

Statistical bulletin

# UK gross domestic expenditure on research and development: 2015

Estimates of research and development in business enterprise, higher education, government, which includes research councils and private non-profit organisations.



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Release date:  
16 March 2017

Next release:  
15 March 2018

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# 1 . Main points

- Research and development (R&D) continued to grow, expanding by £1.2 billion to £31.6 billion in 2015, an increase of 4%.
- Most of this year's growth came from the business sector, which increased by £1.1 billion to £20.9 billion, an increase of 5%.
- R&D over the long-term has grown, rising from £20.1 billion in 1990 (in constant prices, adjusted to remove the effects of inflation) to £31.6 billion in 2015, an increase of 58%.
- Total R&D expenditure in the UK in 2015 represented 1.68% of gross domestic product (GDP), an increase from 1.66% in 2014; this was below the European Union (EU-28) provisional estimate of 2.03% of GDP, but the 11th highest of all member countries.

## 2 . Statistician's comment

"The UK spent £206 per head of population on performing R&D in 1990. This has increased by 136% to £486 in 2015. Removing the effects of inflation this represents an increase of 39%."

Daniel Groves, National Accounts and Economic Statistics, Office for National Statistics.

## 3 . Things you need to know about this release

This release provides estimates of R&D performed in and funded by the following 4 sectors of the UK economy, as defined in the ["Frascati" Manual \(2015\)](#):

- business enterprise (BERD)
- higher education (HERD)
- government, which includes research councils (GovERD)
- private non-profit organisations (PNP)

These sectors' R&D data are known collectively as gross domestic expenditure on R&D (GERD). GERD 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 country of residence of the ultimate owner or users of the R&D produced.

R&D is 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. R&D performed is regarded as a more accurate measure than funding received by an organisation, as not all funds received may be used on R&D as intended.

The business sector is the largest component of GERD; its estimates in this release are derived from the [Business Enterprise Research and Development 2015 statistical bulletin](#), published on 17 November 2016.

## 4 . Your views matter

We are constantly aiming to improve this release and its associated commentary. We would welcome any feedback you might have, and 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](mailto:RandD@ons.gsi.gov.uk) or telephone Cecil Prescott on +44 (0) 1633 456767.

## 5 . UK gross domestic expenditure on R&D performed in the UK, 2015

Expenditure on R&D performed in the UK was £31.6 billion in 2015, reaching its highest level on record. This was up from £30.4 billion in 2014, an increase of 4%. The average annual growth rate since 1990 was also 4%.

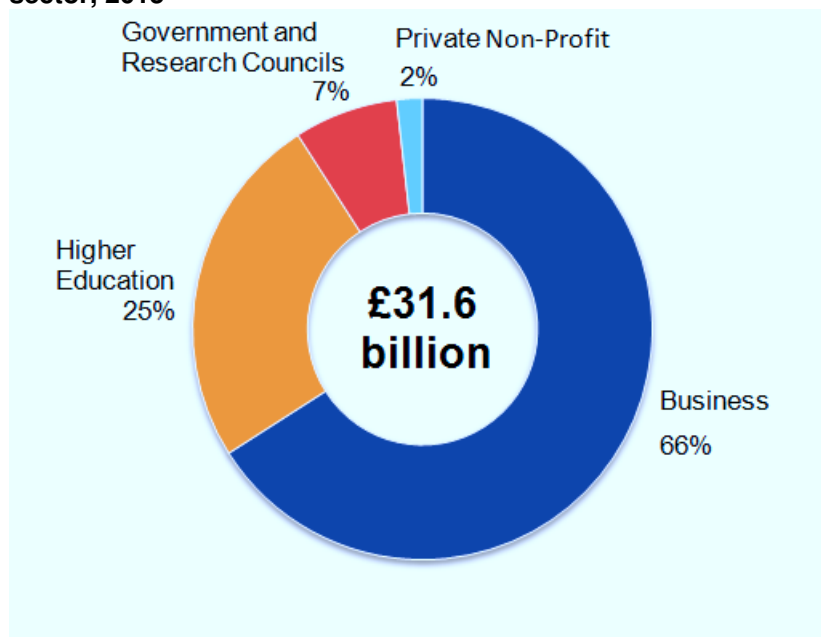
In constant prices (adjusted to remove the effects of inflation), the 2015 estimate surpassed 2014's high by £1.0 billion, with growth of 3%. With an average annual growth rate of 1.8% since the 1990 level of £20.1 billion, the long-term upward trend, in constant prices, is still evident.

Total expenditure on R&D in 2015 represented 1.68% of GDP, an increase from 1.66% in 2014. As a percentage of GDP, this expenditure declined steadily between 1990 and 1997. Since then, the level has fluctuated between 1.53% and 1.68% with an average estimate of 1.62% for the period 1998 to 2015.

## 6 . Expenditure on R&D performed in the UK, by sector of performance

UK estimates of R&D cover the 4 sectors of the economy, namely business, higher education, government (including research councils) and private non-profit organisations. Figure 1 shows the contribution each sector made to the total UK R&D expenditure estimate in 2015.

**Figure 1: Composition of UK gross domestic expenditure on research and development by performing sector, 2015**



## Business

The business sector performs the most R&D in the UK. In 2015, it accounted for £20.9 billion of expenditure, representing 66% of total expenditure on R&D performed in the UK. This is growth of 5% from £19.8 billion in 2014.

On an annual basis, the 400 largest business R&D performers are asked to select the industry product groups that best describe the type of R&D they undertake. For the smaller R&D performers, no product group data are collected, however, these businesses' dominant [Standard Industrial Classification \(SIC\)](#) is used as a proxy to determine product group. The concept of "product groups" is described in more detail in the [UK Business Enterprise Research and Development Quality and Methodology Information \(QMI\)](#).

The product groups with the largest R&D expenditure in 2015 were:

- pharmaceuticals (£4.2 billion)
- motor vehicles and parts (£2.7 billion)
- computer programming and information service activities (£2.4 billion)
- aerospace (£1.7 billion)
- miscellaneous business activities (£1.1 billion)
- machinery and equipment (£1.0 billion)

The UK government has continued to promote growth in R&D, particularly in the business sector, through tax relief and [Catapult Centres](#). A Catapult Centre 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".

More detailed information on business R&D expenditure can be found in the [Business Enterprise Research and Development 2015 statistical bulletin](#) published on 17 November 2016.

## Higher education

The higher education sector, which includes universities and higher education institutes, was the second largest sector, accounting for 25% of total UK R&D expenditure in 2015, at £8.0 billion. This is growth of 2% from £7.8 billion in 2014.

Please note that new financial reporting standards for reporting periods starting on or after 1 January 2015 have introduced significant changes in the way financial performance is reported, which present difficulties in comparing 2015 results with historical trends. The funding for this sector is mainly provided by the Higher Education Funding Councils for [England](#), [Scotland](#), [Wales](#), the [Department for Employment and Learning in Northern Ireland](#) and the 7 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 various government departments, including the Department for Business, Energy and Industrial Strategy, the Department for Environment, Food and Rural Affairs and the Department of Health.

In 2015, R&D expenditure in the UK performed by the government and research councils sector decreased by 5% from £2.2 billion in 2014 to £2.1 billion. This sector accounted for 7% of total expenditure on R&D performed in the UK in 2015.

[Research Councils UK \(RCUK\)](#) is the strategic partnership of the UK's 7 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. RCUK also offers individuals and businesses overseas, access to the UK's research facilities and infrastructure.

Research councils' R&D expenditure decreased by 6% from £819 million in 2014 to £773 million in 2015.

## Private non-profit organisations

The private non-profit (PNP) sector includes registered charities and trusts. Those performing R&D specialise in mainly 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, from cancer prevention to drug development and clinical trials.

The PNP sector is the smallest R&D performing sector in the UK. In 2015, expenditure on R&D performed by these organisations was £0.6 billion, which contributed 2% to total UK-performed R&D expenditure. However, this sector did see the largest overall increase in percentage terms, up 15% from 2014. This is mainly attributable to the addition of several organisations, set up specifically to carry out large R&D projects. It should also be noted that the PNP survey is biennial and therefore the 2014 results were estimated.

## 7 . R&D expenditure by funding sector

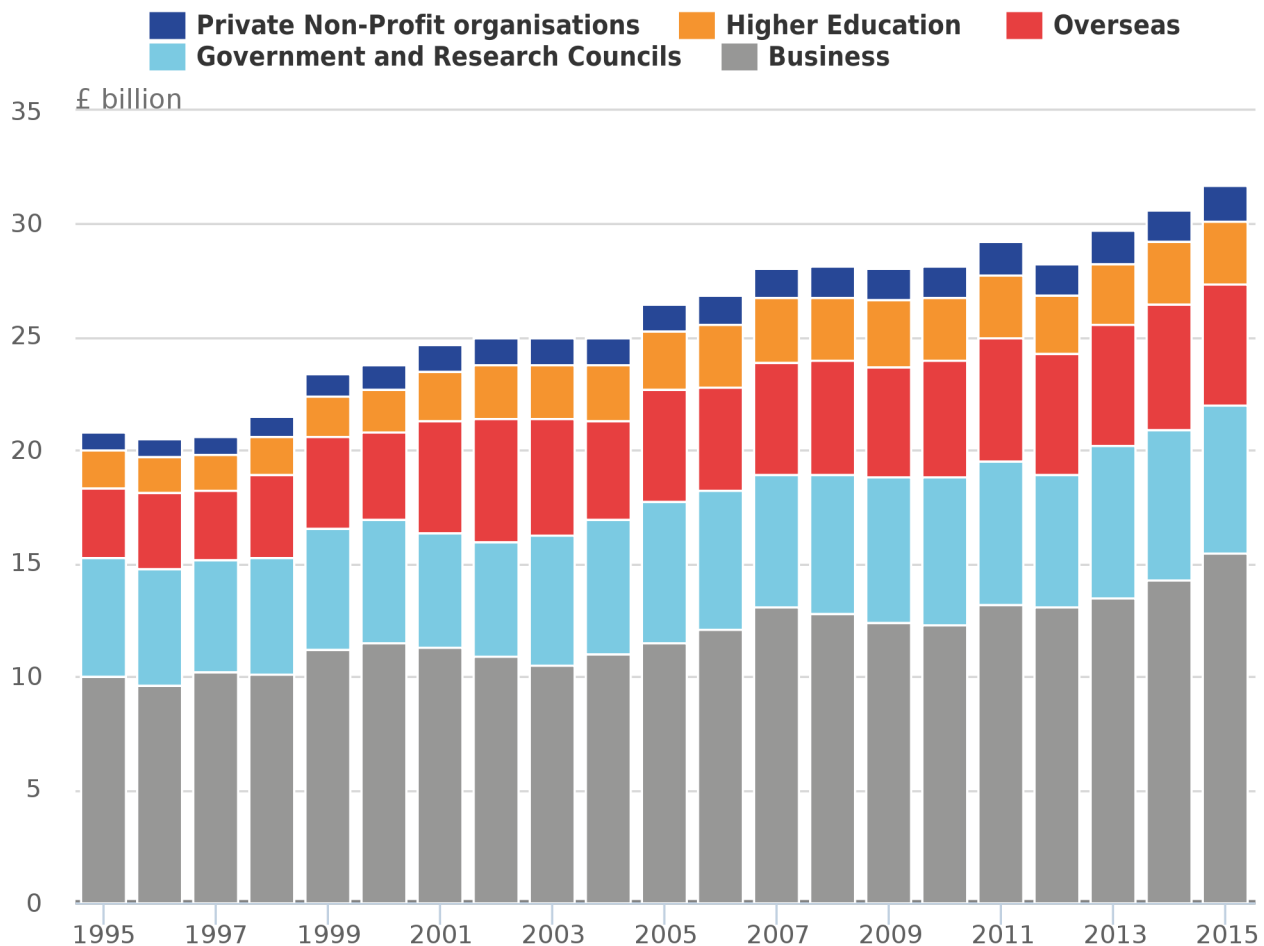
In 2015, the largest funder of R&D performed in the UK was the business sector, which funded 49% or £15.5 billion, of total UK-performed R&D. This was an increase of 9% from £14.2 billion in 2014.

Government (including research councils) was the second largest sector of funding with £6.5 billion, which was 21% of total UK R&D funding in 2015. This was a decrease of 1% from £6.6 billion in 2014. In comparison the sector itself only spent £2.1 billion in 2015 performing R&D in the UK.

In just over 2 decades, there has been a change in the profile of how UK R&D expenditure has been funded. In 1990, R&D funding from overseas was £2.4 billion (12%) in constant prices. Since then, there has been a steady increase in the value of funding from overseas to £5.4 billion (17%) in 2015. Funding of R&D from overseas decreased by 3% since 2014, the first decrease since 2012, while the average annual growth rate since 1990 was 3.3%.

Figure 2 shows the breakdown of UK GERD by funding sector for the last 2 decades.

**Figure 2: Composition of UK gross domestic expenditure on research and development by funding sector in constant prices, 1995 to 2015**



Source: Office for National Statistics

It is important to note that sectors can fund themselves. For example, in 2015, the business sector performed £20.9 billion, of which £15.1 billion was funded by the business sector itself. The remaining £5.8 billion of R&D expenditure performed by businesses was funded by other sectors and overseas.

## 8 . UK defence R&D expenditure

R&D expenditure in the UK for defence purposes accounted for 5% of total R&D expenditure (£1.7 billion) in 2015. This represented a decrease of 2% from 2014. In constant prices, defence R&D expenditure has decreased by 62% since the 1990 estimate of £4.5 billion.

The business sector was by far the largest performer of both civil and defence R&D in 2015, at £19.4 billion (65%) and £1.5 billion (87%) respectively.

The UK government's funding of defence R&D in 2015 was unchanged from 2014 at £1.2 billion. The proportion of UK total defence funding by the government sector also remained unchanged from 68% in 2014. The business sector provided £0.4 billion (23%) of funding and £0.2 billion (9%) came from overseas.

Of particular note, business R&D expenditure in the civil sector grew by 81% in constant prices since 1990, but business expenditure on R&D in the defence sector decreased by 50% over the same period.

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

R&D expenditure can be analysed by UK country and region (Figure 3). In this context, the country and region refers to the location where the R&D is performed.

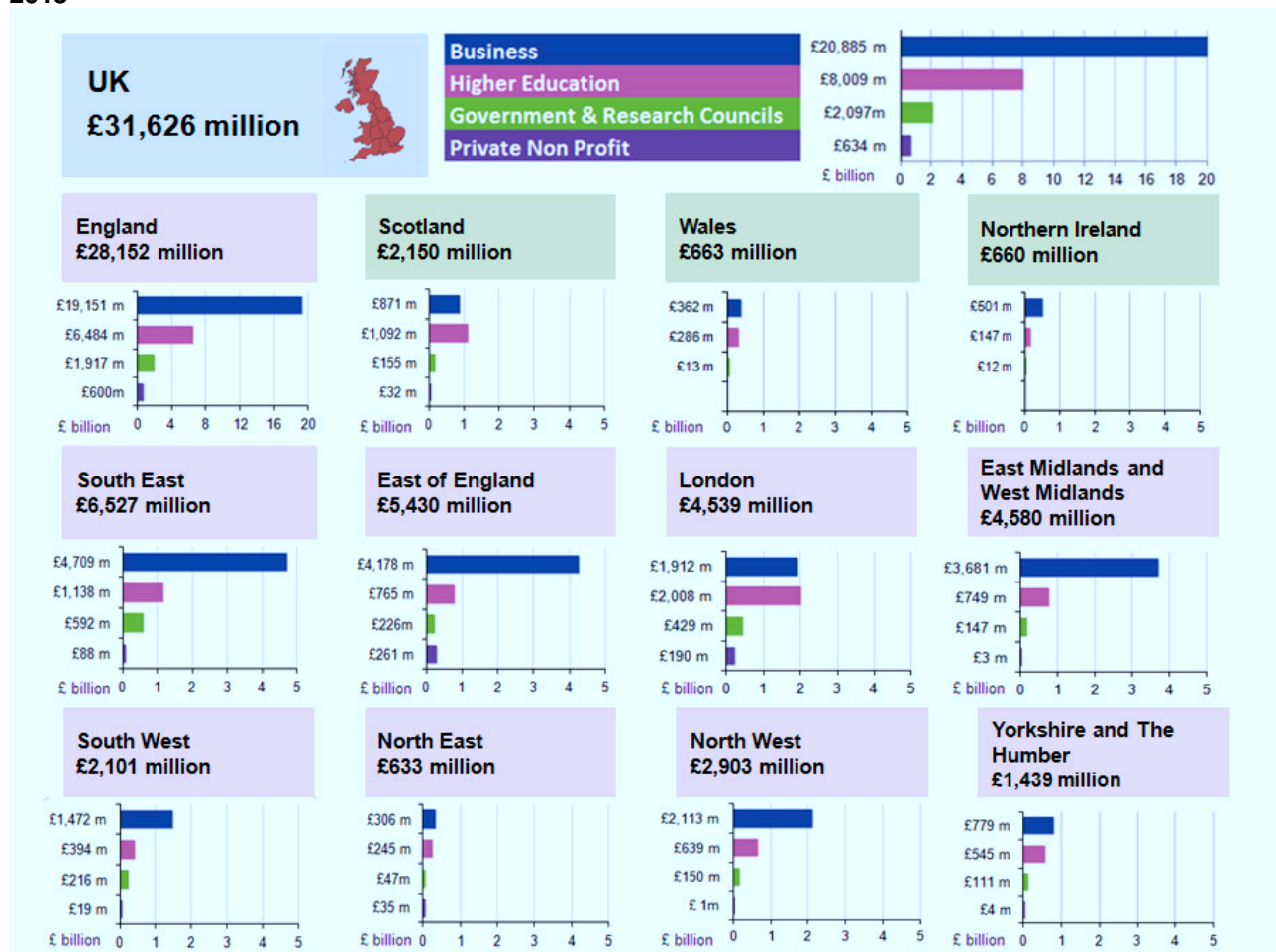
In 2015, the South East and East of England dominated R&D activity in the UK. These regions together accounted for 38% of total UK R&D expenditure (£12.0 billion).

The majority of UK R&D expenditure was carried out in England (£28.2 billion) in 2015. Scotland accounted for £2.2 billion (7%), with Wales and Northern Ireland both contributing £0.7 billion (2%) each.

The methodology for producing regional estimates of expenditure on R&D for the government (including research councils) sector has been reviewed. Estimates previously used departments' full-time equivalent (FTE) R&D employees by region as a proxy to calculate regional expenditure. Departments now provide actual breakdowns of their R&D expenditure by region. To allow comparison of the government data, values using both methods have been included in Table 6 of the [datasets](#) accompanying this bulletin. Due to this change in methodology it has not been possible to compare regions on a like for like basis.

The business sector remained dominant throughout the majority of the UK. However, the higher education sector continued the trend of dominating London and Scotland with spends of £2.0 billion and £1.1 billion respectively. This pattern has been evident for some time. In 2015, the gap between higher education and business in London continued to reduce whereas the gap in Scotland has increased slightly. However, while higher education dominated London and Scotland, this sector's largest annual average increase since 2001 was in the South West at 5.6% compared with Scotland at 5.4% and London at 5.1%.

**Figure 3: UK gross domestic expenditure on research and development by sector, country and region, 2015**





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

[Europe 2020 targets](#) specify 5 targets for the European Union (EU) to achieve by 2020, including a target of 3% of the EU's gross domestic product (GDP) to be invested in R&D. Therefore, the estimates in this release are used in monitoring progress towards this target.

The latest [Preliminary estimates produced by Eurostat](#) indicate the percentage of R&D to GDP increased marginally in the EU-28 up to 2003, reaching a high of 1.79%, before declining slightly through to 2005 (1.74%) and then climbing again to an estimated 2.03% in 2015 (Figure 4). Please note that the 2015 results for the EU-28 and Organisation for Economic Co-operation and Development (OECD) countries are early estimates and are provisional at the time of this release.

**Figure 4: GERD to GDP ratio as a percentage (R&D intensity) by country, European Union (EU-28), 2015**

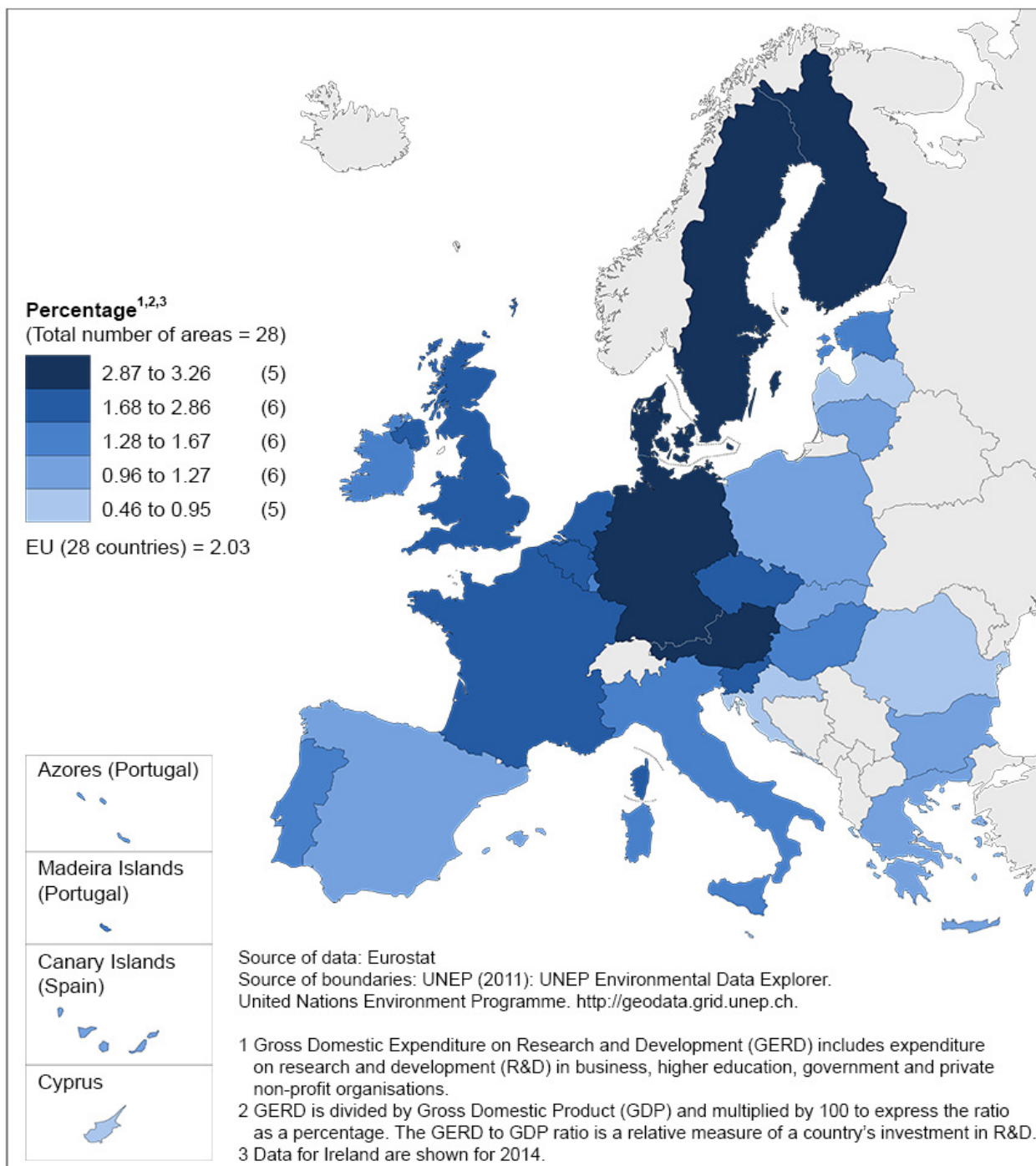
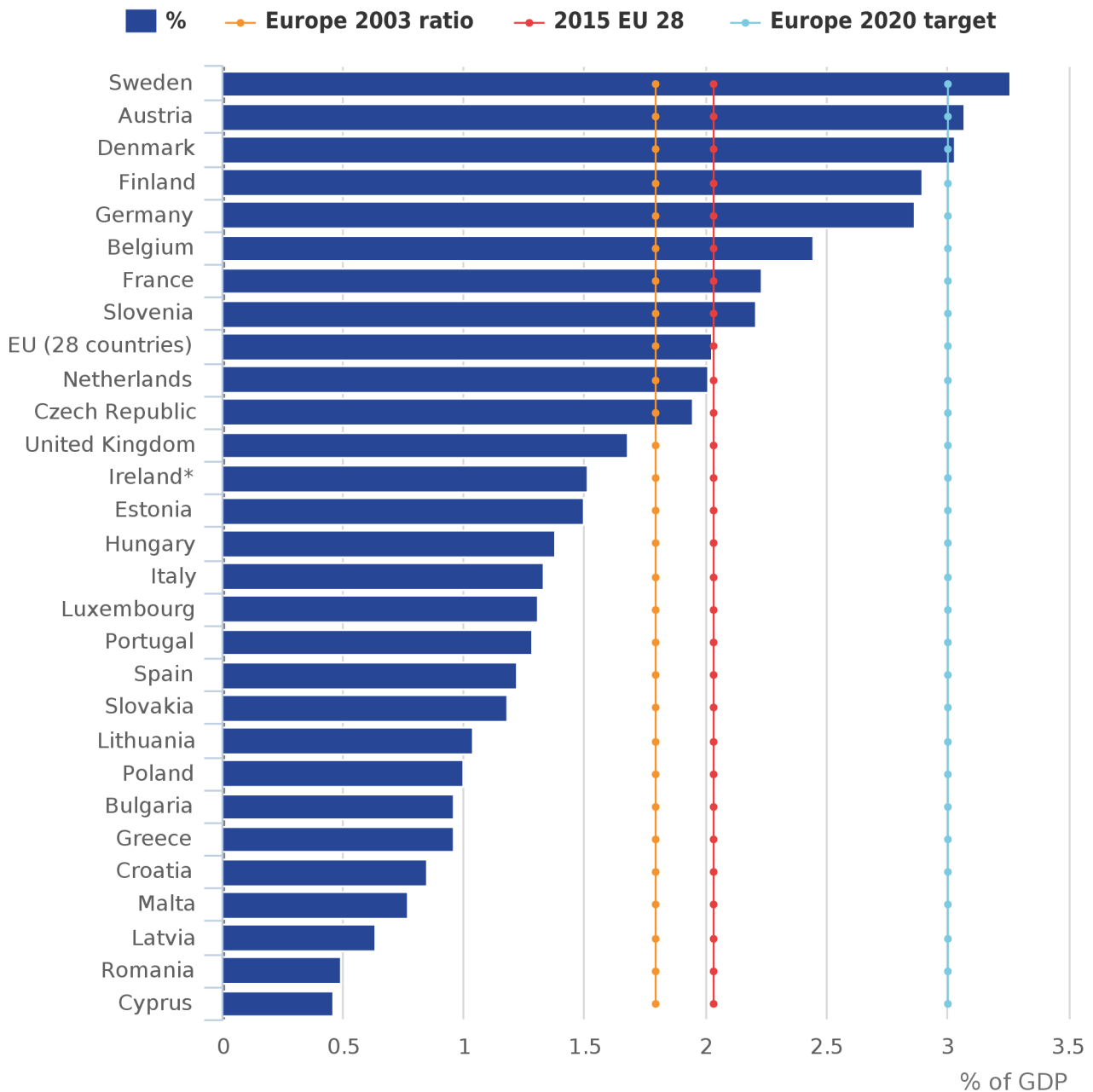




Figure 5 shows the latest available 2015 estimates as a means of placing the UK into an international context with regards to gross domestic expenditure on R&D (GERD) as a percentage of GDP. It shows the individual EU-28 countries' GERD as a percentage of GDP, as well as the average for the EU-28, compared with the Europe 2020 target of 3%. The UK's GERD represented 1.68% of GDP in 2015, an increase from 1.66% in 2014. The UK remained unchanged as the 11th highest GERD as a percentage of GDP of all EU-28 countries, where the average was 2.03% of GDP.

**Figure 5: EU countries' gross domestic expenditure on research and development as a percentage of gross domestic product (R&D intensity), 2015**



Source: Eurostat

Notes:

1. Some EU countries' 2015 estimates taken from the Eurostat website are provisional.
2. \* = data for 2014.

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

## 11 . Links to related statistics

Further statistics on [research and development expenditure in the UK](#) can be found on our website.

## 12 . Quality and methodology

The [UK gross domestic expenditure on research and development Quality and Methodology Information](#) document contains important information on:

- the strengths and limitations of the data and how they compare with related data
- users and uses of the data
- how the output was created
- the quality of the output including the accuracy of the data

### About the data

These points should be noted when examining this bulletin or the data tables:

- there may be differences between totals and the sum of their independently rounded components
- in some tables, entries have either been aggregated or suppressed to avoid disclosure of figures in which the returns of individual organisations could be identified – where this happens, footnotes have been added to the tables
- note that £1.0 billion equals £1,000 million in this release
- the majority of the data series started in 1989 and constant price comparisons have been made using the start of the next decade in 1990
- the 2013 and 2014 estimates have been revised where necessary to take account of businesses misreporting and late returns
- all figures quoted are in current prices unless otherwise stated

### Notes

A definition of “R&D” can be found in the [Frascati Manual \(2015\)](#). This is the internationally agreed standard as defined by the Organisation for Economic Cooperation and Development (OECD).

The GDP measure used is non-seasonally adjusted money GDP between 1955 to 1956 and 2014 to 2015 (1955 to 2015) consistent with [UK Economic Accounts Quarter 3 2015](#) published on 23 December 2016.

This release now includes data tables ([LF1 and LF2](#)) on qualified scientists and engineers in the labour force by gender. These estimates are from our Labour Force Survey and are categorised by type of qualification and occupation from the population of Great Britain aged 16 to 64. Occupation is based on the [Standard Occupational Classification 2010 \(SOC2010\)](#). This information was previously published in the "UK government expenditure on science, engineering and technology". However, these data are more relevant in the context of GERD R&D and can be made accessible at an earlier date.

## **Coherence and international comparisons**

An [information note](#) providing an assessment of the coherence of R&D statistics with other official statistics was published in 2012 on our website.

## UK gross domestic expenditure on research and development (R&D), 2015

Published on 16 March 2017

Please click on the links below to access the datasets:

[Table 1](#) Expenditure on R&D in the UK by performing and funding sectors, 2015

[Table 2](#) Expenditure on R&D in the UK by sector of performance: 2004 to 2015

[Table 3](#) Expenditure on civil and defence R&D in the UK by sector of performance: 2004 to 2015

[Table 4](#) Expenditure on R&D in the UK by sector of funding: 2004 to 2015

[Table 5](#) Expenditure on civil and defence R&D in the UK by sector of funding: 2004 to 2015

[Table 6](#) Country and regional breakdown of expenditure on R&D in the UK by sector of performance, 2015

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Next publication: 15 March 2018

# 1 EXPENDITURE ON R&D IN THE UK BY PERFORMING AND FUNDING SECTORS, 2015

Current prices	Sector performing the R&D					Total <sup>1</sup>	Overseas	£ million
	Government <sup>1</sup>	Research Councils	Higher Education	Business Enterprise	Private Non-Profit			
<b>Sector funding the R&amp;D</b>								
Government	1,124	120	478	1,817	85	<b>3,624</b>	681	
Research Councils	45	512	2,176	1	174	<b>2,908</b>	223	
Higher Education Funding Councils	-	-	2,218	-	-	<b>2,218</b>	-	
Higher Education	3	15	304	-	112	<b>433</b>	-	
Business Enterprise <sup>1</sup>	19	28	349	15,069	19	<b>15,484</b>	7,423	
Private Non-Profit	13	48	1,206	130	157	<b>1,553</b>	-	
Overseas	121	50	1,279	3,868	87	<b>5,406</b>	-	
<b>TOTAL</b>	<b>1,324</b>	<b>773</b>	<b>8,009</b>	<b>20,885</b>	<b>634</b>	<b>31,626</b>	-	
of which:								
Civil	1,156	773	7,969	19,394	627	<b>29,919</b>	-	
Defence	168	-	40	1,491	8	<b>1,707</b>	-	

Source: Office for National Statistics

<sup>1</sup> Estimates of launch investment loan repayments received by government from business have been removed following a review of how these payments should be reported. These loan repayments are in relation to loans given out in previous years and therefore should not be included in current totals of R&D expenditure. The total of loan repayments removed was £112 million, this value has also been removed from the total funding by business and the total performed by government.

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

**Please note:**

Differences may occur between totals and the sum of their independently rounded components.

## 2 EXPENDITURE ON R&D IN THE UK BY SECTOR OF PERFORMANCE: 2004 to 2015

£ million

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector performing the R&amp;D</b>													
Current prices													
<b>TOTAL<sup>3</sup></b>	<b>GLBA</b>	<b>20,242</b>	<b>22,106</b>	<b>22,993</b>	<b>24,696</b>	<b>25,345</b>	<b>25,632</b>	<b>26,173</b>	<b>27,452</b>	<b>27,257</b>	<b>29,015<sup>†</sup></b>	<b>30,413</b>	<b>31,626</b>
Government <sup>3</sup>	GLBK	1,240	1,238	1,252	1,320	1,348	1,406	1,372	1,321	1,391	1,503 <sup>†</sup>	1,391	1,324
Research Councils	DMRS	930	1,051	1,061	1,034	1,041	1,097	1,141	1,035	804	814	819 <sup>†</sup>	773
Business Enterprise	GLBL	12,662	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617 <sup>†</sup>	19,819	20,885
Higher Education	GLBM	5,004	5,580	6,022	6,119	6,545	6,931	6,963	7,117	7,133	7,593 <sup>†</sup>	7,835	8,009
Private Non-Profit <sup>2</sup>	GLBN	406	502	513	546	595	666	652	526	520	489 <sup>†</sup>	549	634
As % of GDP		1.53 <sup>†</sup>	1.58	1.56	1.60	1.64	1.67	1.64	1.68	1.61	1.65	1.66	1.68
		2004 <sup>†</sup>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015

<b>Sector performing the R&amp;D</b>													
Constant prices (2015) <sup>1</sup>													
<b>TOTAL<sup>3</sup></b>	<b>GLBD</b>	<b>25,013</b>	<b>26,606</b>	<b>26,860</b>	<b>28,167</b>	<b>28,143</b>	<b>28,075</b>	<b>28,153</b>	<b>29,124</b>	<b>28,322</b>	<b>29,660</b>	<b>30,639</b>	<b>31,626</b>
Government <sup>3</sup>	GLBW	1,532	1,490	1,463	1,506	1,497	1,540	1,476	1,401	1,445	1,536	1,401	1,324
Research Councils	DMSU	1,149	1,265	1,239	1,179	1,156	1,202	1,227	1,098	835	832	825	773
Business Enterprise	GLBX	15,647	16,530	16,523	17,879	17,560	17,012	17,259	18,515	18,090	19,031	19,966	20,885
Higher Education	GLBY	6,184	6,716	7,035	6,979	7,267	7,592	7,490	7,550	7,412	7,762	7,893	8,009
Private Non-Profit <sup>2</sup>	GLBZ	502	604	599	623	661	729	701	558	540	500	553	634

Source: Office for National Statistics

	2004 <sup>†</sup>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP deflator used to convert current prices to constant prices	80.925	83.085	85.604	87.677	90.059	91.298	92.968	94.259	96.238	97.825	99.262	100

1 Please note that the latest deflators have been applied to the business research and development estimates in this bulletin which has resulted in small differences being observed between the BERD and GERD publications.

2 Prior to 2011 PNP data was estimated. From 2011 data has been collected from a biennial survey with intermediate years being estimated. Estimates for 2015 have been published using survey data.

3 Estimates of launch investment loan repayments received by government from business have been removed following a review of how these payments should be reported. These loan repayments are in relation to loans given out in previous years and therefore should not be included in current totals of R&D expenditure. The total of loan repayments have been removed from the total performed by government and the UK total for 2013, and 2015, there were no repayments in 2014. In current prices the values removed were 2013 (£212 Million) and 2015 (£112 million).

<sup>†</sup> crosses denote earliest data revision.

### Please Note:

Differences may occur between totals and the sum of their independently rounded components.

## 3

EXPENDITURE ON CIVIL AND DEFENCE R&D IN THE UK BY SECTOR OF PERFORMANCE:  
2004 to 2015

£ million

		Civil											
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector performing the R&amp;D</b>													
Current prices													
<b>TOTAL<sup>4</sup></b>	<b>GLBB</b>	<b>17,802</b>	<b>19,255</b>	<b>20,416</b>	<b>21,963</b>	<b>22,945</b>	<b>23,424</b>	<b>24,255</b>	<b>25,471</b>	<b>25,470</b>	<b>27,161<sup>†</sup></b>	<b>28,665</b>	<b>29,919</b>
Government <sup>1</sup>	GLBO	889	882	895	1,042	1,087	1,119	1,146	1,164	1,241	1,339 <sup>†</sup>	1,233	1,156
Research Councils	DMSC	923	1,046	1,057	1,034	1,041	1,097	1,141	1,035	804	814	819 <sup>†</sup>	773
Business Enterprise	GLBP	10,623	11,288	11,975	13,269	13,718	13,648	14,392	15,667	15,808	16,966 <sup>†</sup>	18,272	19,394
Higher Education	GLBQ	4,960	5,538	5,976	6,080	6,505	6,894	6,925	7,082	7,099	7,556 <sup>†</sup>	7,795	7,969
Private Non-Profit <sup>2</sup>	GLBR	406	502	513	539	595	666	651	524	518	487 <sup>†</sup>	546	627
As % of GDP		1.35 <sup>†</sup>	1.37	1.38	1.42	1.48	1.53	1.52	1.56	1.51	1.54	1.56	1.59
		Civil											
		2004 <sup>†</sup>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector performing the R&amp;D</b>													
Constant prices (2015) <sup>1</sup>													
<b>TOTAL<sup>4</sup></b>	<b>C3V7</b>	<b>21,998</b>	<b>23,175</b>	<b>23,849</b>	<b>25,050</b>	<b>25,478</b>	<b>25,657</b>	<b>26,090</b>	<b>27,022</b>	<b>26,466</b>	<b>27,765</b>	<b>28,878</b>	<b>29,919</b>
Government <sup>1</sup>	C3V9	1,099	1,062	1,046	1,188	1,207	1,226	1,233	1,235	1,290	1,369	1,242	1,156
Research Councils	C3V2	1,141	1,259	1,235	1,179	1,156	1,202	1,227	1,098	835	832	825	773
Business Enterprise	C3VA	13,127	13,586	13,989	15,134	15,232	14,949	15,481	16,621	16,426	17,343	18,408	19,394
Higher Education	C3VB	6,129	6,665	6,981	6,935	7,223	7,551	7,449	7,513	7,377	7,724	7,853	7,969
Private Non-Profit <sup>2</sup>	C3VC	502	604	599	615	661	729	700	556	538	498	550	627
		Defence											
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector performing the R&amp;D</b>													
Current prices													
<b>TOTAL</b>	<b>GLBC</b>	<b>2,440</b>	<b>2,851</b>	<b>2,577</b>	<b>2,732</b>	<b>2,399</b>	<b>2,208</b>	<b>1,918</b>	<b>1,980</b>	<b>1,787</b>	<b>1,854<sup>†</sup></b>	<b>1,748</b>	<b>1,707</b>
Government	GLBS	351	357	357	279	262	288	226	158	150	164	158	168
Research Councils	DMSM	7	4	4	-	-	-	-	-	-	-	-	-
Business Enterprise	GLBT	2,039	2,446	2,169	2,407	2,097	1,884	1,653	1,785	1,601	1,651 <sup>†</sup>	1,547	1,491
Higher Education	GLBU	44	43	46	39	40	36	38	35	34	37	40	40
Private Non-Profit <sup>2,3</sup>	GLBV	-	-	-	8	1	-	1	2	2	2	3 <sup>†</sup>	8
As % of GDP		0.18 <sup>†</sup>	0.20	0.17	0.18	0.16	0.14	0.12	0.12	0.11	0.11	0.10	0.09
		Defence											
		2004 <sup>†</sup>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector performing the R&amp;D</b>													
Constant prices (2015) <sup>1</sup>													
<b>TOTAL</b>	<b>C3V8</b>	<b>3,015</b>	<b>3,431</b>	<b>3,010</b>	<b>3,116</b>	<b>2,664</b>	<b>2,418</b>	<b>2,063</b>	<b>2,101</b>	<b>1,857</b>	<b>1,895</b>	<b>1,761</b>	<b>1,707</b>
Government	C3VD	434	430	417	318	291	315	243	168	156	168	159	168
Research Councils	C3V3	9	5	5	-	-	-	-	-	-	-	-	-
Business Enterprise	C3VE	2,520	2,944	2,534	2,745	2,328	2,064	1,778	1,894	1,664	1,688	1,559	1,491
Higher Education	C3VF	54	52	54	44	44	39	41	37	35	38	40	40
Private Non-Profit <sup>2,3</sup>	C3VG	-	-	-	9	1	-	1	2	2	2	3	8
		Source: Office for National Statistics											
		2004 <sup>†</sup>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP deflator used to convert current prices to constant prices		80.925	83.085	85.604	87.677	90.059	91.298	92.968	94.259	96.238	97.825	99.262	100

1 Please note that the latest deflators have been applied to the business research and development estimates in this bulletin which has resulted in small differences being observed between the BERD and GERD publications.

2 Prior to 2011 PNP data was estimated. From 2011 data has been collected from a biennial survey with intermediate years being estimated. Estimates for 2015 have been published using survey data.

3 PNP 2013 defence totals have been estimated using the 2012 data as no survey data available for 2013.

4 Estimates of launch investment loan repayments received by government from business have been removed following a review of how these payments should be reported. These loan repayments are in relation to loans given out in previous years and therefore should not be included in current totals of R&D expenditure. The total of loan repayments have been removed from the total performed by government and the UK total for 2013, and 2015, there were no repayments in 2014. In current prices the values removed were 2013 (£212 Million) and 2015 (£112 million).

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

† crosses denote earliest data revision.

**Please Note:**

Differences may occur between totals and the sum of their independently rounded components.



## 4 EXPENDITURE ON R&D IN THE UK BY SECTOR OF FUNDING: 2004 to 2015

£ million

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector funding the R&amp;D</b>													
Current prices													
<b>TOTAL<sup>3</sup></b>	<b>GLBA</b>	<b>20,242</b>	<b>22,106</b>	<b>22,993</b>	<b>24,696</b>	<b>25,345</b>	<b>25,632</b>	<b>26,173</b>	<b>27,452</b>	<b>27,257</b>	<b>29,015<sup>†</sup></b>	<b>30,413</b>	<b>31,626</b>
Government	GLCA	2,778	2,584	2,531	2,581	2,703	2,939	3,044	3,022	2,933	3,642 <sup>†</sup>	3,618	3,624
Research Councils	DMSR	2,084	2,574	2,709	2,543	2,765	2,908	2,958	2,942	2,666	2,892 <sup>†</sup>	2,950	2,908
Higher Education Funding Councils	DMSS	1,804	1,928	2,085	2,234	2,227	2,395	2,303	2,257	2,185	2,266 <sup>†</sup>	2,290	2,218
Business Enterprise <sup>3</sup>	GLCB	8,914	9,580	10,377	11,519	11,511	11,362	11,443	12,413	12,624	13,157 <sup>†</sup>	14,221	15,484
Higher Education	GLCC	229	266	288	284	303	314	315	353	345	369 <sup>†</sup>	387	433
Private Non-Profit <sup>2</sup>	GLCD	961	1,022	1,076	1,153	1,247	1,279	1,267	1,293	1,316	1,374 <sup>†</sup>	1,426	1,553
Overseas	GLCE	3,472	4,152	3,927	4,382	4,589	4,436	4,842	5,172	5,188	5,316 <sup>†</sup>	5,522	5,406

2004<sup>†</sup> 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

### Sector funding the R&D

Constant prices (2015)<sup>1</sup>

<b>TOTAL<sup>3</sup></b>	<b>GLBD</b>	<b>25,013</b>	<b>26,606</b>	<b>26,860</b>	<b>28,167</b>	<b>28,143</b>	<b>28,075</b>	<b>28,153</b>	<b>29,124</b>	<b>28,322</b>	<b>29,660</b>	<b>30,639</b>	<b>31,626</b>
Government	GLCP	3,433	3,110	2,957	2,944	3,001	3,219	3,274	3,206	3,048	3,723	3,645	3,624
Research Councils	DMSV	2,575	3,098	3,165	2,900	3,070	3,185	3,182	3,121	2,770	2,956	2,972	2,908
Higher Education Funding Councils	DMSW	2,229	2,321	2,436	2,548	2,473	2,623	2,477	2,394	2,270	2,316	2,307	2,218
Business Enterprise <sup>3</sup>	GLCQ	11,015	11,530	12,122	13,138	12,782	12,445	12,309	13,169	13,117	13,450	14,327	15,484
Higher Education	GLCR	283	320	336	324	336	344	339	375	358	377	390	433
Private Non-Profit <sup>2</sup>	GLCS	1,188	1,230	1,257	1,315	1,385	1,401	1,363	1,372	1,367	1,405	1,437	1,553
Overseas	GLCT	4,290	4,997	4,587	4,998	5,096	4,859	5,208	5,487	5,391	5,434	5,563	5,406

Source: Office for National Statistics

	2004 <sup>†</sup>	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP deflator used to convert current prices to constant prices	80.925	83.085	85.604	87.677	90.059	91.298	92.968	94.259	96.238	97.825	99.262	100

- 1 Please note that the latest deflators have been applied to the business research and development estimates in this bulletin which has resulted in small differences being observed between the BERD and GERD publications.
- 2 Prior to 2011 PNP data was estimated. From 2011 data has been collected from a biennial survey with intermediate years being estimated. Estimates for 2015 have been published using survey data.
- 3 Estimates of launch investment loan repayments received by government from business have been removed following a review of how these payments should be reported. These loan repayments are in relation to loans given out in previous years and therefore should not be included in current totals of R&D expenditure. The total of loan repayments have been removed from the total funding by business and the UK total for 2013, and 2015, there were no repayments in 2014. In current prices the values removed were 2013 (£212 Million) and 2015 (£112 million).

<sup>†</sup> crosses denote earliest data revision.

#### Please Note:

Differences may occur between totals and the sum of their independently rounded components.

## 5

EXPENDITURE ON CIVIL AND DEFENCE R&D IN THE UK BY SECTOR OF FUNDING:  
2004 to 2015

£ million

		Civil											
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector funding the R&amp;D</b>													
Current prices													
<b>TOTAL<sup>3</sup></b>	<b>GLBB</b>	<b>17,802</b>	<b>19,255</b>	<b>20,416</b>	<b>21,963</b>	<b>22,945</b>	<b>23,424</b>	<b>24,255</b>	<b>25,471</b>	<b>25,470</b>	<b>27,161</b> †	<b>28,665</b>	<b>29,919</b>
Government	GLCF	1,301	1,299	1,281	1,421	1,577	1,690	1,838	1,758	1,736	2,411 †	2,425	2,471
Research Councils	DMSX	2,084	2,574	2,709	2,543	2,765	2,908	2,958	2,941	2,666	2,892 †	2,950	2,908
Higher Education Funding Councils	DMSY	1,804	1,928	2,085	2,234	2,227	2,395	2,303	2,257	2,185	2,266 †	2,290	2,218
Business Enterprise <sup>3</sup>	GLCG	8,476	8,963	9,646	10,603	10,775	10,659	10,945	11,900	12,206	12,704 †	13,828	15,098
Higher Education	GLCH	229	266	288	284	303	314	315	353	345	369 †	387	433
Private Non-Profit <sup>2</sup>	GLCI	961	1,022	1,076	1,153	1,247	1,279	1,267	1,267	1,311	1,368 †	1,417	1,545
Overseas	GLCJ	2,948	3,203	3,331	3,726	4,054	4,180	4,628	4,995	5,023	5,151 †	5,369	5,247

		Civil											
		2004 †	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector funding the R&amp;D</b>													
Constant prices (2015) <sup>1</sup>													
<b>TOTAL<sup>3</sup></b>	<b>C3V7</b>	<b>21,998</b>	<b>23,175</b>	<b>23,849</b>	<b>25,050</b>	<b>25,478</b>	<b>25,657</b>	<b>26,090</b>	<b>27,022</b>	<b>26,466</b>	<b>27,765</b>	<b>28,878</b>	<b>29,919</b>
Government	C3VH	1,608	1,563	1,496	1,621	1,751	1,851	1,977	1,865	1,804	2,465	2,443	2,471
Research Councils	C3V4	2,575	3,098	3,165	2,900	3,070	3,185	3,182	3,120	2,770	2,956	2,972	2,908
Higher Education Funding Councils	C3V5	2,229	2,321	2,436	2,548	2,473	2,623	2,477	2,394	2,270	2,316	2,307	2,218
Business Enterprise <sup>3</sup>	C3V1	10,474	10,788	11,268	12,093	11,964	11,675	11,773	12,625	12,683	12,986	13,931	15,098
Higher Education	C3VJ	283	320	336	324	336	344	339	375	358	377	390	433
Private Non-Profit <sup>2</sup>	C3VK	1,188	1,230	1,257	1,315	1,385	1,401	1,363	1,344	1,362	1,398	1,428	1,545
Overseas	C3VL	3,643	3,855	3,891	4,250	4,501	4,578	4,978	5,299	5,219	5,266	5,409	5,247

		Defence											
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector funding the R&amp;D</b>													
Current prices													
<b>TOTAL</b>	<b>GLBC</b>	<b>2,440</b>	<b>2,851</b>	<b>2,577</b>	<b>2,732</b>	<b>2,399</b>	<b>2,208</b>	<b>1,918</b>	<b>1,980</b>	<b>1,787</b>	<b>1,854</b> †	<b>1,748</b>	<b>1,707</b>
Government	GLCK	1,477	1,285	1,250	1,160	1,126	1,249	1,206	1,263	1,198	1,231 †	1,193	1,153
Research Councils	GLCM	-	-	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils	DMSZ	-	-	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLCL	439	616	730	916	737	703	498	513	419	452 †	393	386
Higher Education	GLCM	-	-	-	-	-	-	-	-	-	-	-	1
Private Non-Profit <sup>2</sup>	GLCN	-	-	-	-	-	-	-	26	5	6	10	8
Overseas	GLCO	524	949	597	657	536	256	214	177	165	165	153	159

		Defence											
		2004 †	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Sector funding the R&amp;D</b>													
Constant prices (2015) <sup>1</sup>													
<b>TOTAL</b>	<b>C3V8</b>	<b>3,015</b>	<b>3,431</b>	<b>3,010</b>	<b>3,116</b>	<b>2,664</b>	<b>2,418</b>	<b>2,063</b>	<b>2,101</b>	<b>1,857</b>	<b>1,895</b>	<b>1,761</b>	<b>1,707</b>
Government	C3VM	1,825	1,547	1,460	1,323	1,250	1,368	1,297	1,340	1,245	1,258	1,202	1,153
Research Councils	C3ZO	-	-	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils	C3V6	-	-	-	-	-	-	-	-	-	-	-	-
Business Enterprise	C3VN	542	741	853	1,045	818	770	536	544	435	462	396	386
Higher Education	C3VO	-	-	-	-	-	-	-	-	-	-	-	1
Private Non-Profit <sup>2</sup>	C3VP	-	-	-	-	-	-	-	28	5	6	10	8
Overseas	C3VQ	648	1,142	697	749	595	280	230	188	171	169	154	159

Source: Office for National Statistics

	2004 †	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP deflator used to convert current prices to constant prices	80.925	83.085	85.604	87.677	90.059	91.298	92.968	94.259	96.238	97.825	99.262	100

- 1 Please note that the latest deflators have been applied to the business research and development estimates in this bulletin which has resulted in small differences being observed between the BERD and GERD publications.
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- denotes nil, figures unavailable or too small to display.

† crosses denote earliest data revision.

**Please Note:**

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## 6 COUNTRY AND REGIONAL BREAKDOWN OF EXPENDITURE ON R&D IN THE UK BY SECTOR OF PERFORMANCE, 2015

	Current prices		Sector performing the R&D			£ million
	Government <sup>1, 5, 6</sup>		Higher Education <sup>2</sup>	Business <sup>3</sup>	Private Non-Profit <sup>4, 5</sup>	Total
	Old method	New method				
<b>United Kingdom</b>	<b>2,097</b>	<b>2,097</b>	<b>8,009</b>	<b>20,885</b>	<b>634</b>	<b>31,626</b>
North East	1	47	245	306	35	633
North West	89	150	639	2,113	1	2,903
Yorkshire and the Humber	23	111	545	779	4	1,439
East Midlands <sup>5</sup>	..	..	340	1,515	..	1,932
West Midlands <sup>5</sup>	..	..	409	2,166	..	2,648
<b>East Midlands and West Midlands<sup>5</sup></b>	<b>95</b>	<b>147</b>	<b>749</b>	<b>3,681</b>	<b>3</b>	<b>4,580</b>
East of England	219	226	765	4,178	261	5,430
London	264	429	2,008	1,912	190	4,539
South East	794	592	1,138	4,709	88	6,527
South West	324	216	394	1,472	19	2,101
<b>England</b>	<b>1,810</b>	<b>1,917</b>	<b>6,484</b>	<b>19,151</b>	<b>600</b>	<b>28,152</b>
Wales	17	13	286	362	-	663
Scotland	257	155	1,092	871	32	2,150
Northern Ireland	14	12	147	501	-	660

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 17 November 2016.

4 Private Non-Profit estimates have been published using the 2015 survey data from the biennial survey.

5 East Midlands and West Midlands regions data have been combined due to confidentiality.

6 The methodology for producing regional estimates of government expenditure has been reviewed. For 2015, estimates are based on actual respondent data. This has replaced the old method of using government full time equivalent (FTE) R&D employees by region, as a proxy for estimating regional expenditure. The 2015 estimates are shown based on the old and new methods to enable comparison.

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

.. denotes disclosive figures.

### Please note:

Regional expenditure data by funding sector are unavailable.  
Differences may occur between totals and the sum of their independently rounded components.