Statistical bulletin

Business enterprise research and development, UK: 2023

Research and development (R&D) undertaken by businesses in the UK, including data on the type of R&D, sources of funds and regional distribution.

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1 . Main points

- Expenditure on research and development (R&D) performed by UK businesses was £50.0 billion in 2023, an increase of £1.4 billion since 2022 (2.9%).

- The Pharmaceuticals product group made the largest contribution (£8.7 billion) to the total of business R&D performed in 2023 (17.4% of total R&D performed by UK businesses).

- London had the largest regional value of business R&D performed in 2023, at £11.0 billion (22.0%); this was followed by the East of England at £9.7 billion (19.5%) and the South East at £8.5 billion (16.9%).

- When measuring the value of R&D performed by industry, rather than by product group, the Scientific research and development industry performed the most, at £12.7 billion (25.3%).

- Estimates in this release have been compiled based on the new sampling and results methods that were introduced for the 2022 survey. Estimates for 2023 are comparable with those for 2022 but are not directly comparable with years before 2022, with the exception of the UK totals.

2 . Data on Business enterprise research and development

[Business enterprise research and development, UK (designated as accredited official statistics)](#)
Dataset | Released 11 December 2024
UK estimates of annual research and development (R&D) spending by UK businesses.

[Business enterprise research and development, UK (designated as official statistics)](#)
Dataset | Released 11 December 2024
Annual research and development (R&D) spending by UK businesses,designated as official statistics.

3 . Glossary

Research and development

Research and development (R&D) is defined as 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.

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.

Inter-departmental Business Register

The inter-departmental business register (IDBR) is a database of businesses in the UK that is used as the sampling frame for Office for National Statistics (ONS) business surveys.

Product group

A category that relates to the type of R&D work performed by a business, which may or may not relate to the business's main activity.

Standard Industrial Classification

The [UK Standard Industrial Classification (SIC)](#) applied to the collection and publication of a wide range of economic statistics.

4 . Data sources and quality

Methodological developments

In business enterprise research and development (BERD) statistics up to the 2020 reference period, there was undercoverage, particularly of small businesses. Further information on this undercoverage is available in Section 4 of our article on [the comparison of BERD with administrative data sources](#). To address this, we have redeveloped our BERD statistics. Results for the 2022 period were the first to be published using the redeveloped survey methods and the 2023 results in this release are the second to be based on the new methods.

A new sampling approach was introduced for the 2022 survey in which the sample was drawn from the whole of the Inter-departmental Business Register (IDBR). Since the 2022 survey, returns from the BERD survey are weighted to represent the whole population of businesses on the IDBR. Sampling directly from the IDBR ensures that the sample measures the level of R&D performed by businesses across the whole UK economy more effectively than our previous approach. It also more accurately measures the breakdowns of total R&D expenditure, such as regional distribution and type of R&D performed. Our new approach replaces the methodology used in previous years, where the survey results only represented businesses in a pre-established reference list, rather than the whole business sector.

For the 2022 survey, the sample in Great Britain (GB) was approximately 37,000 businesses and for 2023 it was 19,000 businesses. For both periods this is considerably more than the sample size used in our previous method, which was approximately 4,000. Analysis from the 2022 survey results was used to refine the sample for the 2023 survey further, by better focussing where it was needed, while allowing the total number of businesses sampled to be reduced.

Northern Ireland R&D statistics

BERD statistics for Northern Ireland are compiled by the [Northern Ireland Statistics Research Agency](#) (NISRA) and we have been working with NISRA to ensure that, when combined with the GB BERD data, the estimates at the UK level are the best quality possible. The Northern Ireland sample remained at approximately 1,500 businesses for 2023.

It should be noted that the regional estimate for Northern Ireland in this release is slightly higher than the estimate published by NISRA. This is because of a small proportion of R&D being performed in Northern Ireland, but by GB businesses. These businesses are in scope for the GB BERD survey and are excluded from the results published by NISRA. We have worked closely with NISRA to ensure no duplication exists as a result.

Using administrative data

Part of the BERD survey redevelopment work included investigating the measurement of R&D that is used to support claims for R&D tax credits. As part of this, we published an article on the [comparison of BERD with administrative data sources](#) and we now use the HMRC's R&D tax credit data to inform our sample. Using the HMRC data, we identify the top 400 R&D tax credit claimants. These are combined with the top 400 R&D performing businesses, based on expenditure reported on the previous year's BERD survey, to compile a reference list of approximately 800 of the top GB R&D performers, who are automatically included in the sample each year. The remainder of the sampled businesses are randomly drawn from the IDBR, to ensure it includes all business types and that adequate numbers of businesses are sampled by region to produce robust subnational estimates.

Further information about the improvements to our sample design can be found in our [Update on transformation of research and development statistics: November 2023 article](#).

Survey questionnaires

BERD uses two types of questionnaire: a long form and a short form. The long form collects detailed breakdowns about R&D, which includes the type of R&D being performed (referred to as "product group" in this release). It also collects the postcode location of where the R&D has been performed. For 2023, we despatched approximately 8,500 long forms, which is a substantial increase compared with the previous sample design, in which 400 long forms were despatched. This increased sample of long forms provides us with more detailed data to inform the BERD statistics than was the case up to the 2021 survey.

The short form collects totals only, and excludes the detailed breakdowns collected on the long form. To determine the type and location of R&D being performed, assumptions are made based on each short form responder's Standard Industrial Classification (SIC) and address details, as held on the IDBR.

Revisions to 2022

The 2023 survey results mean that there are now two periods available based on the redeveloped survey methods. This has enabled more in-depth validation of the results for 2022 than was possible when only one period was available. This has resulted in a downward revision of the 2022 estimate of R&D performed by businesses in the UK, from the originally published value of £49.9 billion, to £48.6 billion.

Time series

In the 2022 BERD bulletin we indicated our intention to publish a time series of comparable estimates for detailed results for periods before 2022. Unfortunately, because of complexities in the methods, this has taken longer to produce than initially expected. Therefore, results for periods before 2022 are only available at the UK level in this release. We aim to publish more detailed time series estimates as soon as possible.

Future developments to statistics on employment relating to R&D

The second period of redeveloped survey results has provided new information to enable further improvements to survey methods. In the 2022 survey, the method used for estimating the numbers of people working on R&D, known as expansion estimation, was consistent with that used for the monetary values of R&D performed. Now we have two years of data from the redeveloped survey, we can test an alternative method for calculating the number of people working on R&D, which may improve results. To ensure sufficient time for the alternative method to be fully tested and verified, the results for R&D employment that were published in the 2022 release will not be available in time for the 2023 release. They will instead be published at a later date.

Accredited Official Statistics status

As the redevelopment of the BERD statistics is ongoing, only the total UK estimates in this release are designated as "accredited official statistics". All estimates below the UK level are designated as "official statistics", which was the case with the 2022 BERD release. More information about this is available in the Office for Statistics Regulation's (OSR's) letter.

Further background information on the redevelopment of BERD statistics

More in-depth information around how the BERD statistics have been redeveloped is available in our BERD 2021 and BERD 2022 statistical bulletins and in our Update on transformation of research and development statistics: November 2023 article.

More quality and methodology information

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our Business enterprise research and development quality and methodology information (QMI) report.

5 . Related links

[Gross domestic expenditure on research and development, UK: 2022](#)
Bulletin | Released 8 August 2024
Annual estimates of research and development (R&D) performed and funded by business enterprise, higher education, government, UK Research and Innovation (UKRI), and private non-profit organisations.

[Research and development expenditure by the UK government: 2022](#)
Bulletin | Released 30 April 2024
Research and development and related expenditure by UK government departments and devolved administrations.

6 . Cite this statistical bulletin

Office for National Statistics (ONS), released 11 December 2024, ONS website, statistical bulletin, [Business enterprise research and development, UK: 2023](#)