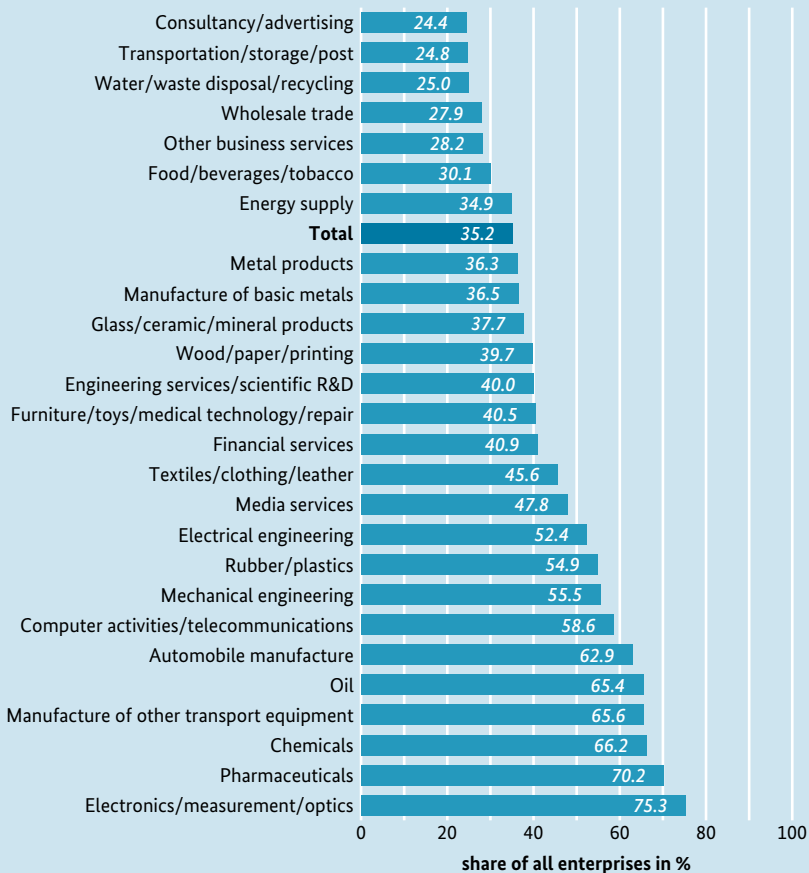
3) Wholesale trade, transportation/storage/post, media and financial services, computer activities/telecommunications, engineering services, scientific research and development, consultancy/advertising and other business services.

Source: Centre for European Economic Research – Mannheim Innovation Panel, special evaluation

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-19

Additional data: www.datenportal.bmbf.de/en/1.8.7

Fig. 20 Innovation rate – enterprises that implement product or process innovations, by individual sectors (2015)¹



Explanation of abbreviations/symbols: R&D = research and development.

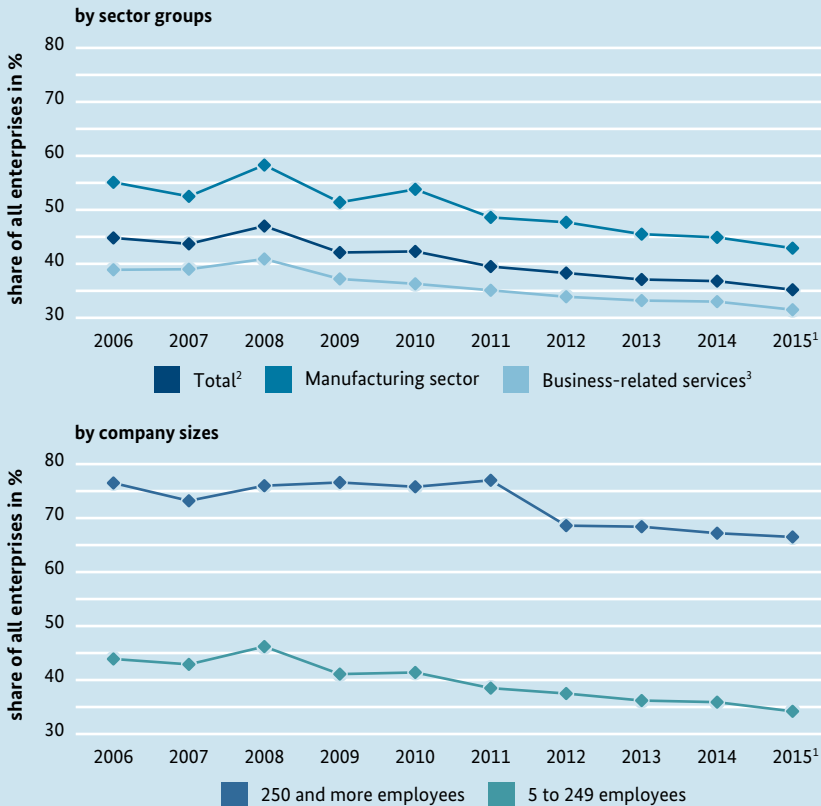
1) Provisional figures.

Source: Centre for European Economic Research – Mannheim Innovation Panel, special evaluation

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-20

Additional data: www.datenportal.bmbf.de/en/1.8.6

Fig. 21 Innovation rate – enterprises that implement product or process innovations, by sector groups and company sizes (2006-2015)



1) Provisional figures.

2) Including mining/quarrying and energy/water/disposal.

3) Wholesale trade, transportation/storage/post, media and financial services, computer activities/telecommunications, engineering services, scientific research and development, consultancy/advertising and other business services.

Source: Centre for European Economic Research – Mannheim Innovation Panel, special evaluation

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-21

Additional data: www.datenportal.bmbf.de/en/1.8.6

Education

Education provides prospects for personal careers of each and every individual as well as for the future and prosperity of our society. The challenges of demographic change and of a looming skills shortage can only be addressed if everyone in Germany is given an opportunity for sound education and the best possible support in developing his or her talent – irrespective of background and material resources. This requires the cooperation of all decision-makers. Since 2008, the Federal Government and the *Länder* have been committed to greater equity in education, better performance and improved transfer opportunities in the education system as part of the Qualification Initiative for Germany.

The joint efforts are paying off, as is shown in the following examples: The provision of care for children under the age of three has improved considerably. Since 2008, the number of school-leavers with general higher education entrance qualifications has been growing and is now well over 50%, while the number of those without a secondary general school-leaving certificate is steadily falling. More than one in two young people in an age bracket takes up higher education studies. Participation in continuing education and training reached a record level of 51% in 2014. Education expenditure rose from approximately 176 billion euros in 2010 to approximately 195 billion euros in 2015.

The refugee influx, in particular in 2016, is confronting the education system with new challenges. Integration through education will become a priority in the years to come because integration cannot function without education. The Federal Education Ministry is supporting the integration of refugees under two major packets of measures – ranging from learning German to taking up training or higher education.

Further information

Internet portal:

- German Education Server – the central directory for educational information on the Internet (www.bildungsserver.de)

Publications:

- Education in Germany 2016 – an indicator-based report including an analysis of education and migration (www.bildungsbericht.de)
- 2017 Report on Vocational Education and Training (www.bmbf.de/de/berufsbildungsbericht-2740.html)
- Data report of the Federal Institute for Vocational Education and Training on the 2017 Report on Vocational Education and Training (<http://datenreport.bibb.de>)
- 2016 Report on Education Financing (<https://www.destatis.de/DE/Publikationen/Thematisch/BildungForschungKultur/BildungKulturFinanzen/Bildungsfinanzbericht.html>)



Fig. 22 Budget for education¹, by expenditure areas, in billions of euros (2005/2012-2015)

Expenditure area	2005	2012	2013	2014	2015
A Education budget in international demarcation (ISCED 2011)	129.3	164.0	168.2	173.3	175.7
- Share of GDP	5.6%	6.0%	6.0%	5.9%	5.8%
A30 Expenditure on educational institutions (state and private funded)	114.7	143.9	148.1	153.2	155.6
- Share of GDP	5.0%	5.2%	5.3%	5.3%	5.1%
A31 ISCED 0: Pre-primary level	13.2	21.8	23.9	25.4	26.5
of which: Children aged younger than 3 years	2.4	7.0	8.1	9.1	b
Children aged 3 to school entrance	10.8	14.8	15.8	16.3	b
A32 ISCED 1-4: School and close to school levels	75.4	86.4	87.6	89.6	91.7
of which: General programmes	53.4	62.5	63.9	65.8	b
Vocational programmes	9.8	10.7	10.7	10.8	b
In-company training under the dual system	10.5	10.8	10.7	10.6	b
A33 ISCED 5-8: Tertiary level	23.6	33.6	34.4	36.0	35.1
of which: Vocational programmes	0.6	0.9	1.0	1.1	b
Academic programmes	21.7	31.1	31.8	33.2	b
of which: R&D at higher education institutions	9.4	14.0	14.3	14.9	15.1
A34 Others (without ISCED classification)	2.5	2.1	2.2	2.2	2.2
A40/ A50 Remaining expenditure in international demarcation	14.6	20.0	20.1	20.1	20.1
- Share of GDP	0.6%	0.7%	0.7%	0.7%	0.7%
B Additional education-relevant expenditure in national demarcation	14.0	17.4	18.3	18.7	19.4
- Share of GDP	0.6%	0.6%	0.6%	0.6%	0.6%
B10 Continuing vocational education	7.9	10.6	10.9	11.2	11.5
B20 Expenditure on other educational opportunities	4.7	6.0	6.4	6.6	6.8
B30 Assistance to participants in continuing education	1.3	0.7	0.9	1.0	1.0
A+B Total education budget	143.3	181.4	186.5	192.1	195.1
- Share of GDP	6.2%	6.6%	6.6%	6.6%	6.4%

Note: Possible rounding differences.

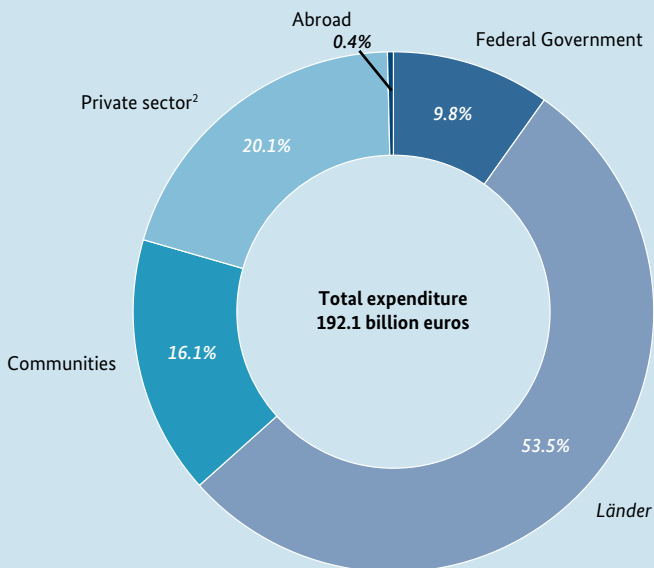
Explanation of abbreviations/symbols: GDP = gross domestic product; ISCED = International Standard Classification of Education; R&D = research and development; b = no data because the numerical value is not sufficiently reliable.

1) Expenditure pursuant to the performance concept. Demarcation pursuant to concept 2012. 2015 figures are preliminary.

Source: Federal Statistical Office (Budget für Bildung, Forschung und Wissenschaft 2014/2015)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-22
Additional data: www.datenportal.bmbf.de/en/1.9.1

Fig. 23 Budget for education for all education areas, by funding sectors, in share of total expenditure¹ (2014)



Note: Possible rounding differences.

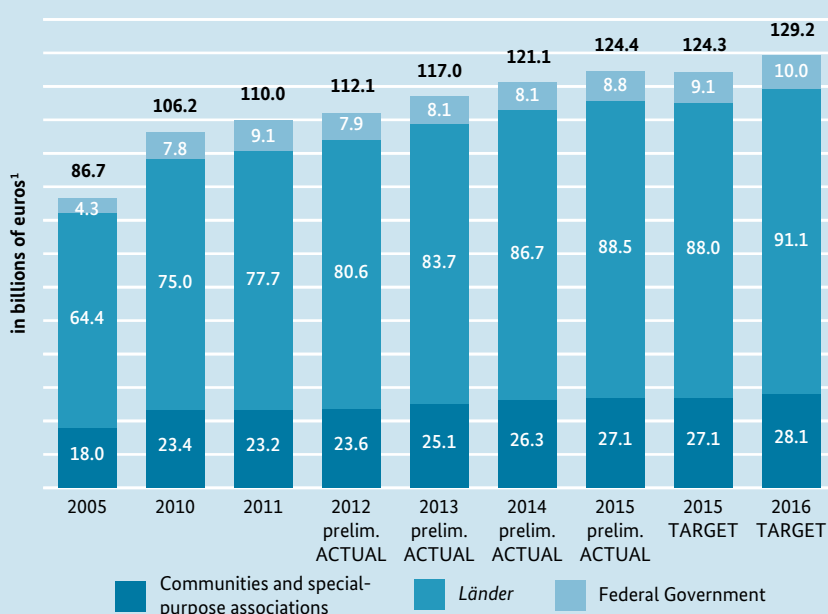
1) Financial statement (funder), in consideration of payment transactions between federal, *Länder* and local governments (initial funds), defined due to concept 2012. The concept of initial funds follows up the direct spendings on education of the federal, *Länder* and local governments, including transfers to other public budgets. The federal funding contribution (initial fund) thus comprises direct federal expenditure plus net transfers to the *Länder* and local government level.

2) Private households, businesses, private non-profit institutions.

Source: Federal Statistical Office (Budget für Bildung, Forschung und Wissenschaft 2014/2015)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-23

Additional data: www.datenportal.bmbf.de/en/1.9.2

Fig. 24 Development of public spending on education (2005-2016)

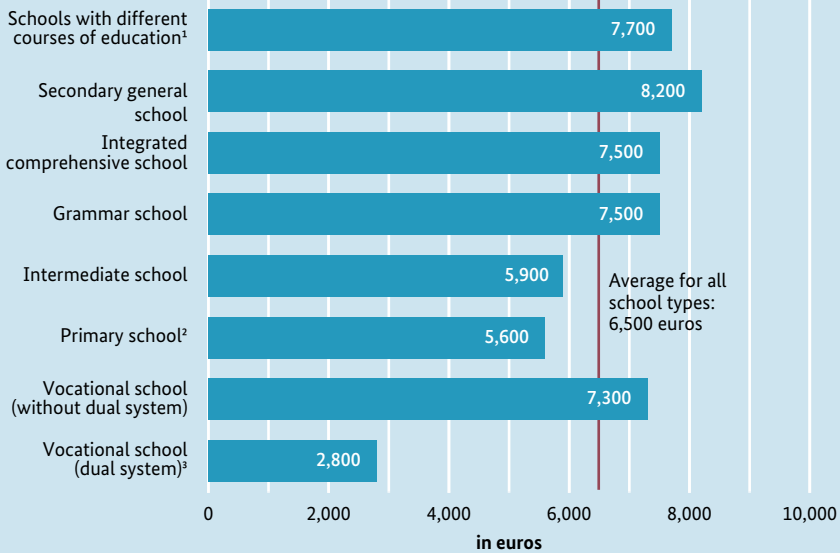
1) Possible rounding differences.

Source: Federal Statistical Office, Bildungsfinanzbericht 2016, table/figure 3.0-1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-24

Additional data: www.datenportal.bmbf.de/en/2.1.13

Public spending on education has risen steadily since 1995 from 75.9 billion euros in 1995 to 129.2 billion euros in 2016. Since 2005, the overall increase was 42.5 billion euros. In this period, federal expenditure on education more than doubled to an amount of 10.0 billion euros in 2016.

Fig. 25 Expenditure on public schools per pupil, by school types (2013)

1) Integrated classes for pupils at secondary general and intermediate schools.

2) Berlin and Brandenburg without 5th and 6th grade.

3) Part-time lessons.

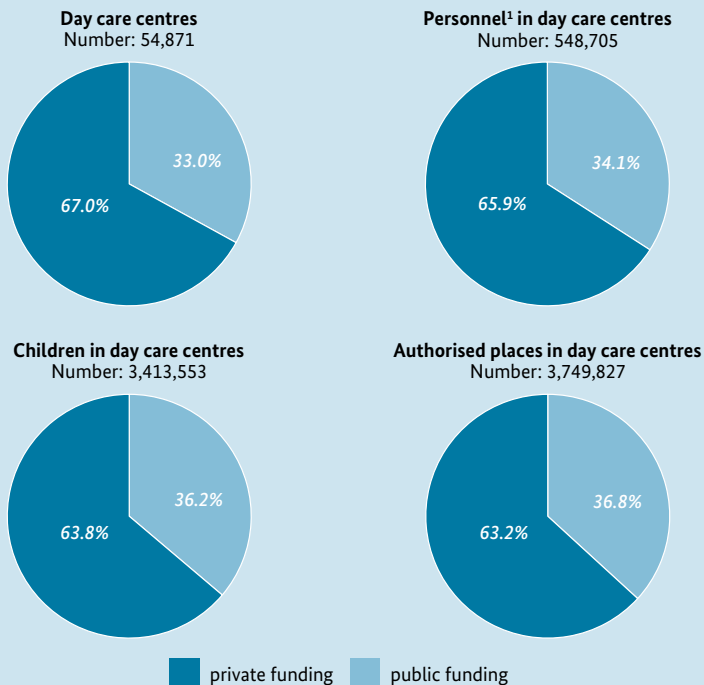
Source: Federal Statistical Office, Bildungsfinanzbericht 2016, tables 4.2.4-1, 4.2.4-2 / figure 4.2.4-1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-25

Additional data: www.datenportal.bmbf.de/en/2.1.14

This graph shows the average annual expenditure per pupil. There are great differences between the different school types. The low expenditure on vocational schools under the dual system is mainly due to the part-time nature of teaching at vocational schools. Company spending on training under the dual system is not included here.

Fig. 26 Day care centres, personnel, number of children and number of authorised places (at 01 March 2016)



1) Educational staff (excluding exempted centre management, administration, housekeeping and building services).
Source: Federal Statistical Office, Statistics on child and youth welfare; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-26
 Additional data: www.datenportal.bmbf.de/en/2.2.1

Unlike general schools and higher education institutions, a majority of childcare facilities are run by independent, non-state organisations (such as churches, charities, and parent associations).

Fig. 27 School enrolments, pupils and graduates/school-leavers at general schools (2011-2015)

At general schools		2011	2012	2013	2014	2015
School enrolments	t	711,040	687,795	689,736	710,834	705,094
	f	48.5%	48.6%	48.5%	48.6%	48.6%
Pupils	t	8,678,196	8,556,879	8,420,111	8,366,666	8,335,061
	f	49.0%	49.0%	48.9%	48.9%	48.9%
at primary schools including orientation stage	t	2,891,273	2,843,715	2,806,056	2,808,033	2,815,978
	f	49.1%	49.1%	49.1%	49.1%	49.1%
at secondary general schools	t	656,754	607,878	553,653	507,502	466,323
	f	43.8%	43.6%	43.5%	43.5%	43.3%
at schools with different courses of education ¹	t	399,899	433,637	453,930	477,102	498,786
	f	46.6%	46.5%	46.3%	46.2%	46.0%
at intermediate schools	t	1,130,004	1,080,598	1,015,160	950,706	899,853
	f	49.3%	49.2%	49.2%	49.1%	49.0%
at integrated comprehensive and Free Waldorf schools	t	714,250	763,556	835,227	904,136	967,161
	f	49.7%	49.4%	49.1%	48.9%	48.7%
at grammar schools	t	2,433,128	2,387,590	2,329,990	2,304,546	2,281,227
	f	52.6%	52.5%	52.5%	52.6%	52.6%
Graduates/school-leavers	t	882,913	868,790	895,334	850,721	846,423
	f	49.6%	49.4%	49.5%	49.1%	48.9%
without secondary general school certificate	t	49,560	47,648	46,295	46,950	47,435
	f	39.7%	39.7%	39.9%	39.6%	38.7%
with secondary general school certificate	t	168,660	157,498	151,314	146,649	139,952
	f	42.1%	41.8%	41.7%	41.3%	41.0%
with intermediate school certificate ²	t	339,758	344,527	377,364	375,791	370,201
	f	49.4%	49.5%	49.4%	49.1%	48.9%
with entrance qualification for universities of applied sciences ²	t	13,769	13,945	1,068	841	973
	f	52.6%	52.3%	47.6%	47.4%	48.6%
with university entrance qualification	t	311,166	305,172	319,293	280,490	287,862
	f	55.3%	54.7%	54.6%	54.7%	54.5%

Explanation of abbreviations/symbols: t = total; f = share of females.

1) Integrated classes for pupils at secondary general and intermediate schools.

2) Break in time series between 2012 and 2013. As of 2013, the category intermediate school certificate includes the proof of the academic part of the entrance qualification for studies at universities of applied sciences.

Source: Federal Statistical Office, Fachserie 11 Reihe 1; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-27

Additional data: www.datenportal.bmbf.de/en/2.3.30

The number of school students in Germany is decreasing during the period under review due to demographic developments. Girls attend grammar schools (*Gymnasien*) more often than boys. The female share of all pupils at general schools is 48.9%, while the share at grammar schools comes to 52.6% (figure 27). The student-teacher ratio (figure 28) has improved across all school types with few exceptions such as schools with different courses of education (*Schularten mit mehreren Bildungsgängen*).



Fig. 28 Student-teacher ratio¹ at general schools (2011-2015)

School type	2011	2012	2013	2014	2015
Primary school	17.0	16.6	16.4	16.3	16.2
Orientation stage independent of school type ²	13.2	13.2	13.2	12.7	12.8
Secondary general school	11.8	11.6	11.4	11.4	11.3
Schools with different courses of education ³	12.2	12.3	12.3	12.1	12.2
Intermediate school	17.3	16.8	16.5	16.3	16.1
Grammar school					
Secondary level I	15.7	15.3	15.0	15.0	15.0
Secondary level II	12.9	12.6	12.3	12.3	12.2
Integrated comprehensive school					
Primary level	16.2	15.8	16.2	16.4	16.2
Secondary level I	13.6	13.3	13.1	12.8	12.8
Secondary level II	12.9	12.7	12.5	12.3	11.9
Free Waldorf School					
Primary level	18.2	17.6	17.3	17.5	17.1
Secondary level I	12.9	12.7	12.4	12.3	12.5
Secondary level II	12.7	12.7	13.2	13.0	12.9
Special needs school	5.6	5.5	5.4	5.3	5.3
Evening secondary general school	14.5	19.3	20.1	19.5	19.2
Evening intermediate school	21.0	20.2	19.9	20.1	20.9
Evening grammar school	16.1	15.3	14.9	14.3	13.9
Adult education college	12.1	11.4	11.7	11.4	11.0
Total	14.1	13.8	13.6	13.5	13.4

Explanation of abbreviations/symbols: KMK = Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany.

- 1) The student-teacher ratio is related to the total number of pupils and the total number of teachers. This ratio cannot be equated with the respective average class size, because several teachers frequently supervise a class.
- 2) Orientation stages independent of school type are comprehensive institutions of grades 5 and 6. If the orientation stages are integrated in particular school types for organisational reasons, they are disclosed with them and cannot be separated.
- 3) Integrated classes for pupils at secondary general and intermediate schools.

Source: KMK, Dokumentation Nr. 211, Zusammenfassende Übersichten 6.1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-28

Additional data: www.datenportal.bmbf.de/en/2.3.25

Fig. 29 General schools, by school types (2011-2015)

School type	2011	2012	2013	2014	2015
Pre-school class	277	282	283	285	285
School kindergarten	1,123	1,081	1,046	999	984
Primary school	16,103	15,971	15,749	15,578	15,421
Orientation stage independent of school type ¹	1,073	1,046	1,055	1,059	1,054
Secondary general school	3,606	3,416	3,193	3,039	2,892
Schools with different courses of education ²	1,648	1,828	1,782	1,802	1,845
Intermediate school	2,530	2,525	2,399	2,313	2,256
Grammar school	3,124	3,122	3,124	3,125	3,117
Integrated comprehensive school	1,118	1,175	1,452	1,778	1,891
Free Waldorf School	211	215	214	215	221
Special needs school	3,282	3,258	3,191	3,117	2,986
Evening school and adult education college	325	320	322	325	324
Total	34,420	34,239	33,810	33,635	33,547

1) Orientation stages independent of school type are comprehensive institutions of grades 5 and 6. If the orientation stages are integrated in particular school types for organisational reasons, they are disclosed with them and cannot be separated.

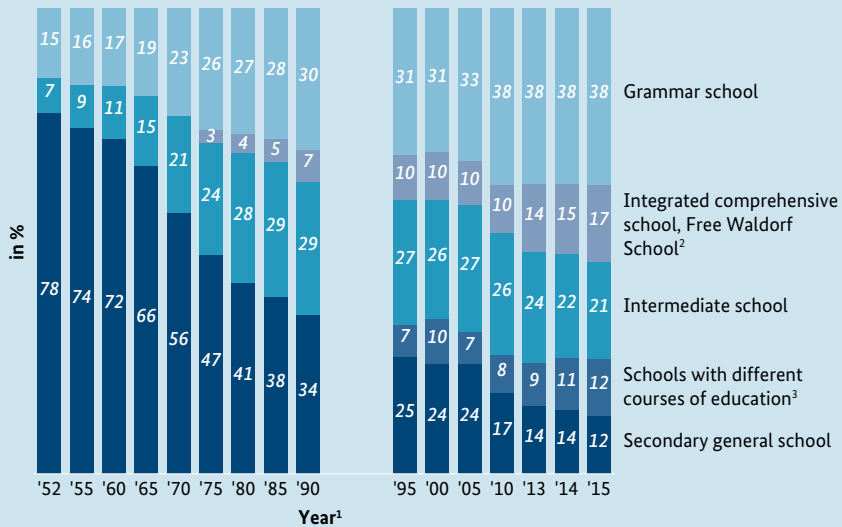
2) Integrated classes for pupils at secondary general and intermediate schools.

Source: Federal Statistical Office, Fachserie 11 Reihe 1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-29

Additional data: www.datenportal.bmbf.de/en/2.3.1

Because of the decline in student numbers resulting from demographic developments, the number of general schools went down by about 900 between 2011 and 2015. The number of schools is falling particularly sharply at the school types primary school (*Grundschule*) and secondary general school (*Hauptschule*). In contrast, the number of integrated comprehensive schools (*Integrierte Gesamtschule*) has increased significantly.

Fig. 30 Pupils in class 8, by school types (1952-2015)

Note: Possible rounding differences.

1) Not including special needs school. Since 1995 including the eastern German *Länder*.

2) Since 1975 included separately in official statistics.

3) Combined classes for pupils in courses at secondary general school and intermediate school that first arose in the eastern German *Länder* after the German reunification.

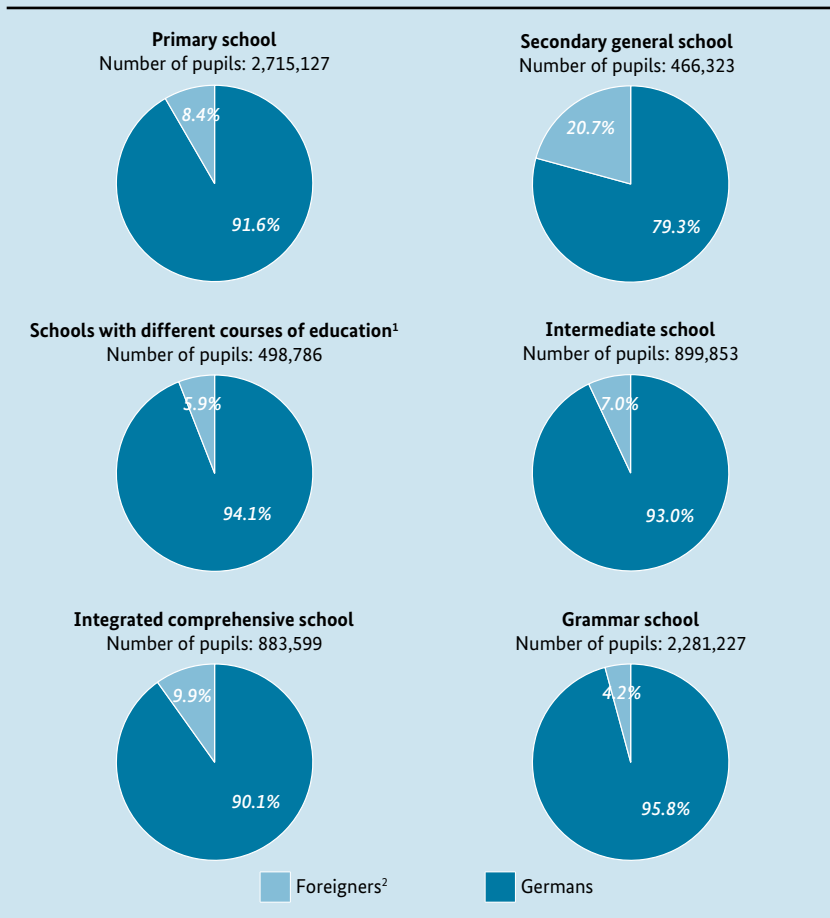
Source: Federal Statistical Office, Fachserie 11 Reihe 1; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-30

Additional data: www.datenportal.bmbf.de/en/2.3.34

While the number of secondary general school (*Hauptschule*) students has been falling constantly over the last sixty years from 78% to 12% in 2015, the percentage of grammar school (*Gymnasium*) students has increased considerably. More than a third of all students have attended this type of school since the 1990s.

Fig. 31 Share of foreign pupils at general schools, by selected school types (2015)



1) Integrated classes for pupils at secondary general and intermediate schools.

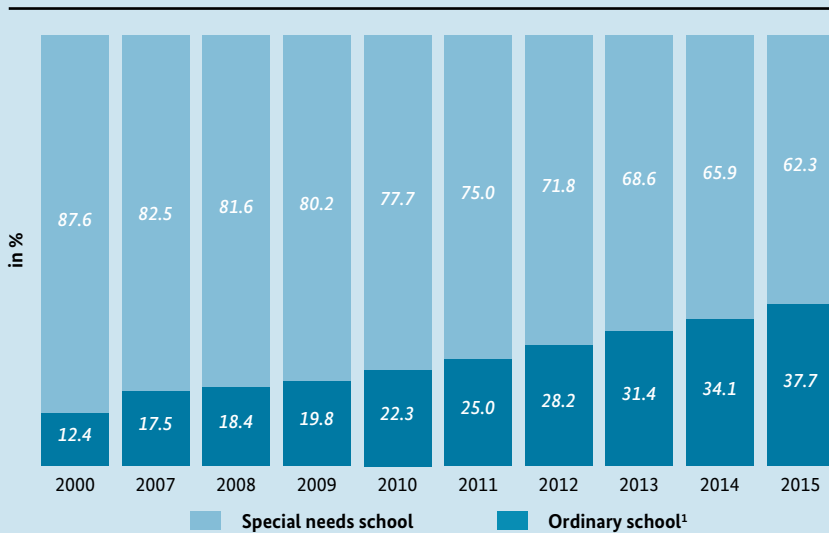
2) Pupils who have a foreign passport or whose nationality is unknown.

Source: Federal Statistical Office, Fachserie 11 Reihe 1; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-31

Additional data: www.datenportal.bmbf.de/en/2.3.32

Fig. 32 Distribution of pupils with special educational needs on special needs schools and ordinary schools (2000/2007-2015)



Explanation of abbreviations/symbols: KMK = Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany.

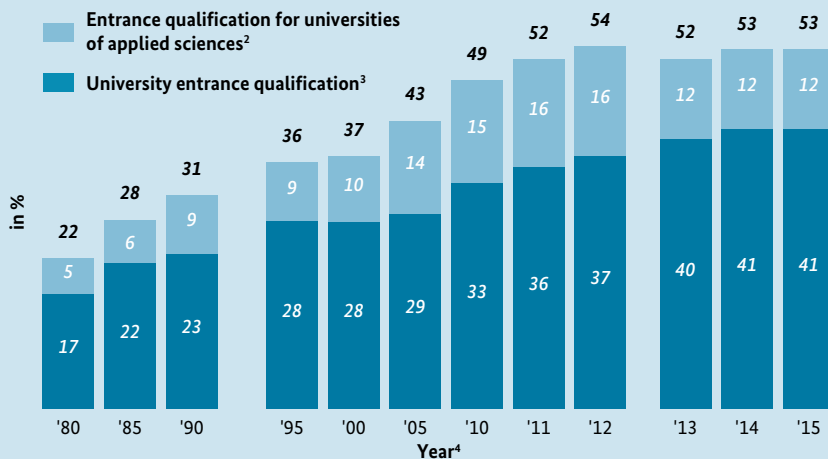
1) Ordinary schools include all general schools without special needs schools.

Source: KMK (Dokumentation Nr. 170, 202 und 210, table A1.1.4.2; Datensammlung Sonderpädagogische Förderung 2015/2016)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-32
Additional data: www.datenportal.bmbf.de/en/2.3.13

The number of integrational pupils, meaning children and young people with special educational needs, who do not go to special needs schools but to ordinary schools, has risen constantly since 2000.

Fig. 33 Percentage¹ of people qualified to enter higher education of the age-specific population, by types of qualification (1980-2015)



1) Until 2005, the percentage of people qualified to enter higher education is related to the average 18 to under 21 age group. As of 2010, the percentage of people qualified to enter higher education is related to the population of the specific years of birth. Quotas are calculated for single years of birth, and afterwards they are added up. Until 2013, population data are based on past censuses. As of 2014, population data are based on 2011 Census. From 2010 to 2013, data are adjusted considering the double *Abitur* graduation classes. Rounding differences are possible.

2) As of 2013, excluding academic part of entrance qualification for universities of applied sciences (as of 2012, in Saxony-Anhalt).

3) Including subject-restricted higher education entrance qualification.

4) Until 1990: former West Germany including Berlin-West.

Source: Federal Statistical Office, Fachserie 11 Reihe 4.3 and 4.3.1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-33

Additional data: www.datenportal.bmbf.de/en/2.5.85

Fig. 34 Pupils at vocational schools, by school types (2011-2015)

School type		2011	2012	2013	2014	2015
Part-time vocational school ¹	t	1,558,964	1,519,244	1,482,022	1,444,086	1,423,898
	f	39.4%	39.1%	38.7%	38.4%	38.1%
Pre-vocational training year ²	t	48,941	48,810	49,230	53,201	80,796
	f	40.0%	39.1%	38.9%	36.5%	31.5%
Basic vocational training year at full-time school ³	t	29,622	28,217	28,748	29,963	6,984
	f	36.1%	36.8%	37.0%	35.5%	22.6%
Vocational extension school	t	481	427	360	298	236
	f	27.0%	26.7%	29.4%	27.2%	25.8%
Full-time vocational school	t	455,212	436,948	431,200	425,991	431,689
	f	57.4%	57.5%	57.5%	57.2%	56.3%
Two-year full-time vocational school	t	24,768	23,196	22,033	20,739	19,166
	f	41.0%	40.5%	41.7%	41.1%	41.2%
Specialised grammar school	t	168,359	172,879	180,712	189,967	194,716
	f	51.5%	51.9%	52.3%	52.6%	53.0%
Specialised upper secondary school	t	137,447	134,151	136,658	139,630	139,579
	f	51.9%	52.2%	52.3%	52.4%	52.4%
Trade and technical school	t	180,612	185,202	190,965	193,418	191,039
	f	50.9%	51.1%	51.7%	51.9%	52.7%
Specialised academy	t	8,077	8,324	8,658	8,746	8,851
	f	83.9%	84.1%	83.7%	83.8%	84.0%
Total	t	2,612,483	2,557,398	2,530,586	2,506,039	2,496,954
	f	44.9 %	44.8 %	44.8 %	44.6 %	44.3 %

Explanation of abbreviations/symbols: t = total; f = share of females.

1) Part-time vocational schools are institutions that are part of the compulsory education system for young people who are in vocational training programmes (dual system), have an employment or are unemployed.

2) The increase in reporting year 2015 mainly is due to programmes for German language training for young refugees and immigrants.

3) As of 2015, in North Rine-Westphalia, the data related to "basic vocational training year" is included in the categories "pre-vocational training year" and "full-time vocational school".

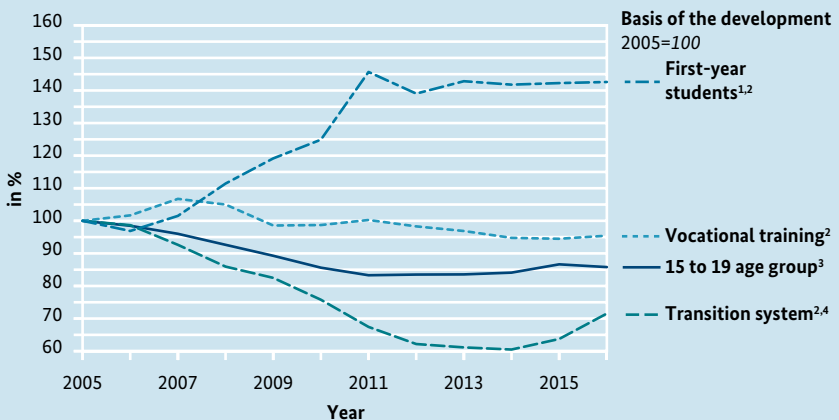
Source: Federal Statistical Office, Fachserie 11 Reihe 2

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-34

Additional data: www.datenportal.bmbf.de/en/2.4.4

www.datenportal.bmbf.de/en/2.4.6

Fig. 35 Transition from school to post-school careers – development of new entrants in selected iABE sectors and first-year students (2005-2016)



Explanation of abbreviations/symbols: iABE = integrated reporting on vocational training (see glossary).

1) Summer semester and following winter semester (e.g. 2005 = SS 2005 and WS 2005/2006).

2) 2016: preliminary results.

3) As of 2011, data are based on 2011 Census. 2016 data are estimated, source: 13th coordinated population projection by the Federal Statistical Office (update based on 2015).

4) Integration into training.

Source: Federal Statistical Office (Fachserie 11 Reihe 4.1; Integrierte Ausbildungsberichterstattung 2015; GENESIS-Online Datenbank, Fortschreibung des Bevölkerungsstandes); Federal Ministry of Education and Research, Berufsbildungsbericht 2016; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-35

Additional data: www.datenportal.bmbf.de/en/2.3.43

This graph shows how young people's educational careers have changed over time. The number of young people who entered the transition system fell by about 35% between 2005 and 2012, since then the number increased slightly. In the area of vocational training the 2015 number is just marginally below the level of 2005. The number of first-year students in higher education increased constantly until 2011 and now the percentage of first-year students reaches more than 50%. The partially strong increase in the years 2010 and 2011 was due to the introduction of the shortened *Abitur* (from 13 to 12 years) that was implemented by the *Länder* in different years and the official ending of compulsory military service in the year 2011.

Fig. 36 Newly concluded training contracts (2001-2015)

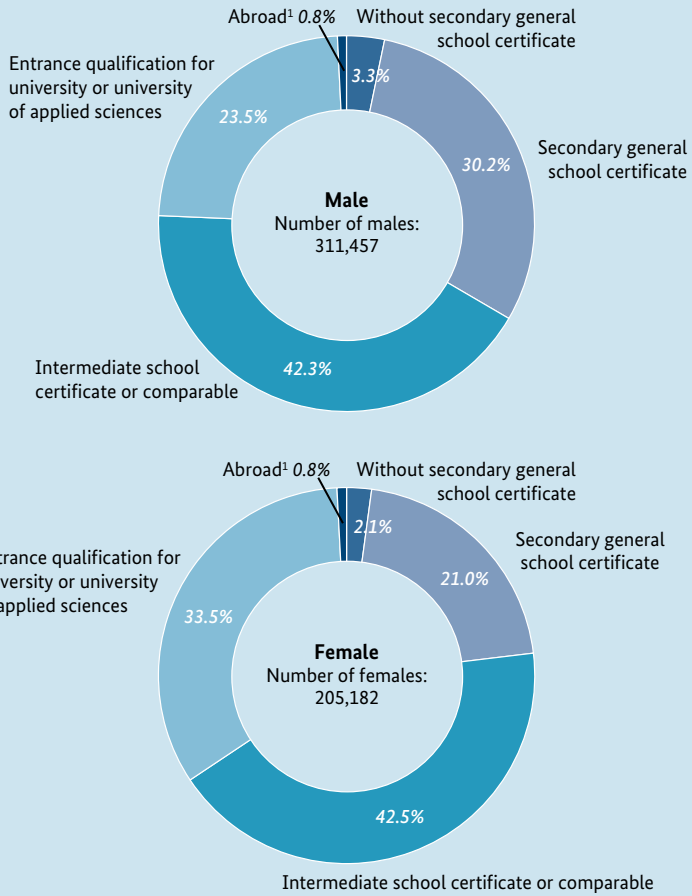
1) Due to the new statistics concept in 2007, the results before and after the adjustment are comparable to a limited extent only.

Source: Federal Statistical Office, Fachserie 11 Reihe 3; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-36

Additional data: www.datenportal.bmbf.de/en/2.4.34

Fig. 37 Newly concluded training contracts, by educational background and sex (2015)



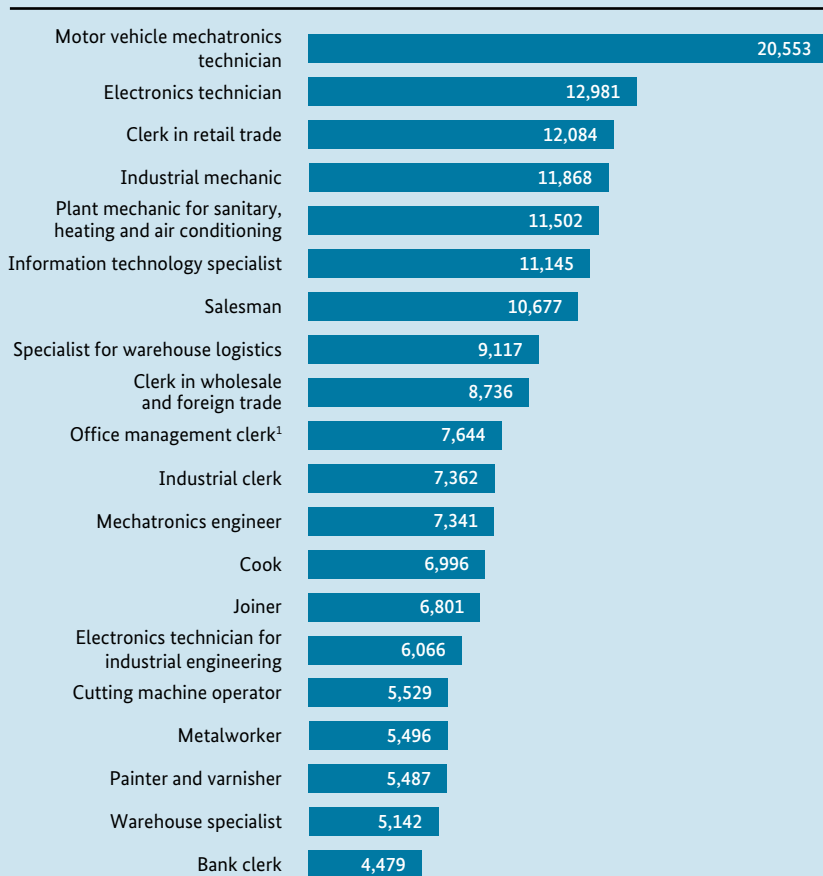
1) School-leaving certificates acquired abroad that are not assignable.

Source: Federal Statistical Office, Fachserie 11 Reihe 3; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-37

Additional data: www.datenportal.bmbf.de/en/2.4.34

Fig. 38 Newly concluded training contracts of males in the 20 most popular training occupations (2016)



Note: 56.0% of the new contracts of males have been concluded in these 20 occupations.

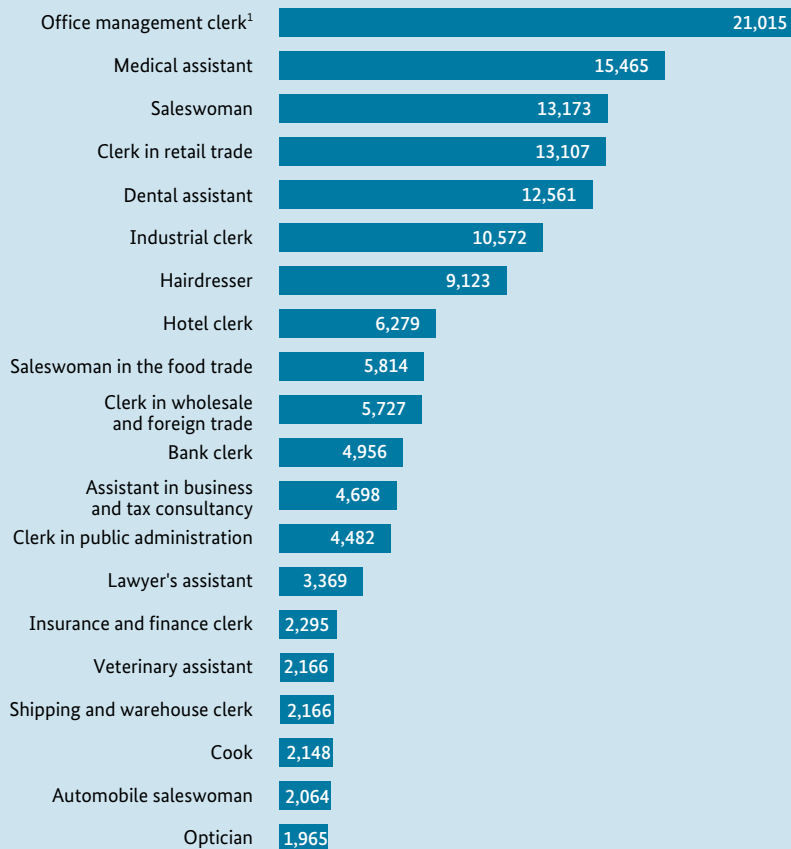
1) Office management clerk including predecessor occupations: office clerk, office communications employee and office communications clerk.

Source: Federal Institute for Vocational Education and Training, survey as of 30 September 2016

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-38

Additional data: www.datenportal.bmbf.de/en/2.4.38

Fig. 39 Newly concluded training contracts of females in the 20 most popular training occupations (2016)



Note: 70.1% of the new contracts of females have been concluded in these 20 occupations.

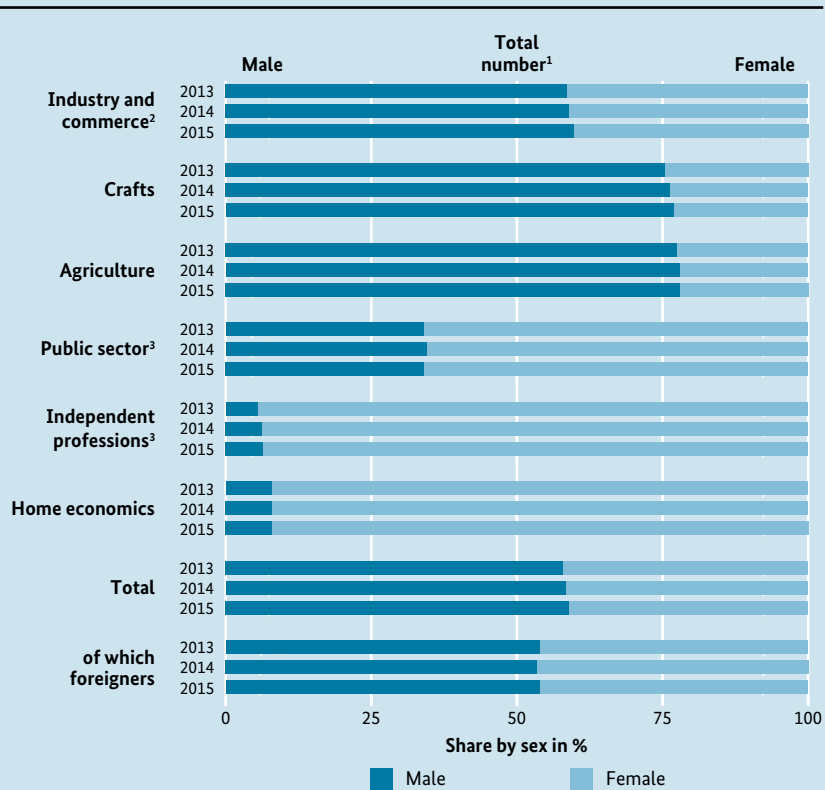
1) Office management clerk including predecessor occupations: office clerk, office communications employee and office communications clerk.

Source: Federal Institute for Vocational Education and Training, survey as of 30 September 2016

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-39

Additional data: www.datenportal.bmbf.de/en/2.4.39

Fig. 40 Successful final examinations, by sex and training sectors (2013-2015)



1) Differences in sums possible due to the rounding procedure to ensure privacy in vocational education statistics. For further information see source.

2) Including banking, insurance, hotels and restaurants, transport.

3) Excluding training contracts registered at other competent authorities (chambers) outside this training sector, according to the vocational training act (*Berufsbildungsgesetz*).

Source: Federal Statistical Office, Fachserie 11 Reihe 3

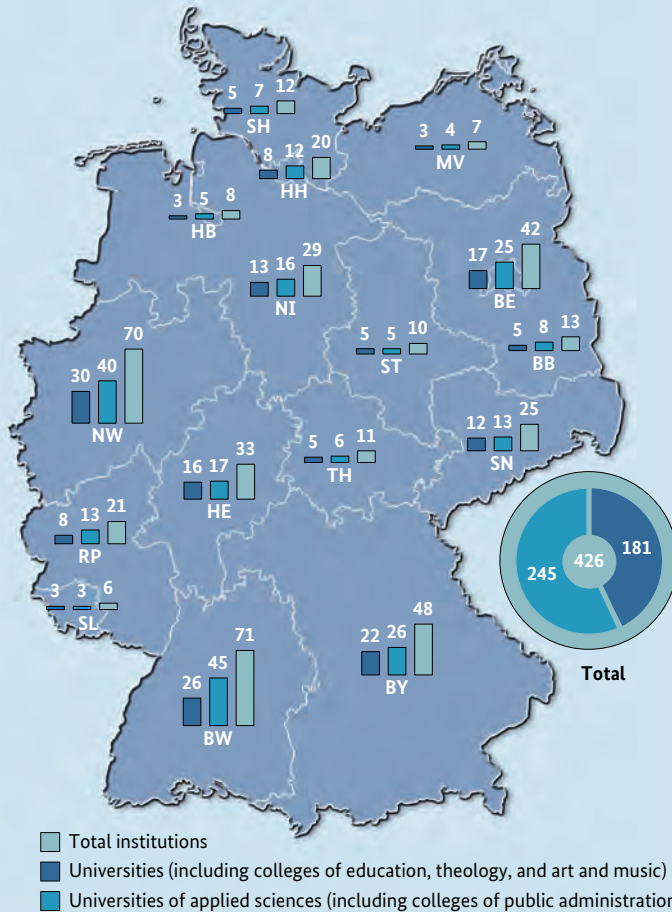
BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-40

Additional data: www.datenportal.bmbf.de/en/2.4.31

www.datenportal.bmbf.de/en/2.4.32

www.datenportal.bmbf.de/en/2.4.37

Fig. 41 Higher education institutions¹, by types and Länder (WS 2015/2016)



Explanation of abbreviations/symbols: WS = winter semester; for abbreviations of the Länder see glossary.

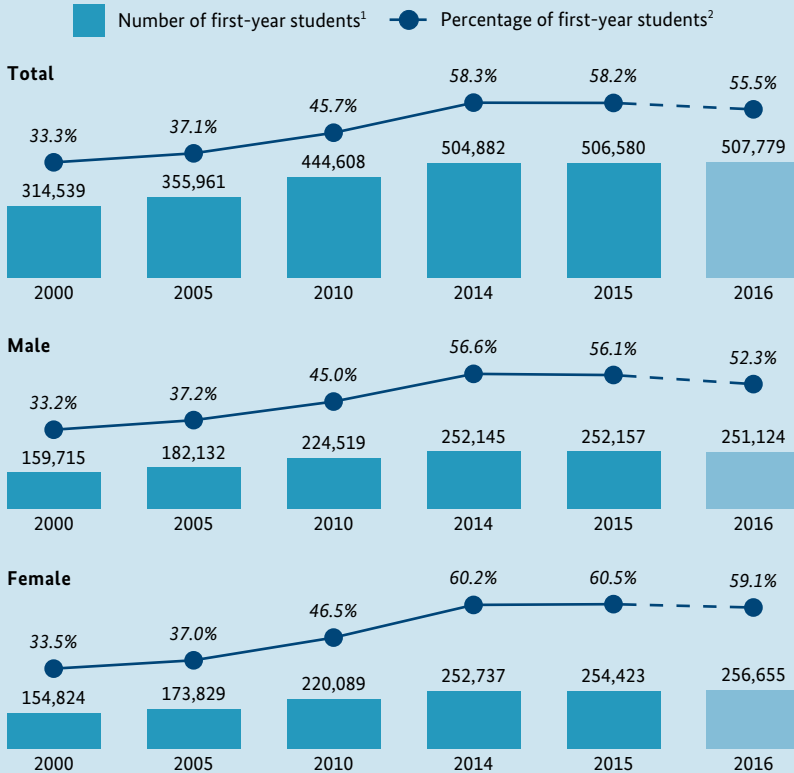
1) Including private institutions. Institutions with multiple locations are counted only once.

Source: Federal Statistical Office, Fachserie 11 Reihe 4.1; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-41

Additional data: www.datenportal.bmbf.de/en/2.5.1

Fig. 42 First-year students and percentage of first-year students, by sex (2000-2016)



1) Summer semester and following winter semester (e.g. 2010 = SS 2010 and WS 2010/2011). 2016: data are preliminary, source: Fachserie 11 Reihe 4.1 Vorbericht.

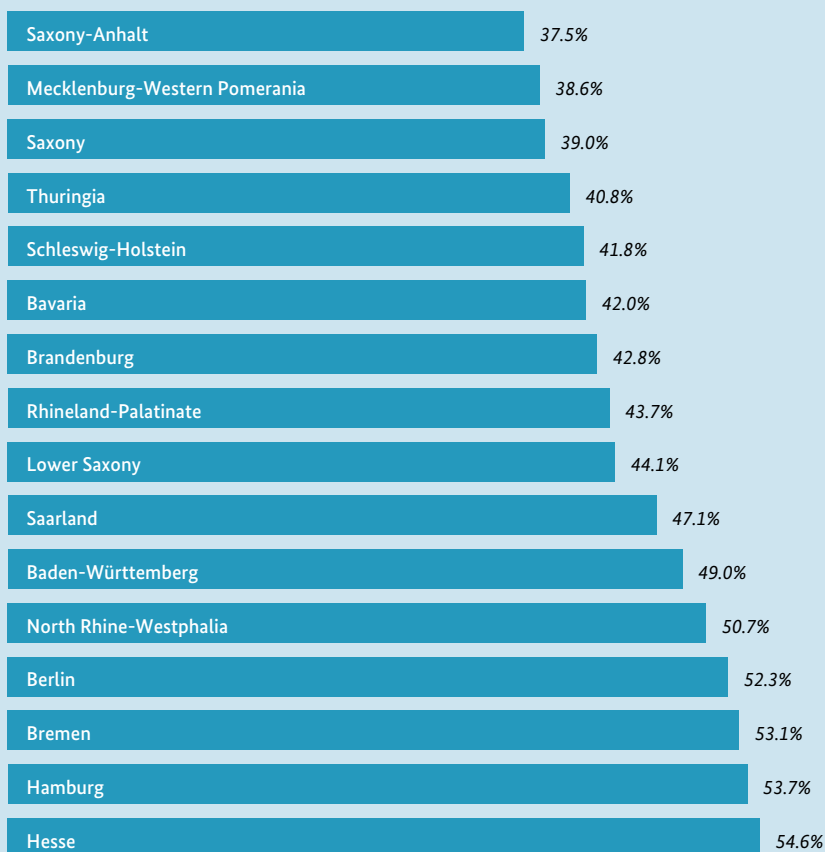
2) Share of students in their first semester (first enrolment) in the age-specific population (related to the year of birth). As of 2014, population data are based on 2011 Census. 2010: data are adjusted considering the double *Abitur* graduation classes. 2016: data are preliminary, source: Schnellmeldungsergebnisse der Hochschulstatistik.

Source: Federal Statistical Office, Fachserie 11 Reihe 4.3.1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-42

Additional data: www.datenportal.bmbf.de/en/2.5.73

Fig. 43 Percentage of first-year students¹, by *Land* in which the higher education entrance qualification has been acquired (2015)



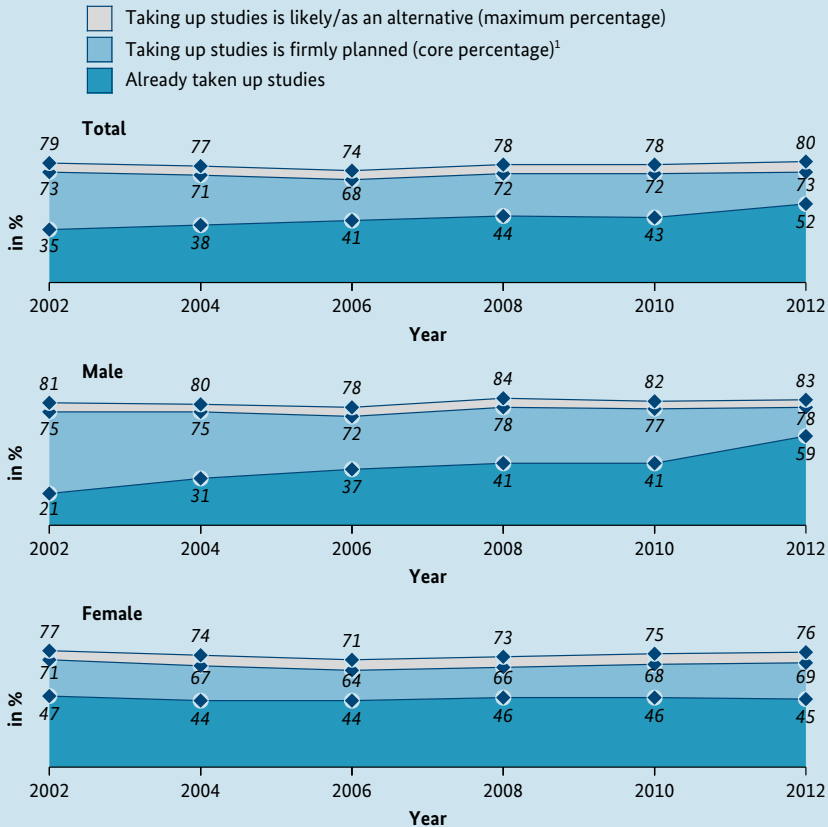
1) Share of students in their first semester (first enrolment) in the age-specific population (related to the year of birth).

Source: Federal Statistical Office, Fachserie 11 Reihe 4.3.1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-43

Additional data: www.datenportal.bmbf.de/en/2.5.73

Fig. 44 Percentage range of people who pursue higher education, by sex (2002-2012)



Note: For explanations of the percentage range of people who pursue higher education see glossary.

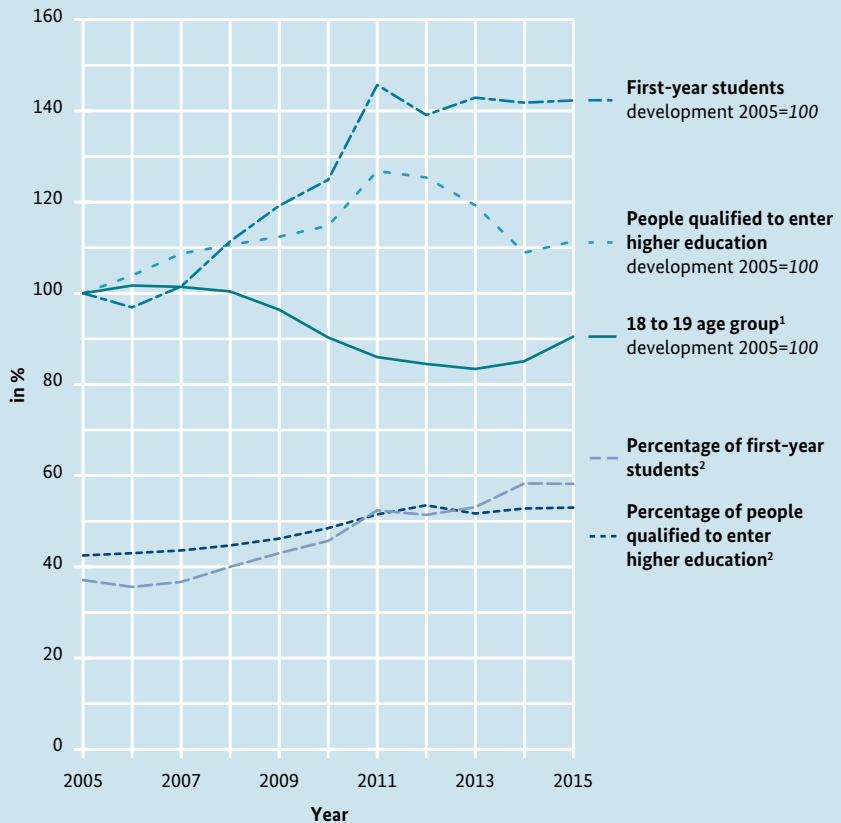
1) Excluding colleges of public administration and colleges of the armed forces. Since 2008, including vocational academies (*Berufsakademien*) and Baden-Württemberg Cooperative State University.

Source: Deutsches Zentrum für Hochschul- und Wissenschaftsforschung, Forum Hochschule 6/2014, Studienberechtigte 2012 ein halbes Jahr vor und ein halbes Jahr nach Schulabgang, table A5.8

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-44

Additional data: www.datenportal.bmbf.de/en/2.5.74

Fig. 45 Transition to higher education – development of basic figures (2005-2015)



1) As of 2011, findings are based on 2011 Census.

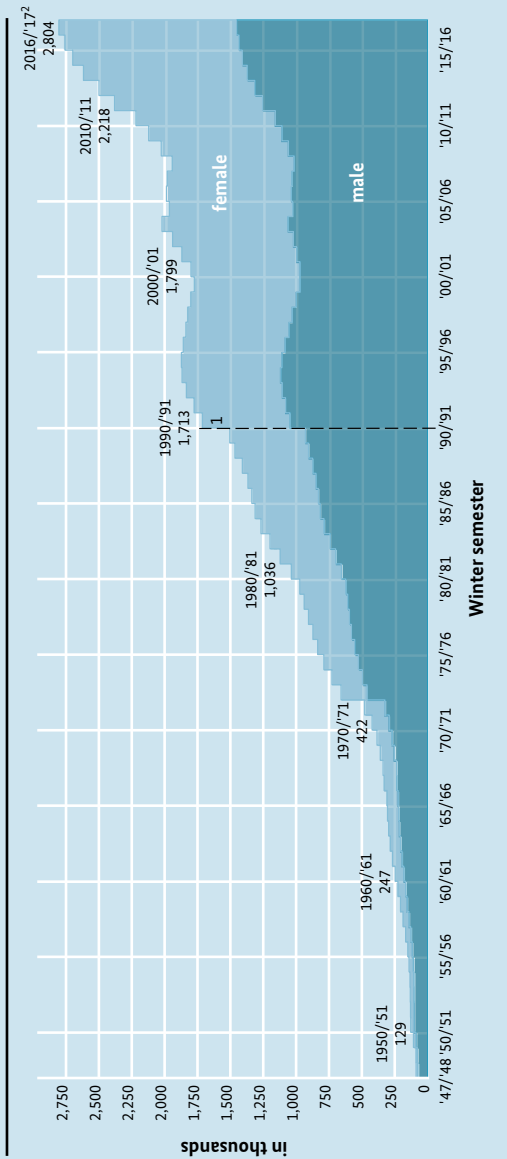
2) From 2007 to 2013, the figures are adjusted considering the double *Abitur* graduation classes. As of 2014, population data are based on 2011 Census.

Source: Federal Statistical Office (Fachserie 11 Reihe 4.3.1; GENESIS-Online Datenbank, Fortschreibung des Bevölkerungsstandes); calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-45

Additional data: www.datenportal.bmbf.de/en/2.5.75

Fig. 46 Number of students, by sex (winter semester 1947/1948-2016/2017)



1) Since 1990, including eastern German Länder and Berlin-East. 2) Preliminary results, source: Fachserie 11 Reihe 4.1 Vorbericht. Source: Federal Statistical Office, Fachserie 11 Reihe 4.1 and special evaluation

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-46
 Additional data: www.datenportal.bmbf.de/en/2.5.23 www.datenportal.bmbf.de/en/2.5.24

Demographic developments and the expansion of education in the 1960s led to a strong increase in the number of university students. Women in particular benefited from this development. While only 19.7% of all students in the 1950/1951 winter semester were women, this figure has risen continuously, reaching 48.2% in the 2016/2017 winter semester (preliminary result).

Fig. 47 Students, by types of higher education institution, subject groups and sex, share of foreign students (winter semester 2016/2017)¹

Subject group		Type of higher education institution		
		Total ²	Uni- versity ³	University of applied sciences ⁴
Humanities	t	346,463	337,097	9,366
	f	67.2%	67.1%	70.4%
	a	12.5%	12.5%	12.3%
Sports	t	27,736	27,010	726
	f	38.1%	38.2%	34.6%
	a	4.4%	4.4%	3.2%
Law, economics, social sciences	t	1,018,087	563,904	415,650
	f	56.5%	56.7%	56.8%
	a	9.9%	10.7%	9.7%
Mathematics, natural sciences	t	320,594	297,202	23,365
	f	47.0%	47.2%	44.1%
	a	11.5%	11.2%	14.6%
Human medicine, health sciences	t	170,791	120,107	50,684
	f	65.8%	62.9%	72.6%
	a	10.4%	12.6%	5.0%
Agricultural, forestry and nutritional sciences, veterinary medicine	t	63,411	39,742	23,669
	f	58.6%	63.4%	50.4%
	a	10.5%	12.9%	6.5%
Engineering	t	757,173	353,836	403,163
	f	22.6%	23.5%	21.9%
	a	17.2%	21.4%	13.6%
Art, art theory	t	94,148	64,706	29,442
	f	62.5%	63.1%	61.3%
	a	19.4%	22.9%	11.5%
Total⁵	t	2,803,916	1,808,254	956,928
	f	48.2%	51.1%	42.7%
	a	12.8%	13.8%	11.3%

Explanation of abbreviations/symbols: t = total; f = share of females; a = share of foreign students.

1) Preliminary results, source: Fachserie 11 Reihe 4.1 Vorbericht.

2) All higher education institutions including colleges of public administration.

3) Including colleges of education, colleges of theology, colleges of art and music.

4) Excluding colleges of public administration.

5) Including other studies and unclear.

Source: Federal Statistical Office, Fachserie 11 Reihe 4.1; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-47

Additional data: www.datenportal.bmbf.de/en/2.5.77

Fig. 48 Higher education graduates, by examination types and sex, share of foreign graduates (2011-2015)

Examination type		2011	2012	2013	2014	2015
Bachelor's degree ¹	t	152,484	183,169	207,401	229,282	245,658
	f	50.0%	49.3%	49.5%	48.6%	48.4%
	a	6.9%	6.6%	6.6%	6.6%	6.4%
Master's degree ¹	t	41,292	58,560	78,358	97,034	113,630
	f	44.2%	45.7%	46.2%	46.2%	45.8%
	a	23.2%	20.1%	18.5%	17.7%	17.8%
University degree ^{1,2,3}	t	94,018	80,290	64,054	50,675	39,049
	f	51.5%	51.9%	52.1%	53.7%	55.4%
	a	10.8%	10.7%	10.2%	10.2%	9.3%
Degree at university of applied sciences ²	t	38,638	25,804	17,381	12,074	10,044
	f	39.9%	39.6%	39.5%	37.9%	37.7%
	a	8.4%	8.6%	8.2%	6.3%	6.3%
Teacher's degree ⁴	t	38,758	38,708	41,519	43,291	43,989
	f	73.1%	73.5%	73.1%	73.3%	73.0%
	a	1.9%	1.9%	2.1%	2.1%	2.4%
Doctorate	t	26,981	26,807	27,707	28,147	29,218
	f	44.9%	45.4%	44.2%	45.5%	44.7%
	a	15.1%	15.4%	15.7%	16.4%	17.2%
Total degrees	t	392,171	413,338	436,420	460,503	481,588
	f	50.7%	50.7%	50.8%	50.5%	50.2%
	a	9.8%	9.6%	9.5%	9.5%	9.6%
Habilitation	t	1,563	1,646	1,567	1,627	1,627
	f	25.5%	27.0%	27.4%	27.8%	28.4%
	a	8.1%	8.9%	8.3%	9.1%	9.8%

Explanation of abbreviations/symbols: t = total; f = share of females; a = share of foreign students.

1) Excluding teacher's degree.

2) Excluding bachelor's degree and master's degree.

3) Including the examination groups "artistic degree" and "other degree".

4) Including teacher's bachelor degree and teacher's master degree.

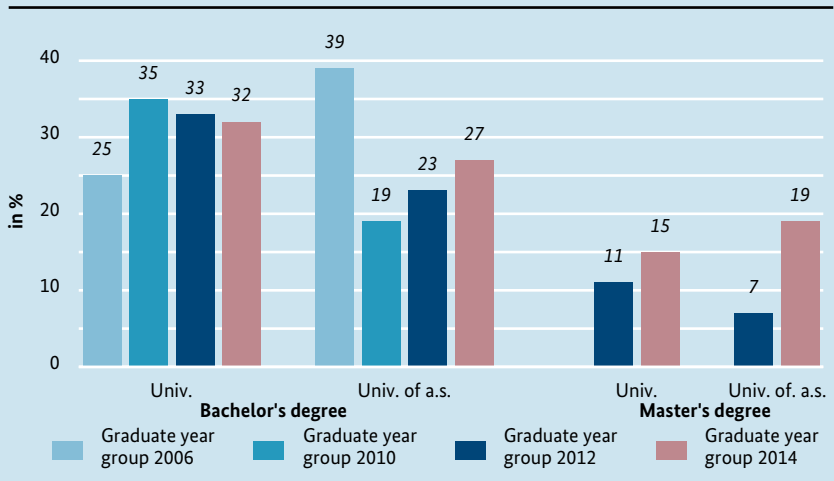
Source: Federal Statistical Office, Fachserie 11 Reihen 4.2, 4.4; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-48

Additional data: www.datenportal.bmbf.de/en/2.5.45

www.datenportal.bmbf.de/en/2.5.102

Fig. 49 Drop-out rates of German students, by degree types and types of higher education institution (graduate year groups 2006-2014)¹



Explanation of abbreviations: Univ. = university; Univ. of a.s. = university of applied sciences (*Fachhochschule*).

1) The drop-outs of the different degree programmes relate to different years of first-year students.

Source: Deutsches Zentrum für Hochschul- und Wissenschaftsforschung (Forum Hochschule 3/2012; Forum Hochschule 4/2014; Forum Hochschule 1/2017)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-49

Additional data: www.datenportal.bmbf.de/en/2.5.90

Fig. 50 Duration of studies with successful final examination, by examination types and sex (2011-2015)

Examination type		2011		2012		2013		2014		2015	
		SH	SS	SH	SS	SH	SS	SH	SS	SH	SS
Bachelor's degree ¹	Male	8.1	7.3	8.4	7.5	8.6	7.6	8.6	7.7	8.7	7.9
	Female	7.6	6.9	7.8	7.1	8.0	7.2	8.1	7.3	8.2	7.5
	Total	7.9	7.1	8.1	7.3	8.3	7.4	8.3	7.5	8.5	7.7
Master's degree ¹	Male	11.1	4.7	11.5	4.8	11.6	4.9	11.9	5.0	12.1	5.2
	Female	11.0	4.7	11.1	4.8	11.4	4.9	11.5	5.0	11.8	5.2
	Total	11.1	4.7	11.3	4.8	11.5	4.9	11.7	5.0	11.9	5.2
University degree ^{1,2}	Male	14.0	12.7	14.4	13.2	15.1	13.8	15.8	14.5	15.5	14.2
	Female	13.6	12.3	14.0	12.6	14.4	13.0	14.8	13.4	14.4	13.1
	Total	13.8	12.5	14.2	12.9	14.7	13.4	15.3	13.9	14.9	13.6
Degree at university of applied sciences ²	Male	11.1	10.1	11.4	10.3	10.7	9.8	10.1	9.4	9.4	8.7
	Female	10.3	9.4	10.5	9.5	9.7	8.9	9.1	8.3	8.2	7.4
	Total	10.8	9.8	11.0	10.0	10.3	9.4	9.7	8.9	9.0	8.2
Teacher's degree ³	Male	13.0	9.7	13.0	9.3	13.0	9.0	12.8	8.7	12.8	8.6
	Female	11.3	8.5	11.3	8.1	11.3	7.9	11.2	7.8	11.3	7.7
	Total	11.8	8.8	11.7	8.4	11.7	8.2	11.6	8.0	11.7	7.9
Total	Male	10.8	8.7	10.7	8.4	10.7	8.0	10.6	7.8	10.6	7.6
	Female	10.4	8.4	10.3	8.1	10.2	7.8	10.2	7.6	10.2	7.4
	Total	10.6	8.5	10.5	8.2	10.5	7.9	10.4	7.7	10.4	7.5

Explanation of abbreviations/symbols: SH = duration of studies by semesters in higher education; SS = duration of studies by subject-related semesters.

1) Excluding teacher's degree.

2) Excluding bachelor's degree and master's degree.



















3) Including teacher's bachelor degree and teacher's master degree.

Source: Federal Statistical Office, special evaluation

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-50

Additional data: www.datenportal.bmbf.de/en/2.5.80

Fig. 51 Doctorates and habilitations, by subject groups and sex (2015)

Subject group ¹	Doctorates		Habitations	
	Total number	Share of females	Total number	Share of females
Humanities ²	3,036	58.4% 	236	32.6% 
Sports	148	43.9% 	9	22.2% 
Law, economics, social sciences	3,692	37.2% 	201	30.8% 
Mathematics, natural sciences	9,950	38.9% 	247	26.7% 
Human medicine, health sciences	7,322	59.7% 	796	28.3% 
Agricultural, forestry and nutritional sciences, veterinary medicine	1,016	65.2% 	36	38.9% 
Engineering	3,736	19.3% 	79	8.9% 
Art, art theory	318	66.0% 	23	39.1% 
Total³	29,218	44.7% 	1,627	28.4% 

1) As of 2015, there has been a change in the subject classification that applies to the habilitation statistics but not yet to doctorates (examination statistics). For more information see source.

2) Formerly "Languages, cultural studies".

3) Doctorates including subjects outside the fields of study structure.

Source: Federal Statistical Office, Fachserie 11 Reihen 4.2, 4.4; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-51

Additional data: www.datenportal.bmbf.de/en/2.5.81

Fig. 52 Higher education staff, by subject groups and sex (2015)

Subject group ¹		Total staff	Academic and creative arts staff	Administrative, technical and other staff
Humanities	t	39,456	35,771	3,685
	f	55.1%	51.9%	86.0%
Sports	t	4,082	3,534	548
	f	43.0%	40.0%	62.4%
Law, economics, social sciences	t	97,925	88,766	9,159
	f	44.2%	40.5%	79.8%
Mathematics, natural sciences	t	72,376	56,296	16,080
	f	38.6%	31.6%	63.1%
Human medicine, health sciences	t	170,163	66,572	103,591
	f	70.1%	47.8%	84.4%
Agricultural, forestry and nutritional sciences, veterinary medicine	t	13,049	8,677	4,372
	f	54.2%	47.9%	66.8%
Engineering	t	94,812	76,628	18,184
	f	23.7%	19.2%	42.8%
Art, art theory	t	20,517	19,300	1,217
	f	42.5%	41.5%	59.8%
Central facilities ²	t	116,856	28,304	88,552
	f	58.7%	52.7%	60.6%
Central facilities of university clinics ³	t	55,149	1,463	53,686
	f	68.7%	58.9%	69.0%
Total	t	684,385	385,311	299,074
	f	52.4%	38.5%	70.4%

Explanation of abbreviations/symbols: t = total; f = share of females.

1) As of 2015, there has been a change in the subject classification so parts of the data are of limited comparability with the previous years.

2) Excluding clinic specific facilities.

3) Only human medicine.

Source: Federal Statistical Office, Fachserie 11 Reihe 4.4; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-52

Additional data: www.datenportal.bmbf.de/en/2.5.82

Fig. 53 Share of males and females in various status and degree groups in the field of higher education (1993/2004/2015)



1) In their first semester (first enrolment).

2) Data of winter semester (e.g. 2015 = WS 2015/2016).

3) Excluding doctorates.

Source: Federal Statistical Office, Fachserie 11 Reihen 4.1, 4.2, 4.4; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-53

Additional data: www.datenportal.bmbf.de/en/2.5.83

Fig. 54 Bafög – number of recipients; expenditure, by amounts and types of aid (2011-2015)

Recipients/Financial amount	2011	2012	2013	2014	2015
Recipients					
Pupils ¹	319,206	308,288	292,815	278,194	259,078
Students	643,578	671,059	665,928	646,576	611,377
Total	962,834	979,347	958,743	924,770	870,455
Fully funded	47.6%	46.7%	46.5%	46.4%	45.9%
Partly funded	52.4%	53.3%	53.5%	53.6%	54.1%
Average monthly number²	615,368	630,164	619,620	596,380	562,170
Financial amount					
Total (in thousands of euros)	3,180,046	3,277,975	3,240,623	3,142,077	2,971,636
Grant	65.3%	64.9%	64.8%	64.8%	64.9%
Interest-free loan	34.7%	35.1%	35.2%	35.2%	35.1%
Average amount of financial aid per capita³ (in euros per month)	431	433	436	439	441

Explanation of abbreviations/symbols: Bafög = Federal Training Assistance Act.

1) Until 2011, the recipients of distant learning institutions are included in total only, since 2012 they are classified as belonging to the group of pupils.

2) Arithmetic mean of a year's twelve average monthly numbers.

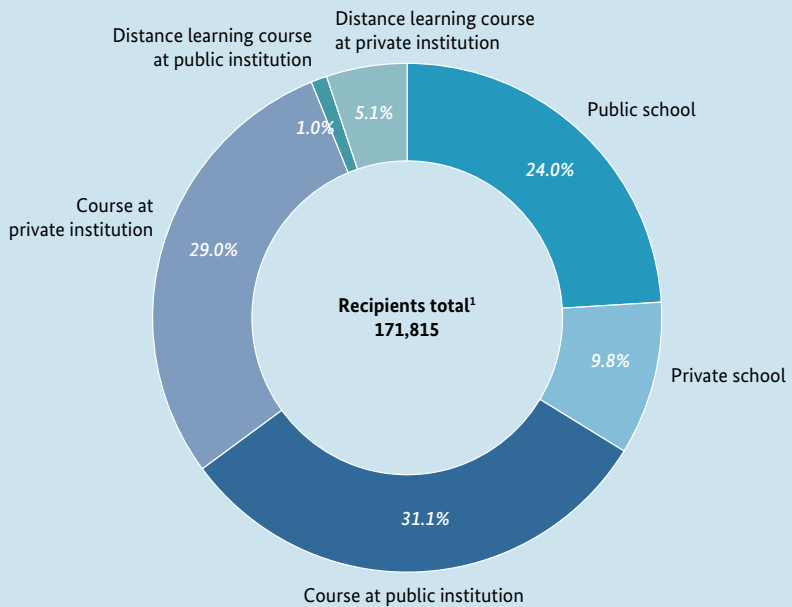
3) With regard to the average monthly number.

Source: Federal Statistical Office, Fachserie 11 Reihe 7

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-54

Additional data: www.datenportal.bmbf.de/en/2.6.11

Fig. 55 AFBG ("Meister-BAföG") – recipients, by continuing education institutions (2014)



Explanation of abbreviations/symbols: AFBG = Upgrading Training Assistance Act; BAföG = Federal Training Assistance Act.

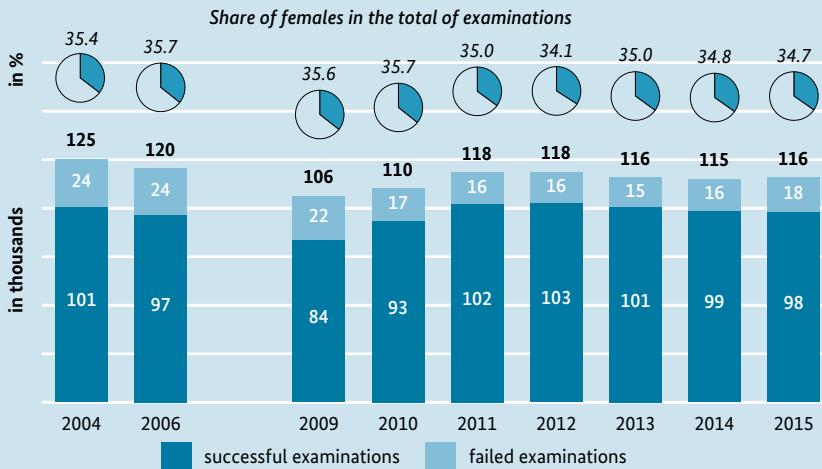
1) Including foreign case (*Auslandsfall*, AFBG, section 5(2)): 5 recipients.

Source: Federal Statistical Office, Fachserie 11 Reihe 8

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-55

Additional data: www.datenportal.bmbf.de/en/2.6.8

www.datenportal.bmbf.de/en/2.6.9

Fig. 56 Further training examinations / Meister examinations, by sex (2004-2015)¹

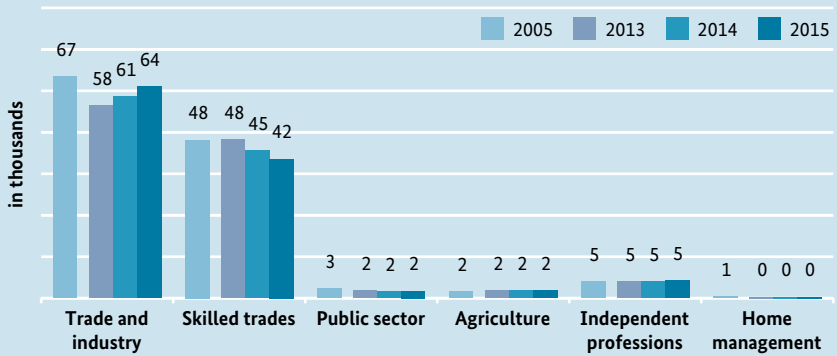
1) Due to the redesign of the statistic in 2007, the comparability of the results before and after this change is limited. For 2007 and 2008 no data has been published of the field further training examination / Meister examination. Possible rounding differences.

Source: Federal Statistical Office, Fachserie 11 Reihe 3; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-56
 Additional data: www.datenportal.bmbf.de/en/2.7.13

The sharp drop in the number of *Meister* examinations until 2009 can be attributed to two factors: First, the number of new training contracts fell by about 74,000 between 1999 and 2009 (about 62,000 of them in the skilled trades alone). This reduces the number of potential participants in *Meister* courses. Second, as a result of the reform of the Craft Trades Law in early 2004, a *Meister* qualification is no longer necessary to run a business in more than half of all skilled trades. After the low in 2009, an increase was recorded until 2012, in particular in the number of successful examinations, while the numbers for the following years slightly declined.

Fig. 57 Further training examinations / Meister examinations, by training sectors (2005/2013-2015)¹



1) Due to the redesign of the statistic in 2007, the comparability of the results before and after this change is limited.
 Source: Federal Statistical Office, Fachserie 11 Reihe 3

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-57
 Additional data: www.datenportal.bmbf.de/en/2.7.13



Fig. 58 Successful Meister examinations, by training sectors (2005-2015)¹



1) Due to the redesign of the statistic in 2007, the comparability of the results before and after this change is limited. For 2007 and 2008 no data has been published of the field further training examination / Meister examination.

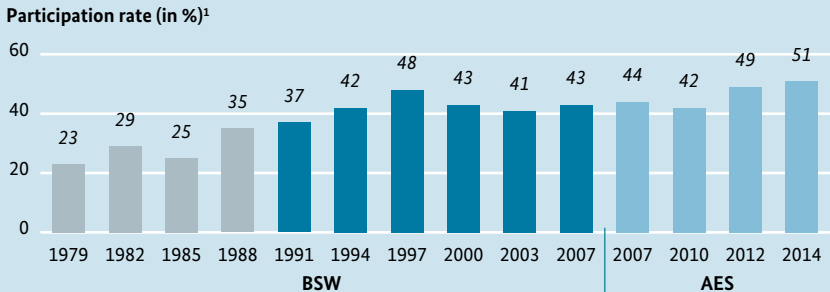
Source: Datenreport zum Berufsbildungsbericht 2009, table B5.2-4 (updated)

Data: Federal Statistical Office, Fachserie 11 Reihe 3

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-58

Additional data: www.datenportal.bmbf.de/en/2.7.14

Fig. 59 Participation in continuing education in Germany (1979-2014)



Explanation of abbreviations/symbols: BSW = continuing education reporting system (*Berichtssystem Weiterbildung*); AES = Adult Education Survey.

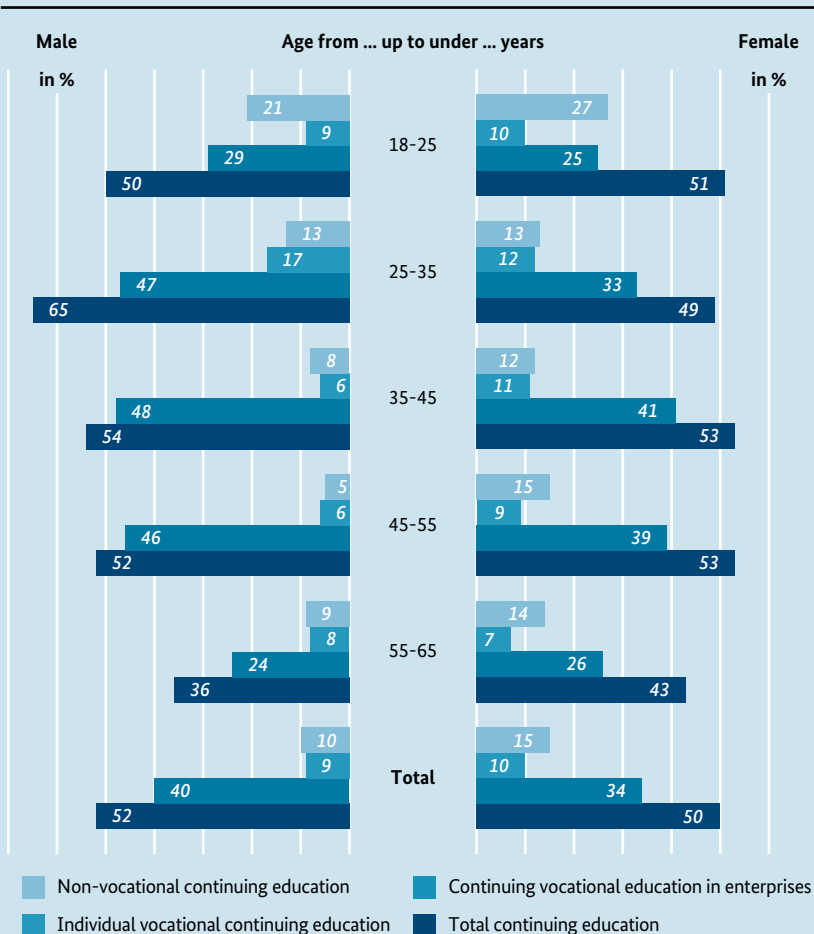
1) As from 1991, including eastern German *Länder* and Berlin-East. Basis until 2007: persons aged 19 to 64. Basis as of 2010: persons aged 18 to 64.

Source: TNS Infratest Sozialforschung, Adult Education Survey 2014

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-59
 Additional data: www.datenportal.bmbf.de/en/2.7.24

In 2014, 51% of the 18 to 64 year olds took part in continuing education. This value confirms the trend of growing participation in continuing education noted since 2012. The participation rate in continuing education varies widely among different groups of persons. Younger people participate more often than older people. The age group of the 25 to 34 year old shows the highest participation rate; and the higher the level of education, the greater the participation in continuing education.

Fig. 60 Participation in continuing education, by age groups and sex (2014)



Source: TNS Infratest Sozialforschung, Adult Education Survey 2014

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-60
 Additional data: www.datenportal.bmbf.de/en/2.7.11

Fig. 61 Participation rates in continuing education, by age groups, highest school-leaving qualification and highest vocational qualification (2012/2014)

Resident population aged 18 to 64	Participation rate (in %)							
	Continuing education, total		Vocational continuing education in enterprises		Individual vocational continuing education		Non-vocational continuing education	
	2012	2014	2012	2014	2012	2014	2012	2014
Age group								
Age from ... up to under ... years								
18 - 25	49	50	23	27	12	9	22	24
25 - 35	51	58	38	40	10	14	12	13
35 - 45	52	53	40	45	9	9	11	10
45 - 55	51	53	40	42	9	7	10	10
55 - 65	38	39	27	25	6	8	12	12
Highest school-leaving qualification¹								
Secondary general school certificate or below	32	36	23	27	5	6	8	8
Intermediate school certificate	51	53	40	41	8	9	11	11
Entrance qualification for universities of applied sciences or higher	64	62	44	43	14	13	18	18
Highest vocational qualification								
Without any vocational qualification	37	39	18	22	9	7	15	15
Training / full-time vocational school	44	47	33	36	7	8	10	9
Meister / trade and technical school	65	66	53	58	9	11	15	11
Higher education degree	68	67	51	48	15	15	17	18
Total	49	51	35	37	9	9	13	12

1) The groups by highest school-leaving qualifications are summed up on the base of the very differentiated AES questionnaire. Due to the weak database, the following groups are not listed: the groups that (a) did not state a school-leaving qualification and (b) did not obtain a school-leaving qualification because they still attend school.
Source: TNS Infratest Sozialforschung, Adult Education Survey 2014

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-61
 Additional data: www.datenportal.bmbf.de/en/2.7.15

Fig. 62 Participation, amount of time and costs of continuing vocational education in enterprises¹, by economic sectors (2010)

Economic sector ²	Participation rate (in %)			Participation		Costs for courses per employee (in euros)
	Total employed	By sex		Per employee (in hours)	Per participant (in hours)	
		Male	Female			
B 5-9 Mining and quarrying	52.0	53.3	46.8	10	20	676
C 10-12 Mfr. of food products, beverages and tobacco	45.7	46.8	44.4	7	16	u
C 13-15 Mfr. of textiles and textile products; Mfr. of leather and leather products	45.7	49.2	41.4	10	21	u
C 17-18 Mfr. of paper and paper products; printing and reproduction	45.9	49.6	35.9	9	20	(454)
C 19-23 Mfr. of coke and refined petroleum products, chemicals, chemical products, basic pharmaceutical products and preparations, rubber and plastic products, and of other non-metallic mineral products	48.2	48.5	47.5	10	21	(718)
C 24-25 Mfr. of basic metals and fabricated metal products	38.8	39.3	36.4	8	22	(542)
C 26-28, 33 Mfr. of computer, electronic and optical products; Mfr. of machinery and equipment n.e.c.; repair and installation of machinery and equipment	58.6	60.1	52.7	14	24	u
C 29-30 Mfr. of transport equipment	45.2	44.9	46.8	11	24	801
C 16, 31-32 Mfr. of wood and wood products; furniture; other manufacturing	37.4	35.8	41.2	6	15	(351)
D + E 35-39 Electricity; water supply, sewerage, waste management and remediation activities	56.6	58.5	50.6	14	25	(1,040)
F 41-43 Construction	42.7	44.2	30.3	7	17	370
G 45 Wholesale and retail trade and repair of motor vehicles and motorcycles	56.4	58.2	49.5	14	26	(847)
G 46 Wholesale trade, except of motor vehicles and motorcycles	39.9	43.7	33.8	6	15	u
G 47 Retail trade, except of motor vehicles and motorcycles	45.5	57.1	39.5	9	21	u
H 49-53 Transportation and storage	49.3	51.8	41.3	10	20	u
I 55-56 Accommodation and food service activities	42.3	43.6	41.5	5	12	(228)
J 58-63 Information and communication	57.1	58.5	53.8	20	36	u
K 64-65 Financial and insurance activities	55.8	55.0	56.4	17	31	(1,426)
K 66 Activities auxiliary to financial services and insurance activities	26.1	22.6	29.9	12	45	u
L+M Real estate activities; professional, scientific and technical activities	39.8	39.4	40.3	8	19	u
Total	47.0	49.0	43.2	11	23	734

Explanation of abbreviations/symbols: Mfr. = Manufacture; u = no data because the numerical value is not sufficiently reliable; () = limited informational value because numerical value is of limited statistical reliability.

1) In enterprises that provide continuing vocational training.

2) According to the classification of economic activities (NACE Rev. 2).

Source: Federal Statistical Office, Fourth European Continuing Vocational Training Survey 2010 (CVTS4)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-62

Additional data: www.datenportal.bmbf.de/en/2.7.22

International comparison

Globalization has become a fact. The question is no longer whether to act globally but how good we are at it. International comparisons provide a means of orientation. The results show that Germany is in an excellent position!

On the European Commission's Innovation Index 2016, Germany ranks fifth in the leading group and with regard to world-market relevant patents per one million inhabitants, Germany is top placed in international comparison. The same applies to the scientific publications per one million inhabitants. In 2015, Germany ranked with 1,340 publications ahead of the USA and about 27% ahead of the EU average.

In the area of education, Germany is also maintaining a good position: The results of PISA 2015 show that Germany is significantly above the OECD average (mathematics: 490 points, reading: 493 points, science: 493 points) in all three domains (mathematics: 506 points, reading: 509 points, science: 509 points). Germany has improved its results in all the three tested domains in comparison to the first PISA survey in 2000.

Internationalization is one of the Federal Government's priorities in this legislative period. It is pursuing the aim of making even better use of the potential and opportunities of international cooperation. At the same time, Germany will face up to its global responsibility, namely to find pioneering answers to the challenges of globalization and to shape solutions – for example for an even more sustainable economy, the turnaround of the energy system or in the context of skilled staff, migration and professional mobility. Furthermore, international collaborations provide an opportunity to define Germany's role more clearly in the merging economic, science and education areas and to increase efficiently the presence of German science and research abroad. Europe is a mainstay of Germany's international commitment.

Further information

Internet portals:

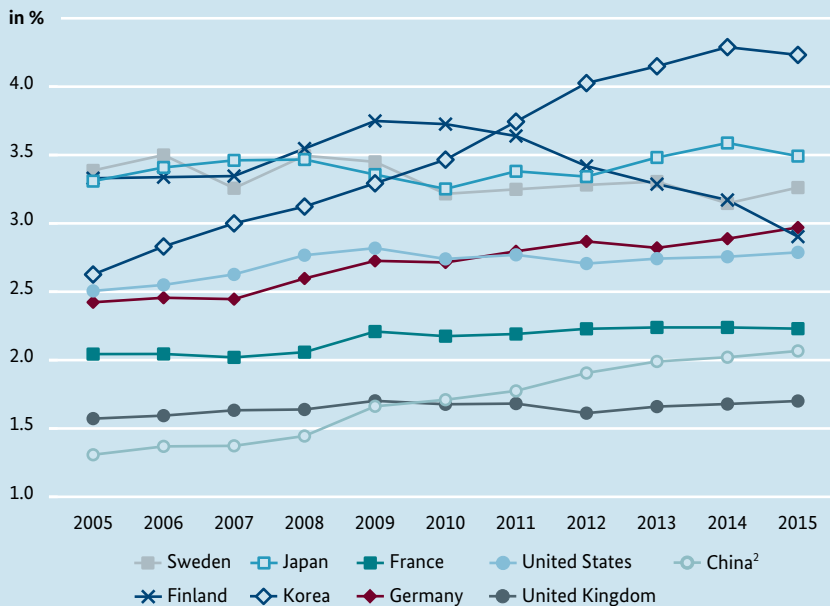
- OECD database (<http://stats.oecd.org/>)
- Eurostat database (<http://ec.europa.eu/eurostat/data/database/>)
- German Education Server (www.bildungsserver.de/innovationsportal/)
- Eurydice – Education Information Network in the European Community (https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Main_Page)

Publication:

- Education at a Glance 2016 / OECD indicators (www.oecd.org/edu/eag.htm)



Fig. 63 Gross domestic expenditure on research and development (GERD), share of gross domestic product in selected countries (2005-2015)¹



1) Some figures are provisional, estimated, or only partly comparable with figures from previous years (see original edition of "Main Science and Technology Indicators").

2) Excluding Hong Kong.

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 19 (updated)

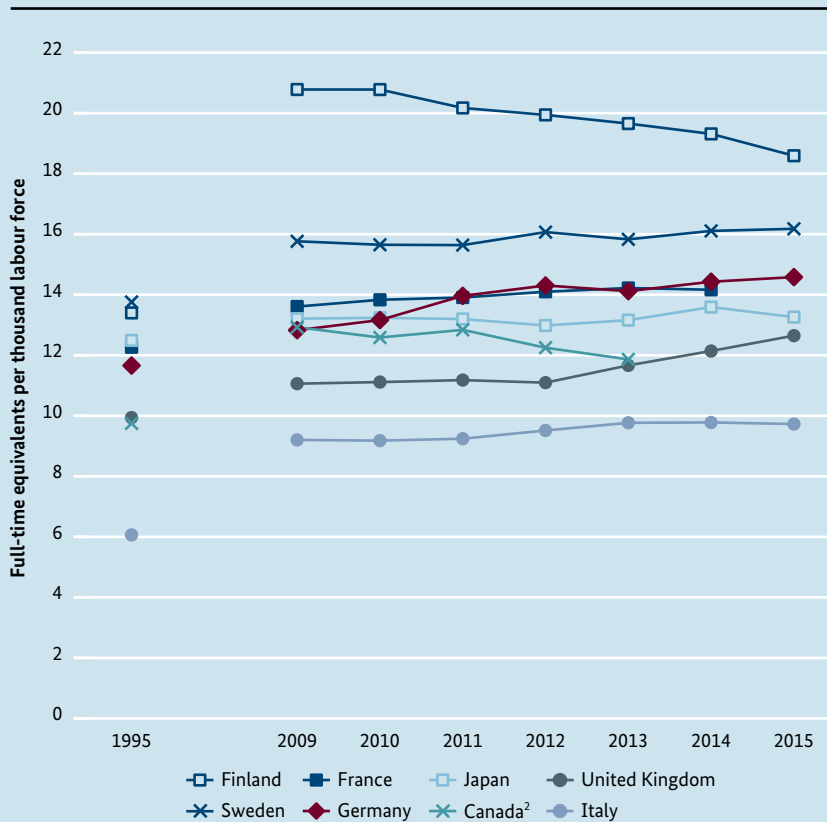
Data: OECD ("Main Science and Technology Indicators 2016/2"); Federal Statistical Office (Budget für Bildung, Forschung und Wissenschaft 2014/2015)

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-63

Additional data: www.datenportal.bmbf.de/en/1.3.1

The indicator for selected countries shows different dynamics: Behind Korea, Japan and Sweden belong to the leading countries. Since 2008, Germany has been on an upward trend, and since 2011, Germany has been slightly ahead of the USA.

Fig. 64 R&D personnel in selected OECD countries, based on full-time equivalents (1995/2009-2015)¹



Explanation of abbreviations/symbols: R&D = research and development; OECD = Organisation for Economic Co-operation and Development.

1) Some figures are provisional, estimated, or only partly comparable with figures from previous years (see original edition of "Main Science and Technology Indicators").

2) 2014 and 2015: no data available.

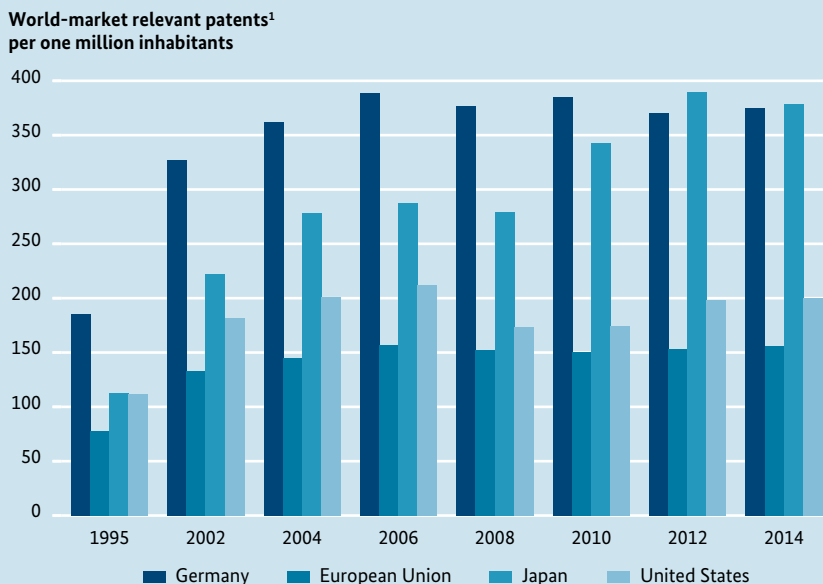
Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 37 (updated)

Data: OECD ("Main Science and Technology Indicators 2016/2")

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-64

Additional data: www.datenportal.bmbf.de/en/1.7.11

Fig. 65 World-market relevant patents: Germany, European Union, Japan and United States (1995/2002-2014)



1) Inventions registered in the European Patent Office or at the World Intellectual Property Organization (WIPO).

Source: Bundesbericht Forschung und Innovation 2016, EB I Tab. 41 (updated)

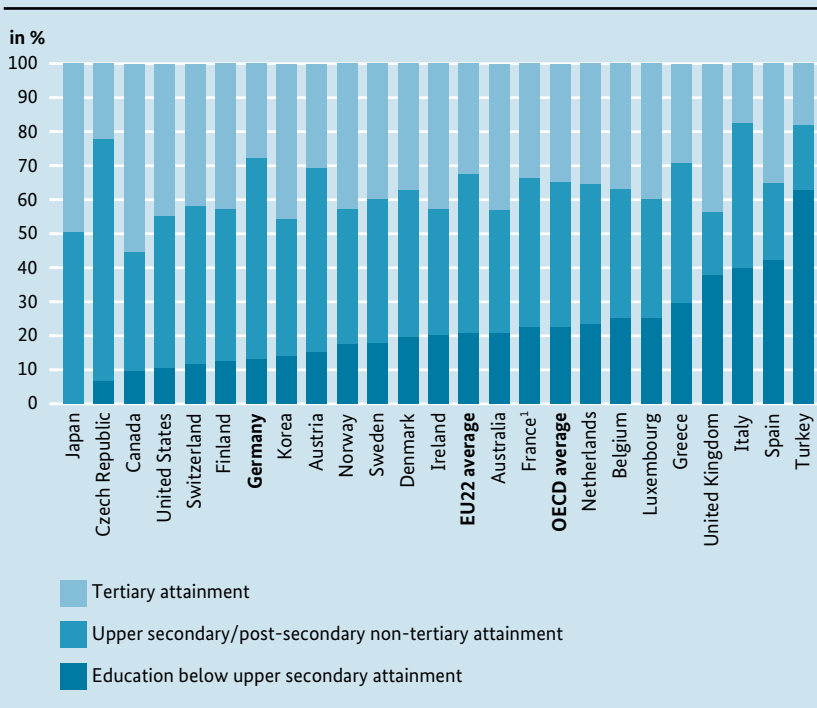
Data: OECD; EUROSTAT; World Intellectual Property Organization, WOPATENT; World Bank, special evaluation; European Patent Office (EPAPAT, PATSTAT); Fraunhofer Institute for Systems and Innovation Research, calculations

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-65

Additional data: www.datenportal.bmbf.de/en/1.8.4

World-market relevant patents are inventions filed in Europe or with the World Intellectual Property Organization. Such patents are particularly important for Germany's export-oriented economy, as they help ensure that the invention is protected even beyond the domestic market. The number of patents per million inhabitants in Germany increased by about 15% between 2002 and 2014. In 2014, Germany listed 375 registrations; that was about 140% above the EU average.

Fig. 66 Educational attainment: Adult population in selected OECD countries (2015)



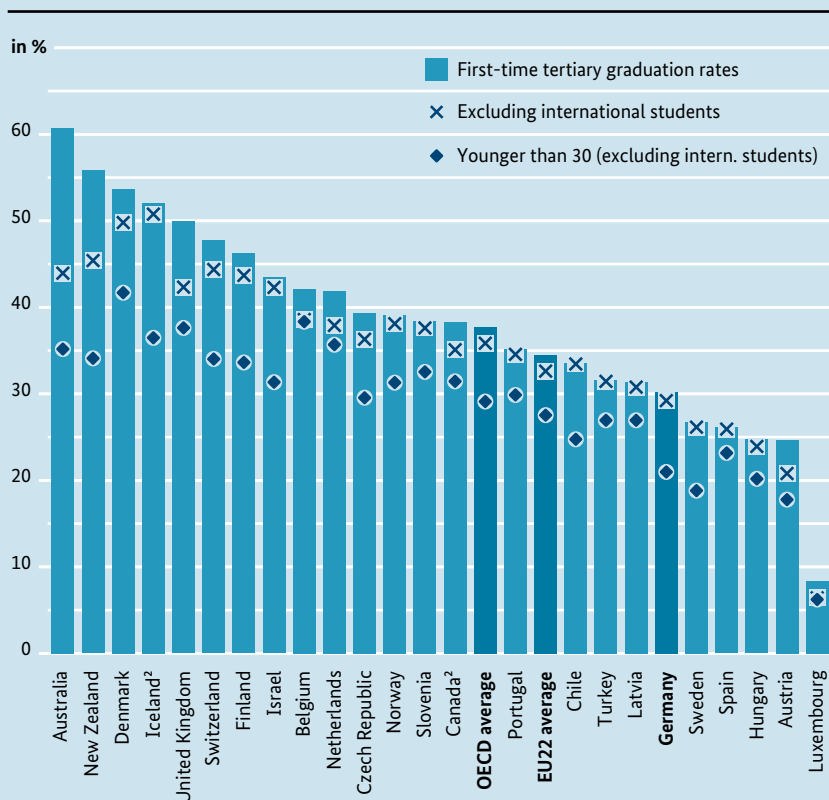
Explanation of abbreviations/symbols: OECD = Organisation for Economic Co-operation and Development.
1) Year of reference 2014 instead of 2015.

Source: OECD, Education at a Glance 2016, table A1.1.a; calculations of the DZHW

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-66
Additional data: www.datenportal.bmbf.de/en/0.56

This graph illustrates that Germany is well-positioned in international comparison. About 87% of the adult population has achieved at least an upper secondary degree, while the OECD average is 81%. That is mainly a result of the well-established vocational training system and the dual training system.

Fig. 67 First-time graduation rates¹ for ISCED level 6 (bachelor's or equivalent) in selected OECD countries (2014)



Explanation of abbreviations/symbols: ISCED = International Standard Classification of Education 2011 (see glossary); OECD = Organisation for Economic Co-operation and Development.

1) Net graduation rates measure the share of graduates of a specific age cohort. The rates indicate the extent of the share of young adults who successfully complete academic or professional education programmes at tertiary level. The net graduation rates shown in this figure are calculated as sum of age-specific graduation rates (the number of graduates of individual age cohorts is divided by the corresponding population).

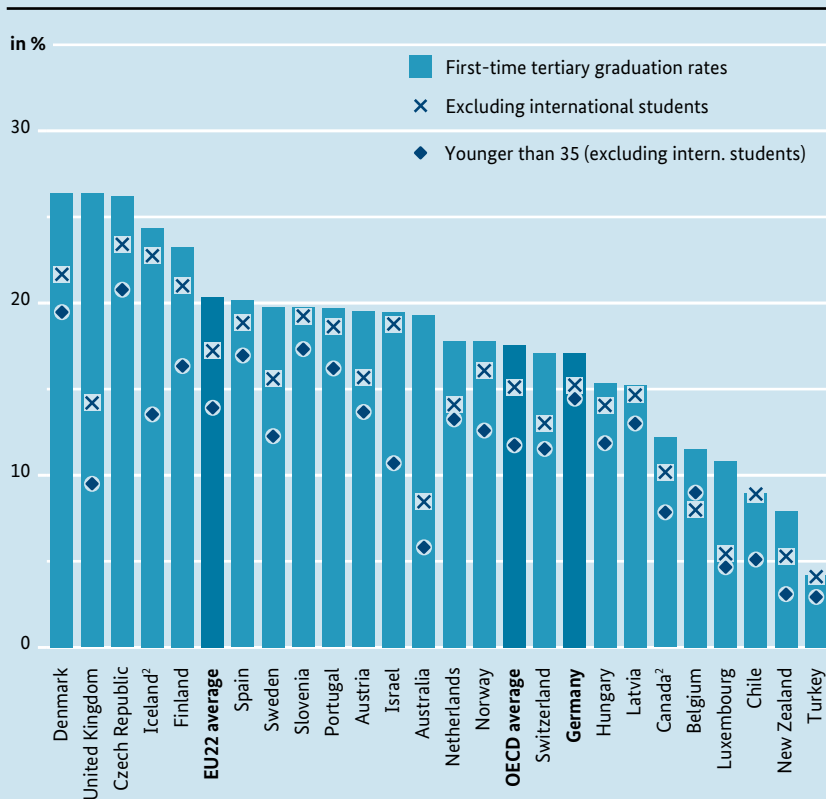
2) Year of reference 2013 instead of 2014.

Source: OECD, Education at a Glance 2016, table A3.1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-67

Additional data: www.datenportal.bmbf.de/en/2.5.103

Fig. 68 First-time graduation rates¹ for ISCED level 7 (master's or equivalent) in selected OECD countries (2014)



Explanation of abbreviations/symbols: ISCED = International Standard Classification of Education 2011 (see glossary); OECD = Organisation for Economic Co-operation and Development.

1) Net graduation rates measure the share of graduates of a specific age cohort. The rates indicate the extent of the share of young adults who successfully complete academic or professional education programmes at tertiary level. The net graduation rates shown in this figure are calculated as sum of age-specific graduation rates (the number of graduates of individual age cohorts is divided by the corresponding population).

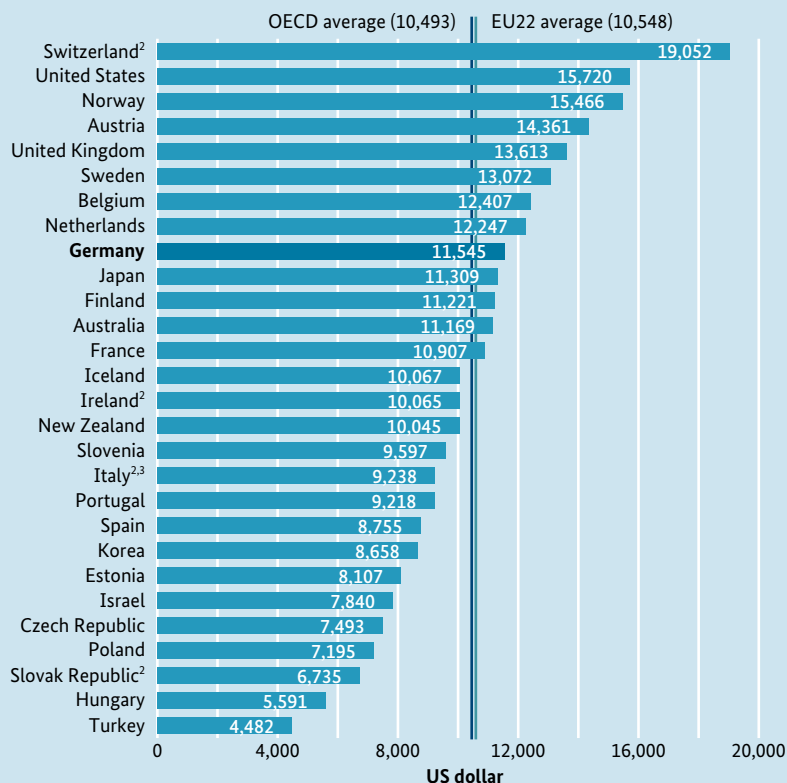
2) Year of reference 2013 instead of 2014.

Source: OECD, Education at a Glance 2016, table A3.1

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-68

Additional data: www.datenportal.bmbf.de/en/2.5.103

Fig. 69 Annual expenditure on educational institutions per pupil/student from primary to tertiary education (2013)¹



Explanation of abbreviations/symbols: OECD = Organisation for Economic Co-operation and Development.

1) Expenditure at a particular level of education is calculated by dividing the total expenditure on educational institutions at that level by the corresponding full-time equivalent enrolment. Expenditure is converted into equivalents US dollar by dividing the national currency figure by the purchasing power parity (PPP) index for the gross domestic product (GDP). The 2013 exchange rate for Germany between US dollar (PPP) and euro was 1.287.

2) Public institutions only (for Slovak Republic tertiary level only; for Italy excluding tertiary education).

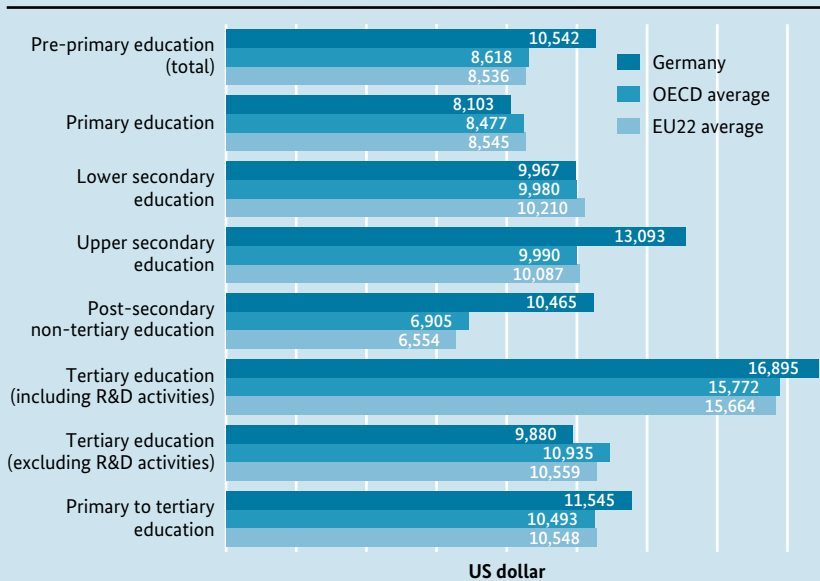
3) Excluding post-secondary non-tertiary education.

Source: Bildungsfinanzbericht 2016, table/figure 5.1.1-1; **Data:** OECD

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-69

Additional data: www.datenportal.bmbf.de/en/2.1.17

Fig. 70 Annual expenditure on educational institutions per pupil/student, by levels of education (2013)¹



Explanation of abbreviations/symbols: R&D = research and development; OECD = Organisation for Economic Co-operation and Development.

1) Expenditure at a particular level of education is calculated by dividing the total expenditure on educational institutions at that level by the corresponding full-time equivalent enrolment. Expenditure is converted into equivalents US dollar by dividing the national currency figure by the purchasing power parity (PPP) index for the gross domestic product (GDP). The 2013 exchange rate for Germany between US dollar (PPP) and euro was 1.287.

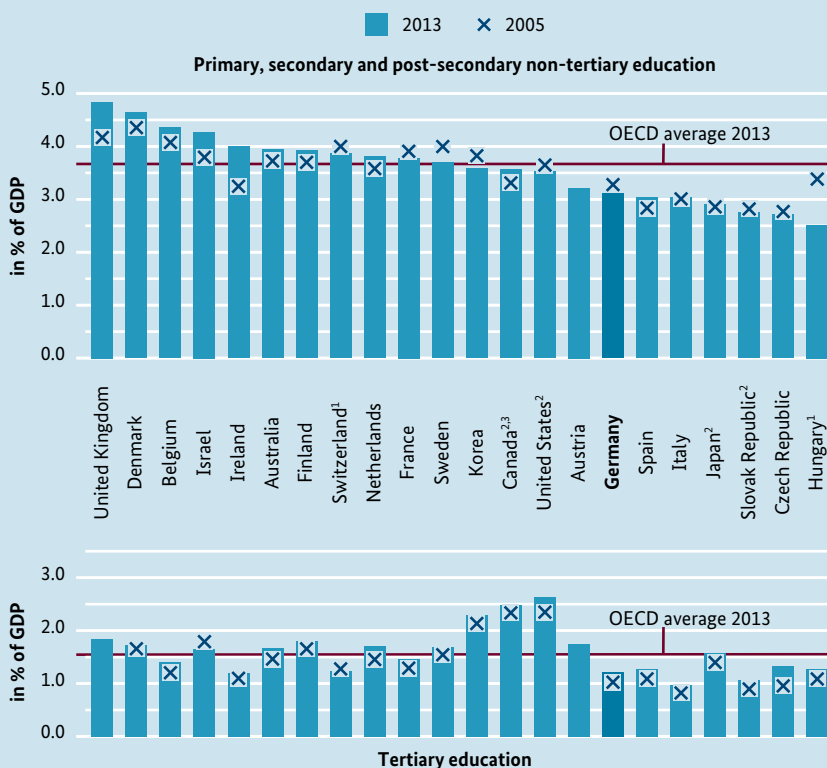
Source: Bildungsfinanzbericht 2016, table 5.1.1-1, figure 5.1.1-2; **Data:** OECD

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-70

Additional data: www.datenportal.bmbf.de/en/2.1.17
www.datenportal.bmbf.de/en/2.1.23

The expenditure on educational institutions per student is an indicator of the staff and financial resources available to the institutions in question. A look at the levels of education shows the differences in spending as well as Germany's position compared to the OECD/EU22 average. Germany is well above the average values most notably in post-secondary non-tertiary education and in tertiary education (including R&D activities).

Fig. 71 Expenditure on educational institutions as a percentage of GDP, by levels of education in selected OECD countries, from public and private sources (2005/2013)



Explanation of abbreviations/symbols: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development.

Note: For 2005, there are no data available for some countries.

1) Public expenditure only (for Switzerland, in tertiary education only).

2) Some levels of education are included in others.

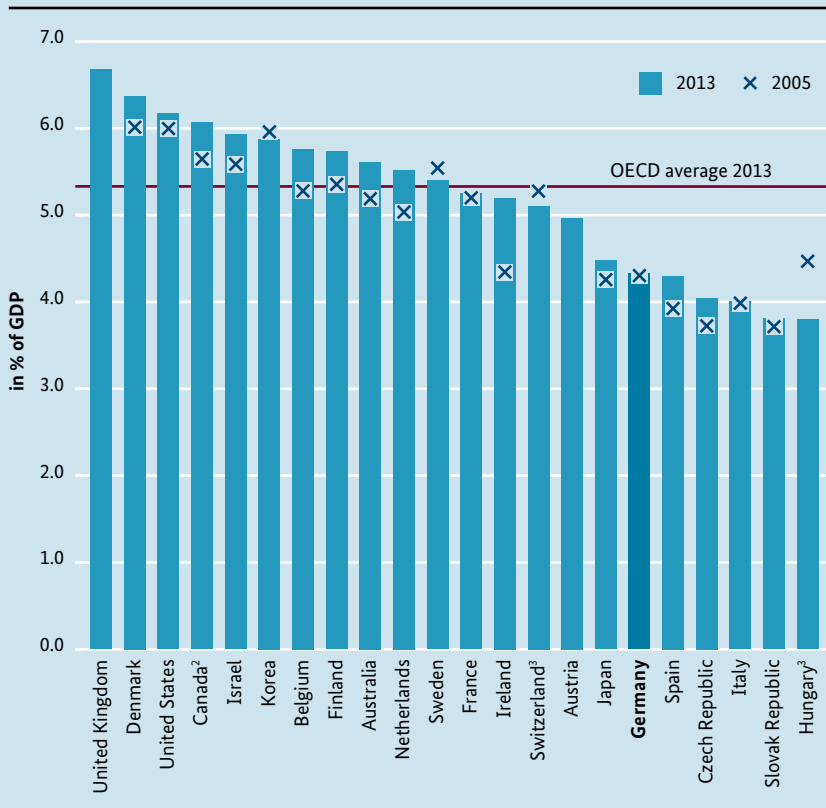
3) Year of reference 2012 instead of 2013.

Source: OECD, Education at a Glance 2016, table B2.2

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-71

Additional data: www.datenportal.bmbf.de/en/2.1.22

Fig. 72 Expenditure on primary to tertiary education institutions¹ as a percentage of GDP, in selected OECD countries, from public and private sources (2005/2013)



Explanation of abbreviations/symbols: GDP = gross domestic product; OECD = Organisation for Economic Co-operation and Development.

Note: For 2005, there are no data available for some countries.

1) Excluding undistributed programmes.

2) Year of reference 2012 instead of 2013.

3) Public expenditure only (for Switzerland, in tertiary education only).

Source: OECD, Education at a Glance 2016, table B2.2/chart B2.3

BMBF's Data Portal: Figure link: www.datenportal.bmbf.de/fig-72

Additional data: www.datenportal.bmbf.de/en/2.1.22

Glossary

Academic and creative arts staff

The group of academic and creative arts staff at institutions of higher education mainly includes members of established academic staff, senior administrators and directors, and employed academic and creative arts staff.

Academic degree

In Germany, students can receive the following academic degrees after passing the relevant examinations: Bachelor's degree, state examination, *Diplom* and *Magister* (both of which are being phased out), Master's degree and doctorate.

AFBG – Upgrading Training Assistance Act (*Aufstiegsfortbildungsförderungsgesetz*)

The Upgrading Training Assistance Act (AFBG, also known as the "*Meister-BAföG*") has been in force since 23 April 1996. It provides skilled craftsmen and tradesmen of all ages with financial support to upgrade their training and attain higher qualifications. The aim is to counteract the skills shortage in Germany and enhance Germany's competitiveness. The law is a comprehensive funding instrument for vocational skill development in all occupational areas.

Apprentice

An apprentice is someone who is undergoing training under the dual system in a recognized training occupation based on a training contract in accordance with the Vocational Training Act. Apprentices learn on the job or in company/intercompany training centres and simultaneously attend part-time vocational school (dual system).

Bachelor

A Bachelor's degree is the first qualification offered by institutions of higher education after completion of an undergraduate programme. In Germany, Bachelor's courses were introduced in connection with the Bologna process. The standard period of study of most Bachelor's degree courses is six semesters, but can be up to seven or eight semesters (i.e. three to four years). Students can then proceed to a more advanced Master's degree programme or, in exceptional cases, a doctorate.

BAföG – Federal Training Assistance Act (*Berufsausbildungsförderungsgesetz*)

The Federal Training Assistance Act regulates government support for the education of school students and university students in Germany. The main aims of the BAföG are to improve equal opportunities in the education system and to mobilize academic potential in lower-income population groups.

Continuing vocational education and training

Continuing vocational education and training has the aim of giving people who have completed their training and are already in the workforce additional qualifications or maintaining/refreshing their existing skills in order to secure their employment prospects and enable them to act independently on the labour market. At the same time, it aims to ensure that there are enough well-qualified workers to cover the needs of companies and the economy as a whole.

Double *Abitur* graduation classes / G8

Since 2007, the *Länder* step-by-step had reduced the number of school years necessary to get the *Abitur* from 13 to 12 (G8), with the exception of Rhineland-Palatinate. Between 2011 and 2013, this affects Lower Saxony, Baden-Württemberg, Bavaria, Hesse and North Rhine-Westphalia. In order to maintain comparability to the previous years, concerned data are adjusted to this (for example at quota calculations).

Education budget

The education budget displays the whole public and private expenditure on education. This includes personnel expenditure, operating expenditure and capital spending for the entire area of education (pre-primary education, out-of-school youth education, schools and institutions of higher education, continuing education). Depreciation, financing costs, hours lost due to continuing education of staff, training allowances and pensions for retired education staff are not included. Public spending under the Federal Training Assistance Act (BAföG), on retraining, transport for students etc. is substantiated within the framework of educational funding. The financial contribution of the central, regional and local authorities (Federal Government, *Länder* and municipalities) to the education budget can be viewed in two different ways – according to the concept of "initial funds" or the concept of "final funds". In the "initial funds" concept, the financial transactions between the central, regional and local authorities are taken into account. The concept of "final funds" does not take financial transactions between the central, regional and local authorities into consideration. The distinction between "initial funds" and "final funds" does not affect the total volume of public spending for the area of education. Nor do transactions between public budgets affect financial contributions from private sources, from abroad, or the total volume of the education budget.

Educational participation rate

The educational participation rate refers to the percentage of people in any given age group who are pursuing a qualification at a certain level (e.g. university degree or training under the dual system).

EU – European Union

The European Union comprises the following 28 member states: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom.

EU19 refers to the 15 member states of the European Union before the enlargement of 1 May 2004 plus four Eastern European OECD countries (Czech Republic, Hungary, Poland and Slovakia).

EU22 refers to the EU member states that are also members of the OECD. Not included are Bulgaria, Croatia, Cyprus, Lithuania, Malta, and Romania.

First-year students / new entrants to higher education

New entrants to higher education are students in their first semester (first enrolment) or in their first semester of a certain course of study.

Full-time equivalent (FTE)

Unit to measure the full-time activity of a person over a certain period. This unit serves to express the working time of a person doing part-time R&D work (including part-time workers) as the working time of a full-time R&D worker (cf. Frascati Manual 2002, sections 331 ff.).

Further training examination / Meister examination

Further training and *Meister* examinations demonstrate knowledge and skills acquired through further training measures. They must comply with the special requirements of vocational adult education.

GDP – Gross domestic product

GDP is a measure of a country's economic performance over a certain period of time. It measures the value of domestically produced goods and services (added value), as long as these are not used as a basis for the production of other goods and services.

Since the changeover to the European System of Accounts 2010 (ESA 2010) in September 2014, R&D expenditure is counted for the most part as capital formation and therefore is no longer rated as intermediate consumption. This new treatment of R&D expenditure within the National Accounts raised the GDP level by about 3%.

GERD – Gross Domestic Expenditure on Research and Development

Total expenditure on domestically performed R&D, whatever the source; this also includes R&D performed within the country and funded from abroad and by international organisations. However, it does not cover the expenditure on R&D performed abroad by international organisations headquartered in the country or R&D funding paid abroad (cf. Frascati Manual 2002, section 423).

Government expenditure on R&D

All resources allocated to R&D by the Federal Government and the *Länder*, regardless of the sector in which R&D is performed.

Habilitation

A habilitation is a postdoctoral qualification to teach at professorial level. The habilitation procedure is an academic examination procedure that includes a habilitation thesis, a colloquium and a public lecture.

Higher education entrance qualification

Admission to a German institution of higher education requires a higher education entrance qualification. To enrol at a university, students must have a general or subject-restricted higher education entrance qualification or pass an aptitude test or an examination for talented/gifted students. The two latter options, subsumed under "admission without a formal higher education entrance qualification" in official higher education statistics, are particularly common among students at colleges of fine arts and colleges of music. To enrol at a university of applied sciences, students must have a general higher education entrance qualification or an entrance qualification for universities of applied sciences or pass an aptitude test or an examination for talented/gifted students.

iABE – Integrated reporting on vocational training

Integrated reporting on vocational training brings together various official statistics

to give an overview of the paths young people's lives take and of vocational training pursued after leaving general schools. A comprehensive system of (educational) sectors and accounts (qualification pathways) describes the programmes available above lower secondary level. Vocational education and training opportunities are categorized according to four (educational) sectors:

"*Vocational training*" (objective: full vocational qualification): A full vocational qualification is the foundation for entering and remaining in employment and for the ability to shape one's own career.

"*Integration into training (transition system)*" (objective: vocational training): Integration measures serve to prepare young people for – and place them in – vocational training. It includes a wide range of programmes and measures, most of them publicly financed.

"*Higher education entrance qualifications*" (objective: acquiring a higher education entrance qualification): A higher education entrance qualification enables people to pursue higher education or vocational training.

"*Academic degree programmes*" (objective: higher education degree): A higher education degree is the foundation for high-level employment.

Industry expenditure on research and development (R&D)

R&D expenditure by business enterprises and institutions for cooperative industrial research and experimental development (IfG).

Innovations

Innovations are new or significantly improved products or services that have been introduced to the market (product innovations) and new or improved production or delivery methods (process innovations) (cf. Oslo Manual 2005, sections 156 and 163).

Institution of higher education

"Institution of higher education" is the general term used for different academic institutions, including those with a practical and artistic focus, that are engaged in training and the promotion of the sciences and arts through research and teaching. Institutions of higher education include universities, colleges of art and music, colleges of education, colleges of theology, comprehensive universities, universities of applied sciences and colleges of public administration.

ISCED 2011 – International Standard Classification of Education

ISCED was developed by UNESCO in the early 1970s to provide a consistent framework for collecting and presenting educational statistics, thus enabling or facilitating national and international comparisons. The classification was updated in 1997 (ISCED 97) and in 2011 (ISCED 2011) and reflects all organized learning processes (see table at the end of the glossary). Since 2015, the new ISCED 2011 is used in the education reports of international organisations (UNESCO, OECD, Eurostat).

Labour force

The labour force comprises all civilians in dependent employment, self-employed people and family workers. This includes employees subject to social insurance contributions, apprentices, people in marginal employment, civil servants (not including soldiers), unemployed people, self-employed people and family workers.

Länder codes (German states)

BW = Baden-Württemberg

BY = Bavaria

BE = Berlin

BB = Brandenburg

HB = Bremen

HH = Hamburg

HE = Hesse

MV = Mecklenburg-Western Pomerania

NI = Lower Saxony

NW = North Rhine-Westphalia

RP = Rhineland-Palatinate

SL = Saarland

SN = Saxony

ST = Saxony-Anhalt

SH = Schleswig-Holstein

TH = Thuringia

Master

A Master's degree is the qualification offered by institutions of higher education after completion of a second-cycle programme. It is conferred after one- or two-year full-time or part-time studies. To be admitted to a Master's degree course, students need to be in possession of a Bachelor's degree or have completed a traditional course of study (*Magister, Diplom*, first state examination in law or teaching, medical degree). A Master's degree can build on previous studies or open up new areas of knowledge.

Meister examination

see "Further training examination / *Meister* examination"

OECD – Organisation for Economic Co-operation and Development

The OECD is a forum in which the governments of 34 countries (most of them

industrialized nations) work together to meet the challenges related to globalization in the areas of economy, society, environment and governance and take advantage of the associated opportunities. The OECD's stated goals are to contribute to optimal economic development and a rising standard of living in its member countries, to promote economic growth in its member countries and in developing countries, and to facilitate the expansion of international trade.

Percentage of first-year students

The percentage of first-year students (first enrolment) in any given year group is an important indicator for higher education planning.

Percentage of people qualified to enter higher education

This refers to the share of school-leavers qualified to enter higher education in the age-specific population. School-leavers qualified to enter higher education comprise school-leavers with general higher education entrance qualification (including subject-restricted higher education entrance qualification) from general and vocational schools.

Percentage of people who pursue higher education

This refers to the percentage of school-leavers in any given year group who have already started a degree course or have the firm intention of starting one. It is calculated on the basis of a representative survey by Deutsches Zentrum für Hochschul- und Wissenschaftsforschung. In addition to this group (people with a firm intention of pursuing higher education), people who are not yet sure about going to university or are considering it as an alternative can also be factored in. A maximum percentage is calculated in this way.

R&D

Research and development

R&D expenditure

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (cf. Frascati Manual 2002, section 63). Expenditure incurred in the context of this work is expenditure on research and development. A distinction is made between intramural and extramural R&D expenditures.

"*Intramural expenditures*" are all expenditures for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds (cf. Frascati Manual 2002, sections 358 f.).

"*Extramural expenditures*" are the sums a unit, organisation or sector reports having paid or committed themselves to pay to another unit, organisation or sector for the performance of R&D during a specific period (cf. Frascati Manual 2002, section 408). These are mostly research contracts awarded to other companies, universities or governmental research institutes.

R&D personnel

All those directly employed in the area of R&D, regardless of their position. This includes researchers, technical personnel and other staff (cf. Frascati Manual 2002, sections 294 ff.).

School types in Germany

General schools:

- "Adult education college" (*Kolleg*): Establishment where adults attend full-time classes to obtain the general higher education entrance qualification.
- "Comprehensive school" (*Gesamtschule*): Type of school at lower secondary level offering several courses of education leading to different qualifications. It either takes the form of a cooperative comprehensive school or an integrated comprehensive school. In the cooperative type, pupils are taught in classes grouped according to the different qualifications available, whilst in the integrated type, pupils are placed in courses according to level of proficiency in a number of core subjects, but taught together as a year group in all other subjects.
- "Evening grammar school" (*Abendgymnasium*): Establishment at which adults can attend evening classes to obtain the general higher education entrance qualification.
- "Evening intermediate school" (*Abendrealschule*): Establishment at which adults can attend evening classes to obtain an intermediate school-leaving qualification.
- "Evening secondary general school" (*Abendhauptschule*): Establishment at which adults can attend evening classes to obtain a secondary general school-leaving qualification.
- "Free Waldorf School" (*Freie Waldorfschule*): Privately maintained primary and secondary schools, which base their work on the ideological and educational ideas of Rudolf Steiner.
- "Grammar school" (*Gymnasium*): Type of school covering both lower and upper

secondary level (years 5-13 or 5-12) and providing an in-depth general education aimed at the general higher education entrance qualification (*Abitur*).

- "Intermediate school" (*Realschule*): Type of school at lower secondary level, usually comprising years 5-10. Provides pupils with a more extensive general education and the opportunity to go on to courses at upper secondary level that lead to vocational or higher education entrance qualifications.

- "Primary school" (*Grundschule*): Compulsory school for all children from the age of 6. It comprises four years, except in Berlin and Brandenburg, where it covers six years.

- "Schools with different courses of education" (*Schularten mit mehreren Bildungsgängen*): A category used in school statistics which applies to types of school providing the courses of education otherwise offered by secondary general schools and intermediate schools. Outside statistics, schools with different courses of education also include comprehensive schools which additionally offer the grammar school course of education.

- "Secondary general school" (*Hauptschule*): Type of school at lower secondary level providing a basic general education, usually comprising years 5-9. Compulsory school, unless the pupil is attending a different type of secondary school.

- "Special needs school" (*Förderschule*): This type of school provides teaching and care for children who have physical or mental disabilities or are at social risk and cannot be taught successfully enough at mainstream schools. As a rule, special needs schools have the same educational mission as other general schools.

Vocational schools:

- "Full-time vocational school" (*Berufsfachschule*): Vocational school at upper secondary level offering a wide range of courses of varying duration. A full-time school, it prepares or trains students for a specific occupation at different levels of qualification.

- "Part-time vocational school" (*Berufsschule*): Vocational school at upper secondary level generally providing part-time instruction in general and vocational subjects to trainees receiving vocational education and training within the dual system.

- "Pre-vocational and basic vocational training year" (*Berufsvorbereitungsjahr/ Berufsgrundbildungsjahr*): Pre-vocational and basic vocational training year refer to vocational education mostly in the form of full-time schooling which provides basic general knowledge and basic vocational knowledge relating to a certain occupational field.

- "Specialised grammar school" (*Fachgymnasium*): Type of school at upper secondary level offering a three-year course which includes both the general education subjects

taught at upper grammar school level and career-oriented subjects, such as business and technology, but which also leads to the general higher education entrance qualification (*Abitur*).

- "Specialised upper secondary school" (*Fachoberschule*): Vocational school at upper secondary level providing two-year courses in various subject areas leading to the entrance qualification for universities of applied sciences. The first year consists of both practical training in the workplace and lessons, whilst the second year covers general and subject-specific lessons.
- "Specialized/vocational academy" (*Fachakademie/Berufsakademie*): Specialized/vocational academies offer vocational education usually as preparation for an upper-level career. An intermediate school certificate or a recognized equivalent is required for entry. Full-time attendance is for at least two years.
- "Trade and technical school" (*Fachschule*): Vocational school offering continuing vocational training courses of between one and three years which build on initial vocational training and subsequent employment and lead to a further qualification in a profession.
- "Two-year full-time vocational school" (*Berufsoberschule/Technische Oberschule*): Vocational school at upper secondary level in a few *Länder*. Offers those who have completed vocational training in the dual system the opportunity to obtain a higher education entrance qualification.
- "Vocational extension school" (*Berufsaufbauschule*): Vocational extension schools are attended by young people who are undergoing or have completed vocational training or who are or have been employed. On successful completion, pupils earn a certificate equivalent to the intermediate school certificate which qualifies them for entrance to trade and technical schools.

Science expenditure

Science expenditure covers expenditure on research and development (R&D) as well as expenditure on academic teaching and education and other related scientific and technological activities. The latter include, for example, scientific and technical information services, data collections for general purposes, studies on the feasibility of technical projects (feasibility studies for research projects, however, form part of R&D), and development of a basis for decision-making in politics and industry.

Training contract

A training contract is concluded between the company providing training and the apprentice on the basis of the Vocational Training Act or the Craft Trades Law. The

content and duration of training and the examination requirements are set out in the Federal Government's training regulations. The training duration is between two and three years, usually three.

Training occupation

In Germany, training occupations are occupational activities that can be learned under the dual system of vocational education and training. Young people can only be trained in officially recognized training occupations. Official recognition is granted through training regulations under the Vocational Training Act (BBiG) or the Craft Trades Law (HwO). The skills to be learned in vocational training are defined in the Vocational Training Act and the training regulations in question.

Training sector

Official statistics differentiate between the following training sectors in company-based vocational training: trade and industry, skilled trades, agriculture, public sector, home management, independent professions (e.g. lawyers and notaries, patent lawyers, tax accountants, tax agents, auditors, doctors, dentists, veterinarians, pharmacists) and maritime transport.

Unemployed

Unemployed people are jobseekers who are temporarily out of employment or employed for less than 15 hours per week, are looking for employment of at least 15 hours per week that is subject to insurance, and submit to the efforts of the employment office or the local authority to find them work – i.e. are able and willing to work.

Unemployment rate

The number of unemployed people is calculated in relation to the number of civilians in dependent employment or, since January 2009, in relation to the total civilian labour force. The unemployment rate is often referred to as the "national unemployment rate", as opposed to the ILO unemployment rate, which is mainly used for the purpose of international comparison.

University of applied sciences (*Fachhochschule*)

Universities of applied sciences offer courses with a greater practical focus, particularly in engineering and the areas of business, social studies, design and informatics. The courses are shorter than at universities.

Assignment of national education programmes to the ISCED 2011 – [1/4]

ISCED level Category	Sub-category	Education programmes
ISCED 0 Early childhood education		
ISCED 01 Early childhood educational development for children younger than three years	010	- Crèches
ISCED 02 Pre-primary education for children from the age of three years to the start of primary education	020	- Kindergartens
	020	- Pre-school classes
	020	- School kindergartens
ISCED 1 Primary education		
ISCED 10 general education	100	- Primary schools
	100	- Comprehensive schools (grades 1-4)
	100	- Waldorf schools (grades 1-4)
	100	- Special needs schools (grades 1-4)
ISCED 2 Lower secondary education		
ISCED 24 general education	241	- Orientation stages (grades 5/6)
	244	- Secondary general schools
	244	- Intermediate schools
	244	- Special needs schools (grades 5-10)
	244	- Schools with different courses of education
	244	- Grammar schools (grades 5-9/10) ¹
	244	- Comprehensive schools (grades 5-9/10) ¹
	244	- Waldorf schools (grades 5-10)
	244	- Evening secondary general schools
	244	- Evening intermediate schools
	244	- Catch up on lower secondary school degrees and fulfilment of compulsory education at vocational schools
	244	- Vocational schools that lead to intermediate degrees
	ISCED 25 vocational education	254

Assignment of national education programmes to the ISCED 2011 – [2/4]

ISCED level Category	Sub-category	Education programmes
ISCED 3 Upper secondary education		
ISCED 34 general education	344	- Grammar schools (grades 10-12/11-13) ¹
	344	- Comprehensive schools (grades 10-12/11-13) ¹
	344	- Waldorf Schools (grades 11-13)
	344	- Special needs schools (grades 11-13)
	344	- Specialised upper secondary schools – two-years (without previous vocational education)
	344	- Specialised grammar schools
	344	- Full-time vocational schools that lead to higher education entry qualification
ISCED 35 vocational education	351	- Basic vocational training year (and other basic vocational programmes that are taken into account to the first year of apprenticeship)
	353	- One-year programmes at training institutions/schools for health care and social professions
	353	- Civil service trainees in the middle grade of civil service
	354	- Part-time vocational schools (dual system)
	354	- Full-time vocational schools that lead to a vocational certificate (excluding health care and social professions and educator training)
ISCED 4 Post-secondary non-tertiary education		
ISCED 44 general education	444	- Evening grammar schools, adult education colleges
	444	- Specialised upper secondary schools – one-year (after previous vocational education)
	444	- Two-year full-time vocational schools
ISCED 45 vocational education	453	- Two- and three-year programmes at training institutions/schools for health care and social professions
	454	- Part-time vocational schools (dual system) (second education after obtaining a higher education entrance qualification) ²
	454	- Full-time vocational schools that lead to a vocational certificate (second education after obtaining a higher education entrance qualification) ²
	454	- Vocational programmes that lead to a higher education entry qualification as well as to a vocational certificate (simultaneously or successively) ²
	454	- Part-time vocational schools (dual system) (second education, vocational)
	454	- Part-time vocational schools (dual system) – retrainees

Assignment of national education programmes to the ISCED 2011 – [3/4]

ISCED level Category	Sub-category	Education programmes
ISCED 5 Short-cycle tertiary education		
ISCED 54 general education	-	-
ISCED 55 vocational education	554	Master craftsman training (very short preparation courses only that last less than 880 hours) ³
ISCED 6 Bachelor's or equivalent level		
ISCED 64 academic	645	<ul style="list-style-type: none"> - Bachelor's programme at - Universities (scientific institutions of higher education including colleges of education, colleges of theology, and colleges of art and music) - Universities of applied sciences (including schools of engineering), Baden-Württemberg Cooperative State University - Colleges of public administration - Vocational academies
	645	- <i>Diplom</i> degree programme at universities of applied sciences
	645	- <i>Diplom</i> degree programme at colleges of public administration
	645	- <i>Diplom</i> degree programme at vocational academies
	647	- Second bachelor's programme
	647	- Second <i>Diplom</i> degree programme at universities of applied sciences
ISCED 65 professional	655	<ul style="list-style-type: none"> - Trade and technical schools (excluding health care and social professions and educator training) including master craftsman training (preparation courses lasting 880 hours or more)³, business economist, business administrator
	655	- Training institutions/schools for educators
	655	- Specialised academies (Bavaria)

Assignment of national education programmes to the ISCED 2011 – [4/4]

ISCED level Category	Sub-category	Education programmes
ISCED 7 Master's or equivalent level		
ISCED 74 academic	746	- <i>Diplom</i> degree programme at university (including teacher training, state examination, <i>Magister</i> programme, artistic and comparable programmes)
	747	- Master's programme at - Universities (scientific institutions of higher education including colleges of education, colleges of theology, and colleges of art and music) - Universities of applied sciences (including schools of engineering), Baden-Württemberg Cooperative State University - Colleges of public administration - Vocational academies
	748	- Second master's programme
	748	- Second <i>Diplom</i> degree programme at university
ISCED 8 Doctoral or equivalent level		
ISCED 8 academic	844	- Doctoral studies
ISCED 9 No other classification		
ISCED 99 No other classification	999	Mainly mentally handicapped pupils at special needs schools that cannot be assigned to an education area

- 1) At grammar schools and integrated comprehensive schools leading to a school-leaving certificate after grade 12, upper secondary level begins at grade 10 instead of 11.)
- 2) Fully qualifying vocational programmes after obtaining a higher education entrance qualification or fully qualifying vocational programmes that additionally lead to a higher education entrance qualification get allocated to ISCED 454 pursuant to Eurostat definition. Last adjusted to the school year 2012/2013.
- 3) The allocation is based on the subject field of the preparation courses.

Notes on sub-categories

- 241 Insufficient for level completion or partial level completion, without direct access to upper secondary education.
- 244, 254 Level completion, with direct access to upper secondary education.
- 351 Insufficient for level completion or partial level completion, without direct access to tertiary education.
- 353 Level completion, without direct access to first tertiary programmes (but may give direct access to post-secondary non-tertiary education).
- 344, 354 Level completion, with direct access to first tertiary programmes (may also give direct access to post-secondary non-tertiary education).
- 453 Level completion, without direct access to first tertiary programmes.
- 444, 454 Level completion, with direct access to first tertiary programmes.

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