

Article

UK public-funded gross regional capital and non-capital expenditure on research and development: financial year ending 2021

Experimental UK public-funded gross capital and non-capital expenditure on research and development (R&D) by International Territorial Level 1 (ITL1) geographies during the financial year ending 2021.

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1 . Main points

- The Greater South East – which consists of the International Territorial Level 1 (ITL1) regions of London, the South East and the East of England – accounted for 49.9% of total UK public-funded expenditure on research and development (R&D) performed in the UK in the financial year ending (FYE) 2021.
- London and the South East had the two highest values of UK public-funded gross R&D expenditure of all UK countries and regions, whereas Northern Ireland had the lowest R&D expenditure value.
- Just over half (53.9%) of total UK public-funded purchased or funded R&D was performed outside the Greater South East in FYE 2021.
- Of total in-house performed UK public-funded R&D, 62.5% was conducted in the Greater South East, with just over one-quarter (28.0%) of total in-house R&D taking place in the South East.

2 . Overview of UK public-funded research and development

Research and development (R&D) refers to any creative and systematic activity that contains certain amount of novelty – which includes the development of new concepts, products and processes – with the aim of increasing the stock of knowledge. Statistics presented in this article are compiled in line with internationally-agreed best practice as defined in the [Frascati Manual 2015 by the Organisation for Economic Co-operation and Development \(OECD\)](#).

All sectors of the economy – private businesses, government, higher education institutions, and private not-for-profit organisations – can fund and conduct R&D activities. This article presents experimental estimates of UK public-funded expenditure on gross capital and non-capital R&D for the financial year ending (FYE) 2021, broken down by International Territorial Level 1 (ITL1) UK countries and regions. Results include estimates for R&D expenditure that is conducted both within the government sector (in-house performed R&D) or outside of government (purchased or funded R&D). The purpose of this publication is to support delivery of the [Government Statistical Service \(GSS\) subnational data strategy](#) and serve as baseline estimates for the measurement of the government's mission on public-funded R&D, outlined in the [Levelling Up White Paper, published on GOV.UK](#).

This set of statistics was compiled using financial microdata or aggregated estimates received from the following three central government departments with the highest expenditure on R&D for FYE 2021:

- the Department for Business, Energy and Industrial Strategy (BEIS) – including UK Research and Innovation (UKRI)
- the Department of Health and Social Care (DHSC)
- the Ministry of Defence (MoD)

These departments constituted a combined 87.5% of UK public-funded gross capital and non-capital expenditure on R&D for FYE 2021. Any remaining public-funded R&D expenditure was derived from the UK government expenditure on research and development (GovERD) survey.

These experimental statistics are consistent with official R&D expenditure estimates from the GovERD survey. Please note, however, that the terminology and methodology used to compile statistics presented in this article differ from those used to produce current GovERD statistics, meaning that both sets of statistics are not directly comparable. These statistics should also not be confused with the UK gross domestic expenditure on research and development (GERD) statistics, which measure the total value of R&D conducted by all sectors of the UK economy.

More information on the data sources and methodology used to compile results presented in this article and how they differ from estimates produced by GovERD and GERD publications can be found in [Section 7: Data sources and quality](#), as well as our accompanying [Measuring UK public-funded gross regional capital and non-capital expenditure on research and development methodology note](#).

3 . UK public-funded gross capital and non-capital research and development expenditure by UK country and region

Gross capital and non-capital research and development (R&D) expenditure is the total expenditure on R&D activities prior to the deduction of any income generated on such activities. This section presents experimental statistics of UK public-funded gross capital and non-capital expenditure on “in-house performed” and “purchasing or funding” R&D during the financial year ending (FYE) 2021 by International Territorial Level 1 (ITL1) UK country and region.

Total gross capital and non-capital R&D

The UK’s public-funded gross capital and non-capital expenditure on R&D was £14.5 billion in FYE 2021, of which 93.0% (or £13.4 billion) was spent across the UK. London and the South East had the two highest values of gross capital and non-capital R&D among all UK countries and regions, as shown in Figure 1. Both regions had a combined R&D value of £5.4 billion (40.4%) in FYE 2021. This was followed by Scotland (£1.3 billion, 9.5%) and the East of England (£1.3 billion, 9.5%).

Figure 1: London and the South East accounted for the highest value of gross capital and non-capital R&D expenditure of all ITL1 UK countries and regions in FYE 2021

Experimental gross capital and non-capital research and development expenditure by ITL1 UK country and region, FYE 2021, £ million

Note:

1. Summing for all UK countries and regions may not match published UK totals because of rounding.

Download the data

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The South West and the North West were the only English regions outside the Greater South East with gross capital and non-capital R&D expenditure values above £1.0 billion in FYE 2021. Whereas Northern Ireland, Wales and the North East had the lowest R&D expenditure, with a combined value of just under £1.0 billion. It should be noted that these lower figures are partially explained by comparatively small populations in these regions and countries.

In-house performed R&D

Expenditure on R&D performed “in-house” refers to any gross capital and non-capital R&D activity that is conducted within the “general government” sector of the National Accounts. This includes central as well as local government. For more information please see our [Public sector classification guide and forward work plan](#). The government sector reported a value of £3.1 billion of total gross expenditure on capital and non-capital R&D that was performed “in-house” in the UK in FYE 2021.

Figure 2: Northern Ireland, the North East, Wales and the West Midlands had an expenditure value of in-house performed R&D below £0.1 billion in FYE 202

Experimental in-house performed gross expenditure on capital and non-capital research and development by ITL1 UK country and region, FYE 2021, £ million

Note:

1. Summing for all UK countries and regions may not match published UK totals because of rounding.

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The South East had the highest in-house performed R&D expenditure of all ITL1 UK countries and regions, with a value of £0.9 billion (or 28.0%) in FYE 2021 (Figure 2). This was closely followed by London, where the government sector performed £0.7 billion (or 21.3%).

Similar to the geographic distribution of overall gross capital and non-capital R&D, Northern Ireland, the North East and Wales performed the lowest in-house R&D expenditure. This contrasts with the South West, which had the highest value of in-house performed R&D expenditure outside the Greater South East in FYE 2021, of £0.4 billion. Overall, this suggests that the majority of in-house performed R&D was concentrated in the southern territories of England.

Purchased or funded R&D

The government sector can also fund or purchase R&D activities that are conducted by organisations outside the government sector, such as private companies, higher education institutions and not-for-profit organisations, both within and outside the UK. In FYE 2021, UK public-funded purchased or funded R&D totalled £11.4 billion, which was mostly performed in the UK (91.1%, £10.4 billion).

For purchased or funded R&D, R&D activities were more spread across the UK than for in-house performed R&D (Figure 3). London and the South East had the two highest values of purchased or funded R&D performance in FYE 2021, of £2.1 billion and £1.8 billion, respectively. Outside the Greater South East, Scotland and the North West were the largest contributors to total UK purchased or funded R&D expenditure in FYE 2021, with a combined value of £2.0 billion.

Figure 3: Scotland and the North West were the largest contributors to the total purchased or funded R&D expenditure outside the Greater South East in FYE 2021

Experimental purchased or funded gross expenditure on capital and non-capital research and development by ITL1 UK country and region, FYE 2021, £ million

Note:

1. Summing for all UK countries and regions may not match published UK totals because of rounding.

Download the data

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The Greater South East

The Greater South East – which consists of the regions of London, the South East and the East of England – is an area of interest for the measurement of public-funded R&D, as outlined in the Levelling Up White Paper. When excluding any R&D expenditure located abroad, the Greater South East area accounted for 49.9% of total UK gross capital and non-capital R&D compared with 50.1% for the "Rest of the UK" (Figure 4).

Figure 4: The Greater South East area accounted for 49.9% of total gross capital and non-capital R&D expenditure in the UK in FYE 2021

Experimental percentage shares of UK gross expenditure on capital and non-capital research and development by the Greater South East and Rest of the UK, FYE 2021, percentage

Notes:

1. The “Greater South East” area covers the ITL1 regions of London, the South East and the East of England.
2. “Rest of the UK” area refers to all UK countries and regions outside the Greater South East.
3. Any expenditure on R&D outside the UK is not included in this analysis.

Download the data

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For in-house performed R&D, the Greater South East accounted for 62.5% compared with all the other UK ITL1 countries and regions (37.5%). The largest area within the Greater South East was the South East, making up 28.0% of the UK’s in-house performed R&D. The South West was the largest region for the “Rest of the UK” at 12.7%, with the next-largest regions being the North West and Scotland at 5.9%.

In contrast, the Greater South East represented 46.1% of UK purchased or funded R&D. London had the largest expenditure of regions within the Greater South East, at 20.1%, and the East of England the smallest at 8.4%. For the “Rest of the UK”, Scotland was the largest at 10.6% and Northern Ireland the smallest at 1.8%.

4 . Explore experimental UK public-funded gross regional capital and non-capital expenditure on research and development data for FYE 2021

Explore these experimental regional estimates of UK public-funded gross expenditure on capital and non-capital research and development (R&D) expenditure for the financial year ending (FYE) 2021 using the interactive tools in Figure 5. Data show R&D expenditure broken down by International Territorial Level 1 (ITL1) UK country or region and by type of performance.

Use this map to get a better understanding of where R&D activities are conducted both within the UK and overseas. Select a UK country or region by hovering over it (desktop only) or use the drop-down menu.

Figure 5: Explore experimental UK public-funded gross regional capital and non-capital expenditure on research and development data for FYE 2021

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5 . UK public-funded gross regional capital and non-capital expenditure on research and development data

[UK public-funded gross regional capital and non-capital expenditure on research and development](#)

Dataset | Released 17 April 2023

Experimental UK public-funded gross capital and non-capital expenditure on research and development (R&D) by International Territorial Level 1 (ITL1) geographies during the financial year ending 2021.

6 . Glossary

Research and development (R&D)

Research and development (R&D) refers to any creative and systematic activity that contains a certain amount of novelty – which includes the development of new concepts, products and processes – with the aim of increasing the stock of knowledge. Statistics presented in this article are compiled in line with internationally-agreed best practice as defined in the [Frascati Manual 2015 by the Organisation for Economic Co-operation and Development \(OECD\)](#).

Gross capital and non-capital expenditure on R&D

Gross capital and non-capital R&D expenditure is the total expenditure on R&D activities prior to the deduction of any income generated on such activities. This includes any R&D funding that flows from central government to local government.

In-house performed R&D

In-house performed R&D measures any R&D activity that is conducted within the “general government” sector of the National Accounts, which includes central as well as local government.

Purchased or funded R&D

Purchased or funded R&D is any R&D activity that is conducted by an organisation outside of government but is purchased or at least partially funded by the government sector.

International Territorial Level (ITL)

[International Territorial Levels \(ITL\)](#) are the new UK geographies classification system. This has superseded the Nomenclature of Units for Territorial Statistics (NUTS) classification system.

7 . Data sources and quality

Data sources

The main sources of information used to compile results in this article are research and development (R&D) expenditure microdata or aggregated R&D estimates from the following three central government departments with the highest R&D expenditure for the financial year ending (FYE) 2021:

- the Department for Business, Energy and Industry (BEIS), which includes UK Research and Innovation (UKRI)
- the Department of Health and Social Care (DHSC), which includes the National Health Service (NHS)
- the Ministry of Defence (MoD)

Together, these departments constituted 87.5% of total gross capital and non-capital R&D expenditure in FYE 2021. These are supplemented with the UK government expenditure on research and development (GovERD) survey responses to measure UK public-funded R&D expenditure outside those three central government departments.

Data coverage

This article publishes, for the first time, experimental estimates of UK public-funded gross capital and non-capital R&D expenditure for FYE 2021, broken down by International Territorial Level 1 (ITL1) UK country or region. These statistics are consistent with GovERD estimates yet not directly comparable because of differences in methods and data sources. However, this publication will be used to inform the design of the GovERD survey, which is currently under review to transform the way we collect and publish public-funded R&D statistics.

Methodological approach

Experimental estimates of gross regional capital and non-capital R&D expenditure within this article are compiled using a combination of bottom-up and top-down approaches. Where departmental microdata was available, these estimates were aggregated at the ITL1 UK country or region using data relating to organisations' operating locations (bottom-up approach). Elsewhere, a top-down approach was used relying on regional Civil Service employment figures from [Civil Service statistics: 2021, published by GOV.UK](#), with expenditure by devolved administrations attributed to the relevant UK country.

These experimental statistics were constrained to total gross capital and non-capital expenditure on R&D derived from GovERD survey for FYE 2021. This means that these experimental estimates are consistent with their GovERD equivalent but are not directly comparable because of differences in methodology and data sources.

Please note that this constraining approach had a relatively small impact on the regional distribution of results presented in this article. This is because this publication uses GovERD estimates for in-house performed R&D expenditure located outside the UK. In those cases, the relevant R&D expenditure was allocated to the corresponding primary location of the organisation in the UK. Also, any R&D activity conducted in UK extra-regio – which include the Channel Islands and the Isle of Man – was excluded or redistributed to their primary UK location where appropriate.

Headquartering checks

Microdata from select central government departments showed R&D expenditure at point of allocation, which may not necessarily represent the location where an organisation conducts R&D activities (R&D performance). This is particularly important when looking at organisations that operate across several sites in the UK but conduct their R&D activities outside their headquarter offices.

The location of performed R&D was confirmed by linking acquired R&D expenditure microdata to local corporate information from the Inter-Departmental Business Register (IDBR). In addition, manual location checks were conducted for any organisation with a total R&D expenditure value of at least £1 million.

Double-counting

It is common that R&D funding flows within the government sector, either to conduct an R&D activity within or outside of government. Acquired microdata showed that these funds appeared in the R&D expenditure of the funding department as well as that of the receiving department. Therefore, any of these R&D funds were excluded to avoid double-counting spend-lines and overestimate public-funded R&D expenditure.

Quality

More quality and methodology information on strengths, limitations, appropriate uses, and how these experimental statistics were produced is available in our accompanying [Measuring UK public-funded gross regional capital and non-capital expenditure on research and development methodology note](#).

8 . Future developments

These experimental statistics have been produced by using a combination of research and development (R&D) expenditure microdata and aggregated R&D estimates received from the three central government departments with the highest R&D expenditure in the financial year ending (FYE) 2021; and of survey data derived from the UK government expenditure on research and development (GovERD) survey. These estimates are intended to serve as a baseline for the measurement of the UK government's Levelling Up mission on public-funded R&D.

This publication also offers valuable information that will be useful to improve the design of the GovERD survey, which is currently under review to transform the way we collect and publish public-funded R&D statistics. We will continue to engage with government bodies to ensure the improved GovERD survey will continue to support the measurement of public-funded R&D expenditure in the upcoming years.

9 . Related links

[Research and development expenditure by the UK government: 2021](#)

Bulletin | Released 30 March 2023

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

[Frascati Manual 2015](#)

Methodology | Released 8 October 2015

A set of internationally-recognised guidelines for collecting and reporting research and development expenditure outlined by the Organisation for Economic Co-operation and Development (OECD).

[Measuring UK public-funded gross regional capital and non-capital expenditure on research and development](#)

Methodology | Released 17 April 2023

Methods used to produce experimental UK public-funded gross capital and non-capital expenditure on research and development, International Territorial Level 1 geographies, financial year ending 2021.

[Regional UK business research and development, methods](#)

Methodology | Released 17 April 2023

Exploring models and data linkage to develop estimates of business expenditure on research and development at International Territorial Level (ITL) 1.

10 . Cite this article

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