

**117.5**

Change over time: 7.4

Strong Innovators 114.5

Germany	Performance relative to EU in 2022	Performance change 2015-2022	Performance change 2021-2022
SUMMARY INNOVATION INDEX	117.5	7.4	-1.7
Human resources	99.8	-4.8	-4.8
Doctorate graduates	159.3	-11.4	-11.4
Population with tertiary education	66.4	0.0	0.0
Lifelong learning	65.6	0.0	0.0
Attractive research systems	109.9	3.3	1.6
International scientific co-publications	95.5	34.6	7.9
Most cited publications	107.8	-8.6	-0.3
Foreign doctorate students	131.9	0.0	0.0
Digitalisation	84.7	9.5	9.5
Broadband penetration	97.4	18.2	18.2
People with above basic overall digital skills	68.2	0.0	0.0
Finance and support	93.4	19.7	10.1
R&D expenditures in the public sector	137.9	14.5	8.1
Venture capital expenditures	90.8	55.4	20.3
Government support for business R&D	40.1	-10.1	2.2
Firm investments	138.0	18.4	-3.9
R&D expenditure in the business sector	139.2	15.5	-5.4
Non-R&D Innovation expenditures	133.5	4.6	-6.3
Innovation expenditures per employee	140.5	34.9	0.0
Use of information technologies	121.7	-22.8	-26.1
Enterprises providing ICT training	125.0	-43.8	-50.0
Employed ICT specialists	118.2	0.0	0.0
Innovators	141.1	53.4	-11.5
Product innovators (SMEs)	131.4	6.1	-25.9
Business process innovators (SMEs)	149.5	103.7	3.9
Linkages	141.7	27.9	-4.0
Innovative SMEs collaborating with others	117.8	42.1	-19.2
Public-private co-publications	185.8	63.5	17.3
Job-to-job mobility of HRST	141.7	0.0	0.0
Intellectual assets	124.0	-15.5	-1.3
PCT patent applications	132.7	-11.3	-3.0
Trademark applications	107.7	10.2	6.0
Design applications	129.3	-39.9	-4.6
Employment impacts	128.9	4.2	-2.6
Employment in knowledge-intensive activities	101.3	0.0	0.0
Employment in innovative enterprises	150.8	8.1	-5.0
Sales impacts	112.6	3.6	-0.8
Medium and high-tech goods exports	124.9	-0.4	-2.6
Knowledge-intensive services exports	104.8	5.9	6.5
Sales of innovative products	107.3	6.2	-6.9
Environmental sustainability	122.5	9.5	0.0
Resource productivity	133.1	52.4	8.0
Air emissions by fine particulate matter	122.4	3.0	-0.2
Environment-related technologies	112.2	-11.9	-5.2

The second column shows performance relative to that of the EU in 2022. Colours next to the column show matching colour codes: dark green: above 125% of the performance of the EU in 2022; light green: between 100% and 125%; yellow: between 70% and 100%; orange: below 70%. Normalised performance uses the data after a possible imputation of missing data and transformation of the data. The next columns show performance change over time between 2015 and 2022 and between 2021 and 2022, with scores relative to those of the EU in 2015. Positive performance changes are shown in green, negative performance changes in red.

GERMANY is a **Strong Innovator** with performance at 117.5% of the EU average. Performance is above the average of the Strong Innovators (114.5%). Performance is increasing (7.4%-points) at a rate lower than that of the EU (9.9%-points). The country's performance lead over the EU is becoming smaller.

Relative strengths

- Public-private co-publications
- Doctorate graduates
- Employment in innovative enterprises
- Business process innovators
- Job-to-job mobility of HRST

Relative weaknesses

- Government support for business R&D
- Lifelong learning
- Population with tertiary education
- People with above basic overall digital skills
- Venture capital expenditures

Strong increases since 2015

- Business process innovators
- Public-private co-publications
- Venture capital expenditures

Strong decreases since 2015

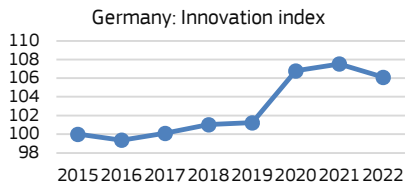
- Enterprises providing ICT training
- Design applications
- Environment-related technologies

Strong increases since 2021

- Venture capital expenditures
- Broadband penetration
- Public-private co-publications

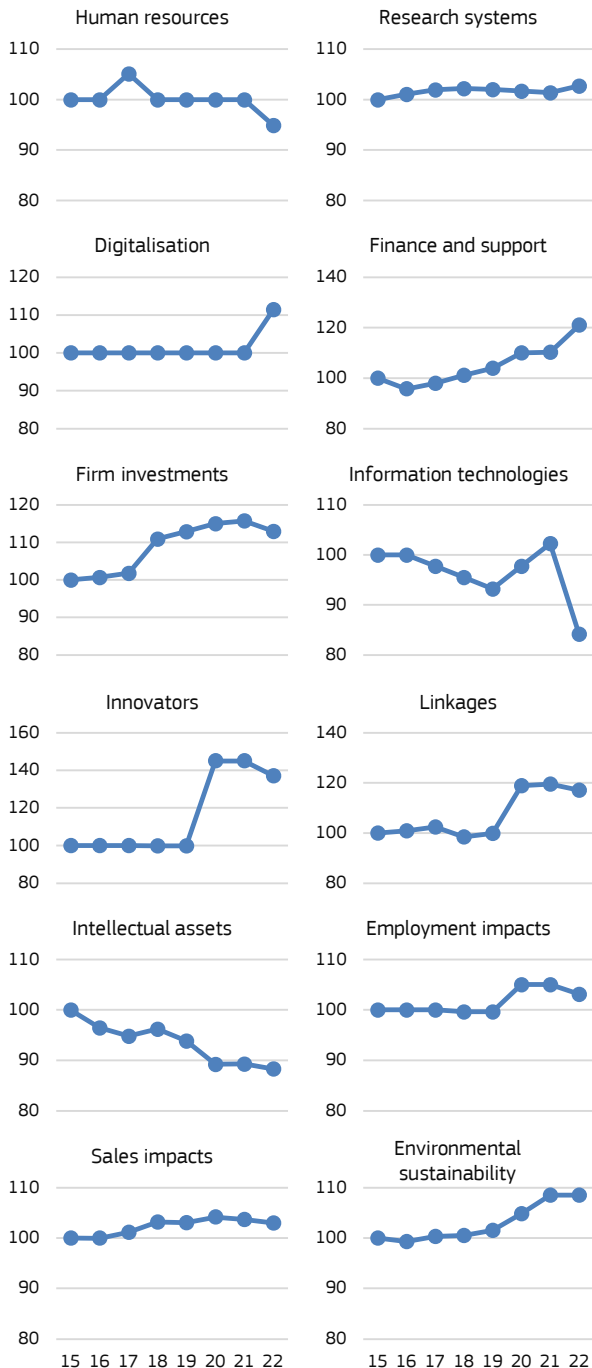
Strong decreases since 2021

- Enterprises providing ICT training
- Product innovators
- Innovative SMEs collaborating with others



The graph on the left shows the evolution of **innovation performance over time** against the performance of the country in 2015. Innovation performance did not change much between 2015 and 2019 and increased strongly in 2020. After a moderate increase in 2021, performance declined in 2022.

The graphs below show the evolution of innovation performance in the different **innovation dimensions** against the performance of the country in 2015. Performance increased strongly for Innovators, and declined for Human resources, Information technologies and Intellectual assets. For the other dimensions performance increased but at lower rates.



Performance is measured relative to that of the country in 2015 (=100).

Structural differences with the EU are shown below:

- Germany has higher per capita income but a slower growing economy. Manufacturing takes up a higher share of the economy, with large enterprises account for a larger share of turnover.
- FDI inflows, Top R&D spenders and buyer sophistication add positively to the innovation climate, enterprise births and entrepreneurial activities add negatively.
- Germany has an above average share of In-house product innovators without market novelties and in Innovators that do not develop innovations themselves.
- Government procurement is above the EU average as drivers of research and innovation while other Governance and policy framework indicators are at par with the EU.
- Germany shows a mixed performance on Climate change related indicators with above average performance on innovation but a below average performance on circular material use rate.

	DE	EU
Performance and structure of the economy		
GDP per capita (PPS)	37,700	31,200
Average annual GDP growth (%)	-1.0	-0.4
Employment share Manufacturing (NACE C) (%)	19.7	16.4
of which High and Medium high-tech (%)	51.3	38.0
Employment share Services (NACE G-N) (%)	38.9	41.1
of which Knowledge-intensive services (%)	36.1	35.8
Turnover share SMEs (%)	31.5	34.8
Turnover share large enterprises (%)	58.1	48.2
Foreign-controlled enterprises – share of value added (%)	11.5	11.7
Business and entrepreneurship		
Enterprise births (10+ employees) (%)	0.7	1.0
Total Entrepreneurial Activity (TEA) (%)	6.4	7.3
FDI net inflows (% GDP)	3.3	1.0
Top R&D spending enterprises per 10 mln. population	29.1	18.3
Buyer sophistication (1 to 7 best)	4.6	3.7
Innovation profiles		
In-house product innovators with market novelties	9.9	10.7
In-house product innovators without market novelties	15.4	12.3
In-house business process innovators	13.2	11.0
Innovators that do not develop innovations themselves	25.2	11.6
Innovation active non-innovators	4.0	3.3
Non-innovators with potential to innovate	17.9	19.9
Non-innovators without disposition to innovate	14.2	31.3
Governance and policy framework		
Ease of starting a business (0 to 100 best)	79.5	76.5
Basic school entrepreneurial education and training	3.2	3.5
Govt. procurement of advanced tech. products	4.6	3.5
Rule of law (-2.5 to 2.5 best)	1.6	1.1
Climate change indicators		
Circular material use rate	7.8	12.2
Greenhouse gas emissions intensity of energy consumption	86.8	82.8
Eco-Innovation Index	116.2	100.0
Demography		
Population size	83.1	447.0
Average annual population growth (%)	0.1	0.1
Population density	234.6	108.8