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# Business Enterprise Research and Development Scotland 2017



An Official Statistics publication for Scotland

BUSINESS AND ENERGY



A National Statistics publication for Scotland



## BUSINESS AND ENERGY

This publication presents information on research and development (R&D) performed by businesses operating in Scotland in 2017 as well as revisions to previously published data for 2015 and 2016. The data in this release are sourced from the Business Enterprise Research and Development (BERD) survey conducted by the Office for National Statistics (ONS).

Note that this publication presents the latest statistics for private sector BERD only. Statistics on Gross Expenditure on R&D in 2017, of which BERD expenditure is a component, will become available in spring 2019.

Further information on Scottish R&D activity and the full set of tables are available at: <http://www2.gov.scot/Topics/Statistics/Browse/Business/RD>

### KEY POINTS

BERD expenditure in Scotland in 2017 was £1.247 billion, this is the highest figure since the start of the series in 2001. Scottish BERD expenditure represented 5.3% of the UK total of £23.7 billion in 2017.

Between 2016 and 2017, Scottish BERD expenditure increased by 13.9% in real terms; UK expenditure increased by 2.9% in real terms over this period.

Between 2007 and 2017, Scottish BERD expenditure increased by 93.6% in real terms; UK expenditure increased by 27.2% over this period.

BERD expenditure was 0.80% of Scottish GDP in 2017, the comparable figure was 1.15% for the UK in 2017.

In 2017, BERD expenditure in Scotland was predominantly split between Manufacturing products (£594 million or 47.6%), and Services products (£560 million or 44.9%), with 'Other' product groups (£94 million), such as 'Extractive Industries', comprising the remaining 7.5%.

BERD expenditure on Services products increased by 47.4% (+£180 million) in real terms between 2016 and 2017, whereas expenditure on Manufacturing products decreased by 1.2% (-£7.4 million) and expenditure on 'Other' products decreased by 17.6% (-£20.1 million).

Businesses in Scotland employed 13,178 R&D staff in 2017, up from 12,547 in 2016, an increase of 5.0%. BERD employment is now at its highest level since the series began in 2001, when R&D employment stood at 7,210.

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## Background

The BERD survey follows the definition of research and development proposed by the Organisation for Economic Cooperation and Development (OECD) and published in the ‘Frascati’ Manual. According to the manual, R&D is defined as:

“creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge”. R&D must contain an appreciable amount of novelty.

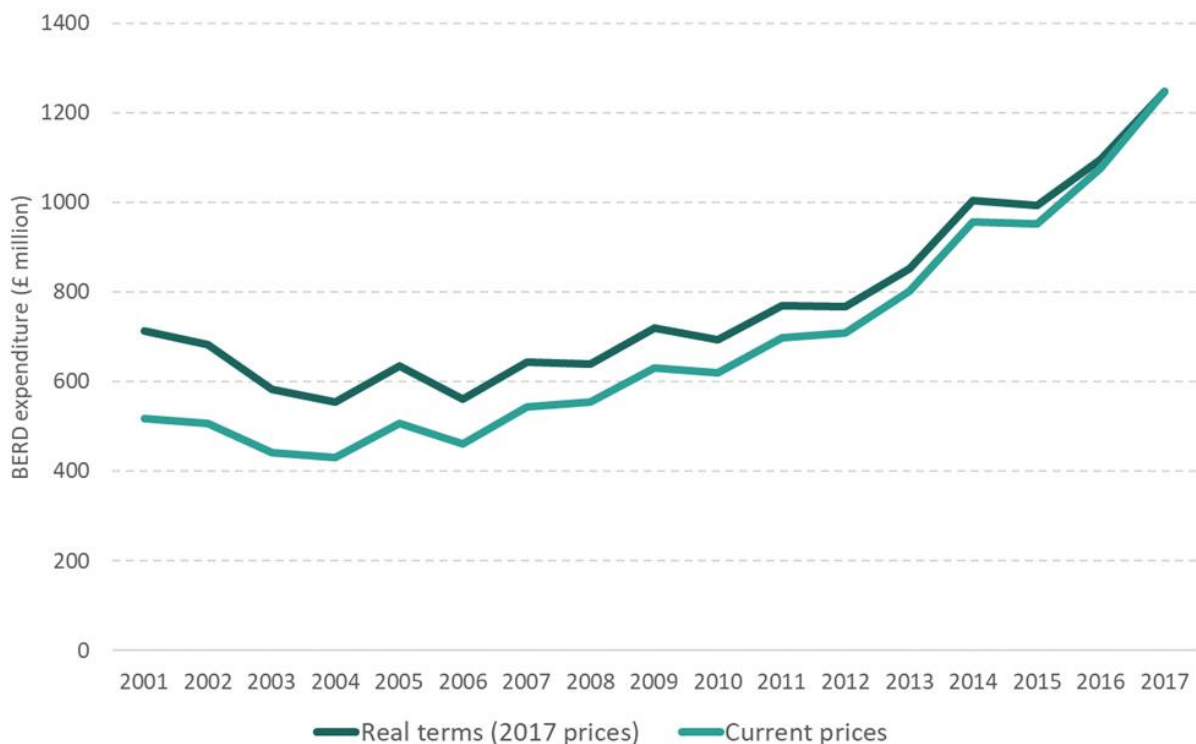
## National Indicator

BERD contributes to Scotland’s Gross Expenditure on Research and Development (GERD), which forms the basis of the National Indicator: ‘Spend on Research and Development’. The figures for GERD will become available in spring 2019.<sup>1</sup>

## BERD Expenditure

The value of Business Enterprise Research and Development (BERD) undertaken in Scotland in 2017 was £1.247 billion, 5.3% of the UK total and 0.80% of Scottish GDP. Expenditure has increased by £152 million (in real terms) since 2016, which represents a 13.9% increase in real terms. BERD expenditure is now at the highest level in the series back to 2001.

**Figure 1: BERD expenditure on R&D performed in Scotland in real terms, 2001 – 2017**



<sup>1</sup> Information on the range of targets and indicators which comprise the National Performance Framework can be found on at: <https://nationalperformance.gov.scot>

In 2017, BERD expenditure in Scotland was predominantly split between Manufacturing products (£594 million or 47.6%), and Services products (£560 million or 44.9%), with 'Other' product groups (£94 million), such as 'Extractive Industries', comprising the remaining 7.5%.

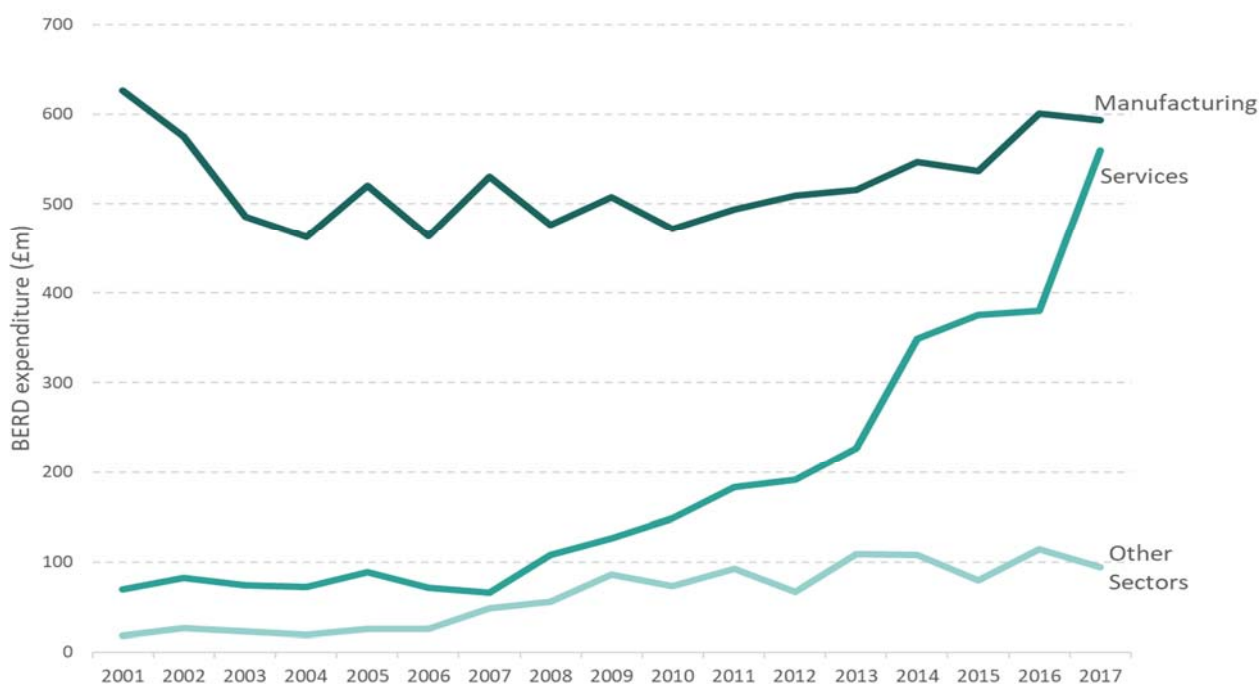
Since 2001, overall BERD expenditure has increased by 74.7% in real terms. When this trend is broken down to the broad product groups, it shows that expenditure on Manufacturing has decreased by 5.2% since 2001. Whereas, in 2017, BERD expenditure on Services products was eight times what it was in 2001, with BERD expenditure on Other products now five times what it was in 2001.

In the short term, BERD expenditure on Services products increased by 47.4% (+£180 million) in real terms between 2016 and 2017, whereas expenditure on Manufacturing products decreased by 1.2% (-£7.4 million) and expenditure on 'Other' products decreased by 17.6% (-£20.1 million).

The drop in BERD spending on Manufacturing products, between 2016 and 2017, was largely driven by decreases in spending on 'Other manufacturing' products (-12.5%) and 'Electrical Machinery' products (-4.4%). The largest increase within Manufacturing was in 'Mechanical Engineering' products (+24.2%) but 'Transport Equipment & Aerospace' and 'Chemicals (which includes Pharmaceuticals)' products also experienced increases, over the latest year.

Between 2016 and 2017, there was a large increase in BERD spending on Services products; this was mainly driven by a 145.6% increase in R&D spending on 'Miscellaneous business activities; Technical testing and analysis' products (+£183 million) – following a slight decrease in 2016. This detailed product group comprised almost a quarter of all Scottish BERD spending in 2017 (24.8%) – the largest proportion of all detailed product groups. In contrast, BERD spend on 'Research and development services' and 'Public administration' products decreased between 2016 and 2017.

**Figure 2: BERD expenditure on R&D performed in Scotland in real terms by broad product group, 2001 - 2017**



Within the 'Other' broad product group, 'Extractive Industries' R&D expenditure decreased by £22.7 million (-36.2%) in real terms between 2016 and 2017 – following a large increase in BERD spend in 2016. 'Agriculture, hunting & forestry; Fishing' experienced a large percentage increase in R&D spending (+51.2%), continuing the trend since 2015.

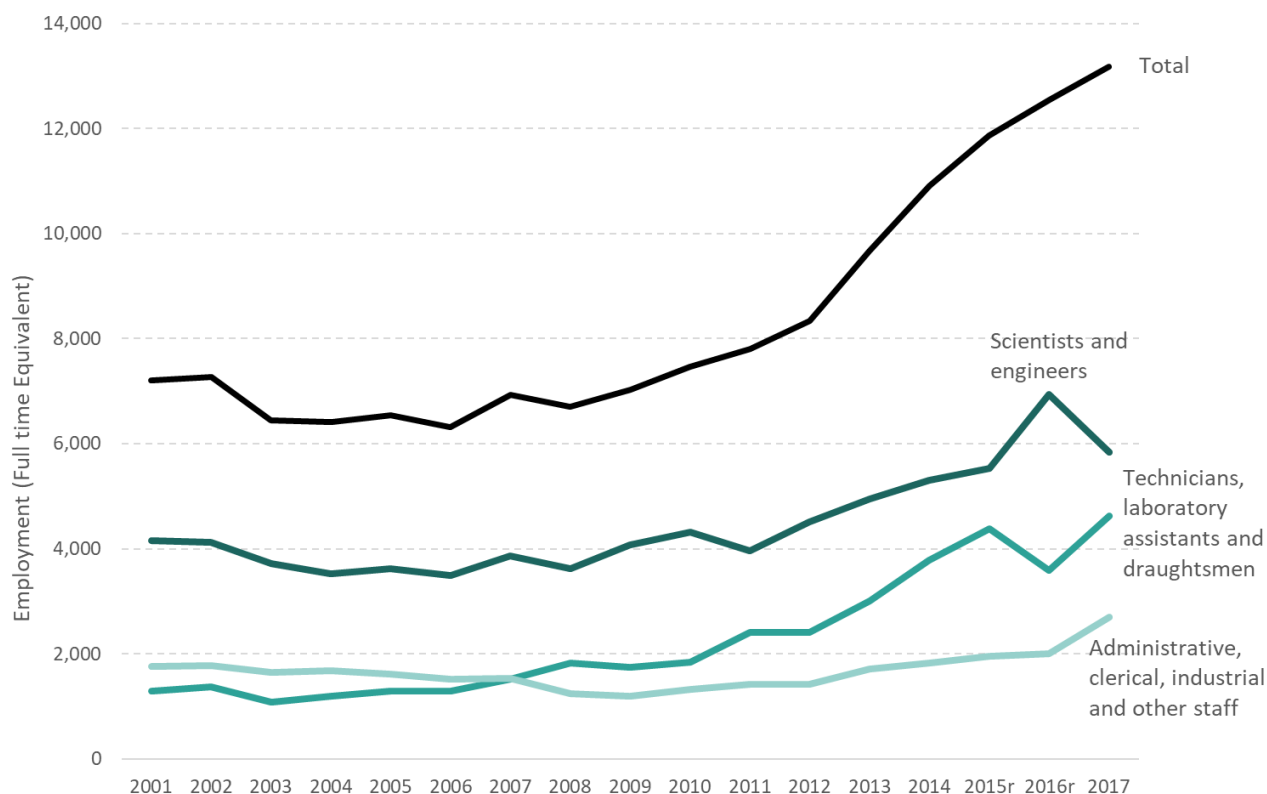
R&D expenditure in Scotland can fluctuate significantly year on year, especially given that R&D expenditure is concentrated in a small number of large businesses. In 2017, five businesses accounted for over a third (37.8%) of Scottish BERD expenditure; these firms also accounted for almost a fifth of Scottish R&D employment. This is a sizeable share of the total R&D expenditure and an increase from 2016 (25.7%); however it represents a fall in the dominance of the top businesses since 2001 when the top five businesses accounted for just over half of BERD expenditure.

## BERD Employment

Enterprises in Scotland employed 13,178 R&D staff in 2017, an increase of 5.0% from 12,547 in 2016. BERD employment is now at its highest since the series began in 2001, when R&D employment stood at 7,210.



**Figure 3: BERD Employment in Scotland, 2001 - 2017**



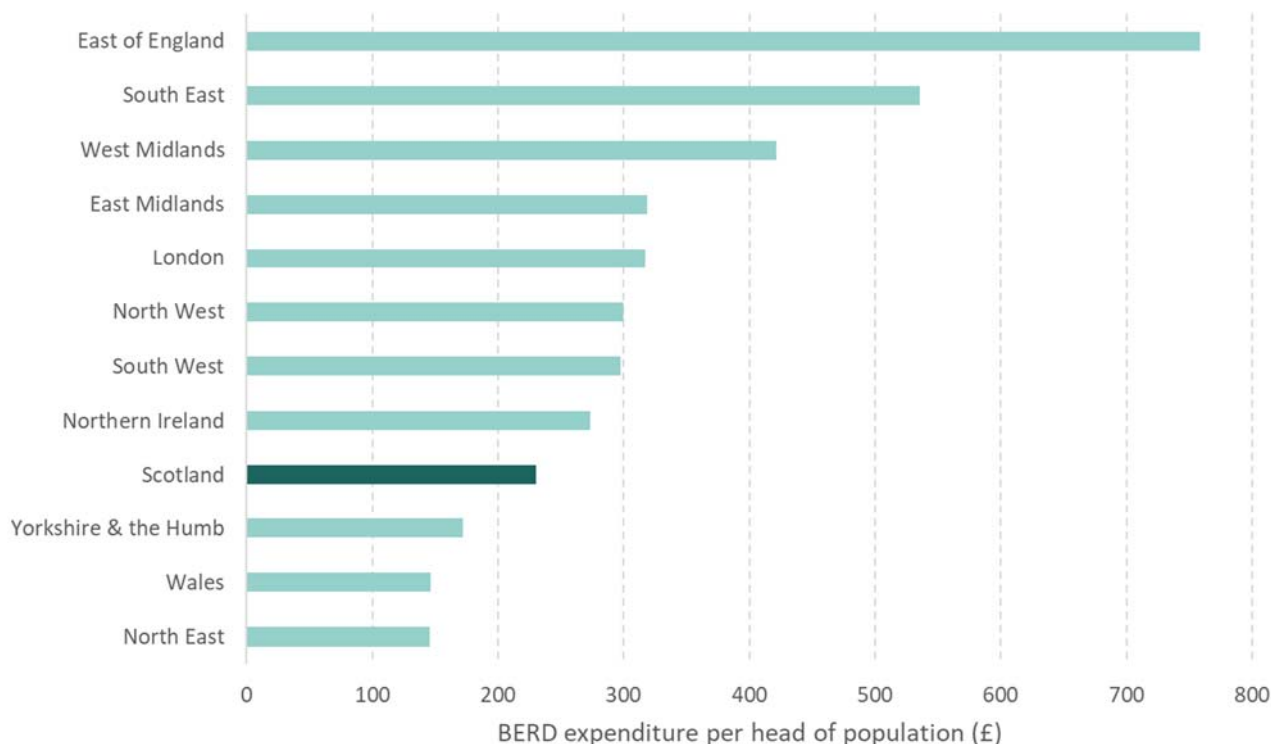
The number of scientist and engineer roles decreased by 15.9%, from 6,939 in 2016 to 5,839 in 2017, whereas the number of administrative, clerical, industrial and other staff, as well as technicians, laboratory assistants and draughtsmen, increased by 34.7% and 28.7% respectively over the same period.

Like expenditure, BERD jobs were mainly split between Manufacturing product groups (46.9%), and Services product groups (45.7%). Both of these product groups experienced increases in R&D employment since 2016: 3.3% for Manufacturing and 9.1% for Services. In contrast, the 'Other' broad product group experienced a 6.4% decrease in employment over the latest year.

### UK regional comparisons

In 2017, BERD expenditure was equivalent to 0.80% of GDP in Scotland compared to 1.15% of GDP in the UK. In 2017, the average BERD spend per head of population was £230 in Scotland, considerably lower than the £359 average spend per head of population across the UK. Only Wales, Yorkshire and the Humber and the North East spent less per head than Scotland. In contrast, spending in the East of England was £758 per head (more than two times the average spend in the UK) and £535 per head in the South East; together these two regions accounted for 40.3% of all BERD expenditure in the UK (19.7% and 20.5% respectively).

**Figure 4: BERD expenditure per head of population by UK region, 2017**



In terms of expenditure as a percentage of GDP, Scotland ranked 8<sup>th</sup> out of the 12 UK regions/countries in 2017. Between 2016 and 2017, BERD expenditure in Scotland increased by 13.9% in real terms – exceeding the 2.9% increase across the UK as a whole; only London, the North East and Yorkshire and the Humber exhibited a greater increase in spending. Since 2007, expenditure in Scotland has increased by 93.6% in real terms, exceeding the UK expenditure increase of 27.2% over the same period. As a result, Scottish BERD expenditure as a proportion of UK BERD expenditure has increased, from 3.5% in 2007 to 5.3% in 2017.

### Scottish Local Authority Area Comparisons

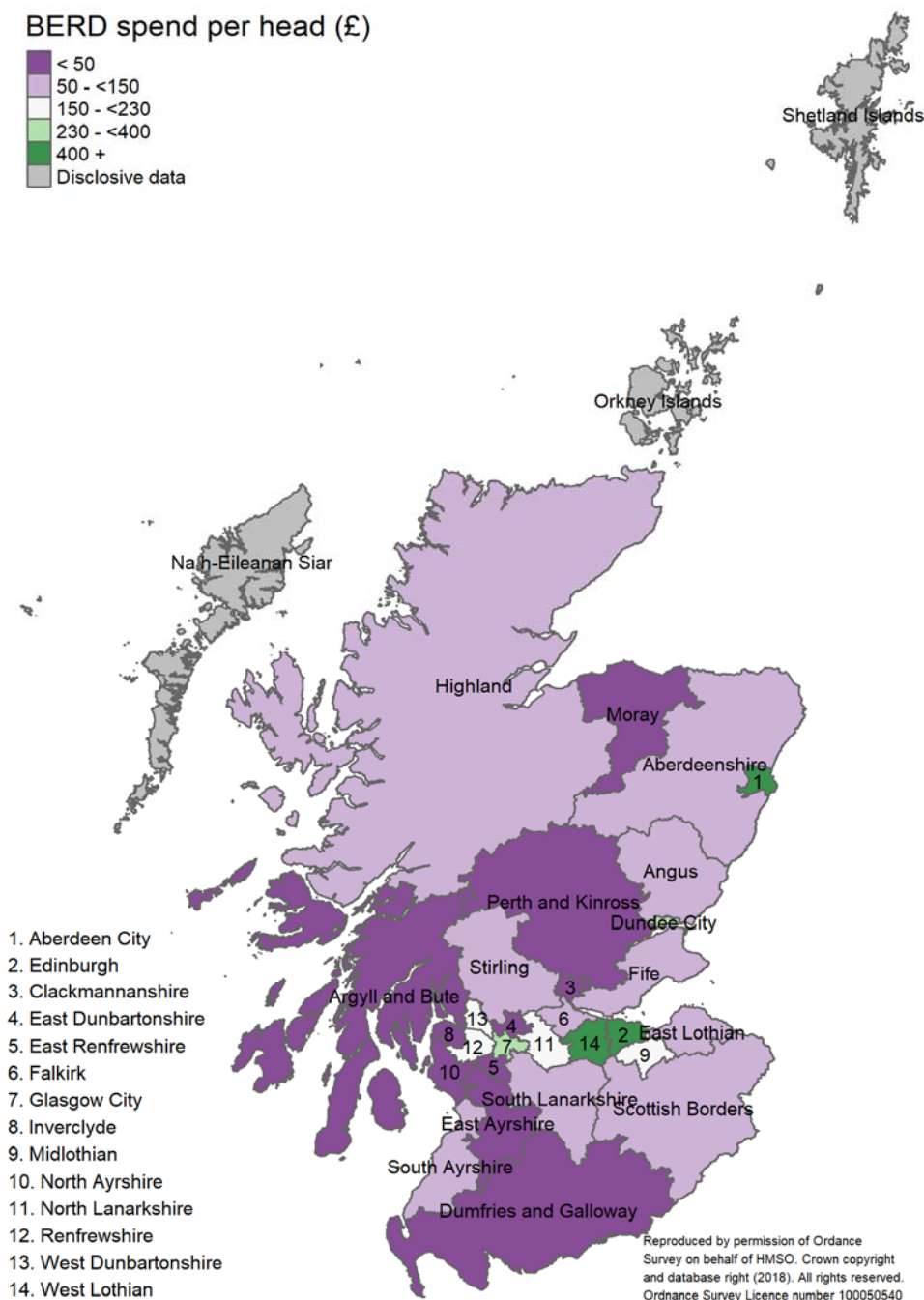
In 2017, around two thirds (60.8%) of BERD expenditure was undertaken by businesses located in just three local authority areas: City of Edinburgh (31.9%), Glasgow City (16.2%) and West Lothian (12.8%). All three of these Local Authority areas experienced large increases in BERD spending between 2016 and 2017. Although smaller in value, BERD spending in West Dunbartonshire increased by 435% (+£13.0 million) over the latest year, and in Angus and Moray spending on R&D by businesses increased by over 75% between 2016 and 2017. Dundee City experienced the largest percentage decrease in BERD spending (down 36.7% over the latest year), while Aberdeen City experienced the greatest value decrease (-£40.8 million over the latest year).

Per head of the population, West Lothian had the highest spend at £882 per head, which is more than 3.5 times the Scottish average of £230 per head. City of

Edinburgh (£774) and Aberdeen City (£541) had the next largest spends per head of population.

Similar to the overall pattern for Scotland, BERD expenditure in the City of Edinburgh was fairly evenly split between Manufacturing products and Services products (47.8% and 50.2% of R&D spending respectively), whereas in Glasgow City and Aberdeen City more was spent on Services than Manufacturing (85.1% and 45.0% of total BERD respectively). In Aberdeen City, businesses invested a relatively high proportion of BERD in Other products (35.9%), compared to Scotland as a whole (7.5%).

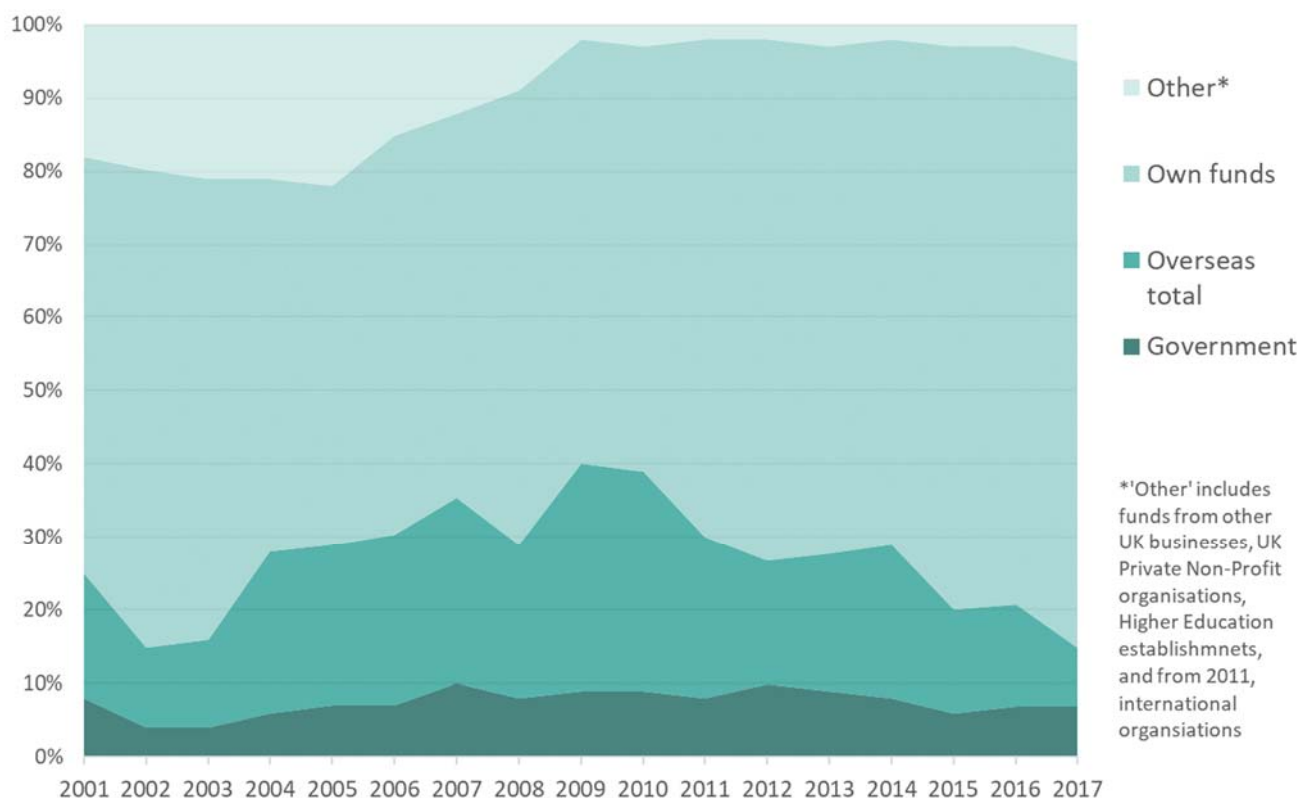
**Figure 5: BERD expenditure per head of population by Scottish Local Authority, 2017**



## R&D performing businesses

In 2017, 80.6% of R&D undertaken by businesses in Scotland was funded by the businesses themselves, a rise from 2016 when it was 77.1%. A further 8.3% was funded from overseas, a drop from 13.9% in 2016, and 6.5% was funded by the government.

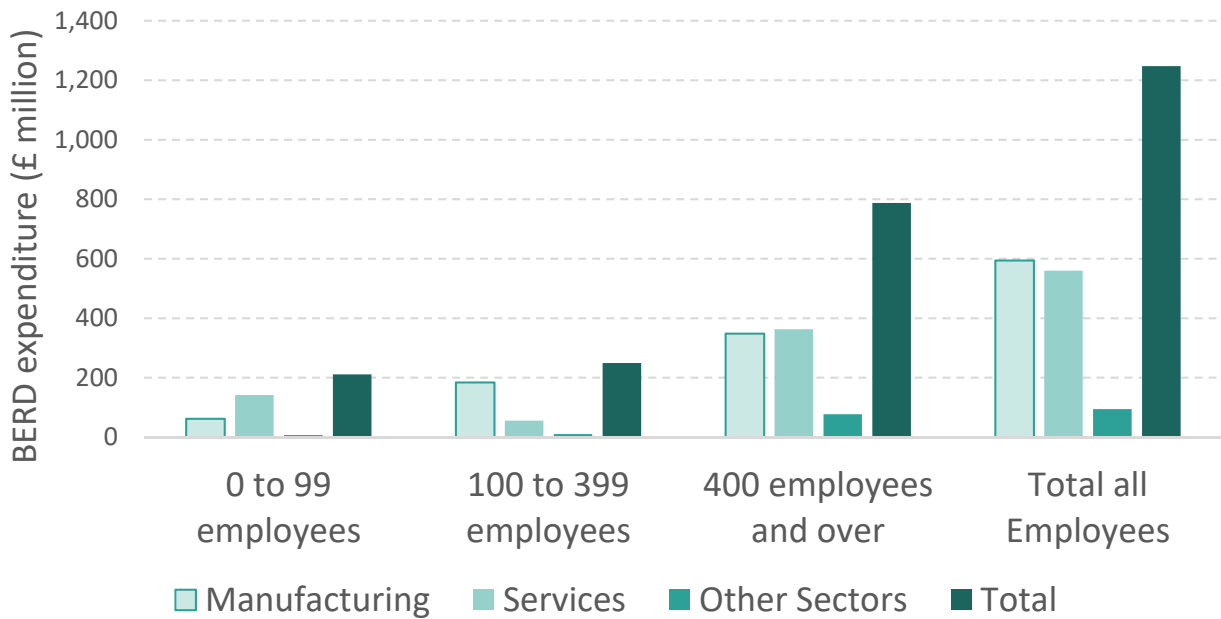
**Figure 6: Sources of funds for R&D performed in businesses in Scotland, 2001 - 2017**



In terms of business size, the largest businesses (400 employees and over) accounted for the majority (63.1% in 2017) of total BERD expenditure – over the latest year the largest businesses have become slightly more dominant (share of 58.6% in 2016).

In 2017, R&D spending patterns varied by business size: in the largest businesses BERD spend was primarily split between Services products (46.1%) and Manufacturing products (44.2%); in businesses with 100-399 employees, almost three quarters of R&D spending was on Manufacturing products (73.7%); whereas in the smallest business (0-99 employees) over two thirds (67.1%) of spending was on Services products.

**Figure 7: BERD expenditure by size of business and broad product group, 2017**



Scottish-owned businesses undertook 37.3% of BERD expenditure in Scotland in 2017 – an increase from 34.8% in 2016. US-based businesses undertook a further 27.1% – a decrease from 34.8% in 2016. Spending by businesses with Other EU ownership increased from 17.0% in 2016 to 24.2% in 2017. The majority of spending in Scottish-owned businesses was on Services products (71.6%) whereas businesses with ownership in the rest of the UK and the US spent most on Manufacturing products (65.2% and 79.1% respectively). For BERD employment, over half was in Scottish-owned businesses (54.3%), with a further 20.5% in US-owned businesses.

**Figure 8: BERD expenditure and R&D employment by country of ownership of business, 2017**



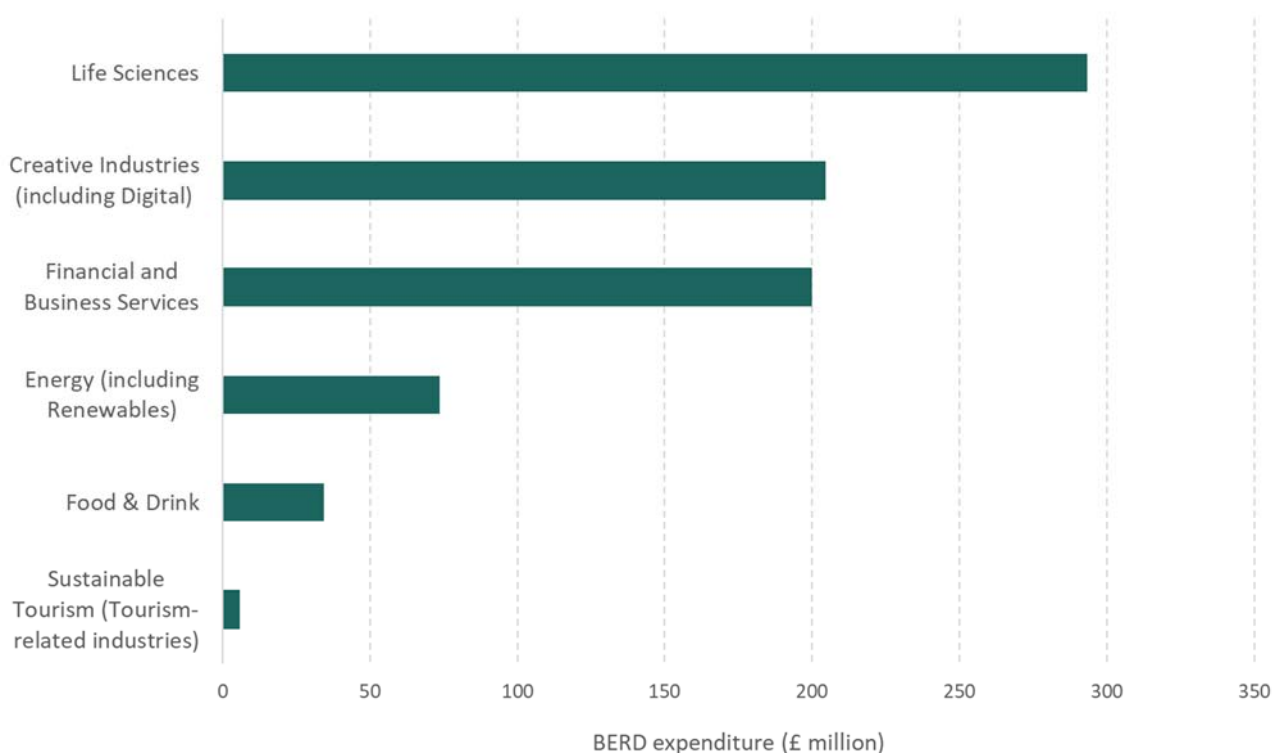
## Growth Sectors<sup>2</sup>

[Scotland's Economic Strategy](#) identified the following industry groups as key growth sectors where Scotland has a distinct comparative advantage:

- Food & Drink (including agriculture & fisheries)
- Creative Industries (including digital)
- Sustainable Tourism
- Energy (including renewables)
- Financial & Business Services
- Life Sciences

The Growth Sectors account for a high proportion of business R&D spending in Scotland: £811 million (or 65.1%) of the Scottish total in 2017. In 2017, Life Sciences had the highest BERD spend at £293 million – representing 23.5% of the Scottish total, followed by Creative Industries (£205 million); R&D spending was lowest in Sustainable Tourism (£5.9 million).

**Figure 9: BERD expenditure by Growth sector, 2017**



<sup>2</sup> Growth sectors are based on Standard Industrial Classification 2007 codes. More information on how the growth sectors are defined is available at: <http://www2.gov.scot/Topics/Statistics/Browse/Business/Publications/GrowthSectors>

Energy was the only Growth Sector to show a decrease in BERD expenditure (-22.9%) between 2016 and 2017, whereas the largest increase was in Financial and Business Services (+36.4%). Since 2009, the increase in BERD spend has been particularly large for the Financial and Business Services Growth Sector.

The Growth Sectors accounted for 62.9% of the total Scottish BERD employment in 2017 – up from 60.9% in 2016. Life Sciences and Creative Industries comprised 21.9% and 17.9% of BERD employment respectively; Creative Industries experienced an increase of 23.3% over the latest year, whereas employment on R&D in Energy declined (-29.4%).

## BACKGROUND NOTES

### Definition of R&D

1. While R&D is often thought of as synonymous with high-tech firms that are on the cutting edge of new technology, many established consumer goods companies spend large sums of money, on a systematic basis, improving existing products.

2. The activities that are classified as R&D differ from company to company, but there are two basic models. In one model, the primary function of R&D is to develop new products. In the second model, the primary function of R&D is to discover and create new knowledge about scientific and technological topics with the purpose of uncovering and enabling development of new products, processes, and services.

3. The majority of the data presented in this release are sourced from the Business Enterprise R&D (BERD) survey conducted by the Office for National Statistics (ONS).

4. The ONS BERD survey follows the definition of research and development proposed by the Organisation for Economic Cooperation and Development (OECD) and published in the 'Frascati' Manual. According to the manual, R&D is defined as:

“creative and systematic work undertaken in order to increase the stock of knowledge - including knowledge of humankind, culture and society - and to devise new applications of available knowledge”. R&D must contain an appreciable amount of novelty.

5. 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, collecting and using R&D data.

### Sampling and Regional Estimates

6. The ONS BERD survey is an annual sample survey based on a continually updated register of R&D performers. The ONS 2017 BERD Statistical Bulletin is available at:

<https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/businessenterpriseresearchanddevelopment/2017>

7. The Northern Ireland Research and Development 2017 statistics are published at:

<https://www.nisra.gov.uk/statistics/business-statistics/research-and-development>

8. The UK sample size is approximately 5,500 businesses (4,000 in GB and 1,500 in NI) - the response rate is normally around 92%. For Great Britain, a stratified random sample is used where the strata are defined as:



- businesses that have previously reported R&D expenditure above a threshold (greater than around £5.7 million (referred to as “large R&D performers”)).

- the remaining businesses identified as (or potential) R&D performers (referred to as “smaller R&D performers”) are allocated into strata using their employment and industry product group

9. The large R&D performers account for around 78% of total expenditure. Each of these large R&D performers is asked to name all the sites at which the business performed R&D and to estimate the R&D spend at that site, this expenditure is then allocated to the appropriate region. Regional data for the smaller R&D performers are estimated from sample returns.

10. A summary quality report for the ONS BERD survey is available at: <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/methodologies/ukbusinessenterpriseresearchanddevelopmentsurveyqmi>

### Coverage

11. BERD includes business enterprise R&D performed in Scotland irrespective of the residence of the ultimate owner.

12. BERD excludes R&D funded by Scottish businesses that is performed overseas.

13. BERD excludes R&D carried out by higher education or government (including government departments, agencies and non-departmental public bodies; local authorities; and private non-profit organisations). Public corporations are counted as business enterprises.

14. Gross expenditure on R&D in Scotland in 2017 performed by all sectors of the economy (i.e. business, higher education and government) will be reported separately in spring 2019.

### Product Groups

15. The 400 large R&D performers are asked to select the industry product groups that best describe the type of R&D activities they undertake. In 2009, these product groups were updated to better reflect the new Standard Industrial Classification (SIC 2007) codes. For the smaller R&D performers, no product group data are collected in the BERD survey. However, the business’ Standard Industrial Classification (SIC) codes are known from the Inter-Departmental Business Register (IDBR) and the assumption is made that the R&D expenditure is for the detailed product group corresponding to that SIC. This approach must be regarded as approximate since, in practice, an individual business can perform R&D for a range of product groups.

16. The introduction of SIC 2007 in the 2009 survey resulted in some businesses’ R&D moving to a different product group than previously published. The largest impact was for businesses with Publishing activities, as these moved out of the

manufacturing sector to be included under Miscellaneous business activities. There was an increase in the Other manufactured goods product group due to businesses being reclassified from Textiles, clothing and leather products, Pulp and paper products, Rubber and plastic products, Fabricated metal products, Machinery and equipment and Precision instruments and optical products.

17. The broad product groups, which consist of aggregations of the detailed product groups, were refined and expanded in 2002 in order to more accurately categorise the data within the manufacturing and service sectors. Since 2011, sewerage and waste management is included in the Other sectors total, when previously it was included in manufacturing.

### **Discontinuities in the data**

18. The BERD survey questionnaire was redesigned from the 2007 survey to better reflect user needs and to address concerns about data quality and difficulty in completion. While the changes are an improvement, they could have an impact on the comparability of the data returned. Unfortunately, it is not possible to measure this impact.

### **Employment**

19. Employment is calculated by respondents to the ONS BERD survey on the basis of 'full-time equivalent' staff average over the year. The categories of employment used are:

- Researchers (scientists and engineers) – engaged in the conception or creation of new knowledge, products, methods and systems
- Technicians – perform scientific and technical tasks normally under the supervision of researchers
- Other (administrative) – support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects

### **Real Terms**

20. The cash values are converted to real terms using Treasury GDP deflators. The deflators are available at:

<https://www.gov.uk/government/statistics/gdp-deflators-at-market-prices-and-money-gdp-october-2018-budget-2018>

### **Time period for which the results relate**

21. Respondents to the ONS BERD survey were asked to make a return for the calendar year 2017 or the nearest 12 month period for which figures were available. Data for all years published were collected on the same basis.

## Revisions Policy

22. BERD Scotland follows the Revisions Policy for the ONS BERD results – the latest (year t) results are provisional until two years later (year t+2).

## Latest Revisions

23. The 2015 and 2016 data have been revised to take account of company misreporting and late returns.

24. One indication of the reliability of the main indicators in this release can be obtained by monitoring the size of revisions. Table 1 records the size and pattern of revisions that have occurred over the last 5 years.

Table 1: Revisions between first publication and most recent estimate, figures in thousands

Year		Year in which data was published						Change in expenditure between first and last estimate
		2012	2013	2014	2015	2016	2017	
Year the data relates to	2012	£706,804	£709,047	£708,662				£1,858
	2013		£797,704	£896,528	£801,043			£3,339
	2014			£905,193	£874,020	£957,080		£51,887
	2015				£870,863	£952,626	952,625	£81,762
	2016					£1,072,134	1,074,544	£2,410
	2017						1,247,278	-

25. There was a large revision in the 2015 data between the 2015 publication and the 2016 publication, which was partly due to a large increase in expenditure in the 'Miscellaneous business activities; Technical testing and analysis' Service product group.

## Sampling variability

26. The estimates in this publication 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 R&D survey is subject to two types of possible errors:

- Sampling errors, due to only a sample of the population being surveyed. The difference between the estimates derived from the sample and value that would be obtained from a census is referred to as the sampling error. The Business Enterprise Research and Development Survey has provided standard errors information in the past but the methodology for estimation of the standard errors used to measure these is currently under review.
- 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 problems ensuring that businesses adhere to Frascati R&D definitions.

### **Analysis of R&D Expenditure by SMEs (small and medium sized enterprises)**

27. A table giving estimates of R&D expenditure by SMEs has been included. The SME definition used is that under European Commission Recommendation (2003/361/EC) of 1 January 2003, in which SMEs are defined as enterprises with less than 250 employees. In addition, a criterion of independence is used to exclude enterprises that are part of a larger enterprise group, so that only true SMEs are evaluated. This criterion is important in the context of R&D estimates, given that R&D activity is often carried out by smaller businesses which form part of larger, sometimes multinational businesses.

28. To apply the SME definition, historic information on business ownership has been obtained using that currently held on the IDBR. Caution should therefore be used in making comparisons over time.

### **Code of Practice for Official Statistics**

29. This is a National Statistics publication. It has been produced to the high professional standards set out in the Code of Practice for Official Statistics.

30. In 2012, the Scottish Government Research and Development statistical publications were assessed by the United Kingdom Statistics Authority (UKSA) for compliance against the Code of Practice for Official Statistics. Details of the assessment are available at:

<https://www.statisticsauthority.gov.uk/archive/assessment/assessment/assessment-reports/assessment-report-189---statistics-on-scottish-businesses-and-research-and-development.pdf>

31. The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

Designation can be broadly interpreted to mean that the statistics:

- meet identified user needs
- are well explained and readily accessible
- are produced according to sound methods, and
- are managed impartially and objectively in the public interest

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

32. A UKSA assessment was also carried out for the ONS Research and Development statistical publications in 2012. Details of the assessment are available at:

<https://www.statisticsauthority.gov.uk/archive/assessment/assessment/assessment-reports/assessment-report-218---statistics-on-research-and-development.pdf>

## Uses

33. Information from the Scottish BERD publication is used by the Scottish Government to monitor performance and inform economic policy. Some of the external users of R&D statistics published by the Scottish Government include the Enterprise Networks and Local Authorities. More information on uses can be found in the on-line [Research and Development Data Sources, Suitability and Uses Note](#).

34. The Scottish Government conducted a user consultation seeking users' views on the format and content of the BERD and GERD publications in autumn 2010. The results of this consultation can be viewed here: <http://www2.gov.scot/Topics/Statistics/Browse/Business/scotstat/RDFindingsReport>

## User Engagement

35. If you would like to be kept informed about on-going developments with regards to the Scottish BERD publication and future releases of R&D data, please register to receive updates via [ScotStat](#) (under Economy topic pick R&D and Innovation).

36. There is also the ScotStat Scottish Economic Statistics Consultation Group (SESCG) – more information on the group is available at: <http://www2.gov.scot/Topics/Statistics/Browse/Economy/ScotStat/comms>

If you would like to join SESCg or provide feedback on the Scottish BERD publication, please contact us at:

Business and Innovation Statistics, Office of the Chief Economic Adviser, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

Telephone: 0131 244 6813

Email: [industrystatistics@gov.scot](mailto:industrystatistics@gov.scot)

37. There is also an ONS-led user community that may be of interest to R&D users. Details of this are available at the Business and Trade Statistics Community on the [StatsUserNet](#) website.

**Table 1A**  
**Expenditure on R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2001 to 2017<sup>1</sup>**  
**Current Prices**

	£ thousands																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
<b>Manufacturing</b>	<b>453,440</b>	<b>426,576</b>	<b>367,555</b>	<b>359,558</b>	<b>415,191</b>	<b>380,637</b>	<b>446,654</b>	<b>412,160</b>	<b>444,825</b>	<b>421,098</b>	<b>447,288</b>	<b>469,945</b>	<b>485,035</b>	<b>521,278</b>	<b>515,138</b>	<b>589,993</b>	<b>593,752</b>
Chemicals	180,469	177,405	160,126	153,483	173,096	136,059	154,602	156,282	169,397	155,658	123,997	127,844	136,716	158,840	167,441	166,551	178,812
Mechanical Engineering	51,819	63,272	48,285	53,665	23,264	21,491	26,850	19,037	27,278	..	33,854	24,923	42,358	39,555	47,058	39,256	49,692
Electrical Machinery	57,695	64,960	48,230	56,770	98,006	92,531	110,326	111,954	108,353	106,122	106,133	124,135	151,144	173,465	155,152	220,681	214,894
Transport Equipment & Aerospace	3,779	4,916	6,245	6,998	6,528	5,031	10,149	5,381	15,738	..	7,268	9,787	7,080	6,681	11,689	26,127	27,867
Other Manufacturing	159,678	116,023	104,670	88,642	114,298	125,525	144,727	119,506	124,059	124,966	176,037	183,257	147,737	142,736	133,798	137,378	122,487
<b>Services</b>	<b>50,016</b>	<b>60,757</b>	<b>56,272</b>	<b>56,017</b>	<b>71,053</b>	<b>58,705</b>	<b>55,100</b>	<b>93,185</b>	<b>110,596</b>	<b>132,397</b>	<b>165,980</b>	<b>177,043</b>	<b>213,851</b>	<b>332,568</b>	<b>360,819</b>	<b>372,637</b>	<b>559,610</b>
<b>Other Sectors</b>	<b>13,213</b>	<b>19,377</b>	<b>17,438</b>	<b>14,804</b>	<b>20,215</b>	<b>20,914</b>	<b>40,843</b>	<b>48,165</b>	<b>75,744</b>	<b>65,323</b>	<b>83,430</b>	<b>61,673</b>	<b>102,156</b>	<b>103,234</b>	<b>76,669</b>	<b>111,914</b>	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6,249	8,254	12,717
Extractive industries	11,270	17,701	14,701	12,225	18,227	19,136	30,958	34,007	53,805	38,560	54,607	33,878	58,118	49,005	38,395	61,339	39,848
Electricity, gas & water supply; Waste management <sup>2</sup>	..	..	..	..	..	..	..	..	..	..	..	..	22,354	30,588	19,945	24,590	20,121
Construction	..	..	..	1,556	1,085	327	485	..	999	350	1,441	9,380	..	..	12,080	17,732	21,230
<b>Grand Total</b>	<b>516,669</b>	<b>506,710</b>	<b>441,265</b>	<b>430,379</b>	<b>506,459</b>	<b>460,255</b>	<b>542,596</b>	<b>553,510</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details

2. From 2009 onwards. Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other Manufacturing

3. r denotes revised figures

4. .. denotes disclosive value

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

6. Totals may not sum due to rounding.

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**Table 1B**  
**Expenditure on R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2001 to 2017<sup>1</sup>**  
**In Real Terms (2017 prices<sup>2</sup>)**

	£ thousands																
	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>r</sup>	2004 <sup>r</sup>	2005 <sup>r</sup>	2006 <sup>r</sup>	2007 <sup>r</sup>	2008 <sup>r</sup>	2009 <sup>r</sup>	2010 <sup>r</sup>	2011 <sup>r</sup>	2012 <sup>r</sup>	2013 <sup>r</sup>	2014 <sup>r</sup>	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
<b>Manufacturing</b>	<b>626,437</b>	<b>575,063</b>	<b>485,420</b>	<b>462,400</b>	<b>520,309</b>	<b>463,237</b>	<b>530,436</b>	<b>476,535</b>	<b>507,120</b>	<b>471,301</b>	<b>494,121</b>	<b>508,901</b>	<b>515,781</b>	<b>547,291</b>	<b>536,552</b>	<b>601,193</b>	<b>593,752</b>
Chemicals	249,322	239,158	211,474	197,383	216,920	165,584	183,602	180,692	193,120	174,215	136,980	138,442	145,382	166,766	174,401	169,713	178,812
Mechanical Engineering	71,589	85,296	63,769	69,015	29,154	26,155	31,886	22,010	31,098	..	37,399	26,989	45,043	41,529	49,014	40,001	49,692
Electrical Machinery	79,707	87,572	63,696	73,008	122,819	112,611	131,021	129,440	123,527	118,774	117,246	134,425	160,725	182,121	161,602	224,870	214,894
Transport Equipment & Aerospace	5,221	6,627	8,248	9,000	8,181	6,123	12,053	6,221	17,942	..	8,029	10,598	7,529	7,014	12,175	26,623	27,867
Other Manufacturing	<b>220,598</b>	<b>156,409</b>	<b>138,235</b>	113,996	143,236	152,764	171,875	138,172	141,433	139,864	194,469	198,448	157,102	149,859	139,360	139,986	122,487
<b>Services</b>	<b>69,098</b>	<b>81,906</b>	<b>74,317</b>	<b>72,039</b>	<b>89,042</b>	<b>71,444</b>	<b>65,436</b>	<b>107,740</b>	<b>126,084</b>	<b>148,181</b>	<b>183,359</b>	<b>191,719</b>	<b>227,407</b>	<b>349,164</b>	<b>375,818</b>	<b>379,711</b>	<b>559,610</b>
<b>Other Sectors</b>	<b>18,254</b>	<b>26,122</b>	<b>23,030</b>	<b>19,038</b>	<b>25,333</b>	<b>25,452</b>	<b>48,504</b>	<b>55,688</b>	<b>86,351</b>	<b>73,111</b>	<b>92,165</b>	<b>66,785</b>	<b>108,632</b>	<b>108,386</b>	<b>79,856</b>	<b>114,039</b>	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6,509	8,411	12,717
Extractive industries	15,570	23,863	19,415	15,722	22,842	23,289	36,765	39,319	61,340	43,157	60,325	36,686	61,802	51,450	39,991	62,503	39,848
Electricity, gas & water supply; Waste management <sup>3</sup>	..	..	..	..	..	..	..	..	..	..	..	..	23,771	32,114	20,774	25,057	20,121
Construction	..	..	..	2,001	1,360	398	576	..	1,139	392	1,592	10,158	..	..	12,582	18,069	21,230
<b>Grand Total</b>	<b>713,789</b>	<b>683,091</b>	<b>582,767</b>	<b>553,478</b>	<b>634,684</b>	<b>560,132</b>	<b>644,375</b>	<b>639,963</b>	<b>719,555</b>	<b>692,593</b>	<b>769,645</b>	<b>767,407</b>	<b>851,820</b>	<b>1,004,840</b>	<b>992,225</b>	<b>1,094,943</b>	<b>1,247,278</b>

Source: ONS and Scottish Government

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details
2. HM Treasury GDP deflators are used to convert the data to 2017 prices
3. From 2009 onwards. Waste management is included in Electricity, gas & water supply; waster management, when previously it was included in Other Manufacturing
4. r denotes revised figures
5. .. Denotes disclosive value
6. - denotes nil figures unavailable or too small to display
7. Totals may not sum due to rounding

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**Table 2A**  
**Expenditure on R&D performed within businesses in Scotland: Current Prices**  
**Detailed Product Groups, 2001 to 2017<sup>1</sup>**

£ thousands

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>f</sup>	2016 <sup>f</sup>	2017	2017 Total	
<b>Manufacturing</b>																			
Food products and beverages; Tobacco products	2,367	6,147	3,120	3,762	5,176	7,490	7,689	7,000	9,871	9,919	15,517	13,514	18,040	16,397	12,555	23,755	24,069	1.9%	
Textiles, clothing and leather products	1,461	1,357	1,754	5,661	946	1,217	2,246	1,257	1,085	1,925	2,086	3,883	3,313	6,050	5,268	2,590	4,954	0.4%	
Pulp, paper and paper products; Printing, Wood and straw products	..	775	1,855	2,075	1,520	1,157	3,023	2,646	1,363	1,767	887	1,979	2,718	2,344	2,362	3,118	4,025	0.3%	
Refined petroleum products and coke oven products	-	..	..	..	..	..	..	..	..	..	..	..	..	..	460	..	..	..	
Chemicals and chemical products	27,315	18,996	16,065	16,742	13,942	11,208	11,917	7,270	4,886	9,436	6,557	6,645	..	..	..	50,562	15,154	1.2%	
Pharmaceuticals	153,154	158,409	144,062	136,741	159,154	124,851	142,685	149,012	164,510	146,222	117,439	121,199	..	..	..	115,989	163,658	13.1%	
Rubber and plastic products	1,141	2,304	4,551	1,584	2,989	3,183	3,268	3,761	3,448	4,752	4,450	4,467	4,799	5,079	7,633	8,175	5,099	0.4%	
Other non-metallic mineral products	..	..	..	..	1,107	648	661	68	633	620	570	532	..	782	481	607	..	..	
Casting of iron and steel	..	594	..	..	..	..	..	..	..	..	..	..	145	336	..	..	..	..	
Non-ferrous metals	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	452	378	0.0%	
Fabricated metal products except machinery and equipment	5,381	8,619	5,372	3,976	3,740	3,522	5,505	3,857	7,956	5,265	11,602	4,831	13,528	7,111	7,169	6,061	14,102	1.1%	
Machinery and equipment	46,438	54,653	42,913	49,689	19,523	17,969	21,345	15,179	19,322	21,159	22,252	20,091	28,830	32,444	39,889	33,195	35,590	2.9%	
Computers and peripheral equipment	3,497	4,016	1,409	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Electrical equipment	20,142	15,682	6,662	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Consumer electronics and communication equipment	34,056	45,262	40,158	41,096	48,056	43,440	44,404	51,586	56,352	60,943	66,193	74,490	94,836	111,155	100,368	136,900	135,235	10.8%	
Precision instruments and optical products; photographic equipment	150,745	103,408	90,645	73,580	99,677	110,680	123,872	103,251	98,851	90,123	126,655	130,603	93,524	72,991	63,204	83,259	61,396	4.9%	
Motor vehicles and parts	2,474	2,222	4,498	1,998	3,828	2,944	6,258	2,302	1,990	3,332	..	4,182	..	1,931	3,406	18,054	9,978	0.8%	
Other transport equipment	..	..	..	1,270	904	..	..	..	..	..	..	..	..	..	..	..	..	..	
Shipbuilding	..	..	..	..	..	..	1,596	..	..	..	2,971	2,474	..	..	..	..	..	..	
Aerospace	..	..	..	..	..	..	..	..	11,524	..	..	3,131	3,078	3,234	6,605	6,219	9,497	0.8%	
Other manufactured goods	1,536	883	1,219	834	2,451	864	1,239	901	8,189	14,944	22,285	26,710	24,756	38,236	40,557	13,542	17,721	1.4%	
Sewerage, waste management, remediation activities <sup>2</sup>	-	..	..	..	..	34	108	35	..	..	..	..	..	..	..	..	..	..	
<b>Services</b>																			
Wholesale and retail trade	1,500	3,138	1,422	2,380	2,567	4,085	753	5,369	6,954	10,732	10,797	8,805	5,786	8,041	11,004	18,407	19,173	1.5%	
Transport and storage, incl. postal and courier activities	..	..	..	..	291	..	..	..	..	399	3,200	..	708	..	..	..	2,017	0.2%	
Telecommunications	..	..	..	..	10,454	..	..	..	4,586	1,513	2,566	..	1,706	1,497	10,626	..	3,386	0.3%	
Miscellaneous business activities; Technical testing and analysis	9,963	13,822	9,697	10,974	18,762	12,773	15,194	31,018	32,242	38,553	44,305	55,883	76,227	140,468	131,635	123,443	308,895	24.8%	
Computer programming and information services activities	16,283	18,281	21,301	25,587	27,574	24,911	25,143	30,190	33,981	32,350	46,187	71,749	67,658	74,665	86,573	..	40,761	51,294	4.1%
Software development <sup>7</sup>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	56,648	71,670	5.7%
Research and development services	15,324	18,672	17,543	9,899	9,411	5,189	6,284	24,396	30,414	45,108	54,968	36,602	44,565	46,503	57,264	62,560	54,715	4.4%	
Public administration	..	1,531	1,016	2,182	1,993	3,350	2,716	799	..	3,741	3,957	2,832	17,201	..	..	63,297	48,462	3.9%	
<b>Other Services</b>																			
Agriculture, hunting and forestry; Fishing	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6,249	8,254	12,717	1.0%	
Extractive Industries	11,270	17,701	14,701	12,225	18,227	19,136	30,958	34,007	53,805	38,560	54,607	33,878	58,118	49,005	38,395	61,339	39,848	3.2%	
Electricity, gas and water supply	..	-	-	..	..	..	..	..	..	..	..	..	..	29,894	19,224	24,304	17,412	1.4%	
Sewerage, waste management, remediation activities	..	..	..	..	..	..	..	..	..	435	..	..	..	695	721	286	2,708	0.2%	
Construction	..	..	..	1,556	1,085	327	485	..	999	350	1,441	9,380	..	..	12,080	17,732	21,230	1.7%	
<b>Grand Total</b>	<b>516,669</b>	<b>506,710</b>	<b>441,265</b>	<b>430,379</b>	<b>506,459</b>	<b>460,255</b>	<b>542,596</b>	<b>553,510</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>	<b>100.0%</b>	

Source: ONS and Scottish Government

Notes:

- There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
- From 2009 onwards. Waste management is included in Other Sectors, when previously it was included in Manufacturing.
- <sup>f</sup> denotes revised figures.
- .. denotes disclosive value.
- denotes nil. figures unavailable or too small to display.
- Totals may not sum due to rounding
- Prior to 2016 Software development was included in Computer programming and information services activities

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**Table 2B**  
**Expenditure on R&D performed within businesses in Scotland: In Real Terms (2017 prices)**  
**Detailed Product Groups, 2001 to 2017<sup>1</sup>**

	£ thousands																	% of 2017
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
<b>Manufacturing</b>																		
Food products and beverages; Tobacco products	3,270	8,287	4,120	4,838	6,486	9,115	9,131	8,093	11,253	11,102	17,142	14,634	19,184	17,215	13,077	24,206	24,069	1.9%
Textiles, clothing and leather products	2,018	1,829	2,316	7,280	1,186	1,481	2,667	1,453	1,237	2,154	2,304	4,205	3,523	6,352	5,487	2,639	4,954	0.4%
Pulp, paper and paper products; Printing, Wood and straw products	..	1,045	2,450	2,669	1,905	1,408	3,590	3,059	1,554	1,978	980	2,143	2,890	2,461	2,460	3,177	4,025	0.3%
Refined petroleum products and coke oven products	..	..	..	..	..	..	..	..	..	..	..	..	..	..	479	..	..	..
Chemicals and chemical products	37,736	25,608	21,217	21,531	17,472	13,640	14,152	8,405	5,570	10,561	7,244	7,196	..	..	..	51,522	15,154	1.2%
Pharmaceuticals	211,585	213,550	190,259	175,852	199,449	151,944	169,450	172,286	187,548	163,654	129,735	131,246	..	..	..	118,191	163,658	13.1%
Rubber and plastic products	1,576	3,106	6,010	2,037	3,746	3,874	3,881	4,348	3,931	5,319	4,916	4,837	5,103	5,332	7,950	8,330	5,099	0.4%
Other non-metallic mineral products	..	..	..	..	1,387	789	785	79	722	694	630	576	..	821	501	619	..	..
Castling of iron and steel	..	801	..	..	..	..	..	..	..	..	..	..	154	353	..	..	..	..
Non-ferrous metals	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	461	378	0.0%
Fabricated metal products except machinery and equipment	7,434	11,619	7,095	5,113	4,687	4,286	6,538	4,459	9,070	5,893	12,817	5,231	14,386	7,466	7,467	6,176	14,102	1.1%
Machinery and equipment	64,155	73,677	56,674	63,901	24,466	21,868	25,349	17,550	22,028	23,682	24,582	21,756	30,657	34,063	41,547	33,825	35,590	2.9%
Computers and peripheral equipment	4,831	5,414	1,861	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Electrical equipment	27,827	21,141	8,798	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Consumer electronics and communication equipment	47,049	61,017	53,036	52,850	60,223	52,867	52,733	59,643	64,244	68,209	73,124	80,665	100,848	116,702	104,540	139,499	135,235	10.8%
Precision instruments and optical products; photographic equipment	208,257	139,403	119,712	94,626	124,913	134,698	147,108	119,378	112,694	100,867	139,916	141,429	99,452	76,633	65,831	84,840	61,396	4.9%
Motor vehicles and parts	3,418	2,995	5,940	2,569	4,797	3,583	7,432	2,662	2,269	3,729	..	4,529	..	2,027	3,548	18,397	9,978	0.8%
Other transport equipment	..	..	..	1,633	1,133	..	..	..	..	..	..	..	..	..	..	..	..	..
Shipbuilding	..	..	..	..	..	..	1,895	..	..	..	3,282	2,679	..	..	..	..	..	..
Aerospace	..	..	..	..	..	..	..	..	13,138	..	..	3,391	3,273	3,395	6,880	6,337	9,497	0.8%
Other manufactured goods	2,122	1,190	1,610	1,073	3,072	1,051	1,471	1,042	9,336	16,726	24,618	28,924	26,325	40,144	42,243	13,799	17,721	1.4%
Sewerage, waste management, remediation activities <sup>2</sup>	..	..	..	..	..	41	128	40	..	..	..	..	..	..	..	..	..	0.0%
<b>Services</b>																		
Wholesale and retail trade	2,072	4,230	1,878	3,061	3,217	4,971	894	6,208	7,928	12,011	11,927	9,535	6,153	8,442	11,461	18,756	19,173	1.5%
Transport and storage, incl. postal and courier activities	..	..	..	..	365	..	..	..	..	447	3,535	..	753	..	..	..	2,017	0.2%
Telecommunications	..	..	..	..	13,101	..	..	..	5,228	1,693	2,835	..	1,814	1,572	11,068	..	3,386	0.3%
Miscellaneous business activities; Technical testing and analysis	13,764	18,633	12,807	14,113	23,512	15,545	18,044	35,863	36,757	43,149	48,944	60,515	81,059	147,478	137,107	125,786	308,895	24.8%
Computer programming and information services activities	22,495	24,644	28,132	32,906	34,555	30,317	29,859	34,905	38,740	36,207	51,023	77,697	71,947	78,391	90,172	41,535	51,294	4.1%
Software development <sup>1</sup>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	57,723	71,670	5.7%
Research and development services	21,170	25,172	23,169	12,730	11,794	6,315	7,463	28,206	34,673	50,486	60,723	39,636	47,390	48,824	59,644	63,748	54,715	4.4%
Public administration	..	2,064	1,342	2,806	2,498	4,077	3,225	924	..	4,187	4,371	3,067	18,291	..	..	64,499	48,462	3.9%
<b>Other Services</b>																		
Agriculture, hunting and forestry; Fishing	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6,509	8,411	12,717	1.0%
Extractive Industries	15,570	23,863	19,415	15,722	22,842	23,289	36,765	39,319	61,340	43,157	60,325	36,686	61,802	51,450	39,991	62,503	39,848	3.2%
Electricity, gas and water supply	..	..	..	..	..	..	..	..	..	..	..	..	..	31,386	20,023	24,765	17,412	1.4%
Sewerage, waste management, remediation activities	..	..	..	..	..	..	..	..	..	487	..	..	..	730	751	291	2,708	0.2%
Construction	..	..	..	2,001	1,360	398	576	..	1,139	392	1,592	10,158	18,651	..	12,582	18,069	21,230	1.7%
<b>Grand Total</b>	<b>713,789</b>	<b>683,091</b>	<b>582,767</b>	<b>553,478</b>	<b>634,684</b>	<b>560,132</b>	<b>644,375</b>	<b>639,963</b>	<b>719,555</b>	<b>692,593</b>	<b>769,645</b>	<b>767,407</b>	<b>851,820</b>	<b>1,004,840</b>	<b>992,225</b>	<b>1,094,943</b>	<b>1,247,278</b>	<b>100.0%</b>

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
2. From 2009 onwards. Waste management is included in Other Sectors, when previously it was included in Manufacturing.
3. r denotes revised figures.
4. .. denotes disclosive value.
5. - denotes nil. figures unavailable or too small to display.
6. Totals may not sum due to rounding
7. Prior to 2016 Software development was included in Computer programming and information services activities

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**Table 3**  
**Current and capital expenditure on R&D performed within businesses in Scotland:**  
**2001 to 2017<sup>1</sup>**

	<b>£ thousands</b>																
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015<sup>r</sup></b>	<b>2016<sup>r</sup></b>	<b>2017</b>
Capital total	54,202	34,621	20,569	31,116	40,739	33,175	31,589	34,052	50,185	45,121	42,670	38,372	42,110	91,677	64,792	92,133	155,749
of which:																	
Land and buildings	19,833	11,235	2,538	4,104	9,029	6,842	5,101	5,630	10,945	5,372	7,782	4,987	7,590	13,242	9,139	17,563	9,484
Plant and machinery	34,369	23,386	18,030	27,012	31,710	26,333	26,488	28,423	39,240	39,749	34,888	33,385	34,520	78,434	55,652	74,570	146,265
Current total	462,467	472,088	420,696	399,262	465,720	427,080	511,007	519,458	580,980	573,697	654,028	670,289	758,933	865,403	887,833	982,411	1,091,529
of which:																	
Salaries and wages	217,373	229,791	219,788	224,042	259,707	220,549	268,298	273,265	292,642	321,573	335,641	365,657	416,374	510,606	532,605	550,284	571,520
Other	245,094	242,298	200,908	175,221	206,013	206,531	242,708	246,193	288,338	252,124	318,387	304,633	342,558	354,797	355,228	432,128	520,009
<b>Total</b>	<b>516,669</b>	<b>506,710</b>	<b>441,265</b>	<b>430,379</b>	<b>506,459</b>	<b>460,255</b>	<b>542,596</b>	<b>553,510</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
2. r denotes revised figures.
3. Totals may not sum due to rounding.

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**Table 4 (2015)**  
**Current and capital expenditure on R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2015<sup>r,2</sup>**

£ thousands					
	Capital Expenditure	Current Expenditure			Total
		Salaries and Wages	Other	Total	
<b>Manufacturing</b>	<b>30,253</b>	<b>268,109</b>	<b>216,776</b>	<b>484,885</b>	<b>515,138</b>
Chemicals	4,869	89,977	72,595	162,572	167,441
Mechanical engineering	3,060	24,802	19,196	43,998	47,058
Electrical machinery	15,411	78,626	61,114	139,740	155,152
Transport equipment & aerospace	653	5,204	5,833	11,037	11,689
Other manufacturing	6,259	69,499	58,039	127,539	133,798
<b>Services</b>	<b>30,124</b>	<b>223,773</b>	<b>106,923</b>	<b>330,695</b>	<b>360,819</b>
<b>Other Sectors</b>	<b>4,415</b>	<b>40,724</b>	<b>31,529</b>	<b>72,253</b>	<b>76,669</b>
Agriculture, hunting & forestry; Fishing	531	..	..	5,717	6,249
Extractive industries	2,551	24,834	11,009	35,844	38,395
Electricity, gas & waste supply; waste management <sup>3</sup>	1,314	10,147	8,485	18,631	19,945
Construction	19	..	..	12,061	12,080
<b>Grand Total</b>	<b>64,792</b>	<b>532,605</b>	<b>355,228</b>	<b>887,833</b>	<b>952,625</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures.
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.
6. Totals may not sum due to rounding.

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**Table 4 (2016)**  
**Current and capital expenditure on R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2016<sup>r,2</sup>**

£ thousands					
	Capital Expenditure	Current Expenditure			Total
		Salaries and Wages	Other	Total	
<b>Manufacturing</b>	<b>50,146</b>	<b>258,695</b>	<b>281,152</b>	<b>539,847</b>	<b>589,993</b>
Chemicals	8,239	68,976	89,336	158,312	166,551
Mechanical engineering	2,782	19,391	17,082	36,474	39,256
Electrical machinery	31,662	99,756	89,263	189,019	220,681
Transport equipment & aerospace	1,580	11,340	13,208	24,548	26,127
Other manufacturing	5,883	59,232	72,263	131,495	137,378
<b>Services</b>	<b>30,686</b>	<b>237,665</b>	<b>104,286</b>	<b>341,951</b>	<b>372,637</b>
<b>Other Sectors</b>	<b>11,301</b>	<b>53,923</b>	<b>46,690</b>	<b>100,613</b>	<b>111,914</b>
Agriculture, hunting & forestry; Fishing	736	2,625	4,892	7,518	8,254
Extractive industries	3,208	37,004	21,127	58,131	61,339
Electricity, gas & waste supply; waste management <sup>3</sup>	6,535	8,759	9,296	18,055	24,590
Construction	822	5,535	11,375	16,909	17,732
<b>Grand Total</b>	<b>92,133</b>	<b>550,284</b>	<b>432,128</b>	<b>982,411</b>	<b>1,074,544</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures.
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.
6. Totals may not sum due to rounding.

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**Table 4 (2017)**  
**Current and capital expenditure on R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2017<sup>1</sup>**

	£ thousands				
	Capital Expenditure	Current Expenditure			Total
		Salaries and Wages	Other	Total	
<b>Manufacturing</b>	<b>36,412</b>	<b>261,163</b>	<b>296,177</b>	<b>557,340</b>	<b>593,752</b>
Chemicals	2,265	66,401	110,146	176,547	178,812
Mechanical engineering	2,501	26,448	20,743	47,191	49,692
Electrical machinery	24,386	101,516	88,992	190,508	214,894
Transport equipment & aerospace	1,250	11,652	14,965	26,617	27,867
Other manufacturing	6,010	55,146	61,331	116,477	122,487
<b>Services</b>	<b>111,907</b>	<b>266,734</b>	<b>180,969</b>	<b>447,704</b>	<b>559,610</b>
<b>Other Sectors</b>	<b>7,430</b>	<b>43,622</b>	<b>42,863</b>	<b>86,486</b>	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	1,160	3,551	8,007	11,557	12,717
Extractive industries	193	18,574	21,081	39,655	39,848
Electricity, gas & waste supply; waste management <sup>3</sup>	5,035	10,572	4,514	15,086	20,121
Construction	1,043	10,926	9,262	20,187	21,230
<b>Grand Total</b>	<b>155,749</b>	<b>571,520</b>	<b>520,009</b>	<b>1,091,529</b>	<b>1,247,278</b>

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

4. .. denotes disclosive value.

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

6. Totals may not sum due to rounding.

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**Table 5 (2015)**  
**Current expenditure on R&D performed within business in Scotland:**  
**Broad Product Groups, 2015<sup>r,2</sup>**

	Current Expenditure			Total
	Basic Research	Applied Research	Experimental Development	
<b>Manufacturing</b>	<b>9,632</b>	<b>163,450</b>	<b>311,803</b>	<b>484,885</b>
Chemicals	983	37,639	123,951	162,572
Mechanical engineering	2,158	23,669	18,170	43,998
Electrical machinery	1,049	41,237	97,455	139,740
Transport equipment & aerospace	526	3,925	6,585	11,037
Other manufacturing	4,917	56,980	65,642	127,539
<b>Services</b>	<b>50,075</b>	<b>163,261</b>	<b>117,359</b>	<b>330,695</b>
<b>Other Sectors</b>	<b>10,450</b>	<b>44,483</b>	<b>17,320</b>	<b>72,253</b>
Agriculture, hunting & forestry; Fishing	1	4,010	1,707	5,717
Extractive industries	4,843	27,485	3,516	35,844
Electricity, gas & water supply; waste management <sup>3</sup>	1,546	8,651	8,434	18,631
Construction	4,060	4,337	3,664	12,061
<b>Grand Total</b>	<b>70,157</b>	<b>371,195</b>	<b>446,481</b>	<b>887,833</b>

£ thousands

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.
6. Totals may not sum to rounding.

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**Table 5 (2016)**  
**Current expenditure on R&D performed within business in Scotland:**  
**Broad Product Groups, 2016<sup>r,2</sup>**

	£ thousands			
	Current Expenditure			Total
	Basic Research	Applied Research	Experimental Development	
<b>Manufacturing</b>	<b>13,937</b>	<b>266,288</b>	<b>259,622</b>	<b>539,847</b>
Chemicals	2,528	57,964	97,820	158,312
Mechanical engineering	2,344	17,955	16,175	36,474
Electrical machinery	828	108,822	79,369	189,019
Transport equipment & aerospace	959	16,960	6,628	24,548
Other manufacturing	7,278	64,587	59,630	131,495
<b>Services</b>	<b>57,671</b>	<b>160,968</b>	<b>123,313</b>	<b>341,951</b>
<b>Other Sectors</b>	<b>5,598</b>	<b>55,927</b>	<b>39,088</b>	<b>100,613</b>
Agriculture, hunting & forestry; Fishing	..	..	5,253	7,518
Extractive industries	3,547	45,831	8,753	58,131
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	16,346	18,055
Construction	1,274	6,899	8,736	16,909
<b>Grand Total</b>	<b>77,205</b>	<b>483,183</b>	<b>422,023</b>	<b>982,411</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.
6. Totals may not sum to rounding.

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**Table 5 (2017)**  
**Current expenditure on R&D performed within business in Scotland:**  
**Broad Product Groups, 2017<sup>1</sup>**

	<b>£ thousands</b>			<b>Total</b>
	<b>Basic Research</b>	<b>Applied Research</b>	<b>Experimental Development</b>	
<b>Manufacturing</b>	<b>12,472</b>	<b>254,142</b>	<b>290,725</b>	<b>557,340</b>
Chemicals	..	45,393	..	176,547
Mechanical engineering	2,036	25,020	20,135	47,191
Electrical machinery	333	117,598	72,577	190,508
Transport equipment & aerospace	..	10,025	..	26,617
Other manufacturing	8,369	56,106	52,001	116,477
<b>Services</b>	<b>72,108</b>	<b>179,368</b>	<b>196,227</b>	<b>447,704</b>
<b>Other Sectors</b>	<b>4,305</b>	<b>40,445</b>	<b>41,736</b>	<b>86,486</b>
Agriculture, hunting & forestry; Fishing	..	3,489	..	11,557
Extractive industries	3,823	22,414	13,418	39,655
Electricity, gas & water supply; waste management <sup>2</sup>	188	2,086	12,811	15,086
Construction	..	12,455	..	20,187
<b>Grand Total</b>	<b>88,886</b>	<b>473,956</b>	<b>528,688</b>	<b>1,091,529</b>

*Source: ONS and Scottish Government*

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007 see Note 16 of the background notes for details.
2. From 2009 onwards. Waste management is included in Electricity, gas and water supply; waste management, when previously it was included in Other manufacturing.
3. .. Denotes disclosive value.
4. - denotes nil. Figures unavailable or too small to display.

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**Table 6 (2015)**  
**Extramural expenditure on R&D by businesses performing R&D in Scotland:**  
**Broad Product Groups, 2015<sup>r,2</sup>**

	£ thousands		
	United Kingdom	Overseas	Total
<b>Manufacturing</b>	<b>6,813</b>	<b>46,015</b>	<b>52,829</b>
Chemicals	..	..	3,486
Mechanical engineering	1,476	2,719	4,196
Electrical machinery	3,193	38,535	41,728
Transport equipment & aerospace	..	..	608
Other manufacturing	1,254	1,557	2,811
<b>Services</b>	<b>10,895</b>	<b>8,068</b>	<b>18,962</b>
<b>Other Sectors</b>	<b>3,503</b>	<b>4,257</b>	<b>7,760</b>
Agriculture, hunting & forestry; Fishing	2,148	1,291	3,439
Extractive industries	..	..	..
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	..
Construction	725	3	729
<b>Grand Total</b>	<b>21,211</b>	<b>58,340</b>	<b>79,551</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.
6. Totals may not sum to rounding.

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**Table 6 (2016)**  
**Extramural expenditure on R&D by businesses performing R&D in Scotland:**  
**Broad Product Groups, 2016<sup>r,2</sup>**

	£ thousands		
	United Kingdom	Overseas	Total
<b>Manufacturing</b>	<b>17,383</b>	<b>144,639</b>	<b>162,022</b>
Chemicals	808	2,600	3,408
Mechanical engineering	4,682	4,837	9,519
Electrical machinery	216	133,446	133,662
Transport equipment & aerospace	381	424	805
Other manufacturing	11,296	3,332	14,628
<b>Services</b>	<b>11,009</b>	<b>24,118</b>	<b>35,127</b>
<b>Other Sectors</b>	<b>5,848</b>	<b>3,670</b>	<b>9,519</b>
Agriculture, hunting & forestry; Fishing	1,952	1,261	3,213
Extractive industries	3,229	1,471	4,701
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	..
Construction	..	..	..
<b>Grand Total</b>	<b>34,240</b>	<b>172,427</b>	<b>206,667</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.
6. Totals may not sum to rounding.

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**Table 6 (2017)**  
**Extramural expenditure on R&D by businesses performing R&D in Scotland:**  
**Broad Product Groups, 2017<sup>1</sup>**

	£ thousands		
	United Kingdom	Overseas	Total
<b>Manufacturing</b>	<b>18,251</b>	<b>188,171</b>	<b>206,422</b>
Chemicals	676	2,361	3,037
Mechanical engineering	..	..	..
Electrical machinery	..	..	..
Transport equipment & aerospace	710	971	1,681
Other manufacturing	1,552	3,287	4,838
<b>Services</b>	<b>4,508</b>	<b>20,974</b>	<b>25,483</b>
<b>Other Sectors</b>	<b>4,081</b>	<b>4,712</b>	<b>8,793</b>
Agriculture, hunting & forestry; Fishing	2,530	1,726	4,256
Extractive industries	1,513	2,827	4,340
Electricity, gas & water supply; waste management <sup>2</sup>	..	..	..
Construction	..	..	..
<b>Grand Total</b>	<b>26,840</b>	<b>213,857</b>	<b>240,698</b>

*Source: ONS and Scottish Government*

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
3. .. denotes disclosive value.
4. - denotes nil, figures unavailable or too small to display.
5. Totals may not sum to rounding.

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**Table 7**  
**Sources of funds for R&D performed within businesses in Scotland:**  
**2001 to 2017**

	£ thousands																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015r	2016r	2017
<b>Government</b>	43,406	18,313	17,531	25,197	33,184	32,237	54,705	42,590	56,313	56,681	56,205	68,981	70,040	73,699	61,163	70,103	81,540
<b>Overseas total</b>	87,683	55,399	51,007	92,876	112,310	107,117	137,725	117,880	193,502	183,991	152,968	122,048	149,240	199,482	129,001	148,868	104,037
of which:																	
European Commission grants	2,864	4,326	2,148	422	504	526	605	1,206	1,217	2,493	2,865	2,179	2,165	1,396	1,983	3,118	1,311
Other Overseas	84,819	51,073	48,859	92,454	111,806	106,592	137,120	116,674	192,286	181,498	150,103	119,869	147,074	198,086	127,018	145,750	102,726
<b>Other UK Business</b>	92,907	99,447	93,765	91,068	111,669	70,575	67,574	49,902	15,635	19,320	11,173	6,753	15,023	16,294	16,296	19,172	20,732
<b>Own funds</b>	292,454	333,461	278,889	221,169	249,254	250,291	282,431	342,994	365,632	358,759	473,561	507,053	562,444	663,192	737,032	828,882	1,004,793
<b>Other<sup>4</sup></b>	219	90	71	69	43	34	162	143	83	67	2,791	3,826	4,297	4,413	9,133	7,519	36,176
<b>Grand Total</b>	<b>516,669</b>	<b>506,710</b>	<b>441,265</b>	<b>430,379</b>	<b>506,459</b>	<b>460,255</b>	<b>542,596</b>	<b>553,510</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>

	Percentages																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015r	2016r	2017
<b>Government</b>	8	4	4	6	7	7	10	8	9	9	8	10	9	8	6	7	7
<b>Overseas total</b>	17	11	12	22	22	23	25	21	31	30	22	17	19	21	14	14	8
of which:																	
European Commission grants	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Overseas	16	10	11	21	22	23	25	21	30	29	22	17	18	21	13	14	8
<b>Other UK Business</b>	18	20	21	21	22	15	12	9	2	3	2	1	2	2	2	2	2
<b>Own funds</b>	57	66	63	51	49	54	52	62	58	58	68	72	70	69	77	77	81
<b>Other<sup>4</sup></b>	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. .. denotes disclosive value
3. Totals may not sum due to rounding
4. 'Other' includes funds from other UK businesses, UK Private Non-Profit organisations and Higher Education establishments, and from 2011, international organisations.

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**Table 8 (2015)**  
**Sources of funds for R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2015<sup>r,2</sup>**

Scotland	£ thousands				Total
	Government	Overseas	Own Funds	Other UK Business <sup>6</sup>	
<b>Manufacturing</b>	<b>31,361</b>	<b>73,587</b>	<b>401,354</b>	<b>8,836</b>	<b>515,138</b>
Chemicals	..	16,374	150,615	..	167,441
Mechanical engineering	2,409	7,996	35,068	1,586	47,058
Electrical machinery	..	38,072	101,893	..	155,152
Transport equipment & Aerospace	2,471	2,433	6,172	613	11,689
Other manufacturing	16,897	8,711	107,606	584	133,798
<b>Services</b>	<b>29,184</b>	<b>45,606</b>	<b>271,026</b>	<b>15,003</b>	<b>360,819</b>
<b>Other Sectors</b>	<b>618</b>	<b>9,809</b>	<b>64,652</b>	<b>1,590</b>	<b>76,669</b>
Agriculture, hunting & forestry; Fishing	117	866	4,969	297	6,249
Extractive industries	353	7,428	30,602	12	38,395
Electricity, gas & water; waste management <sup>3</sup>	81	1,432	17,499	934	19,945
Construction	68	82	11,582	347	12,080
<b>Grand Total</b>	<b>61,163</b>	<b>129,001</b>	<b>737,032</b>	<b>25,429</b>	<b>952,625</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display
6. Figures for other UK Business includes funds from other sources and Higher Education Establishments and, from 2011, international organisations.
7. Totals may not sum due to rounding.

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**Table 8 (2016)**  
**Sources of funds for R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2016<sup>r,2</sup>**

Scotland					£ thousands
	Government	Overseas	Own Funds	Other UK Business <sup>6</sup>	Total
<b>Manufacturing</b>	<b>36,084</b>	<b>82,786</b>	<b>460,515</b>	<b>10,607</b>	<b>589,993</b>
Chemicals	..	18,585	146,845	..	166,551
Mechanical engineering	2,372	7,385	28,671	829	39,256
Electrical machinery	..	46,240	156,212	..	220,681
Transport equipment & Aerospace	1,875	1,409	22,498	345	26,127
Other manufacturing	16,866	9,167	106,290	5,054	137,378
<b>Services</b>	<b>24,527</b>	<b>38,708</b>	<b>295,314</b>	<b>14,089</b>	<b>372,637</b>
<b>Other Sectors</b>	<b>9,491</b>	<b>27,375</b>	<b>73,053</b>	<b>1,995</b>	<b>111,914</b>
Agriculture, hunting & forestry; Fishing	..	..	7,136	7	8,254
Extractive industries	21	19,114	42,201	2	61,339
Electricity, gas & water; waste management <sup>3</sup>	..	..	6,942	1,508	24,590
Construction	459	20	16,774	479	17,732
<b>Grand Total</b>	<b>70,103</b>	<b>148,868</b>	<b>828,882</b>	<b>26,691</b>	<b>1,074,544</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display
6. Figures for other UK Business includes funds from other sources and Higher Education Establishments and, from 2011, international organisations.
7. Totals may not sum due to rounding.

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**Table 8 (2017)**  
**Sources of funds for R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2017<sup>1</sup>**

£ thousands					
Scotland	Government	Overseas	Own Funds	Other UK Business <sup>5</sup>	Total
<b>Manufacturing</b>	<b>44,846</b>	<b>57,197</b>	<b>450,303</b>	<b>41,406</b>	<b>593,752</b>
Chemicals	123	13,266	165,197	226	178,812
Mechanical engineering	2,151	12,295	34,429	817	49,692
Electrical machinery	14,554	23,857	141,773	34,710	214,894
Transport equipment & Aerospace	8,904	1,768	16,239	955	27,867
Other manufacturing	19,113	6,010	92,665	4,698	122,487
<b>Services</b>	<b>35,988</b>	<b>33,657</b>	<b>478,052</b>	<b>11,914</b>	<b>559,610</b>
<b>Other Sectors</b>	<b>706</b>	<b>13,183</b>	<b>76,438</b>	<b>3,588</b>	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	100	7	10,924	1,687	12,717
Extractive industries	94	..	33,170	..	39,848
Electricity, gas & water; waste management <sup>2</sup>	63	..	12,504	..	20,121
Construction	450	35	19,841	905	21,230
<b>Grand Total</b>	<b>81,540</b>	<b>104,037</b>	<b>1,004,793</b>	<b>56,908</b>	<b>1,247,278</b>

*Source: ONS and Scottish Government*

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
3. .. denotes disclosive value.
4. - denotes nil, figures unavailable or too small to display
5. Figures for other UK Business includes funds from other sources and Higher Education Establishments and, from 2011, international organisations.
6. Totals may not sum due to rounding.

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Table 9A  
Expenditure (£ thousands) on R&D performed within businesses in Scotland:  
Local Authority Area Level, 2001 to 2017

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014 <sup>f</sup>	2015 <sup>f</sup>	2016	2017	% of 2017 total	2017 per head of population (£)
Aberdeen City	22,992	29,977	27,918	26,186	36,724	37,507	52,983	54,024	44,094	35,462	71,174	66,222	106,741	158,449	158,121	164,716	123,886	9.9%	541
Aberdeenshire	4,660	6,263	4,687	4,435	7,329	5,818	6,671	9,957	34,752	29,071	33,964	19,605	16,696	22,270	19,716	24,164	36,623	2.9%	140
Angus	802	..	1,538	2,145	1,960	1,474	2,524	1,240	1,889	3,197	2,155	2,306	2,359	2,977	3,092	3,604	6,451	0.5%	55
Argyll & Bute	1,231	1,001	874	..	561	477	525	1,556	1,552	2,423	2,948	..	..	..	1,482	..	1,828	0.1%	21
Clackmannanshire	..	..	..	..	716	658	931	191	..	771	2,941	..	520	2,174	1,964	2,464	2,338	0.2%	45
Dumfries & Galloway	990	1,791	3,387	1,706	2,264	2,980	3,107	1,972	1,875	2,791	4,534	4,860	4,953	4,964	4,907	5,790	6,696	0.5%	45
Dumfries City	46,474	55,485	40,048	48,807	42,208	42,197	43,414	45,143	43,708	33,585	35,046	34,894	35,161	35,020	40,913	61,070	38,667	3.1%	260
East Ayrshire	1,553	1,346	984	1,602	1,981	2,029	1,525	1,648	1,284	1,017	1,194	1,084	1,285	1,792	..	3,529	3,148	0.3%	26
East Dunbartonshire	749	1,150	1,202	774	772	1,010	..	363	..	..	1,119	1,392	1,151	1,213	1,866	2,207	1,891	0.2%	17
East Lothian	..	..	..	..	3,995	5,527	..	1,110	1,882	1,494	..	..	1,954	3,066	5,150	4,307	5,954	0.5%	57
East Renfrewshire	..	..	..	..	1,436	..	905	..	..	1,876	2,486	2,677	2,954	2,904	2,815	3,180	3,589	0.3%	38
City of Edinburgh	197,708	139,145	130,294	101,188	103,266	106,455	147,550	116,081	136,204	146,087	150,655	178,446	195,021	276,319	254,089	279,866	397,354	31.9%	774
Na h-Eileanan Siar	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Falkirk	..	12,759	12,574	9,763	7,042	3,843	10,380	6,700	3,587	5,663	5,423	8,356	6,643	8,421	4,453	12,150	10,405	0.8%	65
Fife	11,361	13,874	9,631	19,998	23,741	18,029	20,074	22,048	19,716	26,605	27,993	31,170	27,208	23,233	24,284	30,033	29,397	2.4%	79
Glasgow City	12,918	19,322	17,167	25,279	25,770	23,724	23,924	31,357	43,897	40,797	66,272	59,829	82,834	77,230	89,387	115,452	201,517	16.2%	324
Highland	..	11,849	..	..	..	..	23,319	29,995	..	29,192	44,023	36,470	32,054	28,178	27,125	30,359	22,677	1.8%	96
Inverclyde	..	..	..	..	..	..	..	7,190	..	..	7,831	5,232	4,608	4,408	4,039	3,297	3,363	0.3%	43
Midlothian	6,787	23,497	21,292	3,587	2,386	1,775	11,295	19,831	16,609	17,076	13,048	12,554	19,208	29,996	25,204	23,688	17,964	1.4%	199
Moray	188	668	507	665	950	664	884	943	1,125	3,385	3,751	3,464	3,693	2,239	1,879	1,639	3,021	0.2%	32
North Ayrshire	2,466	696	770	1,803	856	934	2,556	1,805	2,988	2,339	2,771	3,756	3,016	3,123	4,346	4,952	5,140	0.4%	38
North Lanarkshire	43,465	54,954	49,382	46,656	65,526	64,103	73,209	80,281	108,208	93,304	48,898	58,115	53,080	62,465	63,883	77,034	63,870	5.1%	188
Orkney Islands	..	..	..	..	..	..	..	1,190	..	1,712	1,078	2,001	..	..	..	..	..	..	
Perth & Kinross	586	779	524	668	990	956	1,297	720	1,331	1,993	4,318	4,833	2,110	10,689	8,110	8,491	6,576	0.5%	44
Renfrewshire	11,176	12,435	9,562	10,123	14,129	11,819	21,919	23,398	27,387	32,533	33,570	23,178	26,699	29,122	19,635	26,695	28,311	2.3%	160
Scottish Borders	1,474	1,222	1,317	4,458	1,436	1,913	12,148	4,783	4,564	7,052	5,835	7,571	6,927	5,977	7,160	7,282	7,383	0.6%	64
Shetland Islands	..	..	..	..	..	..	..	..	..	249	342	199	..	..	..	..	..	..	
South Ayrshire	..	1,151	..	627	1,130	734	1,977	2,575	9,723	5,046	5,439	7,527	6,732	5,942	5,648	8,677	9,434	0.8%	84
South Lanarkshire	25,613	39,874	33,282	28,050	41,889	36,214	27,612	25,741	22,940	16,056	19,473	20,115	17,436	19,868	18,708	29,643	21,971	1.8%	69
Stirling	1,160	2,267	1,974	1,791	2,442	1,769	3,653	4,897	6,011	10,618	6,920	8,316	4,560	5,272	4,876	7,149	8,768	0.7%	93
West Dunbartonshire	..	4,423	..	2,460	3,192	2,530	2,196	2,453	3,041	..	5,137	3,752	8,193	5,571	10,451	2,984	15,960	1.3%	178
West Lothian	59,722	54,622	..	56,807	..	44,625	40,659	51,995	50,192	52,171	83,242	95,570	124,552	121,005	135,611	110,260	159,942	12.8%	882
<b>Grand Total</b>	<b>516,669</b>	<b>506,710</b>	<b>441,265</b>	<b>430,379</b>	<b>506,459</b>	<b>460,255</b>	<b>542,596</b>	<b>553,510</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>	<b>100.0%</b>	<b>230</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. .. Denotes disclosive value
3. - denotes nil, figures unavailable or too small to display

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**Table 9B**  
**Employment on R&D performed within businesses in Scotland:**  
**Local Authority Area Level, 2001 to 2017**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	% of 2017 total
<b>Aberdeen City</b>	377	436	406	429	475	583	510	479	451	418	730	839	951	1,746	1,593	1,704	1,395	10.6%
<b>Aberdeenshire</b>	108	168	121	158	225	174	134	151	187	306	348	333	251	301	308	383	519	3.9%
<b>Angus</b>	25	..	31	42	47	37	45	28	35	52	59	42	48	61	58	78	100	0.8%
<b>Argyll &amp; Bute</b>	25	22	23	..	11	9	10	33	26	35	53	..	..	..	34	107	42	0.3%
<b>Clackmannanshire</b>	..	..	..	..	17	17	12	4	..	11	22	..	14	33	43	39	31	0.2%
<b>Dumfries &amp; Galloway</b>	24	47	74	37	48	66	55	47	38	60	79	90	86	98	91	118	136	1.0%
<b>Dundee City</b>	602	663	586	666	604	575	562	550	486	492	417	359	441	475	606	783	569	4.3%
<b>East Ayrshire</b>	37	38	30	42	44	41	33	31	25	21	22	21	22	39	..	87	81	0.6%
<b>East Dunbartonshire</b>	17	29	26	19	18	19	..	7	..	..	24	28	28	28	35	37	45	0.3%
<b>East Lothian</b>	280	138	..	78	60	72	..	24	163	93	..	..	38	68	87	71	98	0.7%
<b>East Renfrewshire</b>	..	..	..	..	23	35	..	..	..	29	56	42	51	53	65	59	67	0.5%
<b>City of Edinburgh</b>	2,308	1,627	1,423	1,501	1,251	1,196	1,881	1,529	1,652	1,816	1,560	1,663	1,872	2,644	2,930	2,967	3,378	25.6%
<b>Na h-Eileanan Siar</b>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>Falkirk</b>	306	251	273	182	124	75	128	97	70	97	91	153	135	188	101	145	152	1.2%
<b>Fife</b>	259	306	254	285	297	185	214	303	246	286	303	346	339	345	384	376	524	4.0%
<b>Glasgow City</b>	227	310	287	441	441	427	371	472	626	643	833	759	1,210	1,048	1,333	1,405	1,533	11.6%
<b>Highland</b>	103	139	166	128	143	210	179	234	146	149	187	204	219	221	250	260	270	2.0%
<b>Inverclyde</b>	..	..	..	..	..	..	59	61	73	63	58	49	47	51	54	54	42	0.3%
<b>Midlothian</b>	124	297	256	81	59	33	144	249	175	222	223	200	241	187	246	265	285	2.2%
<b>Moray</b>	6	20	17	19	16	18	24	29	31	60	76	61	70	43	46	40	81	0.6%
<b>North Ayrshire</b>	40	16	17	36	18	24	50	50	58	60	62	85	85	72	101	98	138	1.0%
<b>North Lanarkshire</b>	634	914	670	539	708	666	790	812	896	818	704	747	717	768	800	872	824	6.3%
<b>Orkney Islands</b>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>Perth &amp; Kinross</b>	14	21	14	18	22	25	24	17	26	33	46	48	47	103	101	102	116	0.9%
<b>Renfrewshire</b>	203	213	200	194	251	230	462	336	347	269	316	360	372	349	326	343	359	2.7%
<b>Scottish Borders</b>	38	30	32	73	38	45	66	92	84	116	108	133	133	134	118	114	152	1.2%
<b>Shetland Islands</b>	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>South Ayrshire</b>	..	31	..	18	23	16	44	44	78	131	98	126	100	97	82	139	140	1.1%
<b>South Lanarkshire</b>	393	472	515	359	434	389	290	269	269	237	363	316	324	330	318	369	408	3.1%
<b>Stirling</b>	23	51	41	43	45	30	59	72	62	155	77	86	67	96	103	125	138	1.0%
<b>West Dunbartonshire</b>	..	64	58	54	53	36	26	37	45	37	41	105	71	72	86	44	125	0.9%
<b>West Lothian</b>	900	841	758	844	967	1,009	683	604	637	713	773	1,012	1,627	1,194	1,496	1,328	1,361	10.3%
<b>Grand Total</b>	<b>7,210</b>	<b>7,269</b>	<b>6,452</b>	<b>6,412</b>	<b>6,537</b>	<b>6,309</b>	<b>6,926</b>	<b>6,703</b>	<b>7,024</b>	<b>7,472</b>	<b>7,810</b>	<b>8,342</b>	<b>9,662</b>	<b>10,914</b>	<b>11,864</b>	<b>12,547</b>	<b>13,178</b>	<b>100.0%</b>

Source: ONS and Scottish Government

Notes:  
1. r denotes revised figures  
2. .. Denotes disclosive value

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**Table 10 (2015)**  
**Expenditure on R&D performed within businesses in Scotland:**  
**Local Authority Area by Main Sectors, 2015<sup>r</sup>**

	£ thousands			
	Manufacturing	Services	Other Sectors <sup>2</sup>	Total
Aberdeen City	46,775	74,783	36,564	158,121
Aberdeenshire	6,394	12,994	328	19,716
Angus	2,322	..	..	3,092
Argyll & Bute	..	827	..	1,482
Clackmannanshire	..	..	..	1,964
Dumfries & Galloway	3,594	..	..	4,907
Dundee City	29,724	..	..	40,913
East Ayrshire	..	..	..	..
East Dunbartonshire	1,130	..	..	1,866
East Lothian	979	4,171	-	5,150
East Renfrewshire	..	..	..	2,815
City of Edinburgh	134,459	114,309	5,321	254,089
Na h-Eileanan Siar	..	137	..	..
Falkirk	2,295	..	..	4,453
Fife	12,048	9,704	2,532	24,284
Glasgow City	24,155	57,524	7,708	89,387
Highland	..	4,371	..	27,125
Inverclyde	3,691	..	..	4,039
Midlothian	..	11,519	..	25,204
Moray	1,384	..	..	1,879
North Ayrshire	2,240	..	..	4,346
North Lanarkshire	47,089	..	..	63,883
Orkney Islands	..	..	..	..
Perth & Kinross	..	1,417	..	8,110
Renfrewshire	11,551	..	..	19,635
Scottish Borders	4,097	..	..	7,160
Shetland Islands	..	..	..	..
South Ayrshire	3,724	..	..	5,648
South Lanarkshire	13,546	..	..	18,708
Stirling	..	2,818	..	4,876
West Dunbartonshire	1,254	..	..	10,451
West Lothian	..	16,656	..	135,611
<b>Grand Total</b>	<b>515,138</b>	<b>360,819</b>	<b>76,669</b>	<b>952,625</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. From 2009 onwards. Waste management is included in Other Sectors, when previously it was included in Manufacturing.
3. .. Denotes disclosive value
4. - denotes nil. figures unavailable or too small to display.
5. Totals may not sum due to rounding.

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**Table 10 (2016)**  
**Expenditure on R&D performed within businesses in Scotland:**  
**Local Authority Area by Main Sectors, 2016<sup>r</sup>**

	£ thousands			
	Manufacturing	Services	Other Sectors <sup>2</sup>	Total
Aberdeen City	21,598	79,273	63,844	164,716
Aberdeenshire	10,100	10,254	3,811	24,164
Angus	2,737	..	..	3,604
Argyll & Bute	..	..	..	..
Clackmannanshire	..	..	..	2,464
Dumfries & Galloway	3,599	2,003	188	5,790
Dundee City	55,549	..	..	61,070
East Ayrshire	2,586	..	..	3,529
East Dunbartonshire	1,487	..	..	2,207
East Lothian	916	3,391	-	4,307
East Renfrewshire	..	..	..	3,180
City of Edinburgh	176,086	97,986	5,794	279,866
Na h-Eileanan Siar	..	..	..	..
Falkirk	10,475	..	..	12,150
Fife	17,782	..	..	30,033
Glasgow City	30,753	82,425	2,273	115,452
Highland	24,038	5,959	..	30,359
Inverclyde	..	..	..	3,297
Midlothian	..	9,765	..	23,688
Moray	1,343	..	..	1,639
North Ayrshire	2,440	..	..	4,952
North Lanarkshire	61,433	..	..	77,034
Orkney Islands	..	..	..	..
Perth & Kinross	..	1,852	..	8,491
Renfrewshire	14,990	..	..	26,695
Scottish Borders	4,958	..	..	7,282
Shetland Islands	..	..	..	..
South Ayrshire	6,373	..	..	8,677
South Lanarkshire	13,711	..	..	29,643
Stirling	2,356	3,691	1,102	7,149
West Dunbartonshire	1,678	..	..	2,984
West Lothian	84,402	25,269	589	110,260
<b>Grand Total</b>	<b>589,993</b>	<b>372,637</b>	<b>111,914</b>	<b>1,074,544</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. From 2009 onwards. Waste management is included in Other Sectors, when previously it was included in Manufacturing.
3. .. Denotes disclosive value
4. - denotes nil. figures unavailable or too small to display.
5. Totals may not sum due to rounding.

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**Table 10 (2017)**  
**Expenditure on R&D performed within businesses in Scotland:**  
**Local Authority Area by Main Sectors, 2017**

	£ thousands			
	Manufacturing	Services	Other Sectors <sup>2</sup>	Total
Aberdeen City	23,599	55,752	44,535	123,886
Aberdeenshire	11,969	14,901	9,752	36,623
Angus	3,381	..	..	6,451
Argyll & Bute	..	802	..	1,828
Clackmannanshire	..	273	..	2,338
Dumfries & Galloway	3,993	..	..	6,696
Dundee City	31,280	..	..	38,667
East Ayrshire	..	1,278	..	3,148
East Dunbartonshire	..	895	..	1,891
East Lothian	..	4,630	..	5,954
East Renfrewshire	..	1,334	..	3,589
City of Edinburgh	189,995	199,307	8,052	397,354
Na h-Eileanan Siar	..	..	..	..
Falkirk	8,174	..	..	10,405
Fife	15,212	..	..	29,397
Glasgow City	28,012	171,531	1,974	201,517
Highland	13,795	5,657	3,225	22,677
Inverclyde	..	2,548	..	3,363
Midlothian	8,303	..	..	17,964
Moray	2,094	..	..	3,021
North Ayrshire	2,711	..	..	5,140
North Lanarkshire	52,139	7,893	3,838	63,870
Orkney Islands	..	..	..	..
Perth & Kinross	1,542	..	..	6,576
Renfrewshire	16,994	..	..	28,311
Scottish Borders	5,652	..	..	7,383
Shetland Islands	..	..	..	..
South Ayrshire	7,205	2,075	153	9,434
South Lanarkshire	..	11,319	..	21,971
Stirling	..	3,716	..	8,768
West Dunbartonshire	..	..	..	15,960
West Lothian	..	29,240	..	159,942
<b>Grand Total</b>	<b>593,752</b>	<b>559,610</b>	<b>93,915</b>	<b>1,247,278</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures
2. From 2009 onwards. Waste management is included in Other Sectors, when previously it was included in Manufacturing.
3. .. Denotes disclosive value
4. - denotes nil. figures unavailable or too small to display.
5. Totals may not sum due to rounding.

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**Table 11**  
**Expenditure on R&D performed in businesses by Government Office Region:**  
**Per head of population, 2017**

	<b>BERD (£ millions)</b>	<b>BERD per head of population £</b>	<b>BERD as a percentage of GDP</b>	<b>Percentage of UK BERD</b>
East of England	4,677	758	2.67%	19.7%
South East	4,860	535	1.59%	20.5%
West Midlands	2,467	421	1.62%	10.4%
East Midlands	1,521	319	1.27%	6.4%
London	2,796	317	0.57%	11.8%
North West	2,174	299	1.09%	9.2%
South West	1,652	297	1.10%	7.0%
Northern Ireland	512	273	1.13%	2.2%
Scotland	<b>1,247</b>	<b>230</b>	<b>0.80%</b>	<b>5.3%</b>
Yorkshire and the Humber	938	172	0.70%	4.0%
Wales	457	146	0.64%	1.9%
North East	384	145	0.63%	1.6%
<b>UK</b>	<b>23,685</b>	<b>359</b>	<b>1.15%</b>	<b>100.0%</b>

*Source: ONS and Scottish Government*

Notes:

1. Ranked by BERD per head of population.
2. Totals may not sum due to rounding.

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**Table 12**  
**Expenditure on R&D performed in businesses by Government Office Region:**  
**Current prices & as a percentage of GDP, 2001 to 2017<sup>1</sup>**

	Business R&D Expenditure (£million)																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
East Midlands	909	974	862	936	1,006	985	1,062	976	992	1,137	1,146	1,218	1,340	1,473	1,528	1,676	1,521
East of England	2,798	2,650	2,915	2,672	3,718	3,650	3,992	4,182	3,812	3,846	3,639	3,606	4,137	4,094	4,200	4,519	4,677
London	700	865	669	759	552	882	1,067	1,109	907	877	1,118	1,570	1,291	1,724	1,878	2,348	2,796
North East	125	124	149	257	289	292	331	318	315	308	259	282	323	282	306	308	384
North West	1,582	1,604	1,538	1,739	1,892	1,623	2,021	2,130	1,926	2,074	2,220	1,781	1,835	1,913	2,115	2,377	2,174
Northern Ireland	150	149	116	120	148	157	177	171	297	324	352	415	441	359	501	481	512
<b>Scotland</b>	<b>517</b>	<b>507</b>	<b>441</b>	<b>430</b>	<b>506</b>	<b>460</b>	<b>543</b>	<b>554</b>	<b>631</b>	<b>619</b>	<b>697</b>	<b>709</b>	<b>801</b>	<b>957</b>	<b>953</b>	<b>1,075</b>	<b>1,247</b>
South East	3,212	3,156	3,266	3,125	3,125	3,347	3,515	3,466	3,758	3,798	4,579	4,133	4,288	4,609	4,765	4,730	4,860
South West	1,006	1,158	1,221	1,296	1,201	1,232	1,229	1,345	1,349	1,454	1,359	1,367	1,450	1,561	1,475	1,516	1,652
Wales	161	187	200	226	232	216	308	243	243	234	252	268	367	386	368	440	457
West Midlands	760	774	794	758	721	915	995	886	847	886	1,281	1,460	1,684	1,924	2,159	2,345	2,467
Yorkshire and the Humber	319	337	335	343	344	384	436	433	454	488	550	600	660	700	768	771	938
<b>UK</b>	<b>12,239</b>	<b>12,484</b>	<b>12,505</b>	<b>12,662</b>	<b>13,734</b>	<b>14,144</b>	<b>15,676</b>	<b>15,814</b>	<b>15,532</b>	<b>16,045</b>	<b>17,452</b>	<b>17,409</b>	<b>18,617</b>	<b>19,982</b>	<b>21,018</b>	<b>22,587</b>	<b>23,685</b>

	% of GDP <sup>2</sup>																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
East Midlands	1.33%	1.36%	1.15%	1.19%	1.21%	1.12%	1.16%	1.07%	1.11%	1.20%	1.18%	1.22%	1.28%	1.36%	1.38%	1.45%	1.27%
East of England	2.74%	2.48%	2.58%	2.29%	3.00%	2.81%	2.97%	3.09%	2.87%	2.81%	2.62%	2.51%	2.76%	2.62%	2.59%	2.69%	2.67%
London	0.30%	0.35%	0.26%	0.28%	0.18%	0.28%	0.31%	0.32%	0.27%	0.25%	0.30%	0.40%	0.32%	0.40%	0.42%	0.50%	0.57%
North East	0.35%	0.32%	0.36%	0.59%	0.62%	0.60%	0.66%	0.64%	0.64%	0.60%	0.50%	0.53%	0.59%	0.50%	0.53%	0.52%	0.63%
North West	1.39%	1.33%	1.20%	1.30%	1.34%	1.08%	1.30%	1.39%	1.24%	1.29%	1.38%	1.07%	1.06%	1.08%	1.15%	1.24%	1.09%
Northern Ireland	0.56%	0.54%	0.39%	0.38%	0.44%	0.44%	0.48%	0.48%	0.84%	0.90%	0.96%	1.08%	1.12%	0.89%	1.21%	1.10%	1.13%
<b>Scotland</b>	<b>0.60%</b>	<b>0.56%</b>	<b>0.46%</b>	<b>0.43%</b>	<b>0.47%</b>	<b>0.40%</b>	<b>0.46%</b>	<b>0.45%</b>	<b>0.51%</b>	<b>0.50%</b>	<b>0.54%</b>	<b>0.54%</b>	<b>0.58%</b>	<b>0.66%</b>	<b>0.65%</b>	<b>0.72%</b>	<b>0.80%</b>
South East	1.83%	1.70%	1.68%	1.56%	1.48%	1.51%	1.52%	1.47%	1.62%	1.56%	1.84%	1.60%	1.59%	1.66%	1.65%	1.59%	1.59%
South West	1.15%	1.26%	1.26%	1.28%	1.12%	1.10%	1.06%	1.14%	1.15%	1.19%	1.10%	1.07%	1.10%	1.13%	1.05%	1.04%	1.10%
Wales	0.39%	0.43%	0.44%	0.47%	0.45%	0.40%	0.55%	0.45%	0.45%	0.42%	0.43%	0.44%	0.58%	0.60%	0.56%	0.64%	0.64%
West Midlands	0.86%	0.84%	0.82%	0.75%	0.68%	0.83%	0.88%	0.79%	0.77%	0.77%	1.07%	1.18%	1.30%	1.42%	1.54%	1.60%	1.62%
Yorkshire and the Humber	0.40%	0.39%	0.37%	0.36%	0.34%	0.36%	0.39%	0.40%	0.42%	0.44%	0.49%	0.52%	0.56%	0.58%	0.61%	0.59%	0.70%
<b>UK</b>	<b>1.07%</b>	<b>1.04%</b>	<b>0.99%</b>	<b>0.95%</b>	<b>0.97%</b>	<b>0.95%</b>	<b>1.01%</b>	<b>1.01%</b>	<b>1.00%</b>	<b>1.00%</b>	<b>1.06%</b>	<b>1.02%</b>	<b>1.05%</b>	<b>1.08%</b>	<b>1.10%</b>	<b>1.14%</b>	<b>1.15%</b>

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data from 2001 onwards with earlier years due to a government agency reclassification.
2. Market price GDP for Scotland sourced from Quarterly National Accounts Scotland. Market price GDP for other UK regions estimated based on the UK GVA (Balanced) to GDP ratio.
3. r denotes revised figures
4. Totals may not sum due to rounding.

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**Table 13**  
**Expenditure on R&D performed within businesses in Scotland by Broad Industry Group:**  
**2009 to 2017**

Industry Group (SIC 2007 Section(s) <sup>2</sup> )	Year								
	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Non-Manufacturing Production (ABDE)</b>	57,705	49,940	64,123	36,057	72,201	60,566	48,607	85,058	70,140
<b>Manufacturing (C)</b>	251,259	234,176	256,533	274,488	263,164	262,678	265,387	334,672	291,684
<b>Construction (F)</b>	963	350	1,441	2,859	2,483	5,701	3,234	6,549	10,701
<b>Wholesale and retail trade; Repair of motor vehicles and motorcycles (G)</b>	72,480	83,489	29,235	8,702	3,879	6,769	8,737	13,463	18,393
<b>Transportation &amp; Storage and Accommodation &amp; Food Service Activities (HI)</b>	2,128	1,728	5,373	2,330	2,203	3,401	4,604	6,592	4,264
<b>Information and communication (J)</b>	38,243	33,691	51,650	72,634	80,248	82,997	107,758	174,152	191,075
<b>Financial &amp; Insurance Activities and Real Estate Activities (KL)</b>	..	..	3,744	4,007	14,519	65,769	57,558	53,774	..
<b>Professional, scientific and technical activities (M)</b>	193,824	197,850	270,380	294,321	350,054	453,672	433,179	367,863	463,443
<b>Administrative and support service activities (N)</b>	10,755	10,276	8,475	8,046	7,762	9,964	18,171	23,549	28,293
<b>Public Administration, Education and Health (OPQ)</b>	..	..	1,657	936	1,357	951	2,624	2,713	..
<b>Arts, Entertainment &amp; Recreation and Other Service Activities (RS)</b>	1,631	4,141	4,086	4,282	3,172	4,612	2,766	6,160	9,237
<b>Total</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>

Source: ONS and Scottish Government

Notes:

1. .. Denotes disclosive value.
2. Standard Industrial Classification 2007
3. Totals may not sum due to rounding.

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**Table 14**  
**Employment on R&D performed within businesses in Scotland:**  
**2001 to 2017**

	Full time equivalent																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
Scientist and engineers	4,152	4,116	3,725	3,528	3,629	3,486	3,860	3,623	4,071	4,310	3,967	4,516	4,948	5,304	5,531	6,939	5,839
Technicians, laboratory assistants and draughtsmen	1,294	1,373	1,075	1,202	1,288	1,297	1,527	1,829	1,752	1,843	2,413	2,405	3,004	3,781	4,377	3,598	4,631
Administrative, clerical industrial and other staff	1,764	1,780	1,652	1,682	1,621	1,526	1,538	1,251	1,201	1,319	1,430	1,421	1,710	1,829	1,956	2,010	2,708
<b>Grand Total</b>	<b>7,210</b>	<b>7,269</b>	<b>6,452</b>	<b>6,412</b>	<b>6,537</b>	<b>6,309</b>	<b>6,926</b>	<b>6,703</b>	<b>7,024</b>	<b>7,472</b>	<b>7,810</b>	<b>8,342</b>	<b>9,662</b>	<b>10,914</b>	<b>11,864</b>	<b>12,547</b>	<b>13,178</b>

	Percentages rcentages																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
Scientist and engineers	58	57	58	55	56	55	56	54	58	58	51	54	51	49	47	55	44
Technicians, laboratory assistants and draughtsmen	18	19	17	19	20	21	22	27	25	25	31	29	31	35	37	29	35
Administrative, clerical industrial and other staff	24	24	26	26	25	24	22	19	17	18	18	17	18	17	16	16	21
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. Totals may not sum due to rounding

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**Table 15 (2015)**  
**Employment on R&D performed within businesses in Scotland**  
**Broad Product Groups, 2015<sup>r,2</sup>**

	Full time equivalent			
	Scientists and Engineers	Technicians, Laboratory Assistants and Draughtsmen	Administrative, Clerical and Other	R&D Employment
<b>Manufacturing</b>	<b>2,553</b>	<b>1,716</b>	<b>1,030</b>	<b>5,299</b>
Chemicals	520	532	549	1,601
Mechanical engineering	255	167	153	575
Electrical machinery	1,035	382	70	1,487
Transport equipment & aerospace	76	49	16	142
Other manufacturing	666	586	242	1,494
<b>Services</b>	<b>2,421</b>	<b>2,545</b>	<b>600</b>	<b>5,565</b>
<b>Other Sectors</b>	<b>558</b>	<b>116</b>	<b>326</b>	<b>1,000</b>
Agriculture, hunting & forestry; Fishing	32	23	22	77
Extractive industries	137	52	48	237
Electricity, gas & water supply; waste management <sup>3</sup>	71	20	76	167
Construction	317	22	180	519
<b>Grand Total</b>	<b>5,531</b>	<b>4,377</b>	<b>1,956</b>	<b>11,864</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures

2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007 see Note 16 of the background notes for details.

3. From 2009 onwards. Waste management is included in Electricity, gas and water supply; waste management, when previously it was included in Other manufacturing.

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**Table 15 (2016)**  
**Employment on R&D performed within businesses in Scotland**  
**Broad Product Groups, 2016<sup>r,2</sup>**

	Full time equivalent			
	Scientists and Engineers	Technicians, Laboratory Assistants and Draughtsmen	Administrative, Clerical and Other	R&D Employment
<b>Manufacturing</b>	<b>3,499</b>	<b>1,363</b>	<b>1,116</b>	<b>5,978</b>
Chemicals	798	459	482	1,739
Mechanical engineering	258	174	162	593
Electrical machinery	1,380	167	98	1,645
Transport equipment & aerospace	169	83	71	323
Other manufacturing	894	480	304	1,678
<b>Services</b>	<b>2,872</b>	<b>2,022</b>	<b>628</b>	<b>5,521</b>
<b>Other Sectors</b>	<b>569</b>	<b>213</b>	<b>266</b>	<b>1,048</b>
Agriculture, hunting & forestry; Fishing	30	24	27	81
Extractive industries	363	115	81	559
Electricity, gas & water supply; waste management <sup>3</sup>	92	23	21	137
Construction	84	51	136	271
<b>Grand Total</b>	<b>6,939</b>	<b>3,598</b>	<b>2,010</b>	<b>12,547</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures

2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007 see Note 16 of the background notes for details.

3. From 2009 onwards. Waste management is included in Electricity, gas and water supply; waste management, when previously it was included in Other manufacturing.

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**Table 15 (2017)**  
**Employment on R&D performed within businesses in Scotland**  
**Broad Product Groups, 2017<sup>1</sup>**

	Full time equivalent			
	Scientists and Engineers	Technicians, Laboratory Assistants and Draughtsmen	Administrative, Clerical and Other	R&D Employment
<b>Manufacturing</b>	<b>3,181</b>	<b>1,463</b>	<b>1,530</b>	<b>6,174</b>
Chemicals	634	401	434	1,470
Mechanical engineering	364	219	331	914
Electrical machinery	1,238	167	244	1,649
Transport equipment & aerospace	119	80	83	282
Other manufacturing	825	595	438	1,859
<b>Services</b>	<b>2,184</b>	<b>2,922</b>	<b>917</b>	<b>6,023</b>
<b>Other Sectors</b>	<b>473</b>	<b>246</b>	<b>262</b>	<b>981</b>
Agriculture, hunting & forestry; Fishing	41	33	37	111
Extractive industries	176	48	24	248
Electricity, gas & water supply; waste management <sup>2</sup>	147	56	35	238
Construction	108	109	166	383
<b>Grand Total</b>	<b>5,839</b>	<b>4,631</b>	<b>2,708</b>	<b>13,178</b>

*Source: ONS and Scottish Government*

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007 see Note 16 of the background notes for details.

2. From 2009 onwards. Waste management is included in Electricity, gas and water supply; waste management, when previously it was included in Other manufacturing.

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**Table 16 (2015)**  
**Expenditure on civil and defence R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2015<sup>r,2</sup>**

			£ thousands
Scotland	Civil	Defence	Total
<b>Manufacturing</b>	<b>458,715</b>	<b>56,423</b>	<b>515,138</b>
Chemicals	167,441	-	167,441
Mechanical engineering	40,328	6,730	47,058
Electrical machinery	..	..	155,152
Transport equipment & aerospace	7,272	4,417	11,689
Other manufacturing	..	..	133,798
<b>Services</b>	<b>358,150</b>	<b>2,668</b>	<b>360,819</b>
<b>Other Sectors</b>	<b>76,669</b>	-	<b>76,669</b>
Agriculture, hunting & forestry; Fishing	6,249	-	6,249
Extractive industries	38,395	-	38,395
Electricity, gas & water supply; waste management <sup>3</sup>	19,945	-	19,945
Construction	12,080	-	12,080
<b>Grand Total</b>	<b>893,534</b>	<b>59,092</b>	<b>952,625</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.

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**Table 16 (2016)**  
**Expenditure on civil and defence R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2016<sup>r,2</sup>**

Scotland	£ thousands		
	Civil	Defence	Total
<b>Manufacturing</b>	<b>520,173</b>	<b>69,820</b>	<b>589,993</b>
Chemicals	..	..	166,551
Mechanical engineering	34,484	4,772	39,256
Electrical machinery	..	..	220,681
Transport equipment & aerospace	24,181	1,946	26,127
Other manufacturing	100,208	37,170	137,378
<b>Services</b>	..	..	<b>372,637</b>
<b>Other Sectors</b>	..	..	<b>111,914</b>
Agriculture, hunting & forestry; Fishing	8,254	-	8,254
Extractive industries	61,339	-	61,339
Electricity, gas & water supply; waste management <sup>3</sup>	24,590	-	24,590
Construction	..	..	17,732
<b>Grand Total</b>	<b>1,001,329</b>	<b>73,215</b>	<b>1,074,544</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.

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**Table 16 (2017)**  
**Expenditure on civil and defence R&D performed within businesses in Scotland:**  
**Broad Product Groups, 2017<sup>2</sup>**

			£ thousands
Scotland	Civil	Defence	Total
<b>Manufacturing</b>	<b>529,100</b>	<b>64,652</b>	<b>593,752</b>
Chemicals	178,812	-	178,812
Mechanical engineering	44,043	5,649	49,692
Electrical machinery	..	..	214,894
Transport equipment & aerospace	24,382	3,485	27,867
Other manufacturing	..	..	122,487
<b>Services</b>	..	..	<b>559,610</b>
<b>Other Sectors</b>	..	..	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	..	..	12,717
Extractive industries	39,848	-	39,848
Electricity, gas & water supply; waste management <sup>3</sup>	20,121	-	20,121
Construction	21,230	-	21,230
<b>Grand Total</b>	<b>1,175,855</b>	<b>71,423</b>	<b>1,247,278</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.

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**Table 17**  
**Employment on civil and defence R&D performed within businesses in Scotland:**  
**2001 to 2017**

Civil	Full time equivalent																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
Scientist and engineers	3,532	3,833	3,446	3,224	3,292	3,131	3,393	3,264	3,660	3,880	3,872	4,407	4,751	5,082	5,287	6,687	5,640
Technicians, laboratory assistants & draughtsman	1,189	1,301	1,026	1,127	1,225	1,248	1,467	1,762	1,689	1,784	2,351	2,364	2,926	3,647	4,186	3,431	4,459
Admin, Clerical industrial & Other staff	1,688	1,695	1,626	1,659	1,588	1,503	1,513	1,215	1,157	1,273	1,415	1,399	1,655	1,748	1,863	1,912	2,619
<b>Grand Total</b>	<b>6,409</b>	<b>6,830</b>	<b>6,098</b>	<b>6,011</b>	<b>6,105</b>	<b>5,882</b>	<b>6,372</b>	<b>6,241</b>	<b>6,507</b>	<b>6,937</b>	<b>7,638</b>	<b>8,170</b>	<b>9,332</b>	<b>10,477</b>	<b>11,336</b>	<b>12,030</b>	<b>12,719</b>

Civil	Percentages																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
Scientist and engineers	55	56	57	54	54	53	53	52	56	56	51	54	51	49	47	56	44
Technicians, laboratory assistants & draughtsman	19	19	17	19	20	21	23	28	26	26	31	29	31	35	37	29	35
Admin, Clerical industrial & Other staff	26	25	27	28	26	26	24	19	18	18	19	17	18	17	16	16	21
<b>Grand Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Defence	Full time equivalent																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
Scientist and engineers	620	283	279	303	336	355	468	358	411	430	95	109	197	222	245	252	199
Technicians, laboratory assistants & draughtsman	106	71	49	75	63	49	60	68	63	59	62	41	78	134	191	167	172
Admin, Clerical industrial & Other staff	76	85	27	22	33	23	25	36	44	46	15	22	55	81	93	98	88
<b>Grand Total</b>	<b>801</b>	<b>439</b>	<b>354</b>	<b>401</b>	<b>432</b>	<b>427</b>	<b>553</b>	<b>462</b>	<b>517</b>	<b>534</b>	<b>172</b>	<b>172</b>	<b>330</b>	<b>437</b>	<b>528</b>	<b>517</b>	<b>459</b>

Defence	Percentages																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
Scientist and engineers	77	64	79	76	78	83	85	78	79	80	55	63	60	51	46	49	43
Technicians, laboratory assistants & draughtsman	13	16	14	19	15	11	11	15	12	11	36	24	24	31	36	32	37
Admin, Clerical industrial & Other staff	9	19	8	6	8	5	5	8	8	9	9	13	17	19	18	19	19
<b>Grand Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: ONS and Scottish Government

- Notes:  
1. r denotes revised figures  
2. Totals may not sum due to rounding

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**Table 18 (2015)**  
**Expenditure on R&D performed within businesses in Scotland by total**  
**UK company employment sizebands: Broad Product Groups, 2015<sup>r,2</sup>**

	£ thousands			
	0 to 99 employees	100 to 399 employees	400 employees and over	Total all Employees
<b>Manufacturing</b>	<b>45,249</b>	<b>154,943</b>	<b>314,946</b>	<b>515,138</b>
Chemicals	..	26,243	..	167,441
Mechanical engineering	15,805	11,305	19,948	47,058
Electrical machinery	8,222	91,595	55,334	155,152
Transport equipment & aerospace	..	2,307	..	11,689
Other manufacturing	15,155	23,494	95,149	133,798
<b>Services</b>	<b>132,889</b>	<b>39,608</b>	<b>188,323</b>	<b>360,819</b>
<b>Other Sectors</b>	<b>1,962</b>	<b>7,564</b>	<b>67,144</b>	<b>76,669</b>
Agriculture, hunting & forestry; Fishing	601	..	..	6,249
Extractive industries	..	..	36,972	38,395
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	18,636	19,945
Construction	..	1,370	..	12,080
<b>Grand Total</b>	<b>180,099</b>	<b>202,114</b>	<b>570,412</b>	<b>952,625</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes disclosive value.
5. - denotes nil, figures unavailable or too small to display.

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**Table 18 (2016)**  
**Expenditure on R&D performed within businesses in Scotland by total**  
**UK company employment sizebands: Broad Product Groups, 2016<sup>r,2</sup>**

	£ thousands			
	0 to 99 employees	100 to 399 employees	400 employees and over	Total all Employees
<b>Manufacturing</b>	<b>60,029</b>	<b>202,016</b>	<b>327,948</b>	<b>589,993</b>
Chemicals	17,542	26,470	122,538	166,551
Mechanical engineering	10,454	13,975	14,827	39,256
Electrical machinery	14,165	116,902	89,614	220,681
Transport equipment & aerospace	3,390	5,459	17,279	26,127
Other manufacturing	14,478	39,210	83,690	137,378
<b>Services</b>	<b>132,122</b>	<b>39,095</b>	<b>201,420</b>	<b>372,637</b>
<b>Other Sectors</b>	<b>4,572</b>	<b>7,239</b>	<b>100,103</b>	<b>111,914</b>
Agriculture, hunting & forestry; Fishing	..	..	3,912	8,254
Extractive industries	..	..	57,987	61,339
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	24,525	24,590
Construction	..	..	13,679	17,732
<b>Grand Total</b>	<b>196,722</b>	<b>248,351</b>	<b>629,471</b>	<b>1,074,544</b>

Source: ONS and Scottish Government

Notes:

1. r denotes revised figures
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
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**Table 18 (2017)**  
**Expenditure on R&D performed within businesses in Scotland by total**  
**UK company employment sizebands: Broad Product Groups, 2017<sup>1</sup>**

	£ thousands			
	0 to 99 employees	100 to 399 employees	400 employees and over	Total all Employees
<b>Manufacturing</b>	<b>62,098</b>	<b>183,773</b>	<b>347,881</b>	<b>593,752</b>
Chemicals	..	18,793	..	178,812
Mechanical engineering	17,163	15,909	16,620	49,692
Electrical machinery	11,564	110,710	92,620	214,894
Transport equipment & aerospace	..	7,575	..	27,867
Other manufacturing	22,444	30,787	69,255	122,487
<b>Services</b>	<b>141,497</b>	<b>55,384</b>	<b>362,730</b>	<b>559,610</b>
<b>Other Sectors</b>	<b>7,129</b>	<b>10,028</b>	<b>76,758</b>	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	..	..	6,220	12,717
Extractive industries	-	2	39,845	39,848
Electricity, gas & water supply; waste management <sup>2</sup>	..	..	16,988	20,121
Construction	5,053	2,472	13,704	21,230
<b>Grand Total</b>	<b>210,724</b>	<b>249,185</b>	<b>787,369</b>	<b>1,247,278</b>

Source: ONS and Scottish Government

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
3. .. Denotes disclosive value.
4. - denotes nil, figures unavailable or too small to display.

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**Table 19 (2015)**  
**R&D employment within businesses in Scotland by total UK company**  
**employment sizebands: Broad Product Groups, 2015<sup>r,2</sup>**

	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>872</b>	<b>1,608</b>	<b>2,819</b>	<b>5,299</b>
Chemicals	..	240	..	1,601
Mechanical engineering	238	205	131	575
Electrical machinery	167	739	581	1,487
Transport equipment & aerospace	..	28	..	142
Other manufacturing	318	395	781	1,494
<b>Services</b>	<b>2,385</b>	<b>639</b>	<b>2,542</b>	<b>5,565</b>
<b>Other Sectors</b>	<b>47</b>	<b>511</b>	<b>442</b>	<b>1,000</b>
Agriculture, hunting & forestry; Fishing	16	..	..	77
Extractive industries	..	..	233	237
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	150	167
Construction	..	446	..	519
<b>Grand Total</b>	<b>3,304</b>	<b>2,758</b>	<b>5,803</b>	<b>11,864</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures

2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

4. .. Denotes disclosive value

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

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**Table 19 (2016)**  
**R&D employment within businesses in Scotland by total UK company**  
**employment sizebands: Broad Product Groups, 2016<sup>r,2</sup>**

	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>1,164</b>	<b>1,920</b>	<b>2,894</b>	<b>5,978</b>
Chemicals	232	276	1,231	1,739
Mechanical engineering	224	209	160	593
Electrical machinery	204	726	714	1,645
Transport equipment & aerospace	100	67	156	323
Other manufacturing	404	641	633	1,678
<b>Services</b>	<b>2,368</b>	<b>722</b>	<b>2,432</b>	<b>5,521</b>
<b>Other Sectors</b>	<b>127</b>	<b>241</b>	<b>680</b>	<b>1,048</b>
Agriculture, hunting & forestry; Fishing	..	..	21	81
Extractive industries	91	..	..	559
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	135	137
Construction	29	..	..	271
<b>Grand Total</b>	<b>3,659</b>	<b>2,882</b>	<b>6,006</b>	<b>12,547</b>

*Source: ONS and Scottish Government*

Notes:

1. r denotes revised figures

2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

4. .. Denotes disclosive value

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

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**Table 19 (2017)**  
**R&D employment within businesses in Scotland by total UK company**  
**employment sizebands: Broad Product Groups, 2017<sup>1</sup>**

	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>1,606</b>	<b>1,701</b>	<b>2,867</b>	<b>6,174</b>
Chemicals	..	215	..	1,470
Mechanical engineering	483	319	112	914
Electrical machinery	282	573	795	1,649
Transport equipment & aerospace	..	81	..	282
Other manufacturing	654	514	691	1,859
<b>Services</b>	<b>2,765</b>	<b>861</b>	<b>2,397</b>	<b>6,023</b>
<b>Other Sectors</b>	<b>305</b>	<b>110</b>	<b>565</b>	<b>981</b>
Agriculture, hunting & forestry; Fishing	..	..	23	111
Extractive industries	-	-	248	248
Electricity, gas & water supply; waste management <sup>2</sup>	..	..	130	238
Construction	194	26	163	383
<b>Grand Total</b>	<b>4,676</b>	<b>2,672</b>	<b>5,829</b>	<b>13,178</b>

*Source: ONS and Scottish Government*

Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

3. .. Denotes disclosive value

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

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**Total 20 (2015)**

**Number of businesses<sup>1</sup> performing R&D within Scotland by total UK company employment sizebands: Broad Product Groups<sup>2</sup>, 2015<sup>r,3</sup>**

	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>600</b>	<b>150</b>	<b>55</b>	<b>805</b>
Chemicals	45	15	5	65
Mechanical engineering	175	30	10	215
Electrical machinery	60	15	5	80
Transport equipment & aerospace	15	5	5	25
Other manufacturing	305	85	30	420
<b>Services</b>	<b>1,855</b>	<b>100</b>	<b>30</b>	<b>1,985</b>
<b>Other Sectors</b>	<b>170</b>	<b>25</b>	<b>20</b>	<b>220</b>
Agriculture, hunting & Forestry; Fishing	30	-	-	30
Extractive industries	15	-	10	25
Electricity, gas & water supply; waste management <sup>4</sup>	-	5	5	10
Construction	125	20	5	155
<b>Grand Total</b>	<b>2,625</b>	<b>280</b>	<b>110</b>	<b>3,010</b>

*Source: ONS and Scottish Government*

Notes:

1. The number of businesses are rounded to the nearest 5.
2. Where business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
3. There is discontinuity between the date for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
4. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
5. r denotes revised figures.
6. Totals may not sum due to rounding.

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**Total 20 (2016)**

**Number of businesses<sup>1</sup> performing R&D within Scotland by total UK company employment sizebands: Broad Product Groups<sup>2</sup>, 2016<sup>r,3</sup>**

	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>660</b>	<b>155</b>	<b>55</b>	<b>875</b>
Chemicals	50	15	5	65
Mechanical engineering	190	35	10	235
Electrical machinery	65	15	10	85
Transport equipment & aerospace	20	5	5	35
Other manufacturing	335	85	30	450
<b>Services</b>	<b>2005</b>	<b>115</b>	<b>35</b>	<b>2155</b>
<b>Other Sectors</b>	<b>180</b>	<b>25</b>	<b>20</b>	<b>225</b>
Agriculture, hunting & Forestry; Fishing	30	0	5	30
Extractive industries	15	0	10	30
Electricity, gas & water supply; waste management <sup>4</sup>	5	0	0	5
Construction	130	25	5	160
<b>Grand Total</b>	<b>2845</b>	<b>300</b>	<b>115</b>	<b>3260</b>

*Source: ONS and Scottish Government*

Notes:

1. The number of businesses are rounded to the nearest 5.
2. Where business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
3. There is discontinuity between the date for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
4. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
5. r denotes revised figures.
6. Totals may not sum due to rounding.

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**Total 20 (2017)**

**Number of businesses<sup>1</sup> performing R&D within Scotland by total UK company employment sizebands: Broad Product Groups<sup>2</sup>, 2017<sup>3</sup>**

	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>765</b>	<b>150</b>	<b>60</b>	<b>975</b>
Chemicals	50	15	5	70
Mechanical engineering	235	40	10	290
Electrical machinery	70	10	10	85
Transport equipment & aerospace	30	10	5	45
Other manufacturing	375	80	25	485
<b>Services</b>	<b>2,065</b>	<b>125</b>	<b>40</b>	<b>2,225</b>
<b>Other Sectors</b>	<b>235</b>	<b>30</b>	<b>25</b>	<b>290</b>
Agriculture, hunting & Forestry; Fishing	45	0	5	50
Extractive industries	0	5	10	15
Electricity, gas & water supply; waste management <sup>4</sup>	25	5	5	30
Construction	170	20	5	195
<b>Grand Total</b>	<b>3,065</b>	<b>305</b>	<b>120</b>	<b>3,490</b>

*Source: ONS and Scottish Government*

## Notes:

1. The number of businesses are rounded to the nearest 5.
2. Where business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
3. There is discontinuity between the date for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
4. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
5. .. Denotes nil, figures unavailable, too small to display or disclosive value
6. Totals may not sum due to rounding.

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**Table 21 (2015)**

**Average expenditure on R&D within businesses performing R&D in Scotland  
by total UK company employment sizebands: Broad Product Groups<sup>1</sup>, 2015<sup>r,2</sup>**

	£ thousands			
	0 to 99 employees	100 to 399 employees	400 employees and over	Total all Employees
<b>Manufacturing</b>	<b>74</b>	<b>990</b>	<b>5,871</b>	<b>641</b>
Chemicals	..	1,640	..	2,597
Mechanical engineering	88	271	2,143	218
Electrical machinery	139	5,616	12,100	2,107
Transport equipment & aerospace	..	384	..	262
Other manufacturing	49	277	2,765	295
<b>Services</b>	<b>72</b>	<b>392</b>	<b>5,871</b>	<b>181</b>
<b>Other Sectors</b>	<b>11</b>	<b>276</b>	<b>3,025</b>	<b>347</b>
Agriculture, hunting & Forestry; Fishing	21	..	..	195
Extractive industries	..	..	3,697	1,476
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	4,563	2,445
Construction	..	57	..	77
<b>Grand Total</b>	<b>68</b>	<b>706</b>	<b>5,297</b>	<b>316</b>

*Source: ONS and Scottish Government*

Notes:

1. Where business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
2. There is discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes nil, figures unavailable, too small to display or disclosive value
5. r denotes revised figures.
6. Totals may not sum due to rounding.

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**Table 21 (2016)**

**Average expenditure on R&D within businesses performing R&D in Scotland  
by total UK company employment sizebands: Broad Product Groups<sup>1</sup>, 2016<sup>r,2</sup>**

	<b>£ thousands</b>			
	<b>0 to 99 employees</b>	<b>100 to 399 employees</b>	<b>400 employees and over</b>	<b>Total all Employees</b>
<b>Manufacturing</b>	<b>88</b>	<b>1,258</b>	<b>5,927</b>	<b>678</b>
Chemicals	365	1,765	43,223	2,632
Mechanical engineering	53	372	1,810	180
Electrical machinery	221	8,172	13,926	2,791
Transport equipment & aerospace	142	611	2,001	567
Other manufacturing	40	446	2,237	259
<b>Services</b>	<b>66</b>	<b>329</b>	<b>6,032</b>	<b>177</b>
<b>Other Sectors</b>	<b>23</b>	<b>256</b>	<b>4,061</b>	<b>442</b>
Agriculture, hunting & Forestry; Fishing	..	..	1,304	258
Extractive industries	..	..	5,799	2,101
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	6,987	2,340
Construction	..	..	1,924	107
<b>Grand Total</b>	<b>68</b>	<b>806</b>	<b>5,599</b>	<b>330</b>

*Source: ONS and Scottish Government*

Notes:

1. Where business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
2. There is discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes nil, figures unavailable, too small to display or disclosive value
5. r denotes revised figures.
6. Totals may not sum due to rounding.

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**Table 21 (2017)**

**Average expenditure on R&D within businesses performing R&D in Scotland  
by total UK company employment sizebands: Broad Product Groups<sup>1</sup>, 2017<sup>2</sup>**

	£ thousands			
	0 to 99 employees	100 to 399 employees	400 employees and over	Total all Employees
<b>Manufacturing</b>	<b>80</b>	<b>1,199</b>	<b>6,221</b>	<b>618</b>
Chemicals	..	1,446	..	2,608
Mechanical engineering	70	331	1,545	167
Electrical machinery	170	11,037	13,015	2,748
Transport equipment & aerospace	..	773	..	819
Other manufacturing	58	396	1,637	201
<b>Services</b>	<b>68</b>	<b>441</b>	<b>9,171</b>	<b>249</b>
<b>Other Sectors</b>	<b>30</b>	<b>298</b>	<b>3,296</b>	<b>319</b>
Agriculture, hunting & Forestry; Fishing	..	..	2,073	265
Extractive industries	-	1	4,425	3,404
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	4,075	479
Construction	30	100	1,872	103
<b>Grand Total</b>	<b>68</b>	<b>799</b>	<b>6,619</b>	<b>358</b>

*Source: ONS and Scottish Government*

Notes:

1. Where business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
2. There is discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. .. Denotes nil, figures unavailable, too small to display or disclosive value
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**Table 22**  
**Expenditure and employment on R&D performed within businesses in Scotland**  
**by country of ownership of business performing R&D: 2001 to 2017**

	Expenditure (£ thousands)																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
<b>Scotland</b>	97,806	120,853	134,314	133,951	143,230	144,736	159,426	157,635	159,635	216,460	204,530	222,480	236,731	346,435	396,307	373,501	465,047
<b>Rest of the UK</b>	121,207	65,574	52,975	58,381	40,941	21,255	33,139	36,279	55,056	30,729	40,847	23,597	25,294	58,425	46,958	80,652	63,718
<b>Other EU<sup>1</sup></b>	56,046	68,284	51,490	55,643	96,886	90,983	123,401	93,416	97,713	102,396	112,845	139,433	151,108	124,808	125,836	183,197	302,343
<b>United States</b>	219,541	233,528	186,564	170,758	207,027	186,996	204,956	240,632	286,219	241,236	285,129	269,396	314,927	347,366	343,358	373,634	337,996
<b>Rest of the World</b>	22,069	18,471	15,922	11,646	18,375	16,286	21,674	25,548	32,542	27,997	53,347	53,756	72,981	80,045	40,167	63,559	78,174
<b>Total</b>	<b>516,669</b>	<b>506,710</b>	<b>441,265</b>	<b>430,379</b>	<b>506,459</b>	<b>460,255</b>	<b>542,596</b>	<b>553,510</b>	<b>631,165</b>	<b>618,818</b>	<b>696,698</b>	<b>708,662</b>	<b>801,043</b>	<b>957,080</b>	<b>952,625</b>	<b>1,074,544</b>	<b>1,247,278</b>

	Employment																
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
<b>Scotland</b>	1,884	2,442	2,309	2,405	2,317	2,175	2,344	2,545	2,519	3,247	3,518	3,686	3,939	5,483	6,315	6,055	7,150
<b>Rest of the UK</b>	1,544	987	882	721	518	292	246	210	282	226	342	228	632	619	561	701	515
<b>Other EU<sup>1</sup></b>	733	842	626	723	1,135	1,049	1,214	1,194	1,180	1,172	907	1,100	1,358	944	1,138	1,465	1,776
<b>United States</b>	2,724	2,697	2,363	2,333	2,300	2,547	2,785	2,475	2,717	2,412	2,510	2,703	3,015	3,140	3,320	3,618	2,696
<b>Rest of the World</b>	325	301	273	229	267	246	337	279	326	414	533	624	718	729	530	709	1,041
<b>Total</b>	<b>7,210</b>	<b>7,269</b>	<b>6,452</b>	<b>6,412</b>	<b>6,537</b>	<b>6,309</b>	<b>6,926</b>	<b>6,703</b>	<b>7,024</b>	<b>7,472</b>	<b>7,810</b>	<b>8,342</b>	<b>9,662</b>	<b>10,914</b>	<b>11,864</b>	<b>12,547</b>	<b>13,178</b>

Source: ONS and Scottish Government sh Government

Notes:

1. The Other EU category shows data from the other EU28 countries.
2. r denotes revised figures.
3. Totals may not sum due to rounding.

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**Total 23 (2015)****Expenditure on R&D performed within businesses in Scotland by country of ownership of business performing R&D: Broad Product Group, 2015<sup>r,1</sup>****£ thousands**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>3</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>113,075</b>	<b>33,760</b>	<b>81,883</b>	<b>270,245</b>	<b>16,174</b>	<b>515,138</b>
Chemicals	26,079	..	..	..	..	167,441
Mechanical engineering	19,505	..	7,680	18,231	..	47,058
Electrical machinery	14,319	..	39,306	81,459	..	155,152
Transport equipment & aerospace	2,714	..	..	..	..	11,689
Other manufacturing	50,458	8,874	29,580	33,890	10,996	133,798
<b>Services</b>	<b>270,467</b>	<b>..</b>	<b>15,401</b>	<b>48,614</b>	<b>..</b>	<b>360,819</b>
<b>Other Sectors</b>	<b>12,764</b>	<b>..</b>	<b>28,552</b>	<b>24,499</b>	<b>..</b>	<b>76,669</b>
Agriculture, hunting & forestry; Fishing	551	-	..	..	..	6,249
Extractive industries	..	..	12,075	20,897	..	38,395
Electricity, gas & water supply; waster management <sup>2</sup>	..	..	7,863	..	..	19,945
Construction	3,096	..	..	-	-	12,080
<b>Grand Total</b>	<b>396,307</b>	<b>46,958</b>	<b>125,836</b>	<b>343,358</b>	<b>40,167</b>	<b>952,625</b>

*Source: ONS and Scottish Government*

## Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

3. The Other EU category shows data from the other EU28 countries.

4. r denotes revised figures.

5. .. Denotes disclosive values.

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**Total 23 (2016)****Expenditure on R&D performed within businesses in Scotland by country of ownership of business performing R&D: Broad Product Group, 2016<sup>r,1</sup>****£ thousands**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>3</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>121,699</b>	<b>58,907</b>	<b>96,495</b>	<b>276,491</b>	<b>36,401</b>	<b>589,993</b>
Chemicals	22,442	..	..	120,544	..	166,551
Mechanical engineering	17,759	..	10,130	..	1,813	39,256
Electrical machinery	35,221	..	42,827	108,084	..	220,681
Transport equipment & aerospace	12,652	..	..	..	..	26,127
Other manufacturing	33,625	11,916	40,857	36,629	14,350	137,378
<b>Services</b>	<b>237,195</b>	<b>18,482</b>	<b>36,319</b>	<b>69,509</b>	<b>11,133</b>	<b>372,637</b>
<b>Other Sectors</b>	<b>14,607</b>	<b>3,263</b>	<b>50,384</b>	<b>27,634</b>	<b>16,025</b>	<b>111,914</b>
Agriculture, hunting & forestry; Fishing	..	..	..	..	3,912	8,254
Extractive industries	..	-	29,925	23,620	..	61,339
Electricity, gas & water supply; waste management <sup>2</sup>	..	..	..	..	..	24,590
Construction	4,472	..	..	..	-	17,732
<b>Grand Total</b>	<b>373,501</b>	<b>80,652</b>	<b>183,197</b>	<b>373,634</b>	<b>63,559</b>	<b>1,074,544</b>

*Source: ONS and Scottish Government*

## Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

3. The Other EU category shows data from the other EU28 countries.

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**Total 23 (2017)****Expenditure on R&D performed within businesses in Scotland by country of ownership of business performing R&D: Broad Product Group, 2017<sup>1</sup>****£ thousands**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>3</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>113,927</b>	<b>41,565</b>	<b>135,303</b>	<b>267,477</b>	<b>35,481</b>	<b>593,752</b>
Chemicals	14,799	..	..	..	..	178,812
Mechanical engineering	22,535	536	7,344	16,296	2,979	49,692
Electrical machinery	25,966	..	80,467	..	9,921	214,894
Transport equipment & aerospace	11,358	..	..	3,473	..	27,867
Other manufacturing	39,268	7,405	39,164	19,026	17,624	122,487
<b>Services</b>	<b>333,163</b>	<b>..</b>	<b>130,637</b>	<b>51,107</b>	<b>..</b>	<b>559,610</b>
<b>Other Sectors</b>	<b>17,957</b>	<b>..</b>	<b>36,404</b>	<b>19,413</b>	<b>..</b>	<b>93,915</b>
Agriculture, hunting & forestry; Fishing	2,498	..	..	..	6,220	12,717
Extractive industries	..	-	12,059	15,465	..	39,848
Electricity, gas & water supply; waster management <sup>2</sup>	5,987	..	..	..	-	20,121
Construction	..	..	10,814	-	-	21,230
<b>Grand Total</b>	<b>465,047</b>	<b>63,718</b>	<b>302,343</b>	<b>337,996</b>	<b>78,174</b>	<b>1,247,278</b>

*Source: ONS and Scottish Government*

## Notes:

1. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007.

See Note 16 of the background notes for details.

2. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.

3. The Other EU category shows data from the other EU28 countries.

4. .. Denotes disclosive values.

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

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**Table 24 (2015)**

**Number of businesses<sup>1</sup> performing R&D within Scotland by country of ownership of business performing R&D: Broad Product Groups<sup>2</sup>, 2015<sup>r,3</sup>**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>5</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>665</b>	<b>15</b>	<b>40</b>	<b>50</b>	<b>30</b>	<b>805</b>
Chemicals	50	0	0	10	5	65
Mechanical engineering	180	0	15	10	5	215
Electrical machinery	65	0	5	5	5	80
Transport equipment & aerospace	20	0	0	5	0	25
Other manufacturing	350	10	20	25	20	420
<b>Services</b>	<b>1,880</b>	<b>10</b>	<b>30</b>	<b>40</b>	<b>30</b>	<b>1,985</b>
<b>Other Sectors</b>	<b>190</b>	<b>0</b>	<b>15</b>	<b>5</b>	<b>5</b>	<b>220</b>
Agriculture, hunting & forestry; Fishing	30	0	0	0	0	30
Extractive industries	10	0	10	5	0	25
Electricity, gas & water supply; waste management <sup>4</sup>	5	0	5	0	0	10
Construction	150	0	0	0	0	155
<b>Grand Total</b>	<b>2,735</b>	<b>30</b>	<b>85</b>	<b>95</b>	<b>65</b>	<b>3,010</b>

*Source: ONS and Scottish Government*

Notes:

1. The number of businesses are rounded to the nearest 5.
2. Where a business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
3. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
4. From 2009 onwards, Waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
5. The Other EU category shows data from the other EU28 countries.
6. r denotes revised figures.

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**Table 24 (2016)**

**Number of businesses<sup>1</sup> performing R&D within Scotland by country of ownership of business performing R&D: Broad Product Groups<sup>2</sup>, 2016<sup>r,3</sup>**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>5</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>730</b>	<b>15</b>	<b>40</b>	<b>50</b>	<b>40</b>	<b>875</b>
Chemicals	50	0	5	10	0	65
Mechanical engineering	200	0	10	10	15	235
Electrical machinery	65	0	5	10	5	85
Transport equipment & aerospace	30	0	0	5	0	35
Other manufacturing	390	10	20	15	20	450
<b>Services</b>	<b>2,030</b>	<b>20</b>	<b>35</b>	<b>45</b>	<b>25</b>	<b>2,155</b>
<b>Other Sectors</b>	<b>195</b>	<b>5</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>225</b>
Agriculture, hunting & forestry; Fishing	25	0	0	0	5	30
Extractive industries	10	0	5	5	5	30
Electricity, gas & water supply; waste management <sup>4</sup>	5	0	0	0	0	5
Construction	155	0	5	0	0	160
<b>Grand Total</b>	<b>2,955</b>	<b>35</b>	<b>90</b>	<b>105</b>	<b>75</b>	<b>3,260</b>

*Source: ONS and Scottish Government*

Notes:

1. The number of businesses are rounded to the nearest 5.
2. Where a business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
3. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
4. From 2009 onwards waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
5. The Other EU category shows data from the other EU28 countries.
6. r denotes revised figures.

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**Table 24 (2017)**

**Number of businesses<sup>1</sup> performing R&D within Scotland by country of ownership of business performing R&D: Broad Product Groups<sup>2</sup>, 2017<sup>3</sup>**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>5</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>805</b>	<b>15</b>	<b>50</b>	<b>55</b>	<b>45</b>	<b>975</b>
Chemicals	50	0	5	10	5	70
Mechanical engineering	240	5	15	15	15	290
Electrical machinery	70	0	10	5	5	85
Transport equipment & aerospace	35	0	5	5	0	45
Other manufacturing	415	10	20	15	25	485
<b>Services</b>	<b>2,070</b>	<b>20</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>2,225</b>
<b>Other Sectors</b>	<b>260</b>	<b>5</b>	<b>15</b>	<b>5</b>	<b>5</b>	<b>290</b>
Agriculture, hunting & forestry; Fishing	40	0	0	0	5	50
Extractive industries	5	0	5	5	5	15
Electricity, gas & water supply; waste management <sup>4</sup>	30	0	5	0	0	30
Construction	185	5	5	0	0	195
<b>Grand Total</b>	<b>3,140</b>	<b>40</b>	<b>105</b>	<b>105</b>	<b>100</b>	<b>3,490</b>

*Source: ONS and Scottish Government*

Notes:

1. The number of businesses are rounded to the nearest 5.
2. Where a business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
3. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
4. From 2009 onwards waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
5. The Other EU category shows data from the other EU28 countries.

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**Table 25 (2015)**  
**Average expenditure on R&D within businesses performing R&D in Scotland**  
**by country of ownership of business performing R&D: Broad Product Groups<sup>1</sup>, 2015<sup>r,2</sup>**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>4</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>170</b>	<b>2,251</b>	<b>2,010</b>	<b>5,185</b>	<b>505</b>	<b>641</b>
Chemicals	511	..	..	..	..	2,597
Mechanical engineering	108	..	385	1,739	..	218
Electrical machinery	220	..	9,765	12,950	..	2,107
Transport equipment & aerospace	135	..	..	..	..	262
Other manufacturing	145	888	952	1,495	611	295
<b>Services</b>	<b>144</b>	<b>..</b>	<b>453</b>	<b>1,263</b>	<b>..</b>	<b>181</b>
<b>Other Sectors</b>	<b>67</b>	<b>..</b>	<b>2,052</b>	<b>4,083</b>	<b>..</b>	<b>347</b>
Agriculture, hunting & forestry; Fishing	20	-	..	..	..	195
Extractive industries	..	..	1,508	4,179	..	1,476
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	2,682	..	..	2,445
Construction	21	..	..	-	-	77
<b>Grand Total</b>	<b>145</b>	<b>1,619</b>	<b>1,498</b>	<b>3,540</b>	<b>618</b>	<b>316</b>

Source: ONS and Scottish Government

Notes:

1. Where a business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. The Other EU category shows data from the EU28 countries.
5. .. Denotes nil, figures unavailable, too small to display or disclosive values
6. r denotes revised figures

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**Table 25 (2016)**  
**Average expenditure on R&D within businesses performing R&D in Scotland**  
**by country of ownership of business performing R&D: Broad Product Groups<sup>1</sup>, 2016<sup>r,2</sup>**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>4</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>167</b>	<b>4,535</b>	<b>2,357</b>	<b>5,759</b>	<b>910</b>	<b>678</b>
Chemicals	449	..	..	12,054	..	2,632
Mechanical engineering	99	..	740	..	139	180
Electrical machinery	497	..	13,346	13,173	..	2,791
Transport equipment & aerospace	454	..	..	..	..	567
Other manufacturing	87	1,487	992	2,281	755	259
<b>Services</b>	<b>117</b>	<b>997</b>	<b>1,183</b>	<b>1,512</b>	<b>445</b>	<b>177</b>
<b>Other Sectors</b>	<b>75</b>	<b>585</b>	<b>3,676</b>	<b>2,763</b>	<b>2,003</b>	<b>442</b>
Agriculture, hunting & forestry; Fishing	..	..	..	..	1,304	258
Extractive industries	..	-	4,216	3,374	..	2,101
Electricity, gas & water supply; waste management <sup>3</sup>	..	..	..	..	..	2,340
Construction	29	..	..	..	-	107
<b>Grand Total</b>	<b>126</b>	<b>2,240</b>	<b>2,036</b>	<b>3,593</b>	<b>871</b>	<b>330</b>

Source: ONS and Scottish Government

Notes:

1. Where a business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. The Other EU category shows data from the EU28 countries.
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**Table 25 (2017)**  
**Average expenditure on R&D within businesses performing R&D in Scotland**  
**by country of ownership of business performing R&D: Broad Product Groups<sup>1</sup>, 2017<sup>2</sup>**

	Country of Ownership					Total
	Scotland	Rest of the UK	Other EU <sup>4</sup>	United States	Rest of the World	
<b>Manufacturing</b>	<b>141</b>	<b>2,772</b>	<b>2,858</b>	<b>4,955</b>	<b>755</b>	<b>618</b>
Chemicals	290	..	..	..	..	2,608
Mechanical engineering	95	139	303	1,055	186	167
Electrical machinery	382	..	13,313	..	2,480	2,748
Transport equipment & aerospace	334	..	..	695	..	819
Other manufacturing	94	919	664	1,267	766	201
<b>Services</b>	<b>161</b>	<b>..</b>	<b>3,081</b>	<b>1,109</b>	<b>..</b>	<b>249</b>
<b>Other Sectors</b>	<b>69</b>	<b>..</b>	<b>2,585</b>	<b>4,853</b>	<b>..</b>	<b>319</b>
Agriculture, hunting & forestry; Fishing	59	..	..	..	2,073	265
Extractive industries	..	-	5,488	5,155	..	3,404
Electricity, gas & water supply; waste management <sup>3</sup>	214	..	..	..	-	479
Construction	..	..	1,545	-	-	103
<b>Grand Total</b>	<b>148</b>	<b>1,634</b>	<b>2,907</b>	<b>3,250</b>	<b>766</b>	<b>358</b>

Source: ONS and Scottish Government

Notes:

1. Where a business undertakes R&D expenditure in more than one broad product group the business is allocated to the broad product group in which it undertakes the highest R&D expenditure.
2. There is a discontinuity between the data for 2009 onwards with earlier years due to the introduction of SIC 2007. See Note 16 of the background notes for details.
3. From 2009 onwards waste management is included in Electricity, gas & water supply; waste management, when previously it was included in Other manufacturing.
4. The Other EU category shows data from the EU28 countries.
5. .. Denotes nil, figures unavailable, too small to display or disclosive values

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**Table 26**  
**Expenditure on R&D performed within businesses in Scotland:**  
**Growth Sector, 2009-2017**

Growth Sector	£ thousands								
	Year								
	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
<b>Food &amp; Drink</b>	17,576	20,242	26,771	24,214	22,163	19,310	16,911	..	34,434
<b>Financial and Business Services</b>	19,067	16,114	..	29,576	..	162,299	154,782	146,467	199,833
<b>Life Sciences</b>	153,783	171,822	254,130	254,647	270,451	293,393	285,063	264,656	293,269
<b>Energy (including Renewables)</b>	57,135	49,818	75,030	45,473	89,956	77,038	61,402	95,346	73,525
<b>Sustainable Tourism (Tourism-related industries)</b>	1,044	3,036	..	3,599	..	3,931	4,538	..	5,869
<b>Creative Industries (including Digital)</b>	57,386	58,413	70,703	101,732	123,899	140,426	138,850	168,113	204,505
<b>All Growth Sectors</b>	305,991	319,446	445,615	459,241	563,123	696,398	661,546	712,223	811,435

*Source: ONS and Scottish Government*

Notes:

1. .. Denotes disclosive value.

2. r denotes revised figures.

3. Growth sectors are based on Standard Industrial Classification 2007 codes. More information on how the growth sectors are defined is available at:

<http://www.gov.scot/Topics/Statistics/Browse/Business/Publications/GrowthSectors>

4. Totals may not sum due to rounding.

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**Table 27**  
**Employment on R&D performed within businesses in Scotland:**  
**Growth Sector, 2009-2017**

Growth Sector	Year								
	2009	2010	2011	2012	2013	2014	2015 <sup>r</sup>	2016 <sup>r</sup>	2017
<b>Food &amp; Drink</b>	376	352	496	392	432	314	280	..	541
<b>Financial and Business Services</b>	239	223	..	420	..	2,140	2,077	1,657	1,821
<b>Life Sciences</b>	1,731	1,957	2,324	2,571	2,588	2,767	2,779	2,751	2,883
<b>Energy (including Renewables)</b>	292	433	602	555	831	516	443	807	570
<b>Sustainable Tourism (Tourism-related industries)</b>	19	50	..	68	..	90	92	..	115
<b>Creative Industries (including Digital)</b>	799	789	1,012	1,390	1,849	1,555	1,716	1,910	2,355
<b>All Growth Sectors</b>	3,456	3,804	4,708	5,396	6,491	7,382	7,387	7,644	8,285

*Source: ONS and Scottish Government*

Notes:

1. .. Denotes disclosive value.

2. r denotes revised figures.

3. Growth sectors are based on Standard Industrial Classification 2007 codes. More information on how the growth sectors are defined is available at:

<http://www.gov.scot/Topics/Statistics/Browse/Business/Publications/GrowthSectors>

4. Totals may not sum due to rounding.

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**Table 28**  
**Expenditure on R&D performed in Businesses in Scotland:**  
**by small and medium size enterprises<sup>1</sup>, 2006-2017**

<b>£ million</b>				
<b>Year</b>	<b>0 to 249 employees</b>		<b>250 employees and over</b>	<b>Total Expenditure</b>
	<b>Independent SME</b>	<b>Part of larger enterprise group</b>		
<b>2006</b>	26	100	334	460
<b>2007</b>	37	122	384	543
<b>2008</b>	26	152	375	554
<b>2009</b>	55	116	460	631
<b>2010</b>	46	131	441	619
<b>2011</b>	56	149	492	697
<b>2012</b>	75	139	494	709
<b>2013</b>	57	171	573	801
<b>2014</b>	68	302	655	957
<b>2015<sup>r</sup></b>	87	286	667	953
<b>2016<sup>r</sup></b>	93	303	772	1,075
<b>2017</b>	104	322	925	1,247

*Source: ONS and Scottish Government*

Notes:

1. The definition of SME used is that under the European Commission Recommendation (96/280/EC) of 3 April 1996, in which SMEs are defined as being enterprises with less than 250 employees, and also a criterion of independence is used to exclude enterprises that are part of a larger enterprise group. To apply this definition, historic information on company ownership has been obtained using that currently held on the ONS IDBR. Caution should therefore be used in making comparisons over time.

2. r denotes revised figures.

3. Totals may not sum due to rounding.

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**Table 29 (2015)**  
**Expenditure and employment on R&D performed in Businesses in Scotland:**  
**Top 100 Enterprise Groups, 2015<sup>r</sup>**

	Total Intramural Expenditure (£ thousands)	R&D Employment (Full time equivalent)
<b>TOTAL ALL ENTERPRISES</b>	<b>952,625</b>	<b>11,864</b>
Enterprise groups with the largest expenditure on R&D		
Top 5	280,186	2,620
Top 10	397,765	3,461
Top 15	467,831	4,386
Top 20	514,166	4,820
Top 50	674,384	6,524
Top 100	744,361	7,455

*Source: ONS and Scottish Government*

1. r denotes revised figures

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**Table 29 (2016)**  
**Expenditure and employment on R&D performed in Businesses in Scotland:**  
**Top 100 Enterprise Groups, 2016<sup>r</sup>**

	Total Intramural Expenditure (£ thousands)	R&D Employment (Full time equivalent)
<b>TOTAL ALL ENTERPRISES</b>	<b>1,074,544</b>	<b>12,547</b>
Enterprise groups with the largest expenditure on R&D		
Top 5	275,945	2,406
Top 10	419,471	3,661
Top 15	508,719	4,207
Top 20	564,867	4,615
Top 50	742,417	6,568
Top 100	831,868	7,841

*Source: ONS and Scottish Government*

1. r denotes revised figures

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**Table 29 (2017)**  
**Expenditure and employment on R&D performed in Businesses in Scotland:**  
**Top 100 Enterprise Groups, 2017**

	Total Intramural Expenditure (£ thousands)	R&D Employment (Full time equivalent)
<b>TOTAL ALL ENTERPRISES</b>	<b>1,247,278</b>	<b>13,178</b>
Enterprise groups with the largest expenditure on R&D		
Top 5	471,516	2,490
Top 10	627,186	3,966
Top 15	693,138	4,357
Top 20	739,188	4,666
Top 50	884,183	6,192
Top 100	970,534	7,190

*Source: ONS and Scottish Government*

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## **A National Statistics publication for Scotland**

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