

Statistical bulletin

Gross domestic expenditure on research and development, UK: 2023

Research and development performed in the UK and funding for R&D, received by businesses, higher education, government, UK Research and Innovation, and private non-profit organisations.

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1 . Main points

- Expenditure on research and development (R&D) performed in the UK amounted to £72.6 billion in 2023, an increase of £3.0 billion (in current prices), since 2022 and £14.3 billion since 2018, which is the first comparable period available.
- The business sector accounted for the largest share of R&D expenditure, at £50.0 billion (69% of the UK total); followed by the higher education sector, at £17.1 billion (24% of the UK total).
- The government sector, including UK Research and Innovation, performed £4.3 billion of R&D (6% of the UK total); the private non-profit sector performed the least, at £1.1 billion (2% of the UK total).
- Based on our latest available measure of gross domestic product (GDP), which does not yet incorporate the latest R&D methodology, total UK R&D expenditure represented 2.64% of GDP in 2023, falling slightly from 2.69% in 2022. This decrease is related to changes in the level of GDP rather than R&D.

2 . Glossary

Research and development

Research and development (R&D) is defined as creative and systematic work undertaken to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge.

OECD

The [Organisation for Economic Co-operation and Development \(OECD\)](#) is an international organisation of governments that exists to find solutions to social, economic and environmental challenges.

Frascati Manual

The internationally recognised [Frascati Manual](#) sets out a methodology for collecting and using R&D statistics. It is published by the OECD and includes definitions of basic concepts, data collection guidelines, and classifications for compiling R&D statistics.

UKRI

[UK Research and Innovation \(UKRI\)](#) is the UK's national funding agency investing in science and research in the UK. Operating across the whole of the UK with a combined budget of more than £6 billion, UKRI brings together the 7 Research Councils, Innovate UK and Research England.

3 . Data on gross domestic expenditure on research and development

[UK gross domestic expenditure on research and development, 2023 \(designated as official statistics\)](#)

Dataset | Released 15 August 2025

Annual estimates of research and development in the UK performed and funded by business enterprise, higher education, government, UK Research and Innovation, and private non-profit organisations.

[UK gross domestic expenditure on research and development, 2023 \(designated as accredited official statistics\)](#)

Dataset | Released 15 August 2025

Annual estimates of research and development in the UK performed and funded by business enterprise, higher education, government, UK Research and Innovation, and private non-profit organisations.

4 . Data sources and quality

This release provides estimates of research and development (R&D) performed in, and funding received by, the following four sectors of the UK economy, as defined in the [Organisation for Economic Co-operation and Development \(OECD's\) Frascati Manual](#):

- business enterprise R&D (BERD)
- higher education R&D (HERD)
- government, including UK Research and Innovation, R&D (GovERD)
- private non-profit organisations R&D (PNPRD)

R&D data from these sectors collectively form the gross domestic expenditure on R&D (GERD) measure.

In this release, R&D and related concepts follow internationally agreed standards defined by the [OECD](#), as published in the [Frascati Manual](#). GERD is the OECD's preferred measure of R&D activity for use in international comparisons.

R&D can be measured by the expenditure on R&D performed by an organisation, or the funding received by an organisation for R&D work. These are often, but not always, the same. Performance is regarded as a more reliable measure than funding received, as not all funds received may be used as intended. This release reports on R&D expenditure in UK organisations, irrespective of the country of residence of the ultimate owner or users of the R&D produced.

All figures quoted are in current prices, unless otherwise stated.

5 . Methodological developments

The R&D statistics published in the [Gross domestic expenditure on research and development \(GERD\) bulletin](#) have been redeveloped to address methodological issues in the business and higher education sectors. The first methodological improvements were introduced in the [GERD 2021 bulletin](#) and further improvements were made in the 2022 edition.

Business sector

A new sample design and results methods were introduced for the BERD 2022 survey. This was to address undercoverage, particularly of small businesses, that had been identified in our previously published [BERD statistics](#) up to the 2020 reference period. As an interim step to adjust for the undercoverage, we applied an uplift approach to the estimates in our [Business enterprise research and development \(BERD\) 2021 bulletin](#) and the previously published results for 2018 to 2020. Further information about this is available in our [Options for Transformation of BERD Statistics article](#).

The new sample has increased the volume of survey data received and ensured that the BERD statistics better reflect business R&D performed in the UK.

Higher education sector

Our [GERD 2020 bulletin](#) improved the measurement of R&D performed in the higher education sector, by introducing a new data source: the [Transparent Approach to Costing \(TRAC\)](#). This data source was identified as being better able to measure R&D activity within the higher education sector, compared with the previous source that was not able to fully capture all R&D being performed in the sector.

For the 2021 and 2022 estimates, in a small number of regions, rather than use the TRAC data, we instead estimated R&D expenditure. This was because a small number of universities were not included in the TRAC results for 2021 and 2022. No account is made for these universities in the TRAC estimates, as noted in the most recent [TRAC data publication](#). This means that estimates for 2021 and 2022 in this release are not directly comparable with those in the TRAC publication. However, our estimated values only represented a small proportion of the overall total for the higher education sector.

Impact of R&D methodology improvements on the national accounts

The first time that the redeveloped BERD data, for 2022 and 2023, will be included in the UK National Accounts, will be in the [Advanced aggregate estimates article](#), due to be published on 19 August 2025.

The first quarterly national accounts release to include the new BERD data will be published on 30 September 2025.

Improvements to the calculation of the R&D deflator will also be introduced into the national accounts.

We will look to incorporate the use of this new deflator in our future [BERD](#), [GovERD](#) and [GERD](#) releases, for the calculation of constant price estimates. This will replace our use of the GDP deflator.

The higher education R&D data from the new TRAC source will be incorporated into national accounts estimates that will be published during 2026. This is because the TRAC data were not available in time for the national accounts releases during 2025.

More information about the changes to the national accounts to incorporate our redeveloped R&D statistics is available in our article [Improvements to estimation of research and development within gross fixed capital formation and business investment: Blue Book 2025](#).

R&D as a proportion of gross domestic product

The estimates of the percentage of gross domestic product (GDP) spent on R&D performed in the UK, that had been dropped from the GERD 2020 and 2021 editions, were reintroduced in the [GERD 2022 bulletin](#). This was so users could see an estimate of the impact on GDP from our improved methods after the implementation of the new BERD sample design. This was earlier than we had previously announced in our [GERD 2021 bulletin](#).

The percentages of GDP in this release should be treated as indicative only, because the R&D estimates based on our new methodology will only be included in the calculations of GDP in the national accounts article due to be published on 19 August 2025 and in the quarterly national accounts due to be published on 30 September 2025.

The percentages of GDP spent on performing R&D in this release, which are for periods since 2018, should not be compared with those last published in the 2019 release because of the methodological changes for compiling the business and higher education sector's R&D statistics.

Quality

The methodological improvements to our GERD statistics from 2018 onwards mean that comparing the new estimates in this release with those for periods prior to 2018, for the business and higher education sectors, is not possible.

We would advise users not to compare any of the 2022 or 2023 GERD estimates in this release, below the UK level, with the lower-level values for previous years.

In the [BERD 2022 bulletin](#) we indicated our intention to publish a time series of comparable business sector estimates for detailed results for periods before 2022. Unfortunately, this has taken longer to produce than initially expected. We aim to publish more detailed time series estimates for the business sector as soon as possible.

Accredited Official Statistics status

In this release, the UK totals and performing sector level research and development (R&D) figures retain their accredited official statistics designation, while the remaining figures have official statistics designation. This approach was introduced in our [GERD 2020 bulletin](#) as a result of the redevelopment of the R&D statistics.

The ONS asked the [Office for Statistics Regulation \(OSR\)](#) to temporarily pause the accredited official statistics status of the detailed GERD breakdowns, for the GERD 2020 bulletin, while the BERD statistics were being redeveloped. We are working with OSR with a view to GERD statistics fully resuming their accredited official statistics status.

6 . Related links

[Business enterprise research and development, UK: 2023](#)

Bulletin | Released 11 December 2024

Spending and numbers employed on research and development by businesses in the UK, including data on sources of funds and regional distribution.

[Research and development expenditure by the UK government: 2023](#)

Bulletin | Released 9 April 2025

Research and development and related expenditure by UK government departments and devolved administrations.

7 . Cite this statistical bulletin

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