

Statistical bulletin

Gross domestic expenditure on research and development, UK: 2012

Estimates of research and development performed and funded by business enterprise, higher education, government, research councils and private non-profit organisations.



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1 . Main points

- In 2012, the UK's gross domestic expenditure on research and development (GERD), in current prices, decreased by 2% to £27.0 billion compared with 2011. Adjusted for inflation, in constant prices, research and development (R&D) expenditure decreased by 3%.
- In constant prices, R&D expenditure has increased by 56% from the 1985 estimate of £17.3 billion. Expenditure peaked in 2011 at £27.9 billion.
- The business sector performed 63% of UK R&D expenditure in 2012. Expenditure by this sector decreased by 2%, in current prices, to £17.1 billion in 2012, compared with 2011.
- Total R&D expenditure in the UK in 2012 represented 1.72% of Gross Domestic Product (GDP), a decrease from 1.77% in 2011.
- International comparisons show that UK R&D expenditure in 2012 was below the EU-28 provisional estimate of 2.06% of GDP.

2 . Overview

This statistical bulletin provides estimates of R&D performed in and funded by the following four sectors of the economy, as defined in the ['Frascati Manual'](#):

- Business Enterprise (BERD)
- Higher Education (HERD)
- Government (GovERD), which includes Research Councils
- Private Non-Profit (PNP) organisations

All these sectors' R&D data are known collectively as GERD, which represents the gross domestic expenditure on R&D in the UK.

GERD is unique in providing this information, and is the preferred measure of R&D activity for use in international comparisons. This release reports on R&D expenditure in the UK irrespective of the residence of the ultimate owner or users of the R&D produced. The main purpose of collecting R&D data from all sectors of the economy is to supply data for policy and monitoring purposes on science and technology, of which R&D is an important part.

In this statistical bulletin, R&D and related concepts follow internationally agreed standards defined by the [Organisation for Economic Cooperation and Development](#) (OECD), as published in the ['Frascati Manual'](#). This manual defines R&D as "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications".

The Frascati Manual was originally written by, and for, the experts in OECD member countries that collect and issue national data on R&D. The definitions provided in this manual are internationally accepted and now serve as a common language for designing and evaluating science and technology policy.

The business sector estimates in this release, the largest component of GERD, are derived from the Business Enterprise Research and Development (BERD) survey, published on 22 November 2013 in the [Business Enterprise Research and Development 2012](#) statistical bulletin. Approximately 5,000 UK businesses were selected for this survey from a continually updated register of R&D performers.

The National Accounts provide the framework that is used to define and measure the UK's economic performance, such as the value of the UK's GDP. Changes to the European System of Accounts (ESA) mean that from September 2014 onwards, expenditure on R&D will contribute to the formation of assets and therefore the value of the UK's net worth. Further information about this important change can be found at [ONS ESA 2010](#).

Two types of estimates are presented in this release, current and constant prices. Estimates in current prices present the value of R&D expenditure in cash terms. Constant price estimates have been adjusted for inflation between years using the GDP deflator. This allows changes in the volume of R&D expenditures to be examined on a comparable basis over time.

3 . User engagement

We are constantly aiming to improve this release and its associated commentary. We would welcome any feedback you might have, and would be particularly interested in knowing how you make use of these data to inform your work. Please contact us via email: RandD@ons.gsi.gov.uk or telephone David Matthews on +44 (0) 1633 456756.

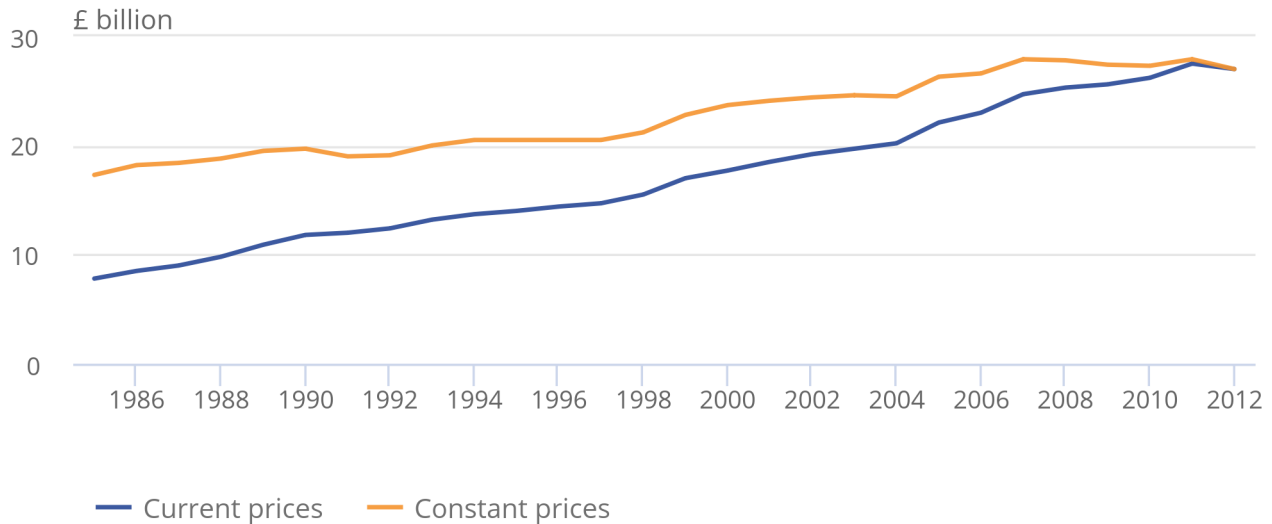
4 . UK gross domestic R&D expenditure, 2012

In 2012, in current prices, £27.0 billion was spent on R&D performed within the UK, a decrease of £0.5 billion (2%) since 2011. This was mainly driven by a £0.4 billion decrease in R&D performed by the business sector. Adjusted for inflation, in constant prices, R&D expenditure decreased by 3%.

In 1985, in constant prices, £17.3 billion was spent on R&D performed in the UK. Since then, there has been a sizeable increase (56%) in R&D expenditure in the UK. Expenditure peaked in 2011 at £27.9 billion (Figure 1).

Figure 1: UK gross domestic expenditure on R&D, 1985 to 2012

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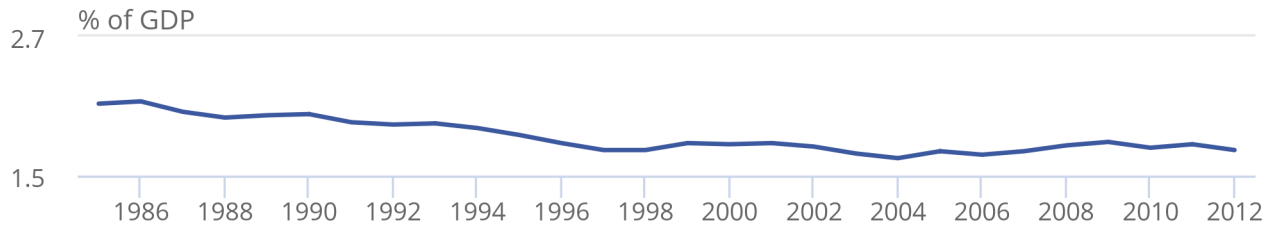
Source: Office for National Statistics

Figure 2 shows UK gross domestic expenditure on R&D, as a percentage of GDP, in current prices. Total R&D expenditure in 2012 represented 1.72% of GDP, a decrease on the 1.77% estimate for 2011. It should be noted that this decrease is partly due to the increase in GDP in 2012, as well as the decrease in R&D expenditure.

UK gross domestic R&D expenditure, as a percentage of GDP, in current prices, peaked in 1986 at 2.14%. Since 2001, R&D expenditure as a percentage of GDP has been within a range of 1.65% to 1.79%.

Figure 2: UK gross expenditure on R&D as a percentage of GDP, 1985 to 2012

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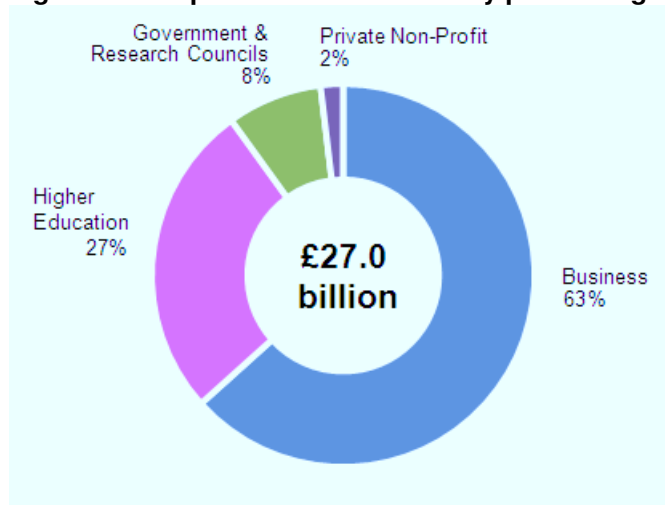
Source: Office for National Statistics

A target set by the UK Government in the [Science and Innovation Framework 2004 - 2014](#) was to increase public and private investment in R&D towards a goal of 2.5% of GDP by 2014.

5 . Expenditure on R&D performed in the UK

UK estimates of R&D cover the four sectors of the economy, namely Business, Higher Education, Government (including Research Councils), and Private Non-Profit organisations. Figure 3 shows the contribution each sector made to the total UK R&D expenditure estimate in 2012.

Figure 3: Composition of UK GERD by performing sector, 2012



Taking each of these R&D sectors in turn:

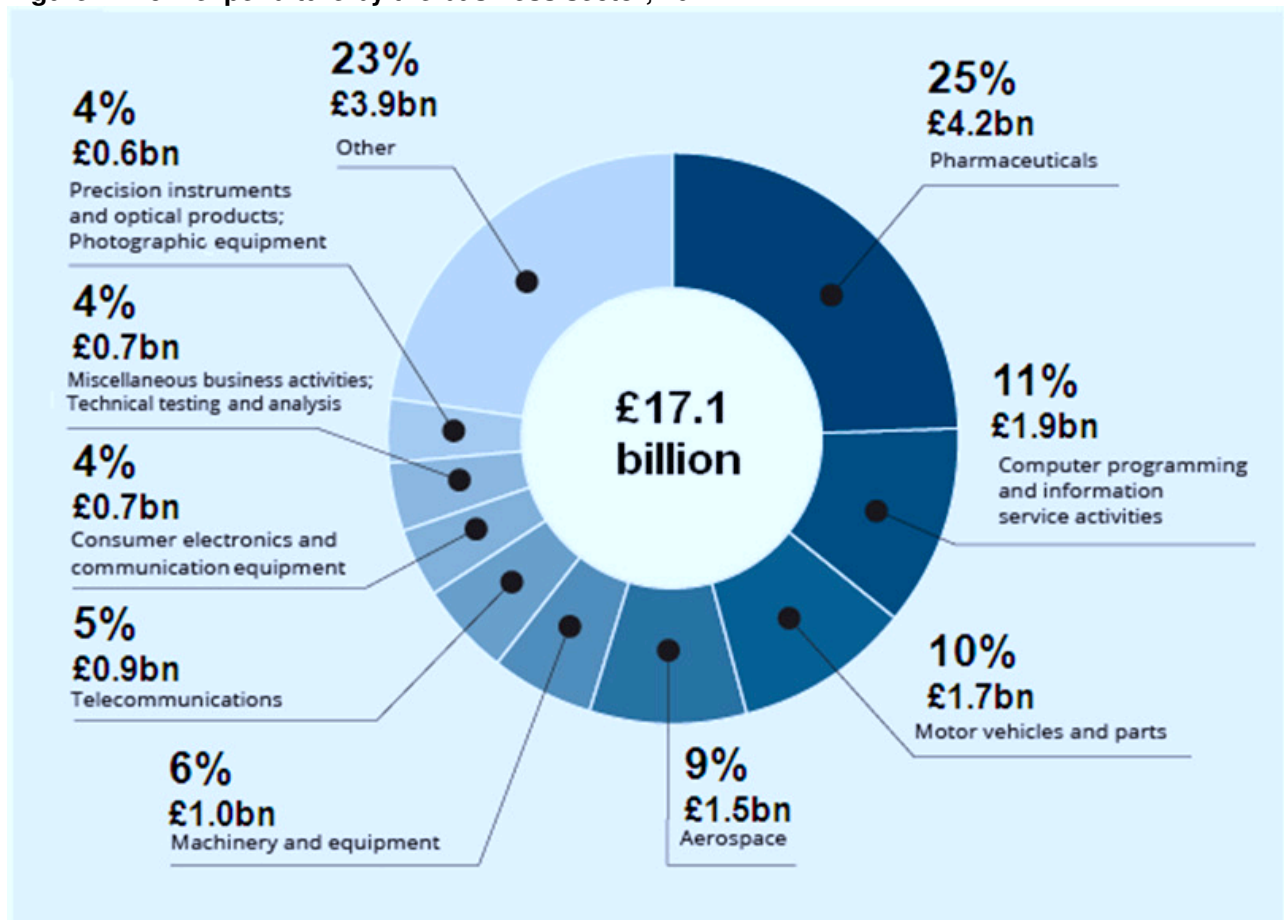
Business

The business sector performs the most R&D of any sector in the UK. In 2012 it accounted for £17.1 billion of expenditure, representing 63% of total expenditure on R&D. This is a decrease of 2% in current prices from £17.5 billion in 2011. On an annual basis, the 400 largest business R&D spenders are asked to select the industry product groups that best describe the type of R&D that they undertake. The product groups with the largest R&D expenditure in 2012 (Figure 4) were:

- Pharmaceuticals (£4.2 billion)
- Computer programming and information service activities (£1.9 billion)
- Motor vehicles and parts (£1.7 billion)
- Aerospace (£1.5 billion)
- Machinery and equipment (£1.0 billion)
- Telecommunications (£0.9 billion)

The UK Government has continued to promote growth in R&D, particularly in the business sector, through the introduction of tax relief, and [Catapult centres](#). A Catapult is a “technology and innovation centre where UK businesses, scientists and engineers can work together on research and development, transforming ideas into new products and services”.

Figure 4: R&D expenditure by the business sector, 2012



More detailed information on business R&D expenditure can be found in the [UK Business Enterprise Research and Development 2012 statistical bulletin](#) published on 22 November 2013.

Higher education

The higher education sector, which includes universities and higher education institutes, represented 27% of total UK R&D expenditure in 2012 at £7.2 billion. This was an increase of 1% in current prices, from £7.1 billion in 2011. The funding for this sector is mainly provided by the Higher Education Funding Councils for [England](#), [Scotland](#) and [Wales](#), the [Department for Education in Northern Ireland](#) and the seven UK research councils.

Government and research councils

The UK Government owns many research institutes and laboratories that carry out R&D. These are managed by different government departments, including the Department for Business, Innovation and Skills, the Department for Environment, Food and Rural Affairs and the Department of Health.

In 2012, R&D expenditure in the UK by the government and research councils sector decreased by 8% in current prices, from £2.4 billion in 2011 to £2.2 billion in 2012. This sector accounted for 8% of total expenditure on R&D performed in the UK in 2012.

[Research Councils UK](#) (RCUK) is the strategic partnership of the UK's seven research councils. Each year the councils perform research covering the full spectrum of academic disciplines from the medical and biological sciences to the arts and humanities.

Research councils' R&D expenditure decreased by 22% in current prices, from £1.0 billion in 2011 to £0.8 billion in 2012.

Private non-profit

The private non-profit sector includes registered charities and trusts. Those performing R&D in this sector specialise mainly in health and medical research. Some of the largest of these are based in the UK. This sector includes, for example, a number of cancer charities that carry out extensive research into types of cancer prevention, from drug development to clinical trials.

The private non-profit sector is the smallest R&D performing sector in the UK. In 2012, it is estimated that £0.5 billion was spent by these organisations, which contributed 2% to total UK R&D expenditure.

6 . Civil and defence expenditure, by performing sector

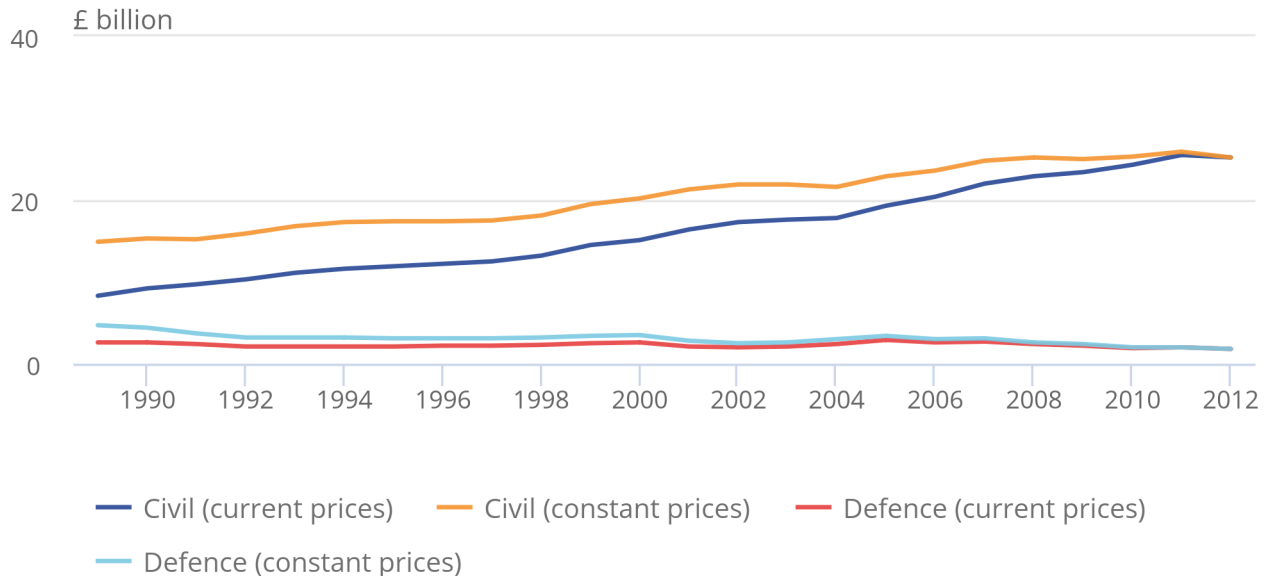
R&D expenditure for civil purposes in 2012 (£25.2 billion) accounted for 93% of total UK R&D expenditure (Figure 5).

In current prices, civil R&D expenditure decreased by 1%, from £25.5 billion in 2011 to £25.2 billion in 2012, while defence R&D decreased by 10%, from £2.0 billion to £1.8 billion.

In constant prices, civil R&D expenditure has increased by 70% (£10.4 billion) since the 1989 estimate of £14.9 billion. In contrast, defence R&D expenditure has decreased by 62% over the same period, from £4.7 billion in 1989.

Figure 5: Expenditure on civil and defence R&D performed in the UK, 1989 to 2012

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Source: Office for National Statistics

Civil and defence R&D expenditure can be further split between the four performing UK sectors. The business sector was by far the largest R&D performer in both civil and defence R&D in 2012, at £15.5 billion and £1.6 billion respectively.

Of particular note, business R&D expenditure in the civil sector has increased by 52% in constant prices since 1989, but business expenditure on R&D in the defence sector has decreased by 48% over this period.

7 . R&D expenditure by funding sector

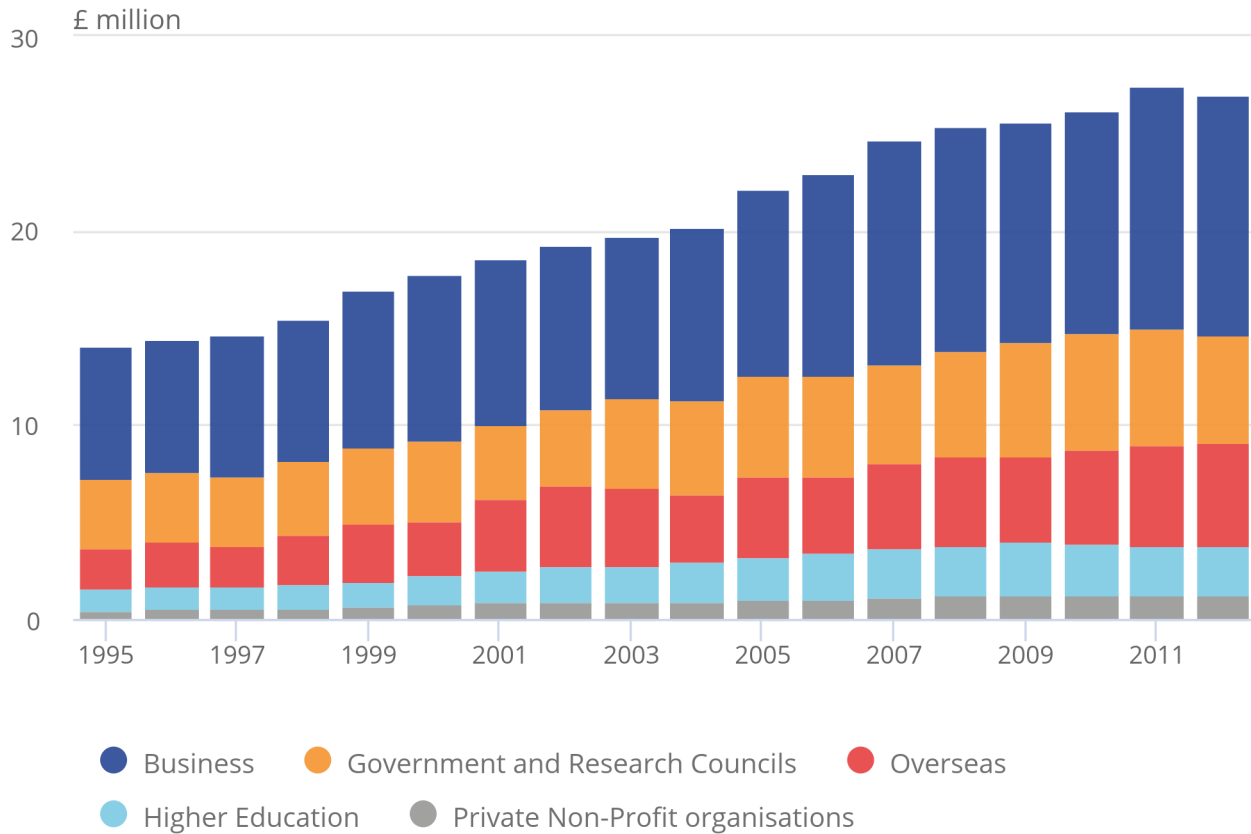
In 2012, most of the funding for R&D performed in the UK was provided by the business sector which funded £12.3 billion. This was a decrease of 1%, in current prices, from £12.5 billion in 2011 (Figure 6). The business sector funded 46% of the total UK R&D spend in 2012.

Although the government and research councils sector spent £2.2 billion performing R&D within their UK public research institutes, they actually funded £5.6 billion of UK R&D spend, 21% of total funding. This can be better understood through an appreciation of the role of [RCUK](#) which offers individuals and businesses overseas, access to the UK's research facilities and infrastructure.

In just under two decades there has been a change in the profile of how UK R&D expenditure has been funded. In 1985, 8% of R&D funding came from overseas. Since then, there has been a steady increase in the proportion of funding for UK R&D expenditure from overseas, from 14% in 1995 to 20% in 2012.

Figure 6: Composition of UK GERD by funding sector, 1995 to 2012

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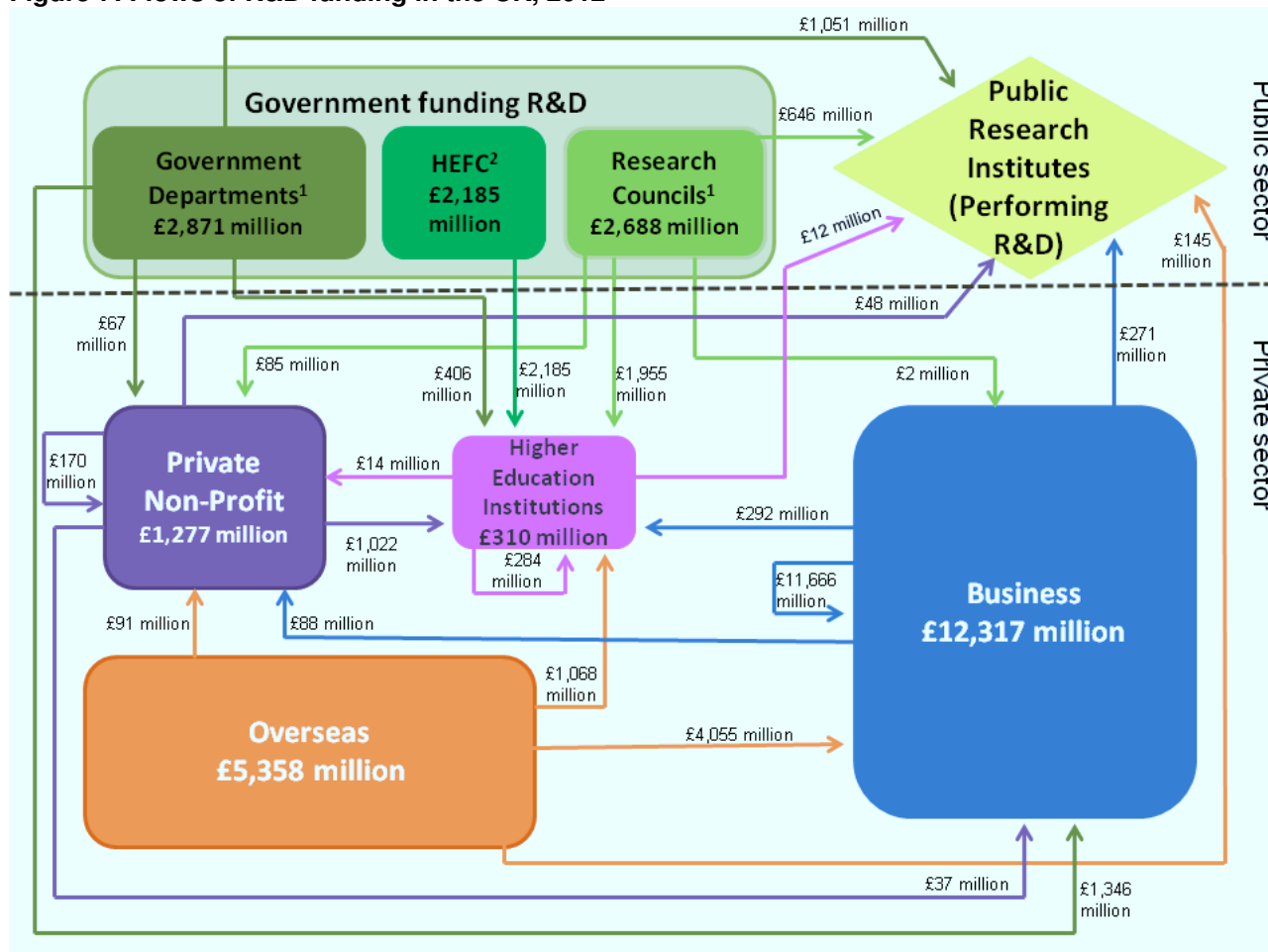


Source: Office for National Statistics

Figure 7 is a representation of the flows of R&D funds from the four UK sectors and overseas. The values in the boxes are the amounts of funding that each sector provided to the other sectors in the UK in 2012. The arrows indicate the values provided to the recipient sector.

It is important to note that sectors can fund themselves. For example, in 2012 the business sector performed £17.1 billion, of which £11.7 billion was funded by this sector. The remaining £5.4 billion of R&D expenditure performed by the business sector was funded by other sectors.

Figure 7: Flows of R&D funding in the UK, 2012



8 . Civil and defence R&D expenditure by funding sector

The majority of funding for civil R&D performed in the UK was provided by the business sector (£11.9 billion), 47% of total civil funding.

Of the £5.4 billion funding received from overseas in 2012, 97% was spent on civil R&D (£5.2 billion).

R&D expenditure for defence purposes in the UK accounted for 7% of total R&D expenditure (£1.8 billion) in 2012. The UK Government's funding of defence R&D in 2012 was £1.2 billion. This was a decrease of 5% in current prices from £1.3 billion in 2011. This is partly due to government contracts awarded to UK businesses for the development of aircraft, naval ships, submarines and their systems and equipment, moving from the research to production stages. The business sector provided £0.4 billion (24%) of funding and £0.2 billion (10%) came from overseas. The UK Government accounted for 67% of total defence funding.

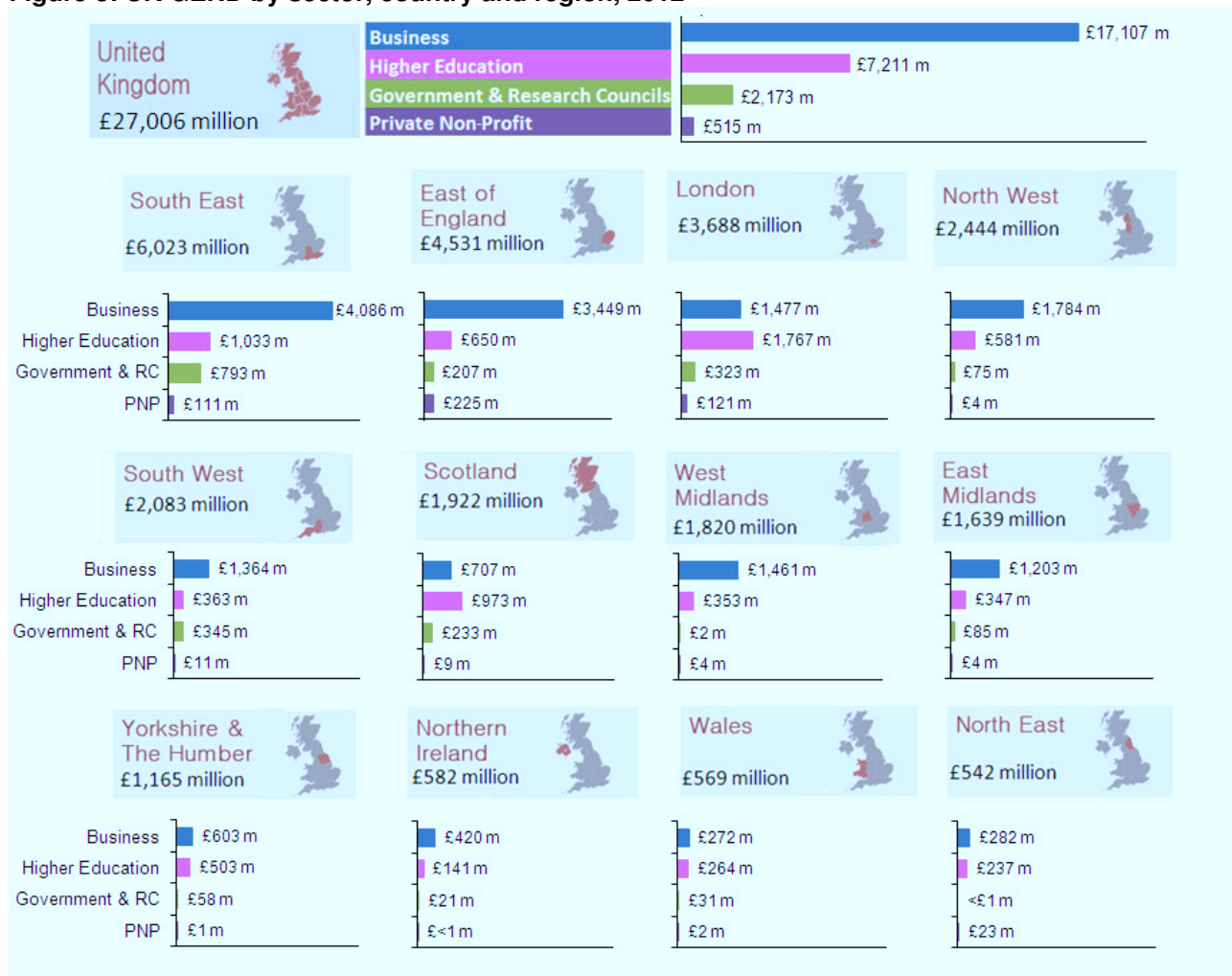
9 . Country and regional breakdown of UK R&D expenditure

R&D expenditure can be analysed by UK country and region (Figure 8). In this context, the country and region refers to the location where the R&D is performed, not the location of the funder.

The South East and East of England continued to dominate where R&D is performed in the UK in 2012. These two regions accounted for 39% of total UK R&D expenditure (£10.6 billion).

The majority of UK R&D expenditure was carried out in England (£23.9 billion) in 2012. Although England showed a decrease in R&D expenditure in current prices of 2% compared with 2011, Northern Ireland and Wales showed increases of 12% and 2% respectively in 2012. The estimate for Scotland showed no change from 2011.

Figure 8: UK GERD by sector, country and region, 2012



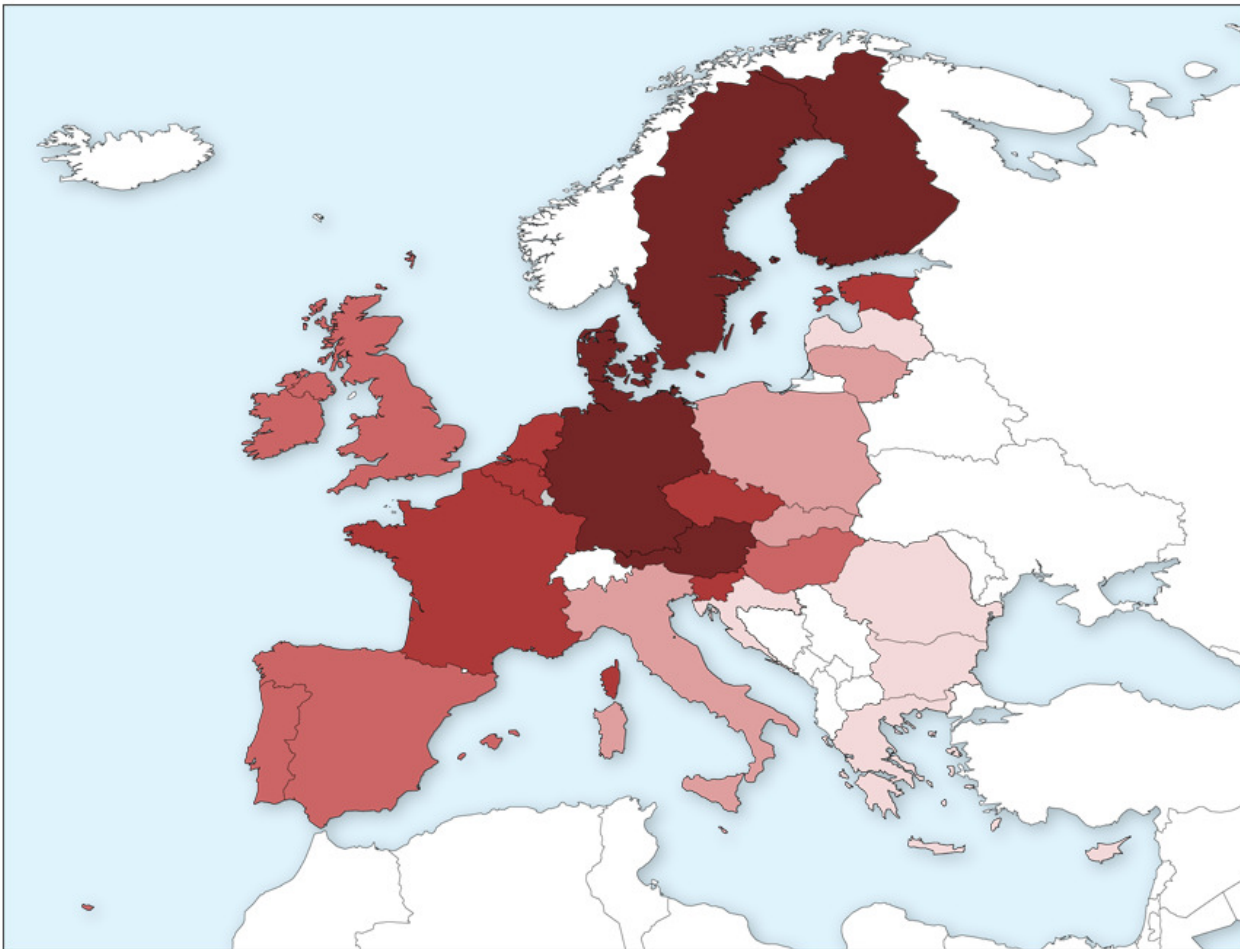
10 . International comparisons of GERD as a percentage of GDP (R&D Intensity)

The [Europe 2020](#) targets specify five targets for the EU for 2020, including a target of 3% of the EU's GDP to be invested in R&D. This means that the estimates in this release are essential in monitoring progress towards this target.

The percentage of R&D to GDP increased marginally in the EU-28 up to 2002, reaching a high of 1.87%, before declining modestly through to 2005 (1.82%), and climbing again to an estimated 2.06% in 2012. Please note that the 2012 results for the EU-28 and OECD countries are early estimates and indicative only at the time of this release.

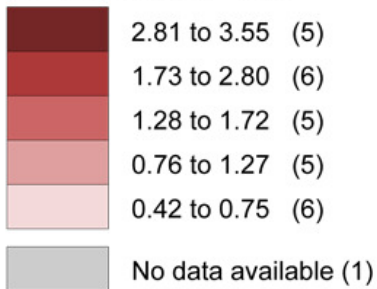
Map: EU GERD as a percentage of GDP (R&D intensity), 2012

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Percentage of GDP

EU (28 countries) = 2.06

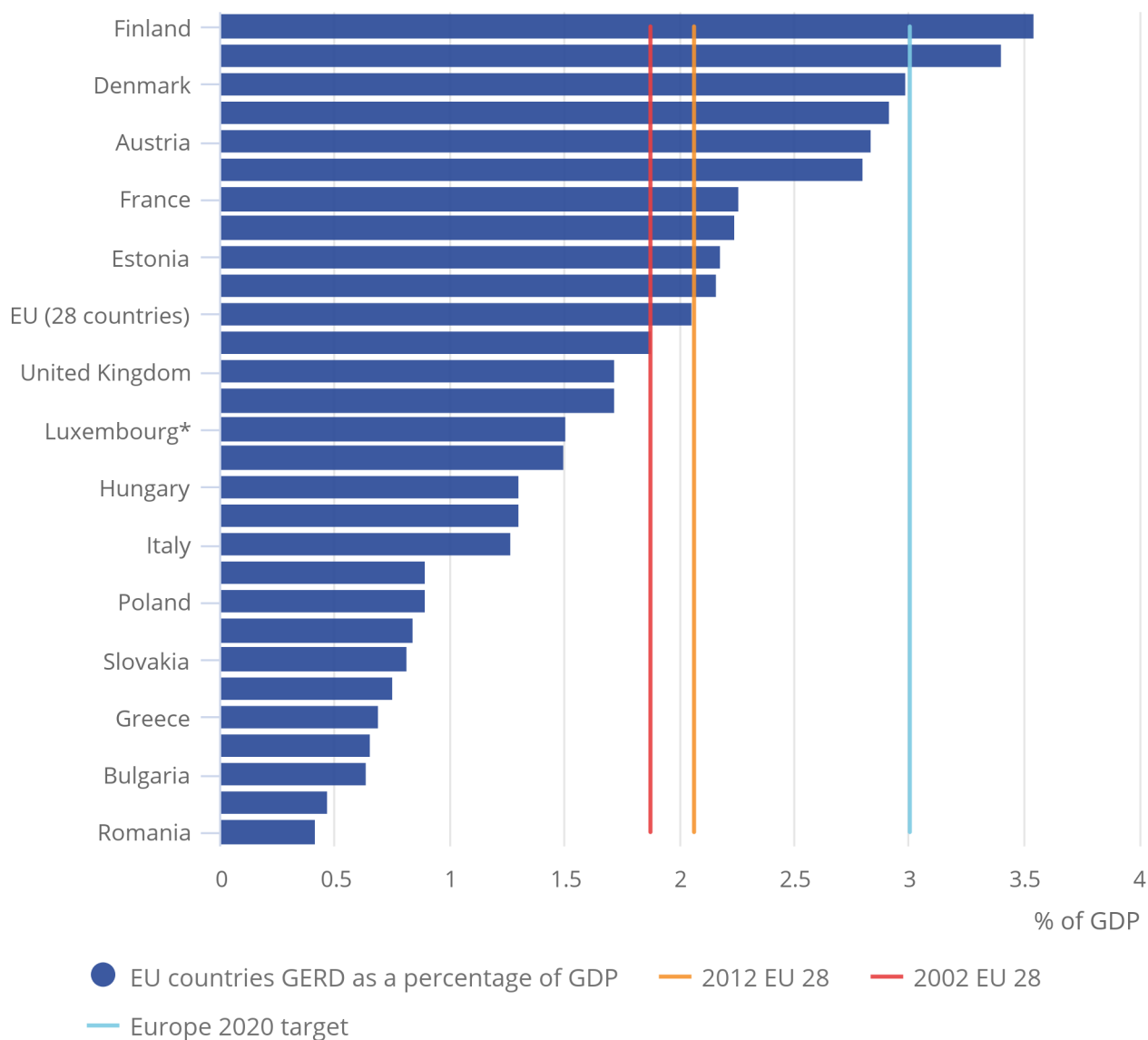


Source of boundaries: UNEP (2011): UNEP Environmental Data Explorer. United Nations Environment Programme. <http://geodata.grid.unep.ch>.
Source of data: Eurostat

Figure 9 presents the latest available 2012 estimates as a means of placing the UK into an international context with regards to GERD as a percentage of GDP. It shows the individual EU-28 countries' GERD as a percentage of GDP, as well as the average for the EU-28, compared with the Europe 2020 target of 3%. The UK's GERD represented 1.72% of GDP in 2012, the joint 12th highest percentage.

Figure 9: EU countries GERD as a percentage of GDP (R&D intensity), 2013

Figure 9: EU countries GERD as a percentage of GDP (R&D intensity), 2013



Source: Eurostat

Notes:

- * = Luxembourg data is for 2011.

The latest OECD GERD estimates indicate that the modest increase in the EU GERD as a percentage of GDP that began in 2010 continued into 2011. OECD’s own preliminary estimates indicate an overall real growth rate for GERD of 3% between 2010 and 2012.

When comparing total business R&D intensity across countries, it is important to take into account differences in individual countries' industrial structures. The OECD has produced a [Science, Technology and Industry Scoreboard](#) to help facilitate these comparisons.

11. Background notes

1. Key issues specific to this bulletin

This is the latest annual release about gross expenditure on R&D in the UK by businesses, government departments, research councils, higher education institutes and private non-profit organisations, published by the Office for National Statistics (ONS). The results in this release are in respect of 2012. ONS began publishing annual data on R&D expenditure in 1993. The source of the information comes from the Business Enterprise Research and Development (BERD) survey, the Government Research and Development (GovERD) survey (including research councils), and the Private Non-Profit Research and Development (PNP) survey.

Higher Education R&D (HERD) data are collected from a census of higher education institutes and provided to ONS by the Higher Education Funding Councils (HEFCs).

All these sectors' (Business, Government, Higher Education and Private Non-Profit) R&D data are known collectively as GERD, which represents the gross domestic expenditure on R&D in the UK.

A [quality report \(137 Kb Pdf\)](#) for the GERD output is available on the ONS website.

2. National Statistics

The [UK Statistics Authority](#) has reviewed this publication in its report: "[Assessment of compliance with the Code of Practice for Official Statistics: Statistics on Research and Development](#)" which was published on 28 June 2012. This review recommended that the UK Gross Domestic Expenditure on Research and Development estimates be designated as National Statistics, subject to ONS carrying out certain requirements. ONS completed the necessary work to meet these requirements and on 3 June 2013, the UK Statistics Authority confirmed that this release, and its associated data, has retained National Statistics status.

3. Timeliness and punctuality

An internal investigation has been carried out to identify if it is feasible to publish these R&D statistics earlier than they are at present. Unfortunately, this investigation concluded that it is not possible for ONS to bring forward the publication of these estimates in the short-term.

The main reason for this is that the higher education estimates are coordinated and provided by HEFC England with respect to academic years. HEFCs are not able to provide ONS with these estimates until the middle of February each year. Affording time to quality assure and check these data, the earliest that these estimates can therefore be published is March.

As part of this investigation ONS sought the views of some of the known users of this publication. They unanimously stated that they are content with the current publication timetable.

4. Completeness of coverage

GERD is the measure used by the majority of commentators on R&D for international comparisons. It covers all R&D performed in the UK, irrespective of who pays for it, including funding from overseas. However, it excludes R&D performed overseas even if it is funded from the UK.

The components of GERD relate to R&D performed in all sectors of the economy:

BERD is a survey conducted annually by ONS, and covers the business sector of the economy which in 2012 performed 63% of total UK R&D expenditure. As part of the 2012 survey, approximately 5,000 questionnaires were sent to businesses known to perform R&D. This included around 400 of the largest R&D spenders, accounting for approximately 80% of the 2012 total business R&D expenditure figure. Smaller R&D performers, and others believed to be performing R&D, were selected using various sampling fractions. Industry product group and business employment size, were used as the stratification variables. Completed questionnaires were returned by 4,488 businesses representing a response rate of 91%.

Estimates from this survey were published on the ONS website on 22 November 2013 in the [UK Business Enterprise Research and Development statistical bulletin, 2012](#).

As part of the assessment of 'Statistics on Research and Development' by the UK Statistics Authority, a requirement was placed on ONS to review the methodology for producing business R&D statistics to identify potential gaps in coverage and meet the coverage requirements of European System of Accounts (ESA) 2010. To meet this requirement and to assist users in their understanding of this complex issue, an Information Note entitled '[Coverage of the Business Enterprise Research & Development Survey](#)' (147 Kb Pdf) , was published on 20 November 2012 to address this issue.

GovERD is an annual census of approximately 140 government departments including seven research councils. Government departments are asked to include the expenditure on R&D they perform as part of their total estimated expenditure on R&D. This includes estimates of R&D performed by local authorities and NHS trusts.

HERD data are provided by the Higher Education Funding Councils for [England](#), [Scotland](#) and [Wales](#), the [Department for Education in Northern Ireland](#) and the seven UK research councils. These bodies also provide data on external research funding from overseas, non-profit organisations and businesses. The timeliness of these data is the main reason for the delay in the publication of GERD. Data are provided to ONS during February of a given year, approximately one month before the GERD release is published.

It is important to note that R&D funding provided to the higher education sector from government departments, research councils and HEFCs are collected as part of the GovERD survey.

PNP data are collected in a biennial survey which was introduced in 2011 with approximately 200 organisations being selected. The estimates from this survey were used in the compilation of the 2011 GERD publication, the first time since the 2003 reference year. Previously, estimates had been based on a number of different sources.

Identifying exactly who carries out R&D in this sector is a challenging task. A letter was despatched in 2010 to 344 organisations which were classified as private non-profit bodies, asking if they undertake R&D activities. The response rate was 50%, with 14% of all organisations surveyed responding positively, confirming that they perform R&D. More in depth analysis of these responses indicated that only a few industries were identified as performing R&D in this sector. Activities included library and archive activities, botanical and zoological gardens and nature reserve activities, engineering and design activities and technical testing and analysis. In 2011, all 690 organisations in these industries were sent a letter to further identify R&D performers. The response rate was 60% with 18% indicating positively. All these identified R&D performers together with known performers from earlier surveys, were sent a questionnaire to collect their totals for 2011.

The PNP survey is run biennially, so this survey did not run in 2013 to collect 2012 data. The next survey will run in 2014 to collect 2013 data from an updated list of R&D performers in this sector. Results for the PNP sector as a performer in 2012 have therefore been estimated.

5. Revisions

As part of this release, business, government and higher education estimates of R&D for 2010 and 2011 have been revised to take account of late returns and misreporting.

One indication of the reliability of the key indicators in this release can be obtained by monitoring the size of revisions. The following table records the size and pattern of revisions that have occurred over the last five years. Please note that these indicators only report summary measures for revisions, (the revised data may itself be subject to sampling or other sources of error).

Table 1: Revisions between first publication and estimates three years later

	Value in latest period	Average revision	Average revision without regard to sign
Gross expenditure on R&D performed in the UK	27,006	-147	284

£ million

Source: Office for National Statistics

A spreadsheet is available providing the [revisions of estimates \(35 Kb Excel sheet\)](#) from 2005 and the calculations behind the averages in the revisions table. The table covers estimates of the UK's gross domestic expenditure on R&D first published from March 2007 (for 2005) to March 2011 (for 2009).

A statistical test has been applied to the average revision to find out if there is bias in the estimates. No statistically significant bias was identified.

6. Sampling variability

Estimates from the BERD survey are based on a stratified sample drawn from the population of businesses known to actually perform R&D or are likely to be R&D performers. As with any sample survey, the BERD survey is subject to two types of possible error:

- Sampling errors - due to only a sample of the population being surveyed. These estimates can be quantified and were published as part of the [BERD publication](#).
- Non-sampling errors - these include factors such as population coverage, misreporting and non-response bias. These errors are generally hard to quantify because of the difficulty in identifying the population of actual/likely R&D performers, and because of the problems ensuring that businesses adhere to Frascati R&D definitions. An [Information Note \(147 Kb Pdf\)](#) has been published which provides an overview of the survey design and looks at the methods and sources used to update the sampling frame.

7. Discontinuities in data

The BERD, GovERD and PNP questionnaires were redesigned after the 2010 survey to better reflect user needs, including new National Accounts and European Union requirements. These followed large revisions to both the BERD and GovERD surveys for the 2007 data collections.

A new methodology and a new survey were introduced for compiling estimates of R&D expenditure for the PNP sector as a performer from 2011. The estimates from this survey have been used as the basis for the compilation of the 2012 PNP performer data in this publication.

While all these changes are viewed as being an improvement, they may have an impact on the comparability of data over time. Unfortunately, it is not possible to measure this impact.

8. General information

These points should be noted when examining the data tables:

- There may be discrepancies between totals and the sum of their independently rounded components

- In addition to being analysed by sector of performance, GERD may be analysed by sector of funding. The R&D performed by any one sector of the economy can be funded by any of the other sectors, or by the performing sector itself
- For the purposes of estimation, the recommended practice of the OECD is to use information from those performing R&D, where this is available. These estimates are considered more reliable than those from surveys of R&D funders

9. Regional data

Regional estimates were first introduced as part of the 2011 GERD statistical bulletin, published in March 2013. Regional estimates are produced for the four sectors as follows:

- Business – businesses receiving the long questionnaire (the 400 largest R&D spenders) account for approximately 80% of total business R&D expenditure. Each business is asked to provide the workplace postcodes for all the sites at which the business performed R&D, and to allocate the total expenditure figures of the business to the sites on a percentage basis. Regional data for the remaining 20% of total expenditure all have a value estimated by using county region codes from the business register of R&D performers. Aggregation is undertaken at broad product group and county level
- Higher Education – these estimates are coordinated and provided by [HEFC England](#) and are based on the geographic region of all their Higher Education Institutes (HEIs)
- Government – the annual census of the government sector collects regional full time equivalent (FTE) data. Ratio estimation is then applied to the corresponding in-house expenditure data to provide estimates per FTE per region. These are then aggregated to provide regional expenditure values for this sector
- Private Non-Profit – each organisation is asked to provide the workplace postcodes for all the sites at which the organisation performed R&D, and to allocate the total expenditure figures of the organisation to the sites on a percentage basis. As this survey is a census, any non responder's expenditure estimates are allocated regionally using the county region codes from the business register.

10. Users and uses of data

GERD is the UK's most reliable estimate of national research and development spending that draws together information on R&D spending in the public and private sectors for both civil and defence applications.

Changes introduced as part of the amendments to the System of National Accounts (SNA) in 2008, and in ESA 2010, specify that R&D from September 2014 onwards, should be considered as an ancillary activity. Expenditure on R&D should constitute investment in R&D assets, which as a consequence needs to be capitalised in the UK National Accounts. In short, R&D expenditure will now contribute to the compilation of the value of the UK's net worth and be included as part of GDP estimates. Please see the ONS ESA 2010 page for more information.

There are numerous users within and outside Government who use these data to produce various analyses and to inform policy decisions. These include:

- [European Union's Statistical Office \(Eurostat\)](#) - the UK provides statistics measuring R&D activity in accordance with European Commission Regulation No. 995/2012 of the European Parliament and the Council. The estimates in this statistical bulletin are used to provide information that is consistent with other EU member states and to enable benchmarking to be achieved. [Europe 2020 targets](#) for economic growth include a target of 3% of the EUs' GDP (both private and publicly funded) to be invested in R&D by 2020. This means that the estimates in this release are essential in monitoring progress towards this target
- [OECD](#) – uses GERD data for constructing internationally comparable databases and producing regular statistical publications such as the '[Main Science and Technology Indicators](#)' (MSTI) and '[The Annual Business Enterprise Research and Development](#)' statistics (ANBERD). The data are also used for analytical studies, which underpin economic analyses and policy reviews

- The [European Commission's Research and Innovation Directorate](#) has recently published the [Innovation Union Competitiveness report, 2011](#). One of the key findings is that the EU is slowly moving towards its target of 3% of GDP but there is a widening gap between the EU and its world competitors notably due to weaker business R&D investment
- The [Department for Business, Innovation and Skills](#) (BIS) use GERD data to assess policy impact and inform debate. R&D data underpin their assessments of UK innovation performance as well as international work in the field
- The [Welsh Government](#) (WG), [Scottish Government](#) (SG) and the [Northern Ireland Department of Finance and Personnel](#) (DFPNI) use GERD data as a key indicator for measuring the performance of their respective economies within the UK, as well as to monitor and develop R&D policies which seek to increase R&D investment. Regional GERD information is also published in the [Scottish GERD tables](#)
- The [Research and Development Society](#) is a UK-based organisation formed to promote the better understanding of R&D in all its forms. Its members include representatives from industry, government departments and agencies, universities and consultants. The Research and Development Society make use of GERD data, as a key source of information, for understanding how much is being invested in R&D in the UK on an annual basis and to inform wider debates about R&D

Requests for GERD data are made from a variety of sources including academics, government departments, and economic consultants. This means that the data are used in various publications.

For example:

- Dr Ian Viney, Head of Strategic Evaluation at the [Medical Research Council](#) (MRC) , produced analysis in the [UK Health Research Analysis 2009/10](#) published in November 2012, which included funding flows in the UK of health related R&D expenditure
- [Defence Analytical Services and Advice Agency](#) (DASA) provides professional analytical, economic and statistical services and advice to the Ministry of Defence (MOD), and defence-related statistics to Parliament, other government departments and the public

Do you make use of our annual estimates of UK GERD? If yes, we would like to hear from you (RandD@ons.gsi.gov.uk) and understand how you make use of these statistics. This will enable us, in the future, to better meet your needs as a user.

Science, Engineering and Technology (SET) Statistics

Until the publication of the 2011 estimates in 2013, the Department for Business, Innovation and Skills (BIS) published annual estimates of government departmental spending on [Science, Engineering and Technology](#), known as "SET Statistics". These are a summary of key science, engineering and technology indicators and are collated by the Office for National Statistics (ONS) using data collected as part of the GoVERD survey. SET Statistics are broader than just R&D, as they comprise Government R&D expenditure (including overseas), technology transfer activities, and scientific and technical postgraduate education and training.

ONS will publish the UK's SET Statistics for 2012. The release of these estimates has been provisionally scheduled for July 2014.

11. Coherence and international comparisons

An [Information Note \(807.8 Kb Pdf\)](#) providing an assessment of the coherence of R&D statistics with other official statistics was published in 2012 on the ONS website.

12. ONS Business Statistics

There is a [Business and Trade Statistics community](#) on the [StatsUserNet](#) website. StatsUserNet is the Royal Statistical Society's new interactive site for users of official statistics. The community objectives are to promote dialogue and share information between users and producers of official business and trade statistics about the structure, content and performance of businesses within the UK. Anyone can join the discussions by registering via either of the links above.

13. Social media

Follow ONS on [Twitter](#) and receive up to date information about our statistics.

Like ONS on [Facebook](#) to receive our updates in your newsfeed and to post comments on our page.

14. Special events

ONS has published commentary, analysis and policy on 'Special Events' which may affect statistical outputs. For full details visit the [special events](#) page on the ONS website.

15. Release policy

Details of the policy governing the release of new data are available from the Media Relations Office. Also available is a list of the organisations given [pre-publication access](#) to the contents of this bulletin.

All data in this release can be downloaded free of charge from the ONS website. Here are the instructions to obtain a full time series of data from the statistical bulletin or release pages:

- Select 'Data in this release'
- Select 'View datasets associated with this release'
- Select the latest release
- Select 'Select series from this dataset'
- Select the reference table of interest
- Select 'View series'
- Select the series of interest (Hint: for a custom download you can use SHIFT to select a range of series or CTRL to select multiple individual series)
- Select 'View selection'
- Select 'Download'

16. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

These National Statistics are produced to high professional standards and released according to the arrangements approved by the UK Statistics Authority.

UK Gross Domestic Expenditure on Research and Development (R&D), 2012

Published on 12 March 2014

Please click on the links below to access the datasets:

[Table 1](#) Expenditure on R&D in the UK by performing and funding sectors, 2012

[Table 2](#) Expenditure on R&D in the UK by sector of performance: 2001 to 2012

[Table 3](#) Expenditure on Civil and Defence R&D in the UK by sector of performance: 2001 to 2012

[Table 4](#) Expenditure on R&D in the UK by sector of funding: 2001 to 2012

[Table 5](#) Expenditure on Civil and Defence R&D in the UK by sector of funding: 2001 to 2012

[Table 6](#) Country and Regional breakdown of expenditure on R&D in the UK by sector of performance, 2012

[Table R1](#) Expenditure on R&D in the UK: Revisions to series previously published

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Email: RandD@ons.gsi.gov.uk

Next publication: March 2015

1

EXPENDITURE ON R&D IN THE UK BY PERFORMING AND FUNDING SECTORS, 2012

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Current prices	Sector performing the R&D					Total	Overseas	£ million
	Government	Research Councils	Higher Education	Business Enterprise	Private Non-Profit			
Sector providing the funds								
Government	948	103	406	1,346	67	2,871	481	
Research Councils	68	578	1,955	2	85	2,688	206	
Higher Education Funding Councils	-	-	2,185	-	-	2,185	-	
Higher Education	2	10	284	-	14	310	-	
Business Enterprise	243	28	292	11,666	88	12,317	2,243	
Private Non-Profit	4	44	1,022	37	170	1,277	-	
Overseas	96	49	1,068	4,055	91	5,358	-	
TOTAL	1,360	813	7,211	17,107	515	27,006	-	
of which:								
Civil	1,210	813	7,178	15,518	513	25,232	-	
Defence	150	-	34	1,588	2	1,774	-	

Source: Office for National Statistics

- denotes nil, figures unavailable or too small to display.

2

EXPENDITURE ON R&D IN THE UK BY SECTOR OF PERFORMANCE:

2001 to 2012

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		£ million											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector performing the R&D													
Current prices													
TOTAL	GLBA	18,547	19,243	19,727	20,242	22,106	22,993	24,696	25,345	25,632	26,173 †	27,459	27,006
Government	GLBK	1,160	1,053	1,243	1,240	1,238	1,252	1,320	1,348	1,406	1,372	1,321	1,360
Research Councils	DMRS	674	713	825	930	1,051	1,061	1,034	1,041	1,097	1,141	1,040	813
Business Enterprise	GLBL	12,239	12,484	12,505	12,662	13,734	14,144	15,676	15,814	15,532	16,045	17,468	17,107
Higher Education	GLBM	4,149	4,618	4,785	5,004	5,580	6,022	6,119	6,545	6,931	6,963	7,133	7,211
Private Non-Profit	GLBN	325	374	369	406	502	513	546	595	666	652	496	515
As % of GDP		1.78	1.75	1.69	1.65	1.71	1.68	1.71	1.76	1.79	1.74	1.77	1.72
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012

Sector performing the R&D

Constant prices (2012)

TOTAL		24,099 †	24,436	24,574	24,538	26,317	26,609	27,878	27,825	27,389	27,255	27,944	27,006
Government		1,507	1,337	1,548	1,503	1,474	1,449	1,490	1,480	1,502	1,429	1,344	1,360
Research Councils		876	905	1,028	1,127	1,251	1,228	1,167	1,143	1,172	1,188	1,058	813
Business Enterprise		15,903	15,853	15,578	15,349	16,350	16,368	17,696	17,361	16,596	16,708	17,776	17,107
Higher Education		5,391	5,864	5,961	6,066	6,643	6,969	6,907	7,185	7,406	7,251	7,259	7,211
Private Non-Profit		422	475	460	492	598	594	616	653	712	679	505	515

Source: Office for National Statistics

† crosses denote earliest data revision.

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EXPENDITURE ON CIVIL AND DEFENCE R&D IN THE UK BY SECTOR OF PERFORMANCE:
2001 to 2012[Return to Main Menu](#)

£ million

		Civil											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector performing the R&D													
Current prices													
TOTAL	GLBB	16,424	17,272	17,603	17,802	19,255	20,416	21,963	22,945	23,424	24,255[†]	25,495	25,232
Government	GLBO	746	771	869	889	882	895	1,042	1,087	1,119	1,146 [†]	1,164	1,210
Research Councils	DMSC	669	708	819	923	1,046	1,057	1,034	1,041	1,097	1,141	1,040	813
Business Enterprise	GLBP	10,580	10,839	10,800	10,623	11,288	11,975	13,269	13,718	13,648	14,392 [†]	15,699	15,518
Higher Education	GLBQ	4,104	4,581	4,746	4,960	5,538	5,976	6,080	6,505	6,894	6,925	7,098 [†]	7,178
Private Non-Profit	GLBR	325	374	369	406	502	513	539	595	666	651	494	513
As % of GDP		1.58 [†]	1.57	1.51	1.45	1.49	1.49	1.52	1.59	1.64	1.61	1.65	1.60
		Civil											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector performing the R&D													
Constant prices (2012)													
TOTAL		21,340[†]	21,933	21,928	21,580	22,923	23,626	24,793	25,190	25,029	25,258	25,945	25,232
Government		969 [†]	979	1,083	1,078	1,050	1,036	1,176	1,193	1,196	1,193	1,185	1,210
Research Councils		869 [†]	899	1,020	1,119	1,245	1,223	1,167	1,143	1,172	1,188	1,058	813
Business Enterprise		13,747 [†]	13,764	13,454	12,877	13,438	13,858	14,979	15,060	14,583	14,987	15,976	15,518
Higher Education		5,333 [†]	5,817	5,912	6,013	6,593	6,916	6,863	7,142	7,366	7,211	7,223	7,178
Private Non-Profit		422 [†]	475	460	492	598	594	608	653	712	678	503	513
		Defence											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector performing the R&D													
Current prices													
TOTAL	GLBC	2,123	1,971	2,124	2,440	2,851	2,577	2,732	2,399	2,208	1,918[†]	1,964	1,774
Government	GLBS	414	283	374	351	357	357	279	262	288	226	158	150
Research Councils	DMSM	5	6	6	7	4	4	-	-	-	-	-	-
Business Enterprise	GLBT	1,659	1,645	1,706	2,039	2,446	2,169	2,407	2,097	1,884	1,653 [†]	1,769	1,588
Higher Education	GLBU	45	37	38	44	43	46	39	40	36	38	35	34
Private Non-Profit	GLBV	-	-	-	-	-	-	8	1	-	1	2	2
As % of GDP		0.2 [†]	0.18	0.18	0.2	0.22	0.19	0.19	0.17	0.15	0.13	0.13	0.11
		Defence											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector performing the R&D													
Constant prices (2012)													
TOTAL		2,759[†]	2,503	2,646	2,958	3,394	2,982	3,084	2,634	2,359	1,997	1,999	1,774
Government		538 [†]	359	466	425	425	413	315	288	308	235	161	150
Research Councils		6	8 [†]	7	8	5	5	-	-	-	-	-	-
Business Enterprise		2,156 [†]	2,089	2,125	2,472	2,912	2,510	2,717	2,302	2,013	1,721	1,800	1,588
Higher Education		58 [†]	47	47	53	51	53	44	44	38	40	36	34
Private Non-Profit		-	-	-	-	-	-	9	1	-	1	2	2

Source: Office for National Statistics

- denotes nil, figures unavailable or too small to display.

[†] crosses denote earliest data revision.[Return to Main Menu](#)

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EXPENDITURE ON R&D IN THE UK BY SECTOR OF FUNDING:
 2001 to 2012

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		£ million											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector funding R&D in the UK													
Current prices													
TOTAL	GLBA	18,547	19,243	19,727	20,242	22,106	22,993	24,696	25,345	25,632	26,173 †	27,459	27,006
Government	GLCA	2,299	2,215	2,650	2,778	2,584	2,531	2,581	2,703	2,939	3,044 †	3,028	2,871
Research Councils	DMSR	1,512	1,713	1,947	2,084	2,574	2,709	2,543	2,765	2,908	2,958	2,942	2,688
Higher Education Funding Councils	DMSS	1,474	1,626	1,665	1,804	1,928	2,085	2,234	2,227	2,395	2,303	2,257	2,185
Business Enterprise	GLCB	8,499	8,384	8,287	8,914	9,580	10,377	11,519	11,511	11,362	11,443 †	12,498	12,317
Higher Education	GLCC	184	208	218	229	266	288	284	303	314	315	317	310
Private Non-Profit	GLCD	889	962	931	961	1,022	1,076	1,153	1,247	1,279	1,267	1,279 †	1,277
Overseas	GLCE	3,691	4,135	4,029	3,472	4,152	3,927	4,382	4,589	4,436	4,842 †	5,136	5,358
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012

Sector funding R&D in the UK

Constant prices (2012)

TOTAL		24,099 †	24,436	24,574	24,538	26,317	26,609	27,878	27,825	27,389	27,255	27,944	27,006
Government		2,987 †	2,813	3,301	3,368	3,076	2,929	2,914	2,967	3,140	3,170	3,081	2,871
Research Councils		1,965 †	2,175	2,425	2,526	3,064	3,135	2,871	3,036	3,107	3,080	2,994	2,688
Higher Education Funding Councils		1,915 †	2,065	2,074	2,187	2,295	2,413	2,522	2,445	2,559	2,398	2,297	2,185
Business Enterprise		11,043 †	10,646	10,323	10,806	11,405	12,009	13,003	12,637	12,141	11,916	12,719	12,317
Higher Education		239 †	264	272	278	317	333	321	333	336	328	323	310
Private Non-Profit		1,155 †	1,222	1,160	1,165	1,217	1,245	1,302	1,369	1,367	1,319	1,302	1,277
Overseas		4,796 †	5,251	5,019	4,209	4,943	4,545	4,947	5,038	4,740	5,042	5,227	5,358

Source: Office for National Statistics

† crosses denote earliest data revision.

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£ million

		Civil											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sector funding R&D in the UK													
Current prices													
TOTAL	GLBB	16,424	17,272	17,603	17,802	19,255	20,416	21,963	22,945	23,424	24,255[†]	25,495	25,232
Government	GLCF	1,090	1,258	1,507	1,301	1,299	1,281	1,421	1,577	1,690	1,838 [†]	1,772	1,683
Research Councils	DMSX	1,512	1,713	1,947	2,084	2,574	2,709	2,543	2,765	2,908	2,958	2,942	2,688
Higher Education Funding Councils	DMSY	1,474	1,626	1,665	1,804	1,928	2,085	2,234	2,227	2,395	2,303	2,257	2,185
Business Enterprise	GLCG	8,033	7,926	7,879	8,476	8,963	9,646	10,603	10,775	10,659	10,945 [†]	11,992	11,900
Higher Education	GLCH	184	208	218	229	266	288	284	303	314	315	317	309
Private Non-Profit	GLCI	889	962	931	961	1,022	1,076	1,153	1,247	1,279	1,267	1,253 [†]	1,277
Overseas	GLCJ	3,244	3,578	3,456	2,948	3,203	3,331	3,726	4,054	4,180	4,628	4,962 [†]	5,190
Sector funding R&D in the UK													
Constant prices (2012)													
TOTAL		21,340[†]	21,933	21,928	21,580	22,923	23,626	24,793	25,190	25,029	25,258	25,945	25,232
Government		1,416 [†]	1,597	1,877	1,577	1,546	1,482	1,604	1,731	1,806	1,914	1,803	1,683
Research Councils		1,965 [†]	2,175	2,425	2,526	3,064	3,135	2,871	3,036	3,107	3,080	2,994	2,688
Higher Education Funding Councils		1,915 [†]	2,065	2,074	2,187	2,295	2,413	2,522	2,445	2,559	2,398	2,297	2,185
Business Enterprise		10,438 [†]	10,065	9,815	10,275	10,670	11,163	11,969	11,829	11,390	11,397	12,204	11,900
Higher Education		239 [†]	264	272	278	317	333	321	333	336	328	323	309
Private Non-Profit		1,155 [†]	1,222	1,160	1,165	1,217	1,245	1,302	1,369	1,367	1,319	1,275	1,277
Overseas		4,215 [†]	4,543	4,305	3,574	3,813	3,855	4,206	4,451	4,466	4,819	5,050	5,190
Sector funding R&D in the UK													
Current prices													
TOTAL	GLBC	2,123	1,971	2,124	2,440	2,851	2,577	2,732	2,399	2,208	1,918[†]	1,964	1,774
Government	GLCK	1,208	956	1,143	1,477	1,285	1,250	1,160	1,126	1,249	1,206 [†]	1,257	1,188
Research Councils	GLCM	-	-	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils	DMSZ	-	-	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLCL	467	458	407	439	616	730	916	737	703	498 [†]	506	417
Higher Education	GLCM	-	-	-	-	-	-	-	-	-	-	-	-
Private Non-Profit	GLCN	-	-	-	-	-	-	-	-	-	-	26	-
Overseas	GLCO	447	556	574	524	949	597	657	536	256	214 [†]	174	169
Sector funding R&D in the UK													
Constant prices (2012)													
TOTAL		2,759[†]	2,503	2,646	2,958	3,394	2,982	3,084	2,634	2,359	1,997	1,999	1,774
Government		1,570 [†]	1,214	1,424	1,790	1,530	1,447	1,309	1,236	1,335	1,256	1,279	1,188
Research Councils		-	-	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils		-	-	-	-	-	-	-	-	-	-	-	-
Business Enterprise		607 [†]	582	507	532	733	845	1,034	809	751	519	515	417
Higher Education		-	-	-	-	-	-	-	-	-	-	-	-
Private Non-Profit		-	-	-	-	-	-	-	-	-	-	26	-
Overseas		581 [†]	706	715	635	1,130	691	742	588	274	223	177	169

Source: Office for National Statistics

- denotes nil, figures unavailable or too small to display.
[†] crosses denote earliest data revision.

6

COUNTRY AND REGIONAL BREAKDOWN OF EXPENDITURE ON R&D IN THE UK BY SECTOR OF PERFORMANCE, 2012

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Current prices	Sector performing the R&D				£ million
	Government ¹	Higher Education ²	Business ³	Private Non-Profit ⁴	
United Kingdom	2,173	7,211	17,107	515	27,006
North East	-	237	282	23	542
North West	75	581	1,784	4	2,444
Yorkshire and the Humber	58	503	603	1	1,165
East Midlands	85	347	1,203	4	1,639
West Midlands	2	353	1,461	4	1,820
East of England	207	650	3,449	225	4,531
London	323	1,767	1,477	121	3,688
South East	793	1,033	4,086	111	6,023
South West	345	363	1,364	11	2,083
England	1,889	5,834	15,708	504	23,935
Wales	31	264	272	2	569
Scotland	233	973	707	9	1,922
Northern Ireland	21	141	420	-	582

Source: Office for National Statistics

1 Government estimates include Research Councils and those areas of Central Government not available from the GovERD survey or from Local Authorities.

2 Higher Education estimates provided by HEFCE.

3 Business estimates first published in the BERD publication on 22 November 2013.

4 Private Non-Profit breakdowns estimated using the 2011 data, as no survey data available for 2012.

- denotes nil, figures unavailable or too small to display.

Please note: Regional expenditure data by funding sector are unavailable.

R1**EXPENDITURE ON R&D IN THE UK:
REVISIONS TO SERIES PREVIOUSLY PUBLISHED**Current prices £ million

		2010	2011
TOTAL	GLBA	-6	79
Sector performing the R&D			
Government	GLBK	1	13
Research Councils	DMRS	-	-
Business Enterprise	GLBL	-8	60
Higher Education	GLBM	1	6
Private Non-Profit	GLBN	-	-
Sector funding R&D in the UK			
Government	GLCA	7	-110
Research Councils	DMSR	-	-
Higher Education Funding Councils	DMSS	-	-
Business Enterprise	GLCB	-14	-58
Higher Education	GLCC	-	-
Overseas	GLCE	1	272
Private Non-Profit	GLCD	-	-27
		2010	2011
CIVIL	GLBB	12	157
Sector performing the R&D			
Government	GLBO	1	13
Research Councils	DMSC	-	-
Business Enterprise	GLBP	10	137
Higher Education	GLBQ	-	7
Private Non-Profit	GLBR	-	-
Sector funding R&D in the UK			
Government	GLCF	24	-49
Research Councils	DMSX	-	-
Higher Education Funding Councils	DMSY	-	-
Business Enterprise	GLCG	-12	-41
Higher Education	GLCH	-	-
Overseas	GLCJ	-	274
Private Non-Profit	GLCI	-	-27
		2010	2011
DEFENCE	GLBC	-18	-78
Sector performing the R&D			
Government	GLBS	-	-
Research Councils	DMSM	-	-
Business Enterprise	GLBT	-18	-78
Higher Education	GLBU	-	-
Private Non-Profit	GLBV	-	-
Sector funding R&D in the UK			
Government	GLCK	-16	-60
Research Councils	GLCM	-	-
Higher Education Funding Councils	DMSZ	-	-
Business Enterprise	GLCL	-2	-16
Higher Education	GLCM	-	-
Overseas	GLCO	1	-2
Private Non-Profit	GLCN	-	-

Source: Office for National Statistics

- denotes nil, figures unavailable or too small to display.