European Innovation Scoreboard 2023
Country profile
Germany
European Innovation Scoreboard 2023 – Country profile Germany

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European Innovation
Scoreboard 2023
Country profile Germany

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as part of the European Innovation Scoreboard project
for the European Commission, Directorate-General for Research and Innovation under

The European Innovation Scoreboard report and annexes, and the indicators database are available at:
### Germany

#### SUMMARY INNOVATION INDEX
- **Performance relative to EU in 2023**: 117.8
- **Performance change 2016-2023**: 7.6
- **Performance change 2022-2023**: -1.3

#### Human resources
- **Performance change 2022-2023**: -3.4

#### Doctorate graduates
- **Performance change 2022-2023**: -11.4

#### Population with tertiary education
- **Performance change 2022-2023**: 1.2

#### Lifelong learning
- **Performance change 2022-2023**: 1.2

#### Attractive research systems
- **Performance change 2022-2023**: -1.3

#### International scientific co-publications
- **Performance change 2022-2023**: -2.6

#### Most cited publications
- **Performance change 2022-2023**: -1.4

#### Foreign doctorate students
- **Performance change 2022-2023**: 0.0

#### Digitalisation
- **Performance change 2022-2023**: 10.8

#### Broadband penetration
- **Performance change 2022-2023**: 21.2

#### People with above basic overall digital skills
- **Performance change 2022-2023**: 0.0

#### Finance and support
- **Performance change 2022-2023**: -0.2

#### R&D expenditures in the public sector
- **Performance change 2022-2023**: 16.1

#### Venture capital expenditures
- **Performance change 2022-2023**: 3.3

#### Government support for business R&D
- **Performance change 2022-2023**: -2.0

#### Firm investments
- **Performance change 2022-2023**: -3.4

#### R&D expenditure in the business sector
- **Performance change 2022-2023**: 0.0

#### Non-R&D Innovation expenditures
- **Performance change 2022-2023**: -6.3

#### Innovation expenditures per employee
- **Performance change 2022-2023**: -4.1

#### Use of information technologies
- **Performance change 2022-2023**: -6.0

#### Enterprises providing ICT training
- **Performance change 2022-2023**: 22.3

#### Employed ICT specialists
- **Performance change 2022-2023**: 3.4

#### Innovative SMEs collaborating with others
- **Performance change 2022-2023**: -19.2

#### Public-private co-publications
- **Performance change 2022-2023**: -1.0

#### Job-to-job mobility of HRST
- **Performance change 2022-2023**: 0.0

#### Intellectual assets
- **Performance change 2022-2023**: -6.9

#### PCT patent applications
- **Performance change 2022-2023**: -2.8

#### Trademark applications
- **Performance change 2022-2023**: -3.6

#### Design applications
- **Performance change 2022-2023**: -14.8

#### Employment impacts
- **Performance change 2022-2023**: -5.0

#### Employment in knowledge-intensive activities
- **Performance change 2022-2023**: -5.0

#### Sales impacts
- **Performance change 2022-2023**: -6.9

#### Medium and high-tech goods exports
- **Performance change 2022-2023**: 2.4

#### Knowledge-intensive services exports
- **Performance change 2022-2023**: 4.1

#### Sales of innovative products
- **Performance change 2022-2023**: -6.9

#### Environmental sustainability
- **Performance change 2022-2023**: -0.7

#### Resource productivity
- **Performance change 2022-2023**: 5.5

#### Air emissions by fine particulate matter
- **Performance change 2022-2023**: -0.6

#### Environment-related technologies
- **Performance change 2022-2023**: -5.2

GERMANY is a **Strong Innovator** with performance at 117.8% of the EU average. Performance is above the average of the Strong Innovators. Performance is increasing at a rate lower than that of the EU (8.5%-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
- Innovation expenditures per employee

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

**Strong increases since 2016**
- Business process innovators
- Public-private co-publications
- Venture capital expenditures

**Strong decreases since 2016**
- Design applications
- Enterprises providing ICT training
- Environment-related technologies

**Strong increases since 2022**
- Enterprises providing ICT training
- Broadband penetration
- Resource productivity

**Strong decreases since 2022**
- Product innovators
- Innovative SMEs collaborating with others

The second column shows performance relative to that of the EU in 2023. Colours next to the column show matching colour codes: dark green: above 125% of the performance of the EU in 2023; light green: between 100% and 125%; light orange: between 70% and 100%; dark orange: below 70%. The next columns show performance change over time between 2016 and 2023 and between 2022 and 2023, with scores relative to those of the EU in 2016. Positive (negative) performance changes are shown in green (red).
The graph on the left shows the evolution of innovation performance over time against the performance of the country in 2016. Innovation performance did not change much between 2016 and 2020 and increased strongly in 2021. After a moderate increase in 2022, performance declined in 2023.

The graphs below show the evolution of innovation performance in the different innovation dimensions against the performance of the country in 2016. Performance increased strongly for Digitalisation, Finance and support and Innovators, and did declined for Human resources, Information technologies and Intellectual assets.

**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 accounting 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 above average shares of In-house product innovators without market novelties and In-house business process innovators.
- Government procurement is above the EU average as driver of research and innovation while most 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 reduction of greenhouse gas emissions.

<table>
<thead>
<tr>
<th>Performance and structure of the economy</th>
<th>DE</th>
<th>EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (PPS)</td>
<td>39,000</td>
<td>32,600</td>
</tr>
<tr>
<td>Average annual GDP growth (%)</td>
<td>1.8</td>
<td>4.4</td>
</tr>
<tr>
<td>Employment share Manufacturing (NACE C) (%)</td>
<td>19.7</td>
<td>16.4</td>
</tr>
<tr>
<td>of which High and Medium high-tech (%)</td>
<td>51.3</td>
<td>38.0</td>
</tr>
<tr>
<td>Employment share Services (NACE G-N) (%)</td>
<td>38.9</td>
<td>41.1</td>
</tr>
<tr>
<td>of which Knowledge-intensive services (%)</td>
<td>36.1</td>
<td>35.8</td>
</tr>
<tr>
<td>Turnover share SMEs (%)</td>
<td>29.0</td>
<td>34.1</td>
</tr>
<tr>
<td>Turnover share large enterprises (%)</td>
<td>61.2</td>
<td>49.6</td>
</tr>
<tr>
<td>Foreign-controlled enterprises – share of value added (%)</td>
<td>10.3</td>
<td>11.8</td>
</tr>
</tbody>
</table>

**Business and entrepreneurship**

- Enterprise births (10+ employees) (%) | 0.7 | 1.0 |
- Total Entrepreneurial Activity (TEA) (%) | 6.4 | 6.8 |
- FDI net inflows (% GDP) | 2.4 | 2.1 |
- Top R&D spending enterprises per 10 mln. population | 31.7 | 20.3 |
- Buyer sophistication (1 to 7 best) | 4.6 | 3.7 |

**Innovation profiles**

- In-house product innovators with market novelties | 8.5 | 12.2 |
- In-house product innovators without market novelties | 20.7 | 12.8 |
- In-house business process innovators | 23.8 | 16.5 |
- Innovators that do not develop innovations themselves | 10.0 | 6.5 |
- Innovation active non-innovators | 5.6 | 4.1 |
- Non-innovators with potential to innovate | 18.5 | 17.2 |
- Non-innovators without disposition to innovate | 12.9 | 30.7 |

**Governance and policy framework**

- Corruption Perceptions Index (0 to 100 best) | 79.7 | 64.0 |
- Basic school entrepreneurial education and training | 3.2 | 3.3 |
- Govt. procurement of advanced tech. products | 4.6 | 3.5 |
- Rule of law (-2.5 to 2.5 best) | 1.6 | 1.0 |

**Climate change indicators**

- Circular material use rate | 12.8 | 11.8 |
- Greenhouse gas emissions intensity of energy consumption | 86.8 | 82.8 |
- Eco-Innovation Index | 116.2 | 100.0 |

**Demography**

- Population size | 83.2 | 447.1 |
- Average annual population growth (%) | 0.0 | -0.1 |
- Population density | 234.6 | 108.8 |
This report provides the Country profile from the 2023 European Innovation Scoreboard for Germany.

*Studies and reports*