

SDG Goal 9	Industry, innovation and infrastructure
SDG Target 9.5	Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending
SDG Indicator 9.5.1	Research and development expenditure as a proportion of GDP
Time series	Proportion of R&D expenditures to GDP

1. General information on the time series

- Date of national metadata: 7 December 2022
- National data: <http://sdg-indicators.de/9-5-1/>
- Definition: Research and development (R&D) expenditure as a proportion of gross domestic product (GDP) is the amount of R&D expenditure divided by the total output of the economy.
- Disaggregation: region

2. Comparability with the global metadata

- Date of global metadata: December 2021
- Global metadata: <https://unstats.un.org/sdgs/metadata/files/Metadata-09-05-01.pdf>
- The time series is compliant with the global metadata.

3. Data description

- Research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge. Expenditures on intramural R&D represent the amount of money spent on R&D that is performed within a reporting unit.
The data on GDP is calculated by the Federal Statistical Office's National Accounts as a secondary statistic. GDP is adjusted based on a price base changing every year (previous year's price base). After several revisions due to new data input, final results are available four years after the first preliminary release.

4. Access to data source

- Research and development expenditure and staff – GENESIS online 21821-0001:
<https://www-genesis.destatis.de/genesis//online?operation=table&code=21821-0001&bypass=true&levelindex=1&levelid=1628839743715>
- Research and development expenditure and staff: Länder – GENESIS online 21821-0002:
<https://www-genesis.destatis.de/genesis//online?operation=table&code=21821-0002&bypass=true&levelindex=1&levelid=1623135114747#abreadcrumb>

5. Metadata on source data

- Quality Report - Survey on Expenses, Revenues and Personnel of the Public and Publicly Subventioned Institutions for Sciences, Research and Development (only available in German):
<https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Bildung/wissenschaft-forschung-entwicklung.pdf>
- Quality Report - National Accounts:
<https://www.destatis.de/EN/Methods/Quality/QualityReports/National-Accounts-Domestic-Product/national-accounts.pdf>

6. Timeliness and frequency

- Timeliness: t + 15 months
- Frequency: Annual

7. Calculation method

- Unit of measurement: Percentage
- Calculation:

$$\text{Proportion of R \& D expenditures to GDP} = \frac{\text{R\&D expenditure [MnEUR]}}{\text{GDP [MnEUR]}} \cdot 100 [\%]$$