

Northern Ireland Research and Development Statistics 2015



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Key points

- In 2015 £749.6m was spent on R&D by Businesses, Higher Education and Government in Northern Ireland (NI). This is an increase of £143.7m (24%) in cash terms compared to the previous year, with about 90% (£129.5m) of the increase accounted for by private sector businesses. This is the highest level of total R&D spending on record for the survey.
- Of the £749.6 million spent on total R&D, £540.0 million (72%) was spent by Businesses, £192.9 million (26%) by the Higher Education sector and the remainder (£16.7 million or 2%) was Government expenditure.
- The increase in total expenditure was primarily due to an increase of £129.5m (32% over the year) in Business expenditure. There was also an increase of £15.2m in Higher Education expenditure (9%) but a fall of £1.0m (6%) in Government expenditure.
- Of the twelve United Kingdom (UK) regions, Northern Ireland reported the largest annual increase in (in-house) R&D expenditure over the year (40%).
- The ten biggest spending companies accounted for 46% of the total R&D spend in Northern Ireland in 2015, higher than in 2014 (42%).
- There was an 8% increase in the number of local and externally owned companies engaged in R&D over the year. Externally owned companies accounted for 65% of Business R&D expenditure compared to 35% by locally owned companies. R&D spend by locally owned companies reported an annual increase of 27%.
- R&D expenditure by Small and Medium-sized companies (SMEs) increased by £62.8m (33%) from 2014 to 2015.
- Variations may occur in NI R&D data from year to year due to the influence of one or two large scale projects, either starting or finishing. It is likely this contributed to the increase in Business R&D expenditure over the year.

National Statistics

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.

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the Code of Practice for Official Statistics. They are awarded National Statistics status following an assessment by the Authority's regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

It is a producer's responsibility to maintain compliance with the standards expected of National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the Authority promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.

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This bulletin provides information on Research & Development (R&D) expenditure and employment in Northern Ireland. R&D activity contributes to the development of new technologies, products and processes and is a key driver of productivity growth. The Northern Ireland R&D surveys cover the Business Sector, Higher Education and Other Government financed activities.

R&D Definition

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”. The statistics are produced according to internationally agreed standards as defined by the Organisation for Economic Cooperation and Development (OECD), as published in the “Frascati” Manual. Details can be found at the following link: <http://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm>

This report presents statistics on a current price basis, which reports prices as they were at the time of measurement and not adjusted for inflation, and constant prices, which are prices adjusted for inflation between years using the GDP deflator. The latter is more appropriate when analysing changes in R&D expenditure over time.

Coverage and Results

The performance and funding of most Research & Development (R&D) activity occurs in three main economic sectors: - the Business Sector, Higher Education Institutions and Government.

The Northern Ireland Statistics and Research Agency (NISRA) carries out annual surveys of R&D expenditure in the Business sector and Higher Education Institutions in Northern Ireland. Information on Government R&D comes from an annual survey conducted by the Office for National Statistics (ONS), which is addressed to all Government Departments, including those in NI¹.

All companies believed to be performing R&D are included in the survey - in effect, therefore, a census of known R&D performers is carried out. Further information about identifying such companies is contained in the background notes section. A total of 1,101 returns were received by the Department – some 80% of those identified.

Where companies failed to respond, their level of R&D spend was estimated from Invest NI administrative records, other business surveys and historical records as appropriate. For further information see Section 6 - Background Notes.

All results contained in this bulletin are provisional and may be subject to revision to take account of any additional information received subsequent to publication.

¹ The latest details are available on the Office for National Statistics website at <http://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgovernmentexpenditure/scienceengineeringandtechnology/2014>

2.1 Total Expenditure on R&D in Cash Terms

Total expenditure on R&D in NI in cash terms was £749.6 million (m) in 2015, of which £540.0m (72%) was spent by Businesses, £192.9m (26%) by the Higher Education sector and the remainder, £16.7m (2%) was Government expenditure (Table 1).

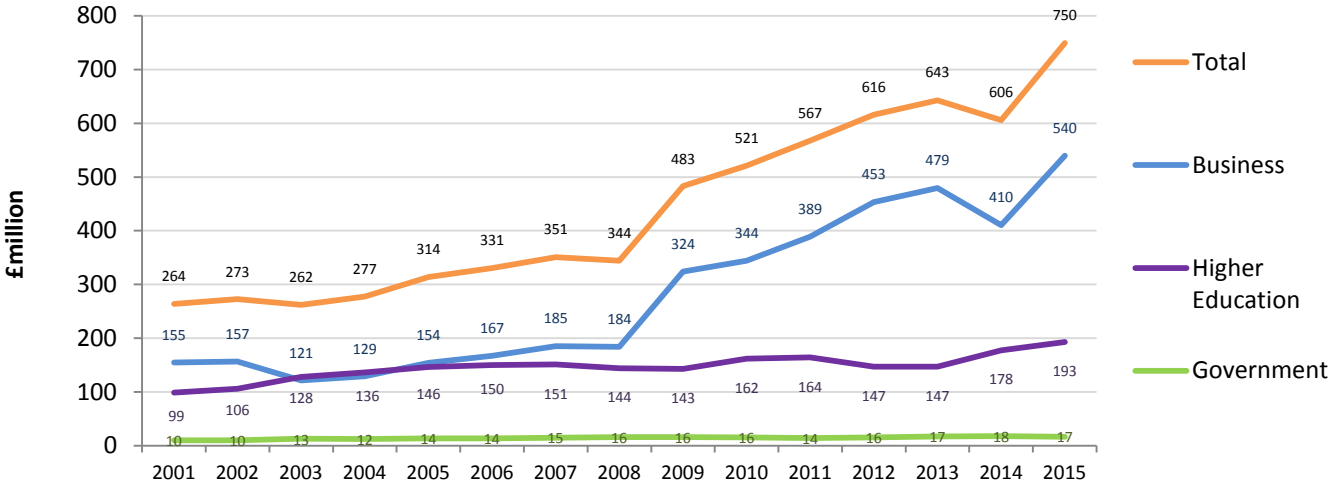
There was an increase of £143.7m (24%) in cash terms in NI total R&D expenditure between 2014 and 2015. This was primarily due to an increase of £129.5m (32% over the year) in Business expenditure, to £540.0m in 2015. There was also an increase of £15.2m in Higher Education expenditure (9%) and a decrease of £1.0m (6%) in Government expenditure in 2015.

Over the last two years total R&D spending in cash terms in NI has risen by £106.5m (17%).

Table 1: Total NI R&D expenditure in cash terms, 2001 - 2015 (£million)

	Business	Higher Education	Government	Total
2001	155.0	98.8	10.0	263.8
2002	156.6	105.8	10.1	272.5
2003	121.3	127.8	12.7	261.8
2004	129.0	136.1	12.3	277.4
2005	154.3	146.2	13.6	314.1
2006	167.0	150.1	13.7	330.8
2007	185.1	151.3	14.7	351.1
2008	183.9	144.2	15.9	344.0
2009	323.7	143.0	16.1	482.8
2010	344.0	161.8	15.6	521.4
2011	388.8	164.3	14.4	567.5
2012	453.2	147.3	15.5	616.0
2013	479.3	147.0	16.8	643.1
2014	410.5	177.7	17.7	605.9
2015	540.0	192.9	16.7	749.6

Figure 1: Total NI R&D expenditure in cash terms 2001-2015 (£million)



2.2 Total Expenditure on R&D in Real Terms

In addition to the measure of R&D activity in cash terms provided in the key points section and in section 2.1, it is also of interest to examine change in spend in real terms. This takes out the effect of price changes over time through the use of deflators, enabling a more consistent measure of investment in R&D activity (Table 2).

Table 2: Total NI R&D expenditure in real terms, 2001 - 2015 (£million)

	Business	Higher Education	Government	Total
2001	205.0	130.7	13.2	348.9
2002	202.5	136.8	13.1	352.4
2003	153.4	161.7	16.1	331.2
2004	159.0	167.7	15.2	341.8
2005	185.2	175.5	16.3	377.0
2006	194.5	174.9	15.9	385.3
2007	210.5	172.1	16.7	399.3
2008	203.6	159.7	17.6	380.9
2009	353.6	156.2	17.6	527.4
2010	369.0	173.6	16.7	559.3
2011	411.3	173.8	15.2	600.3
2012	469.6	152.6	16.1	638.3
2013	488.5	149.8	17.1	655.5
2014	412.3	178.5	17.8	608.5
2015	540.0	192.9	16.7	749.6

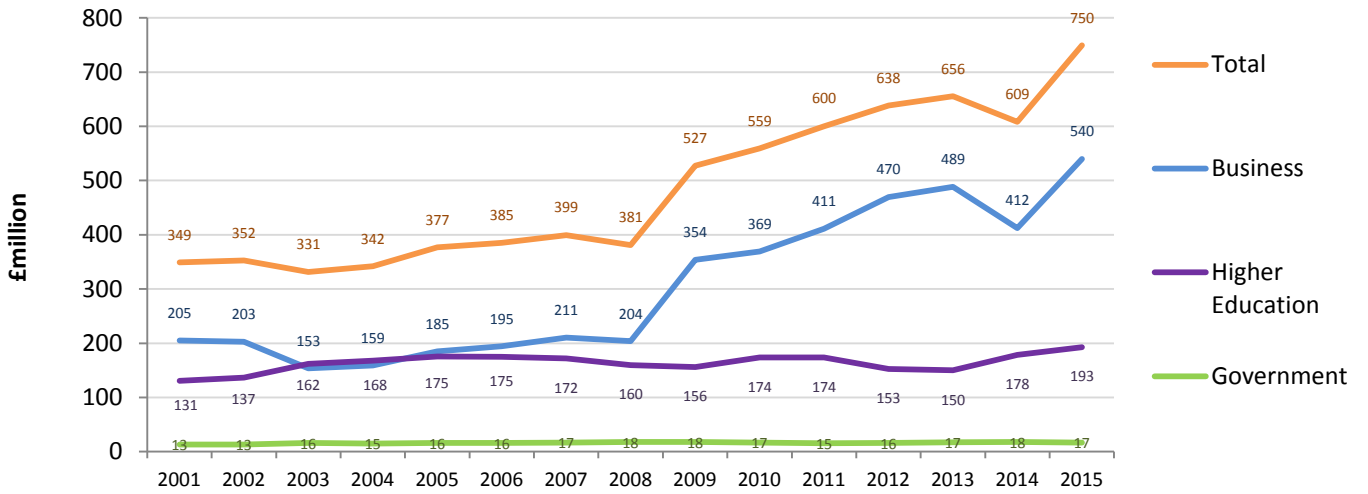
In real terms, total expenditure increased by £141.0m or 23% from £608.5m in 2014 to £749.6m in 2015. It was 34% above the level of such expenditure in 2010.

In 2015 the Northern Ireland Business sector again accounted for a much greater share of total R&D expenditure (72%) than the Higher Education sector (26%). In 2014 the figures were 68% and 29% respectively.

On a real terms basis Business R&D expenditure increased by 31% over the year (£127.7m) and increased by 46% (£171.0m) over the five year period from 2010 to 2015.

In real terms, expenditure by Higher Education increased by £14.4m (8%) and Government expenditure decreased by £1.1m (6%) over the year. Since 2010, Higher Education R&D expenditure has increased by £19.3m (11%) while Government spending is at the same level (£16.7m) in real terms.

Figure 2: Total NI R&D expenditure in real terms 2001-2015 (£million)²



Detailed analysis of company spend throughout the remainder of the survey is undertaken in cash terms.

² GDP deflator used to convert cash terms to real terms: e.g. 2008 (90.3), 2009 (91.6), 2010 (93.2), 2011 (94.5), 2012 (99.5), 2013 (98.1), 2014 (99.6), 2015 = 100.

3

Business Expenditure on Research & Development (BERD)

Detailed analysis of company spend throughout the remainder of the survey is undertaken in cash terms, except where otherwise stated.

3.1 Business Expenditure on Research & Development (BERD) in 2015

Table 3 details the headline results for 2015 BERD. Total expenditure on R&D by private sector NI businesses was an estimated £540.0 million in 2015 in cash terms.

Total BERD consists of in-house R&D expenditure (i.e. R&D carried out within the company) and purchased R&D expenditure (i.e. R&D funded by firms in NI but undertaken by other firms in the UK and abroad)³. The vast majority of total BERD was in-house expenditure (£501.5m or 93%) with £38.5m or 7% being purchased R&D expenditure which decreased from £52.2m in the previous year.

Sixty-eight per cent of funding for in-house R&D in 2015 came from the companies' own resources (£343.5m) while government provided a further 8% (or £39.8m) and the remainder came from overseas and other sources (7% or £34.1m). The ten biggest spending companies in 2015 accounted for 46% of total R&D expenditure in Northern Ireland, higher than the proportion in 2014 (42%).

In 2015, 73 companies spent more than £1 million on R&D, ten more companies than in 2014.

Table 3: Business Expenditure on R&D: 2015 (£million)

	Total 2015 BERD (£m)	As a % of total 2015 BERD
Total 2015 BERD	540.0	100
In-house BERD (of which):	501.5	93
Non Capital Expenditure	446.9	83
Capital Expenditure	54.5	10
Purchased BERD (of which):	38.5	7
Undertaken by Higher Education	0.9	0.2

³ For definitions, see Section 6: Background Notes

3.2 Business Expenditure on Research & Development - Comparisons over time

As shown in Table 4, between 2010 and 2015 total BERD increased by 57% in cash terms, with in-house R&D increasing by 55% and purchased R&D expenditure increasing by 95%.

Table 4: Business Expenditure on R&D: 2010 – 2015 (£million)⁴

	Cash terms						change cash		Real terms						change real	
	2010	2011	2012	2013	2014	2015	2014 - 15	2010 - 15	2010	2011	2012	2013	2014	2015	2014 - 15	2010 - 15
Total BERD	344.0	388.8	453.2	479.3	410.5	540.0	32	57	369.0	411.3	469.6	488.5	412.3	540.0	31	46
In-house R&D	324.2	354.1	415.0	440.6	358.3	501.5	40	55	347.7	374.6	430.0	449.2	359.9	501.5	39	44
Non capital	230.0	321.2	372.6	379.2	327.6	446.9	36	94	246.7	339.8	386.1	386.5	329.1	446.9	36	81
Capital	94.2	32.8	42.4	61.5	30.7	54.5	78	-42	101.0	34.7	43.9	62.6	30.8	54.5	77	-46
Purchased R&D	19.8	34.7	38.2	38.6	52.2	38.5	-26	95	21.2	36.7	39.6	39.3	52.4	38.5	-26	81

⁴ A more detailed breakdown of business expenditure, including funding, ownership, research, size and sector can be found in Annexe Table 1

3.3 Business Expenditure on Research & Development - Summary

Business R&D: In-house Expenditure

In-house expenditure is an important component of total R&D as it shows the amount spent on R&D by firms in NI that was undertaken within NI (purchased R&D expenditure by companies in NI may be carried out in other parts of the UK or abroad). NI business R&D expenditure carried out within a company in NI (in-house), accounted for 93% (£501.5m) of total business expenditure in 2015. In-house expenditure increased by 40% between 2014 and 2015.

In-house Business R&D: UK and regional comparisons

Of the 12 UK regions, nine showed an increase in in-house business R&D expenditure in cash terms over the year to 2015 (Table 5). Northern Ireland increased by 40%, which was the highest percentage increase across all the UK regions. The change in R&D expenditure in NI is the result of several factors, including companies beginning new projects, resulting staff increases and spending on new equipment and materials. This can have a large impact on annual NI R&D estimates, particularly where larger companies have commenced a significant R&D project.

In the UK as a whole such expenditure increased by 5%. Changes varied from an increase of 40% in NI to a decrease of 6% in Wales.

Table 5: In-house R&D expenditure by UK businesses by country or region, 2014 - 2015 (£million)

Region	Expenditure (£million)		% Change 2014-2015
	2015	2014	
UK	20,885	19,819	5
England	19,151	18,201	5
North East	306	282	9
North West	2,113	1,913	10
Yorkshire & the Humber	779	700	11
East Midlands	1,515	1,473	3
West Midlands	2,166	1,924	13
South West	1,472	1,561	-6
East of England	4,178	4,071	3
London	1,912	1,723	11
South East	4,709	4,554	3
Wales	362	386	-6
Scotland	871	874	0
Northern Ireland	501	358	40

R&D Investment Rate

Regional Gross Value Added (GVA) for 2014 released by the Office for National Statistics (ONS) on the 9th December 2015 shows that Northern Ireland 2015 in-house R&D as a proportion of GVA was 1.5% and was the fifth highest of the twelve UK regions (Table 6). A higher proportion was recorded in the East of England (3.0%), the South East (2.0%) the West Midlands (1.9%) and the East Midlands (1.6%). Northern Ireland in-house R&D as a proportion of GVA is higher than the UK average rate (1.3%). Regional GVA figures for 2015 are expected to be released by the ONS in December 2016.

Table 6: In-house R&D expenditure by UK businesses as a proportion of GVA (£million)

Region	Total GVA*	In-house BERD	BERD as % GVA
	£m	£m	
	2014	2015	
UK	1,618,346	20,885	1.3
England	1,377,851	19,151	1.4
North East	47,702	306	0.6
North West	149,869	2,113	1.4
Yorkshire & the Humber	106,467	779	0.7
East Midlands	95,178	1,515	1.6
West Midlands	114,755	2,166	1.9
South West	121,070	1,472	1.2
East of England	138,801	4,178	3.0
London	364,310	1,912	0.5
South East	239,698	4,709	2.0
Wales	54,336	362	0.7
Scotland	123,543	871	0.7
Northern Ireland	34,384	501	1.5

*Source: Office for National Statistics, NUTS1 regional GVA

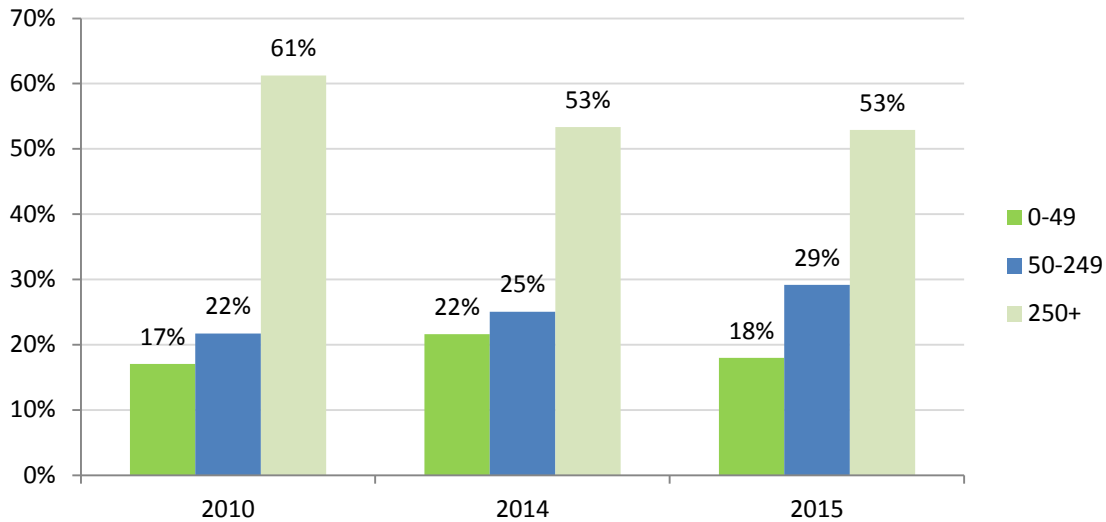
UK Business Expenditure on Research and Development (BERD) results were released on 17th November 2016 and can be found at the following link:

<http://www.ons.gov.uk/businessindustryandtrade/business/businessinnovation>

Company size

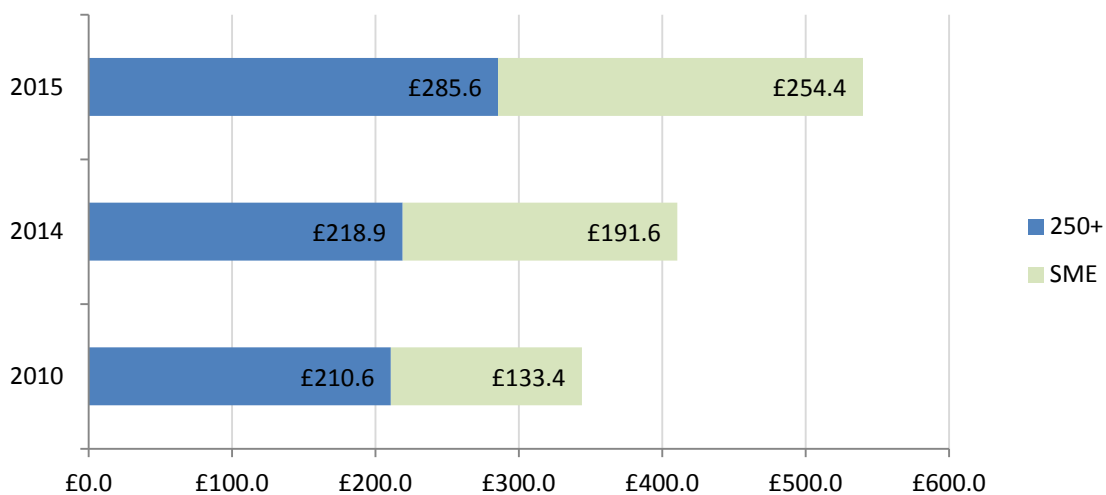
Companies with 250 or more employees accounted for 53% of business R&D expenditure (BERD) in 2015, although they represented only 7% of all R&D performing companies. Small firms (i.e. those with less than 50 employees) represented 71% of R&D performing companies and accounted for 18% of total business R&D expenditure (Figure 3).

Figure 3: Percentage of total BERD expenditure by company size 2010, 2014 - 2015 (by total employees)



R&D expenditure by Small and Medium-sized companies (SMEs)⁵ accounted for 47% (£254.4m) of the total business expenditure in 2015. Total SME expenditure increased in cash terms by £62.8m (33%) from 2014 to 2015. Over the five year period SME expenditure has increased by 91% (£121.0m) to £254.4m. The contribution of large companies (250 or more employees) to total R&D business expenditure saw no change over the year (53% in 2014 and 2015). See Annexe Table 4 for further details.

Figure 4: Total BERD expenditure by SMEs and large companies 2010, 2014-2015 (by total employees, £million)



⁵ The European Commission definition of Small Medium Enterprises (SME) used is defined as being enterprises with less than 250 employees and large companies as being enterprises with more than 250 employees.

3.4 Business Expenditure on Research & Development – Sectoral Breakdowns

In 2015, the majority of R&D was carried out within the Manufacturing sector (65%) with the remaining 35% carried out in the Services & Other industries category. The respective figures in 2014 were 63% of R&D carried out in Manufacturing sector and 37% in the Services & Other category.

R&D expenditure by businesses in the Manufacturing sector increased by £92.8m (36%) from 2014 to 2015. There was also an increase of £36.7m (24%) among businesses in the Services & Other industries category.

The manufacture of transport equipment sub-section (CL) accounted for 43% of all Manufacturing R&D (see Table 7), a slight increase from 39% in 2014, with the manufacture of computer, electronic and optical products (CI) accounting for 20% in both 2014 and 2015.

Table 7: Total BERD expenditure by manufacturing subsection, 2014 – 2015 (£million)

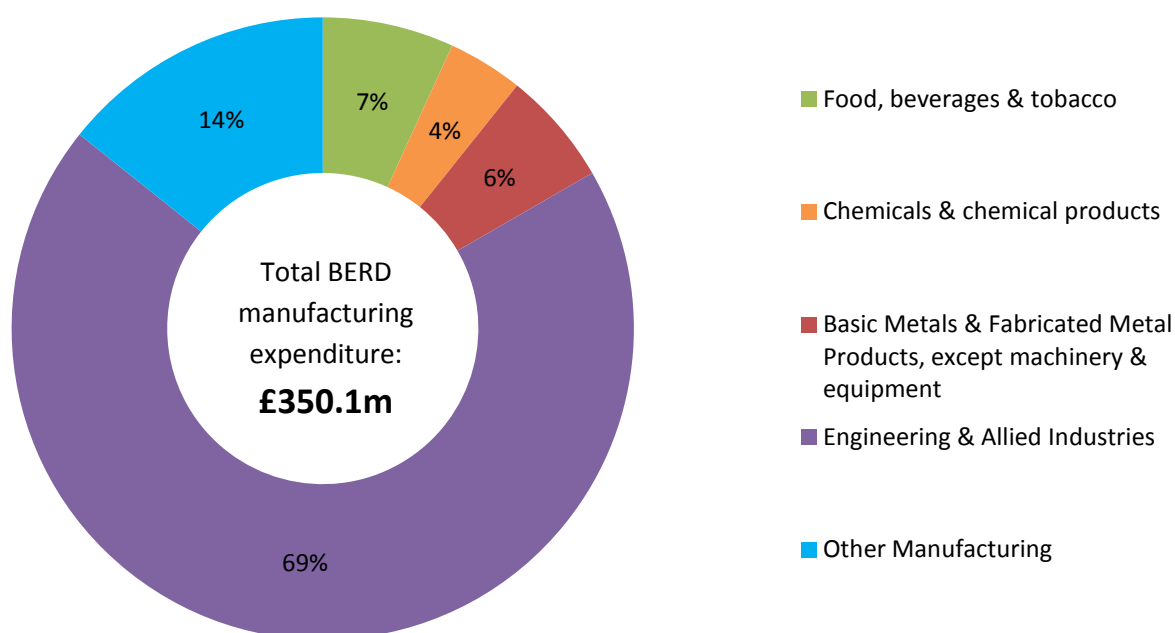
Manufacturing subsection	2015		2014	
	£m	% total	£m	% total
Manufacture of food products, beverages and tobacco products	23.9	7	21	8
Manufacture of textiles, wearing apparel, leather and related products	*	*	*	*
Manufacture of wood and paper products; printing and reproduction of recorded media	2.9	1	3	1
Manufacture of coke and refined petroleum products	*	*	*	*
Manufacture of chemicals and chemical products	13.7	4	12	5
Manufacture of basic pharmaceutical products and pharmaceutical preparations	*	*	*	*
Manufacture of rubber and plastics products, and other non-metallic mineral products	12.6	4	8	3
Manufacture of basic metals and fabricated metal products, except machinery and equipment	20.8	6	14	5
Manufacture of computer, electronic and optical products	70.0	20	51	20
Manufacture of electrical equipment	4.4	1	4	2
Manufacture of machinery and equipment n.e.c.	18.1	5	16	6
Manufacture of transport equipment	149.2	43	102	39
Other manufacturing; repair and installation of machinery and equipment	6.3	2	6	2
Total manufacturing	350.1	100	257	100

Note: Figures may not add due to rounding

* = disclosive

Figure 5 below, highlights that 69% of R&D spending within the Manufacturing sector was accounted for by companies involved in Engineering & Allied Industries (CI, CJ, CK, CL).

Figure 5: Percentage of manufacturing expenditure by SIC 2007 subsection,⁸ 2015



As Table 8 details, in-house R&D expenditure, i.e. spending carried out within the company, accounted for 93% (£501.5m) of total R&D expenditure in NI in 2015. This was higher than the proportion in 2014 (87%).

Table 8: In-house and purchased R&D expenditure by sector, 2015 (£million)

	IN-HOUSE		PURCHASED		TOTAL BERD
	£m	% of Total BERD	£m	% of Total BERD	
Manufacturing	322.3	60	27.7	5	350.1
Services & Other	179.1	33	10.8	2	189.9
All Industries ⁶	501.5	93	38.5	7	540.0

The two components of in-house R&D expenditure are non capital expenditure (salaries & wages and other costs) and capital expenditure (land & buildings and plants & machinery).

⁶ All industries include Manufacturing, service sector industries plus a range of other industries. For full details of the other industries covered see Section 6, Background Notes.

Non capital expenditure makes up 89% of in-house expenditure, lower than that in 2014 (91%). Table 9 and Figure 6 highlight that there were differences between sectors in the categories of in-house R&D spend.

The proportion spent on non capital is much greater than capital expenditure in both Manufacturing and in Services & Other. A larger proportion of non capital expenditure was spent on salaries and wages in the Services & Other sector (64% of total in-house expenditure) compared to 43% in the Manufacturing Sector.

Although salaries and wages in the Services & Other sector have increased over the year (by £15.2m) they have decreased as a proportion of in-house expenditure from 72% (£99.8m) in 2014 to 64% (£115.0m) in 2015.

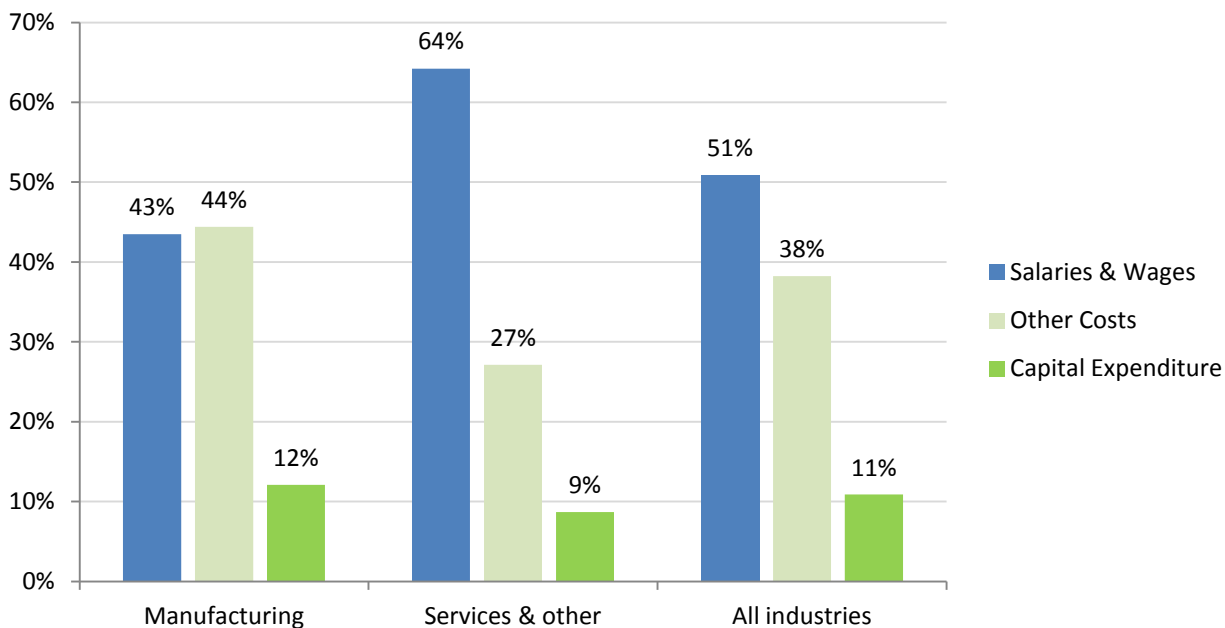
Salaries and wages in the Manufacturing Sector increased by 26% (£28.9m) over the year, from £111.4m in 2014 to £140.2m in 2015. It also saw a decrease as a proportion of in house expenditure from 51% in 2014 to 43% in 2015.

Over the year to 2015 the proportion spent on total capital expenditure increased from 9% to 11%.

Table 9: Breakdown of In-house R&D expenditure by sector, 2014 - 2015 (£million)

	Manufacturing		Services & Other		All Industries	
	£m	%	£m	%	£m	%
2015						
Non Capital Expenditure	283.3	88	163.6	91	446.9	89
Salaries & Wages	140.2	43	115.0	64	255.3	51
Other Costs	143.1	44	48.6	27	191.7	38
Capital Expenditure	39.0	12	15.5	9	54.5	11
Land & Buildings	2.3	1	1.4	1	3.7	1
Plant & Machinery	36.7	11	14.2	8	50.8	10
Total In-house Expenditure	322.3	100	179.1	100	501.5	100
2014						
Non Capital Expenditure	194.9	89	132.7	96	327.6	91
Salaries & Wages	111.4	51	99.8	72	211.2	59
Other Costs	83.5	38	32.9	24	116.4	32
Capital Expenditure	24.9	11	5.8	4	30.7	9
Land & Buildings	2.0	1	0.6	0	2.6	1
Plant & Machinery	22.9	10	5.2	4	28.1	8
Total In-house Expenditure	219.8	100	138.5	100	358.3	100

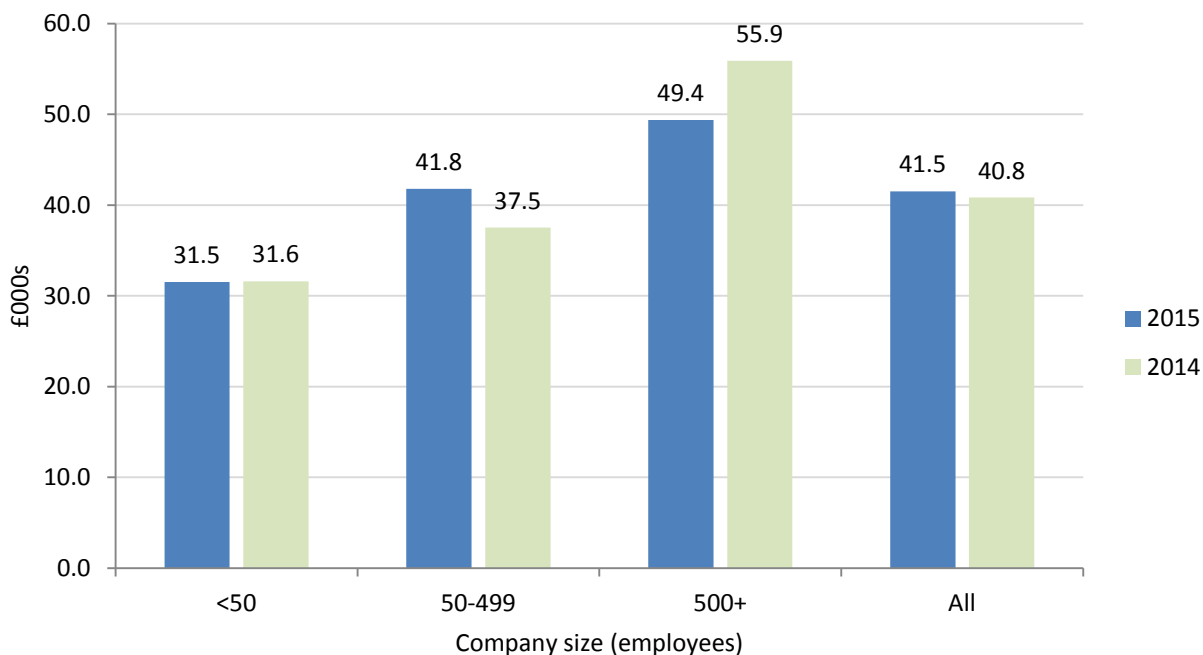
Figure 6: Percentage of In-house R&D expenditure by sector, 2015



3.5 Business Expenditure on Research & Development – Non Capital Expenditure

Non capital expenditure includes expenditure on salaries and wages and other costs (materials, supplies, equipment and services). As Figure 7 below shows, there are differences in the level of salaries & wages per head between companies of different sizes (based on full-time equivalent (FTE) figures).

Figure 7: Salaries & wages per head by company size, 2015 (£000's, rounded to nearest £100)



Overall the salaries and wages per R&D FTE was £41,500, an increase of 2% from £40,800 in 2014. Salaries and wages per head for companies with 500 or more employees were £49,400, a decrease of 12% from £55,900 the previous year while companies with between 50-499 employees increased by 11% over the year to £41,800 per head. This compares with £31,500 per head for companies with less than 50 employees (Figure 7).

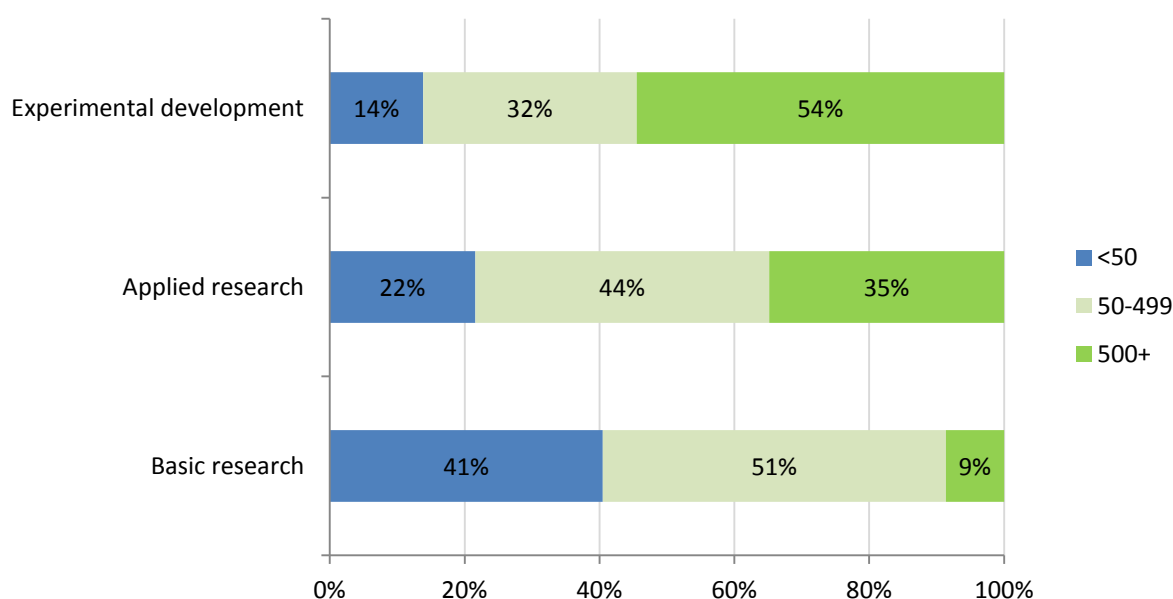
The majority of R&D non-capital expenditure in 2015 occurred in the Manufacturing Sector (63%) with 37% occurring in the Services and Other Sector (Table 10).

Table 10: Type of research by sector as percentage of all research, 2014 - 2015 (non capital expenditure, percentages)

	Manufacturing %			Services & other %			All industries %		
	2015	2014	% point change	2015	2014	% point change	2015	2014	% point change
Basic	2	2	-1	2	2	1	4	4	0
Applied	22	20	1	20	22	-2	41	42	-1
Experimental development	40	37	4	15	17	-3	55	54	1
All research	63	59	4	37	41	-4	100	100	0

As Table 10 again shows, non capital expenditure can also be analysed in terms of type of research carried out. Experimental development accounted for 55% of non capital expenditure in 2015, just above that in 2014 (54%), with applied research and basic research accounting for 41% and 4% respectively. Figure 8 shows that the majority of spending on applied and basic research is carried out by companies with between 0 and 499 employees (65% and 91% respectively), while companies with over 500 employees account for the majority of experimental development (54%). A detailed breakdown of the type of research carried out by both industry and company size is given in Annexe Table 2.

Figure 8: Type of research by company size, 2015 (percentage of expenditure)



3.6 Business Expenditure on Research & Development – Sources of Funds

The funding of in-house R&D expenditure comes from a number of sources: the companies' own funds, from Government, overseas funding (e.g. EU) and other businesses and organisations.

Table 11 shows that the greatest proportion of R&D funding was from Own Funds NI – 68% in 2015, down from 73% in 2014. 79% of R&D was funded by Own Funds NI in firms with over 500 employees compared to 61% in companies with between 50-499 employees and 59% in firms with fewer than 50 employees. Firms with fewer than 50 employees saw the greatest percentage point increase over the year in funding from parent companies, rising from 6% in 2014 to 19% in 2015.

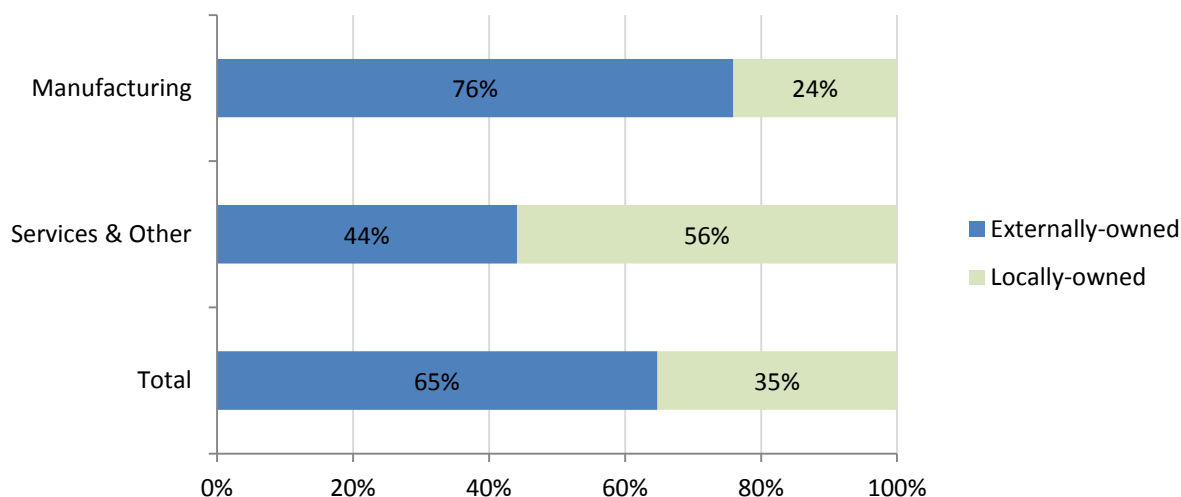
Table 11: In-house BERD R&D funding by source and company size 2014 – 2015 (percentage)

	<50 %		50-499 %		500+ %		All %	
	2015	2014	2015	2014	2015	2014	2015	2014
Own Funds NI	59	70	61	64	79	81	68	73
Own Funds Parent	19	6	20	15	14	14	17	13
Government	9	12	7	7	8	4	8	7
Overseas/Other	13	12	12	13	0	1	7	8
Total	100	100	100	100	100	100	100	100

3.7 Business Expenditure on Research & Development – Ownership Analysis

Figure 9 shows that the majority of R&D expenditure in Manufacturing is carried out by externally-owned companies (76%), and since 2008 the percentage has been at least 60%. In contrast, the Services & Other sector saw the majority of expenditure taking place among locally owned companies (56% in 2015). 65% of total R&D expenditure is performed by externally owned companies (up from 63% in 2014).

Figure 9: Ownership by sector, 2015 (percentage)



Expenditure by locally owned companies (£190.3m) increased by 27% from £150.4m in 2014 to £190.3m in 2015, while the number of these companies who reported R&D expenditure increased to 590 (from 549 in 2014).

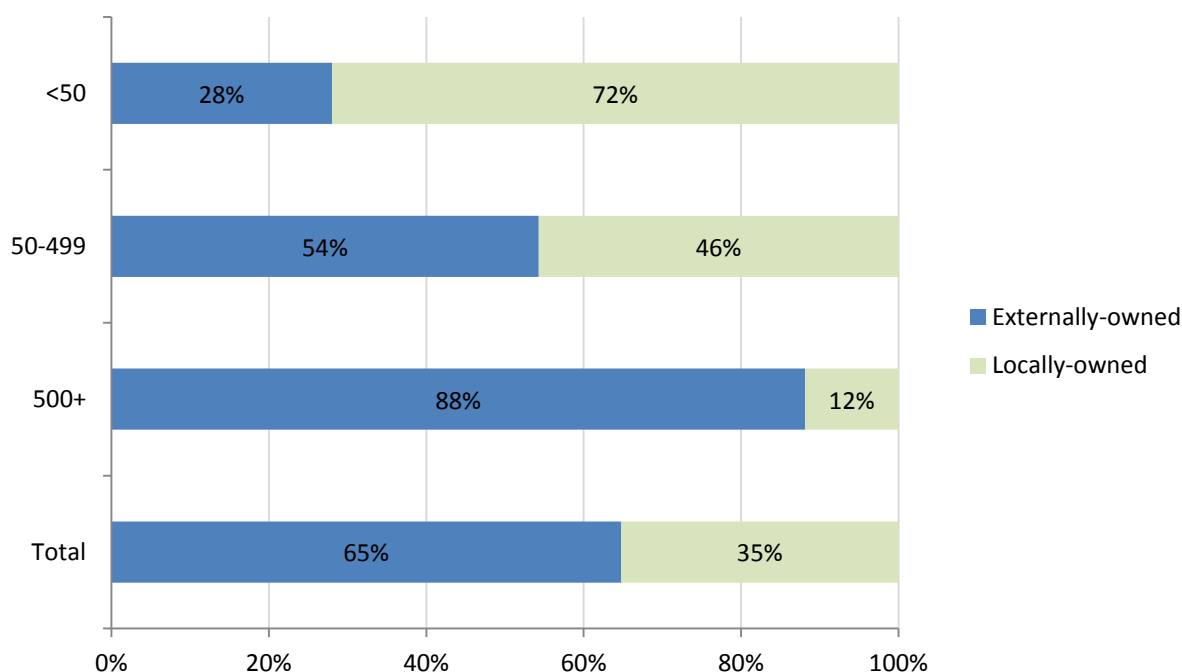
NI owned companies in 2015 accounted for 83% of all R&D performing companies and 35% of the total expenditure (Table 12). This can be compared with externally-owned companies accounting for 65% of the R&D expenditure and 17% of R&D performing companies. Their contribution to the total R&D spend was higher than in 2014 and their cash value increased by £89.6m over the same period.

Table 12: Total R&D expenditure by ownership of company, 2015

	£m		%		No. businesses		%	
	2015	2014	2015	2014	2015	2014	2015	2014
Externally owned	349.6	260.0	65	63	124	110	17	17
Locally owned	190.3	150.4	35	37	590	549	83	83
Total	540.0	410.5	100	100	714	659	100	100

As shown in Figure 10 the majority of R&D spend in companies with under 50 employees (72%) was by NI owned firms. However, in companies with between 50 and 499 employees and 500 or more employees the larger proportion was by externally owned firms (54% and 88% respectively).

Figure 10: Ownership by company size, 2015 (percentage of expenditure)



3.8 Business Expenditure on Research & Development - Employment

Estimates of employment in R&D are produced on a full-time equivalent (FTE) basis whereby businesses convert part-time employees' hours into full-time employees' equivalents. FTE estimates provide a better indication of total labour input than a simple headcount.

In 2015, surveyed companies reported a total of 9,220⁷ employees working on R&D. As in 2014, this corresponds to approximately 14% of all employees in companies carrying out R&D. The full time equivalent figure (FTE) for 2015 was 6,150 (Table 13).

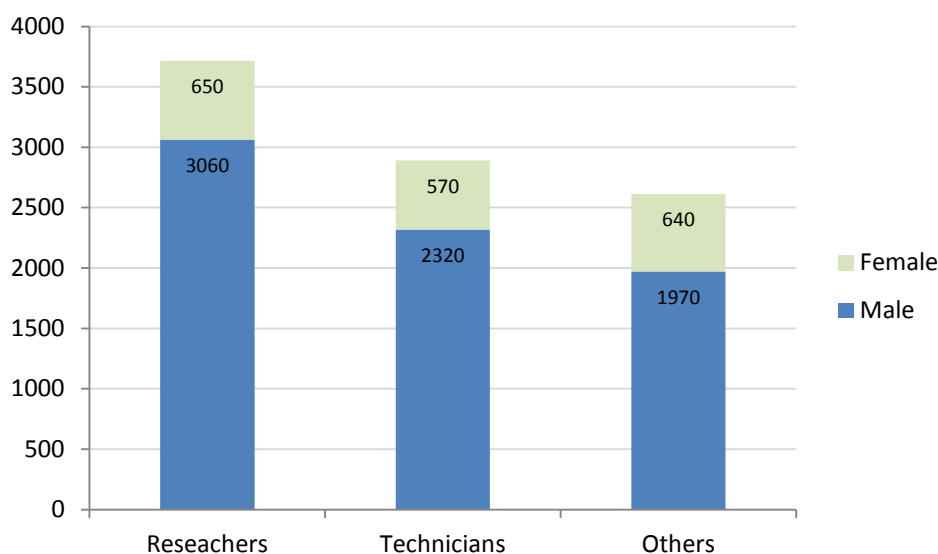
Table 13: R&D employment, 2005-2015

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
No. employees	2,720	3,040	3,310	3,750	4,690	5,230	5,440	6,320	6,800	8,330	9,220
FTE	2,600	2,870	2,760	2,940	3,520	3,950	4,240	4,560	4,780	5,170	6,150

Of the total employees involved in R&D activities, 7,350 (80%) were males and 1,870 (20%) were females. This compared to 8,330 employees in 2014 with 6,580 males and 1,750 females, representing 79% and 21% respectively. Figure 11 represents the split of employees by gender and type.

By type of R&D employee, researchers accounted for 40%, technicians for 31% and other employees (e.g. support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects) for 28% of all R&D employees in 2015. Comparable full-time equivalent figures show that 2,880 employees were researchers (47%), 1,860 employees were technicians (30%) and the number of other employees was 1,410 (23%).

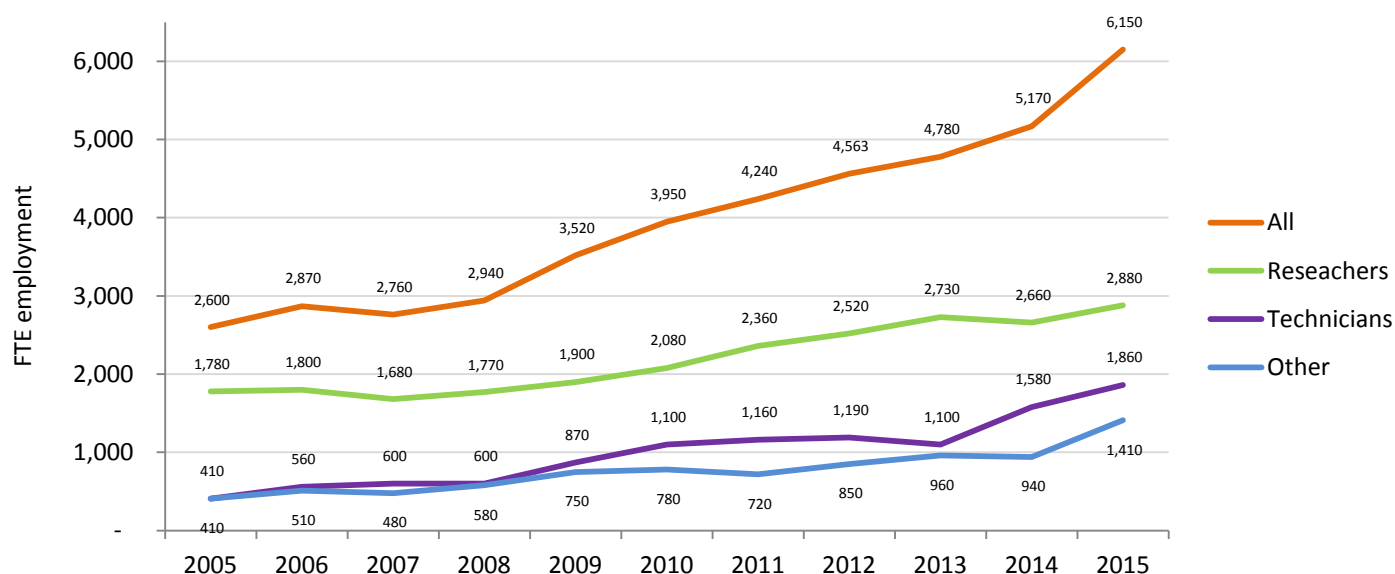
Figure 11: R&D employment by gender, 2015 (total headcount)



⁷ Please note: All employment figures have been rounded to the nearest 10

The number of R&D employees increased by 11% over the year to 2015. The FTE rise from 2014 to 2015 was 19%. The change in FTE levels from 2005 - 2015 is shown in Figure 12.

Figure 12: R&D FTE employment, 2005-2015



Average in-house R&D expenditure was £81,600 per R&D FTE employee in 2015, 18% higher than the figure of £69,300 per R&D FTE employee in 2014.

3.9 Business Expenditure on Research & Development – Tax Credits and Joint Ventures

Businesses were asked if they received any R&D tax credits and if their R&D work was part of a joint project in 2015, following the introduction of the question in the 2004 survey.

As shown in Table 14, companies reported that they received tax credits amounting to £36.0m in total. This represents a decrease in the amount received when compared with last year.

Table 14: Breakdown of R&D tax credits, 2008-2015 (£million)

	2008	2009	2010	2011	2012	2013	2014	2015
Tax credit (£m)	9.5	21.7	19.2	35.3	37.3	41.5	45.8	36.0

Forty nine companies reported that their R&D work was part of a joint project with a source outside their company. Fifteen companies had a joint project with Higher Education Establishments, 20 with other Businesses and 14 with both. This shows a decrease in the number of companies engaging in joint projects since last year (60 companies in 2014).

Table 15: Count of businesses conducting joint ventures

	2013	2014	2015
Business	28	23	20
Higher Education	9	21	15
Both	10	16	14
Total	47	60	49

3.10 Research & Development Information from Other Sources

Business Expenditure on Research & Development in the Republic of Ireland

The [Business Expenditure on Research and Development \(BERD\) Survey](#) is a biennial survey that is conducted by the Central Statistics Office (CSO), and the most recent data was released by the CSO on 19 June 2015. This survey examines R&D activities performed across the business sector in 2013.

The key findings include:

Aggregate levels of BERD (2013)

- Enterprises across all business sectors in Ireland spent €2.02 billion on in-house research and development (R&D) activities in 2013, a 15% increase on 2011. Enterprises active in R&D in 2013 estimated an R&D spend of €2.02 billion in 2014.
- Business R&D intensity (BERD as a percentage of GDP) reached 1.03% in 2011. Finland had the highest BERD intensity in the EU with 2.56% of GDP.
- Foreign owned enterprises accounted for 65% of the total business R&D spend in 2013.
- The vast majority of expenditure on R&D by businesses (93%) in 2013 was current expenditure (wages of R&D staff etc.) and 7% on capital expenditure (e.g. buildings, equipment, licence payments etc.)
- 57% of BERD was generated in the services sector in 2013.
- Medium and large enterprises (more than 50 employees) accounted for over three quarters of BERD in 2013.
- 90% of BERD funding was from company funds in 2013, up from 89% in 2011.

Human resources in R&D (2013)

- There were over 24,700 research personnel in the business sector and more than 17,00 full time equivalents (FTEs).
- More than half of R&D personnel (headcount) were employed in Irish owned firms.
- The majority of R&D personnel (67%) were employed in the services sector.

- Medium to large companies employed two thirds of all research personnel.
- There were 13,750 researchers or 10,793 FTEs employed in the business sector.
- Of total researchers in the business sector, 23% were female.
- 9% of all business sector researchers held a PhD qualification.

Number of R&D performing firms (2013)

- The number of R&D performing firms in 2013 was nearly 2,000 and 80% were Irish owned.
- Of firms engaged in R&D activities, 60% were in the services sector and 40% in manufacturing.
- Small firms with less than 50 employees accounted for 73% of all R&D active firms.
- More than 74% of all R&D performing enterprises spent less than €500k on R&D activities and 10% of enterprises were engaged in large scale R&D activities (spending in excess of €2 million)
- Over 80% of Irish owned firms spent less than €500k on R&D compared with 45% of foreign-owned firms.
- The vast majority (98%) of small enterprises spent less than €2million on R&D activities compared to 79% of medium sized enterprises and 57% of large enterprises.
- In both the manufacturing and services sectors, over 90% of firms spent less than €500k on R&D activities.

Type of research (2013)

- R&D expenditure was mostly concentrated in experimental development, accounting for 64% of all expenditure.
- Over half of Irish enterprises were engaged in experimental development compared to almost three-quarters of foreign owned companies.
- Small enterprises were more likely to engage in applied research (38%) than medium and large enterprises (23%).

Collaboration

- Of all R&D performing firms, 31% engaged in joint research projects with other parties in 2013.
- Of all collaboration partners, both small and medium/ large firms were most likely to collaborate with Higher Education Institutes (HEIs) in Ireland.
- Foreign owned firms were more likely than Irish firms to collaborate with research partners, with 37% and 29% respectively engaged.
- The most likely collaboration partner for all firms was HEIs in Ireland, rather than HEIs outside of Ireland or collaborations with other firms either within or outside Ireland

The 2015/2016 results will be published in early 2017.

UK Innovation Survey

The most recent UK Innovation Survey (2015) provides estimates of the innovation activity of small, medium and large businesses (SMEs – those with 10 - 249 employees) in the production and most of the services sectors. The broad definition of Innovation used in the survey covers a wide range of activities of which R&D is just one element. According to the latest results, during 2012-14 45% of NI SMEs were broader innovators, compared to 41% during 2010-12 (2013 survey). The equivalent UK figures also showed an increase from 46% to 54%. The survey also reported that 11% of businesses reported carrying out internal R&D. However, the Innovation definition of R&D is broader than the Frascati manual definition, which must be borne in mind when making comparisons between the results of the R&D and Innovation surveys.

Northern Ireland results from the 2013=5 and earlier Innovation Surveys are available at the following link: <https://www.economy-ni.gov.uk/articles/innovation-survey>

The methodology, sample details and first UK-level findings from the UK Innovation Survey 2015 can be found on the Office for National Statistics website at: <https://www.gov.uk/government/statistics/uk-innovation-survey-2015-main-report>

4

Higher Education Expenditure on Research & Development (HERD)

Table 16 details the headline results from the 2013-2015 Higher Education Expenditure on Research & Development (HERD) surveys.

Table 16: Higher Education Expenditure on R&D, 2013-2015 (£million)

HERD Expenditure	2013	2014	2015
	£million	£million	£million
Total HERD Expenditure⁸	148.3	179.0	193.8
<i>Of which</i> Non Capital Expenditure	139.4	159.4	171.9
Capital Expenditure	8.9	19.7	21.9
HERD Source of Funding			
Government Block Grant ⁹	78.3	84.4	90.0
OST Research Councils ¹⁰	12.8	20.7	24.4
UK-based charities	10.7	14.1	13.8
UK Cent Gov/Local Auth/Health ¹¹	24.4	29.0	36.6
UK Ind/Comm/Pub Corp ¹²	4.0	5.0	5.0
EU Government	9.1	13.6	13.0
EU Other	3.0	2.9	2.7
Other Overseas	4.0	7.7	7.6
Other Sources	2.0	1.6	0.6
HERD Employment	2013	2014	2015
	Count	Count	Count
Total HERD Employment¹³	1,610	1,750	1,720
<i>Of which</i> Academic staff	1,210	1,340	1,310
Technicians ¹⁴	200	180	180
Other ¹⁵	200	230	220

⁸Expenditure for 2015 includes £0.9 million of expenditure funded by Northern Ireland businesses (£1.3m in 2014 and £1.3m in 2013). Therefore, net HERD in 2015 was £192.9m (this is as detailed in Table 1). All university expenditure on R&D is in-house expenditure - i.e. R&D work carried out within the university. Figures given are in £millions and constituent parts may not add due to rounding.

⁹ Figure also includes funding from other sources such as fees, used to fund day-to-day R&D activity.

¹⁰ Office of Science and Technology Research Councils

¹¹ Funding from UK Central Government, Local Authorities and Health Trusts/Hospitals

¹² Funding from UK industry/commerce/public corporations

¹³ This is the number of full-time equivalents. Figures are rounded to the nearest 10 and constituent parts may not add due to rounding

¹⁴ Technicians – Perform scientific and technical tasks normally under the supervision of researchers.

¹⁵ Others -Support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects.

Total HERD expenditure increased by 8%; from £179.0m in 2014 to £193.8m in 2015. This compared with an increase of 21% from 2013 to 2014. The increase in 2015 in-house expenditure was comprised of an 11% increase in capital expenditure and 8% in non capital expenditure. This compares to the previous period where capital expenditure increased by 121% and non capital expenditure increased by 14%.

Employment totals decreased by 2% between 2014 and 2015, from 1,750 full-time equivalent persons in 2014 to 1,720 in 2015. The change in R&D employment consisted of a decrease in the number of academic staff (2%, from 1,340 to 1,310), the number of technicians (1%) and a decrease in the number of other employees employed in R&D (1% from 230 to 220).

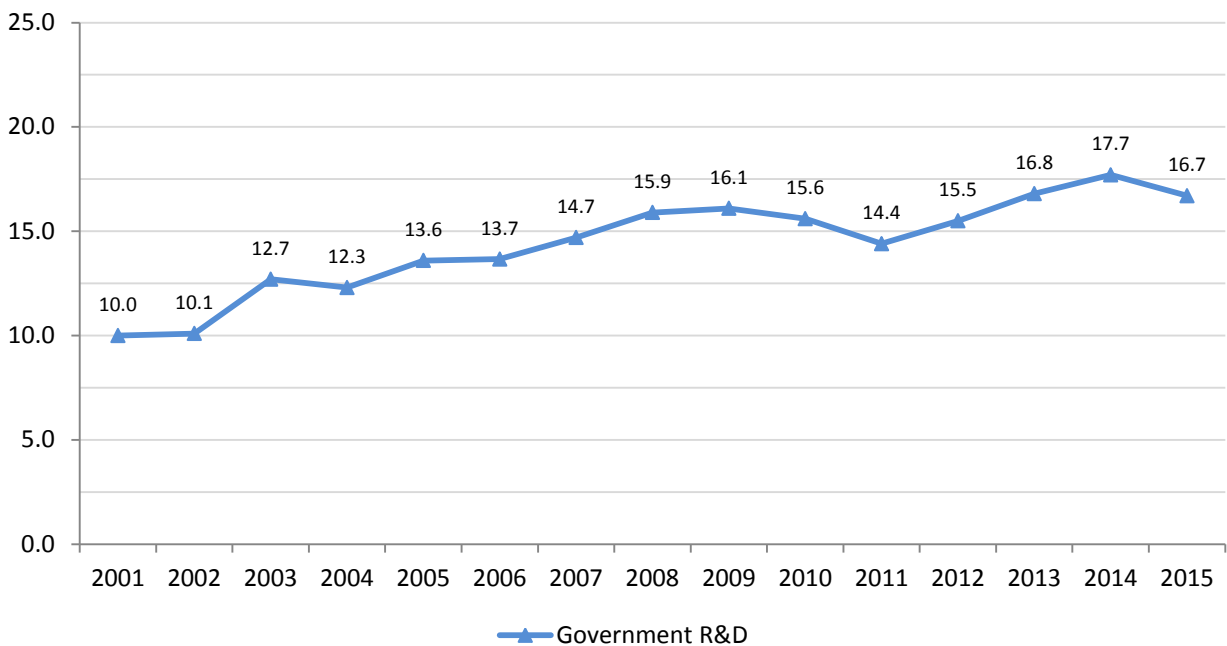
Block grants remained the largest source of funds with their value increasing by 7%; from £84.4m in 2014 to £90.0m in 2015. Their relative contribution remained largely similar over the year, accounting for 46% in 2015 and 47% in 2014. Funding from UK Central Government/Local Authorities and Health Trusts/Hospitals increased by 26% from £29.0m in 2014 to £36.6m in 2015, accounting for 19% of HERD funding in 2015 compared to 16% in 2014. The largest decrease over the year was in the Other Sources category, which fell by 63%, from £1.6m in 2014 to £0.6m in 2015.

5

Government Expenditure on Research & Development (GERD)

The ONS collects expenditure and employment figures relating to R&D conducted within government establishments. By utilising this data in conjunction with the results from the BERD and HERD surveys, it has been possible to compile a more complete picture of total expenditure on R&D in NI. Figure 13 shows the trend in total Government Expenditure on Research & Development (GERD) from 2001 – 2015.

Figure 13: Government Expenditure on R&D, 2001 - 2015 (£million)



Government R&D expenditure fell by £1.0m (6%) over the year to 2015, from £17.7m in 2014 to £16.7m in 2015. Over the five year period from 2010 to 2015 Government R&D expenditure increased by 7% (£1.1m).

A quality report for the Northern Ireland Research and Development Statistic publication can be found at the following link: <https://www.economy-ni.gov.uk/publications/archive-publications-rd>

6.1: Business Expenditure on Research & Development

The survey of NI BERD during 2015 was undertaken by the Northern Ireland Statistics and Research Agency (NISRA). The sample and survey results only cover business enterprises as defined in the [“Frascati” Manual](#). This excludes government organisations, higher education establishments and charities.

The definition of R&D adopted for the purposes of the NI inquiry is the same as that used by ONS for the equivalent GB survey. For the purposes of National Statistics, R&D and related concepts follow internationally agreed standards defined by the Organisation for Economic Cooperation and Development (OECD), as published in the “Frascati” Manual. R&D, in the Frascati Manual, 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”.

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.

The NI questionnaire follows the same structure and includes the same questions as the GB questionnaire, although there were some modifications to tailor the questions asked for use in NI e.g. identification of Invest NI companies.

The survey covers expenditure in the year ending December 2015, although companies were given the option of supplying data for a business year ending on any date between 6 April 2016 and 5 April 2015.

It is worth noting that a number of NI companies are part of national and international companies. Many concentrate their R&D at particular sites, not necessarily in NI, although all of their plants, including those in NI, will share in the benefits of research. **Variations may occur in NI R&D data from year to year due to the influence of one or two large-scale projects.**

6.2 BERD Survey Design

Survey Design - Sample

R&D surveys pose special problems for survey design – R&D takes place in only a small proportion of businesses but a comprehensive list of these businesses does not exist. A simple random sample of the business population would not be suitable for an R&D survey

because many of the sample businesses would not undertake R&D and many significant R&D performers would be missed in such a sample.

The solution is to implement a stratified sample design. The stratification variable was the known level of R&D performance of the businesses. This information was gained from previous surveys (mainly the 2014 survey) and extra information from various sources such as the Office for National Statistics (ONS), Invest NI and filter questions on the Annual Business Inquiry and Community Innovation Survey. For the purposes of the 2015 survey, businesses were stratified into 4 groups:

- (i) Businesses responding to the 2014 survey who returned or had estimated a total R&D expenditure value greater than zero;
- (ii) Businesses reporting positively to the R&D filter question in the Annual Business Inquiry and Community Innovation Survey; other identified potential R&D performers (principally, those companies who had received assistance from Invest NI during 2015); and companies newly identified to ONS as R&D spenders;
- (iii) Companies who have been identified as 'not R&D performers' when selected for past surveys;
- (iv) The remainder of Northern Ireland businesses.

The businesses making up strata (i) and (ii) formed a register of R&D performers and the sample for the 2015 survey was derived from this register. Indeed, each of these businesses was issued a questionnaire – in effect, therefore, a census of R&D performers was carried out. Strata (iii) and (iv) were not included as they were assumed to have zero R&D expenditure.

Survey Design - Response Rate

It is worth noting that a number of NI companies are part of national and international companies. Many concentrate their R&D at particular sites, not necessarily in NI, although all of their plants, including those in NI, will share in the benefits of research. For the 2015 survey 1,388 forms were sent out to businesses believed to be performing R&D. Completed forms were returned by 1,101 businesses representing a response rate of 80%. The total number of companies spending on R&D is relatively small – 714 in 2015 (up from 659 in 2014). Estimates were made for the R&D activity of non-responding businesses.

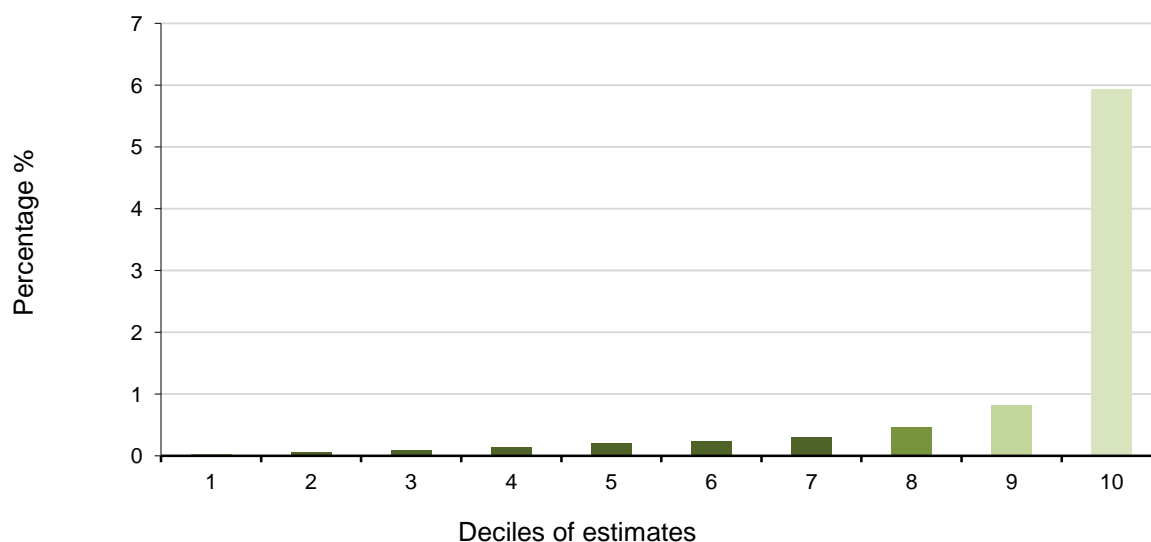
Survey Design - Estimation

Estimates for Invest NI companies were based on the value of offers made to promote R&D investment, the amount remaining to be claimed against these offers, the frequency of claims and the contribution of Invest NI's assistance to total planned R&D expenditure. Estimates for Invest NI companies make up 17% of the total non-respondent companies. The remaining 83% - non Invest NI estimates - were based on historical information and other administrative surveys within the Economic and Labour Market Statistics Branch.

Overall, estimates make up 8% of total BERD spend for 2015 (compared to 9% in 2014). Estimates for Invest NI and non Invest NI companies each account for 4% of total BERD spend in 2015.

Figure 15 shows that all estimates made up 8% of total 2015 BERD spend. When estimates are ranked according to ascending size of spend, the last two deciles (i.e. the top 20% of companies) accounted for 82% of the total BERD estimated spend, indicating that most of the estimates were small in magnitude. The bulk of the value of the estimates has been accounted for by a relatively small number of companies.

Figure 14: Deciles of estimates as a percentage of 2015 BERD



Status of Figures in Current Bulletin

These results are provisional and are subject to revision should additional information become available. As part of this release, business, government and higher education estimates of R&D performance for 2013 and 2014 have been revised to take account of late returns and misreporting.

Table 17: Size of revisions to previously published data, 2013 - 2014 (£million)

	2013			2014		
	Published £m	Revised £m	Difference £m	Published £m	Revised £m	Difference £m
Expenditure by Businesses	£472.6	£479.3	£6.7	£403.5	£410.5	£6.9
Expenditure by Higher Education ¹	£147.0	£147.0	£0.0	£177.7	£177.7	£0.0
Other Expenditure by Government	£16.3	£16.8	£0.5	£21.1	£17.7	-£3.4
Total Expenditure on R&D	£635.9	£643.1	£7.2	£602.3	£605.9	£3.6

Figures contained within all tables in this release may not add due to rounding. Percentages calculated on these rounded figures may differ from those that are detailed in the text. Results are shown mainly by industrial sector and company size (based on the number of employees). The sectoral analyses are based on the Standard Industrial Classification 2007 (or SIC 2007) of industries. Data prior to 2009 are on a SIC 2003 basis. Care should therefore be taken when making comparisons with previous reports. More details on SIC 2007 are available [here](#).

6.3 Definition of Terms

Type of R&D Expenditure

- Total Expenditure on R&D - This covers expenditure by businesses, expenditure by higher education and other expenditure by Government.
- In-house R&D – This is R&D carried out within the company and was previously referred to as intramural expenditure.
- Purchase of R&D – This is R&D funded by plant(s) in Northern Ireland but undertaken by other firms or organisations in the UK and abroad and was previously referred to as extramural expenditure.
- Capital Expenditure - Includes companies' expenditure on land, buildings, equipment and machinery (including vehicles). Capital expenditure on R&D is particularly subject to distortions and is likely to fluctuate significantly from year to year as a small number of projects could cause this percentage to increase or decrease sharply. For example, some R&D projects may have a duration of several years but involve heavy capital outlay in the formative years of the research. The erratic nature of R&D capital expenditure may partly explain differences in capital expenditure among companies of different sizes. Only by looking at underlying trends over several years will it be possible to see if some sectors or companies of differing sizes are more likely to require more expenditure of a capital nature.

Type of Research

- Basic Research - work undertaken primarily for the advancement of scientific knowledge without a specific practical application in view.
- Applied Research – Work undertaken to acquire new knowledge with a specific application in mind.
- Experimental Development - covers the use of the results of basic and applied research directed to the introduction of new materials, processes, products, devices and systems, or the improvement of existing ones. This includes the prototype or pilot plant stage, design and drawing required during R&D and innovation work done on contracts with outside organisations, Government departments and public bodies.

Sources of Funding

- Business - Funds from individual plants within NI or from parent or other companies within the group.
- Government - Funds from Invest NI and other government sources.
- Overseas - This includes EU Funds as well as other funds from outside the UK. EU funds are those from the European Commission's Structural or Framework Funds.
- Other Funds - Funds from private businesses, other public organisations and any other organisations within the UK.

R&D Employment

- Staff Types - Employment in R&D splits into the following categories; researchers - engaged in the conception or creation of new knowledge, products, methods and systems; technicians - who perform scientific and technical tasks normally under the supervision of researchers; and others - support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects.
- Full Time Equivalent Employment – One full time equivalent (FTE) may be thought of as one person-year. For example, a person who normally spends 30% of their time on R&D and the rest on other activities would be considered as 0.3 FTE. Similarly, if a full-time R&D worker is employed at an R&D unit for only six months, this results in the FTE of 0.5. A person who works half of a standard week and spends half of their time on R&D and the rest on other activities should be considered as 0.25 FTE

SIC 2007 Classification

Manufacturing is defined to cover Section C, which includes the following groupings in this publication:

CA	Manufacture of food products, beverages and tobacco products
CB	Manufacture of textiles, wearing apparel, leather and related products
CC	Manufacture of wood and paper products; printing and reproduction of recorded media
CD	Manufacture of coke and refined petroleum products
CE	Manufacture of chemicals and chemical products
CF	Manufacture of basic pharmaceutical products and pharmaceutical preparations
CG	Manufacture of rubber and plastics products, and other non-metallic mineral products
CH	Manufacture of basic metals and fabricated metal products, except machinery and equipment
CI	Manufacture of computer, electronic and optical products
CJ	Manufacture of electrical equipment
CK	Manufacture of machinery and equipment n.e.c.
CL	Manufacture of transport equipment
CM	Other manufacturing; repair and installation of machinery and equipment

Where aggregation of Manufacturing groupings within this publication is required it is as follows (for example, see Figure 5):

CA	Food, beverages & tobacco
CE	Chemicals & chemical products
CH	Basic Metals & Fabricated Metal Products, except machinery & equipment
CI, CJ, CK, CL	Engineering & Allied Industries
CB, CC, CD, CF, CG,CM	Other Manufacturing

The Service Sector covers Sections G through to U, namely:

G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
K	Financial and insurance activities
L	Real estate activities
M-N	Professional, scientific, technical, and administrative and support service activities
O-Q	Public administration and defence, education, human health and social work activities
R-U	Other service activities

The Other Industries category covers:

A	Agriculture, forestry and fishing
B	Mining and quarrying
D	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage, waste management and remediation
F	Construction

6.4 Users and Uses of Data

A primary use of the business R&D data (BERD) in this Statistical Bulletin is its provision to ONS for inclusion in the UK published results. This in turn is a key component in measuring the UK's gross domestic expenditure on R&D.

Changes introduced as part of the amendments to the System of National Accounts (SNA) in 2008 and European System of Accounts (ESA) in 2010 specify R&D, from 2014 onwards, should not be considered as an ancillary activity and instead expenditure on R&D should constitute investment in R&D assets, which as a consequence needs to be capitalised in the UK National Accounts. Therefore R&D expenditure will now contribute to the compilation of the value of the UK's net worth and be included as part of Gross Domestic Product (GDP) estimates.

Within Government, the Department for the Economy (DfE) rely upon R&D data to better inform policy development; this includes conducting economic research, appraisals and evaluation; providing Ministerial briefings and economic commentary, as well as responding to Assembly Questions.

Invest NI use the data to better inform their decision making and investment strategies and to enhance their own internal research. The following link provides an example: <http://www.investni.com/support-for-business/products-and-services/first-time-research-and-development.html>

Outside government the data is used by a variety of different private sector and academic analysts to assist with industrial and investment decisions. The data is also used to inform the wider public about the shape of the Northern Ireland Economy.

6.5 Northern Ireland Higher Education and Government Expenditure on Research & Development

Higher Education Expenditure on Research & Development

NISRA carries out an annual survey of R&D expenditure in Higher Education Establishments in Northern Ireland. The figures shown in Table 13 provide combined results from the two Northern Ireland universities - i.e. Queen's University Belfast (QUB) and the University of Ulster (UU). The data collected refers to the academic year i.e. 2014/2015 ending 31/7/2015. The universities have made data available for this period on the basis of Transparency Review data collected within each respective institution.

More detailed information on Transparency Review procedures in each of the local universities can be found at the following links:

QUB:

<http://www.qub.ac.uk/directorates/FinanceDirectorate/FinancialManagementandResourceUtilisation/CapitalandCosting/Costing/>

UU:

http://www.ulster.ac.uk/finance/transparency_reviews.html

- Total R&D Expenditure - Following consultation with the universities, it was agreed that all university expenditure on R&D is 'in-house' expenditure - i.e. R&D work carried out within the university.
- Non Capital Expenditure – Includes expenditure on salaries and wages and other costs (materials, supplies, equipment and services).
- Capital Expenditure - Includes expenditure on land, buildings, machinery and equipment. It should be noted that capital expenditure on R&D within universities is likely to fluctuate significantly from year to year. For example, an R&D project may have duration of several years but involve heavy capital outlay in the formative years of the research.
- Source of funding – this is split into nine separate categories as shown in Table 13. For the purposes of this survey, the Government Block Grant was used as a 'balancing figure' with values for the other eight categories completed using data from the Transparency Review.
- R&D Employment – It is possible, using the results from the Transparency Review, to determine how much time members of staff spend on R&D. Figures shown have been rounded to the nearest 10

Government Expenditure on Research & Development

The ONS collects annual data on total UK government expenditure on science, engineering and technology (SET) as a census survey. SET expenditure by the UK government includes expenditure by government departments, research councils and Higher Education Funding Councils (HEFCs). It also includes estimates of expenditure on R&D conducted within Government Departments.

By utilising this data in conjunction with the results from the NISRA survey, it has been possible to compile a more complete picture of total expenditure on R&D in NI. The figures shown in Table 1, expenditure by businesses, higher education and other expenditure by Government complement each other; i.e. is no double counting.

The 2014 ONS Report is available at the following link:

<https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopment/expenditure/bulletins/ukgovernmentexpenditureonscienceengineeringandtechnology/2014>

User Engagement

We welcome any feedback you might have in relation to this report, and would be particularly interested in knowing how you make use of these data to inform your work. Please contact us at statistics@finance-ni.gov.uk

Next Publication

The next bulletin will be published in November 2017, and will be available at: <https://www.economy-ni.gov.uk/articles/research-and-development>

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Annexe

Annexe Table 1: Business Expenditure on R&D 2010 – 2015 (current and constant prices, £million)¹⁶

	Cash Terms £m						% change cash		Real Terms £m						% change real	
	2010	2011	2012	2013	2014	2015	2014-2015	2010-2015	2010	2011	2012	2013	2014	2015	2014-2015	2010-2015
Total Business Expenditure	344.0	388.8	453.2	479.3	410.5	540.0	32	57	369.0	411.3	469.6	488.5	412.3	540.0	31	46
In-house R&D	324.2	354.1	415.0	440.6	358.3	501.5	40	55	347.7	374.6	430.0	449.2	359.9	501.5	39	44
Non capital	230.0	321.2	372.6	379.2	327.6	446.9	36	94	246.7	339.8	386.1	386.5	329.1	446.9	36	81
Capital	94.2	32.8	42.4	61.5	30.7	54.5	78	-42	101.0	34.7	43.9	62.6	30.8	54.5	77	-46
Purchased R&D	19.8	34.7	38.2	38.6	52.2	38.5	-26	95	21.2	36.7	39.6	39.3	52.4	38.5	-26	81

Totals may not sum due to rounding

¹⁶ GDP deflator used to convert cash terms to real terms: 2010 (93.2), 2011(94.5), 2012, (96.5), 2013(98.1), 2014(99.6), 2015=100

Annexe Table 1 continued: Business Expenditure on R&D 2010 – 2015 (current and constant prices, £million)

	Cash Terms £m						% change cash		Real Terms £m						% change real	
	2010	2011	2012	2013	2014	2015	2014-2015	2010-2015	2010	2011	2012	2013	2014	2015	2014-2015	2010-2015
In-house non capital research																
Basic Research	18.4	7.3	11.8	10.0	13.3	18.5	39	0	19.7	7.7	12.2	10.2	13.3	18.5	39	-6
Applied Research	96.7	114.0	143.4	136.8	137.5	183.5	33	90	103.7	120.6	148.5	139.4	138.1	183.5	33	77
Experimental Development	114.9	200.0	217.5	232.4	176.8	245.0	39	113	123.2	211.6	225.3	236.9	177.6	245.0	38	99
In-house funding																
Own Funds	264.0	294.1	345.8	363.3	305.7	427.6	40	62	283.2	311.1	358.3	370.3	307.0	427.6	39	51
Government	57.3	54.2	41.8	52.9	24.1	39.8	65	-31	61.5	57.3	43.3	54.0	24.2	39.8	64	-35
Overseas/Other	2.8	5.8	27.4	24.4	28.5	34.1	20	1117	3.0	6.1	28.4	24.9	28.6	34.1	19	1035
Company size																
SME	133.4	140.6	173.7	180.5	191.6	254.4	33	91	143.1	148.7	180.0	184.0	192.4	254.4	32	78
Services and Other	210.6	248.1	279.5	298.7	218.9	285.6	30	36	225.9	262.5	289.6	304.5	219.9	285.6	30	26

Totals may not sum due to rounding

Annexe Table 1 continued: Business Expenditure on R&D 2010 – 2015 (current and constant prices, percentage)

	Cash Terms %						% point change cash		Real Terms %						% point change real	
	2010	2011	2012	2013	2014	2015	2014-2015	2010-2015	2010	2011	2012	2013	2014	2015	2014-2015	2010-2015
Ownership																
External	68	74	78	75	63	65	2	-5	68	74	78	75	64	65	2	-5
Local	32	26	22	25	37	35	-4	10	32	26	22	25	37	35	-4	10
Sector																
Manufacturing	71	79	79	75	74	76	3	7	71	79	79	76	74	76	2	7
Services and Other	29	21	21	25	26	24	-8	-17	29	21	21	24	26	24	-8	-17

Totals may not sum due to rounding

Annex Table 2: 2015 In-House R&D expenditure by sector and employment size-band (£m)

		Non Capital Expenditure						Capital Expenditure			Total In-house Expenditure
		Salaries & Wages	Other Costs	Basic Research	Applied Research	Experimental Development	Total Expenditure	Land & Building	Plant & Machinery	Total Expenditure	
Manufacturing											
Employment size band	<50	12.2	11.1	2.1	12.9	8.3	23.3	*	*	*	30.5
	50-249	32.8	18.5	1.8	24.7	24.8	51.3	1.1	7.4	8.5	59.9
	250+	95.2	113.6	3.5	58.6	146.7	208.8	*	*	*	232.0
	Total	140.2	143.1	7.4	96.2	179.7	283.3	2.3	36.7	39.0	322.3
Services & Other											
Employment size band	<50	34.8	23.0	5.4	26.7	25.7	57.8	*	*	*	60.8
	50-249	55.5	18.4	*	35.9	*	73.9	0.8	10.6	11.4	85.3
	250+	24.8	7.2	*	24.7	*	31.9	*	*	*	33.1
	Total	115.0	48.6	11.1	87.3	65.3	163.6	1.4	14.2	15.5	179.1
All Industries											
Employment size band	<50	47.0	34.0	7.5	39.6	33.9	81.0	*	*	*	91.2
	50-249	88.3	36.9	6.5	60.6	58.1	125.2	1.9	18.0	20.0	145.2
	250+	119.9	120.8	4.5	83.3	152.9	240.7	*	*	*	265.0
	Total	255.3	191.7	18.5	183.5	245.0	446.9	3.7	50.8	54.5	501.5

*Disclosive
Totals may not sum due to rounding

Annex Table 3: 2015 Purchased R&D expenditure by sector and employment size-band (£m)

		Purchased R&D Expenditure			
		Work commissioned within NI	Work commissioned within GB	Work carried out outside the UK	Total Purchased R&D Expenditure
Manufacturing					
Employment size band	<50	*	*	*	*
	50-249	0.6	0.7	5.1	6.4
	250+	*	*	*	*
	Total	7.3	6.2	14.2	27.7
Services & Other					
Employment size band	<50	*	*	*	*
	50-249	0.2	1.2	4.5	5.9
	250+	*	*	*	*
	Total	3.3	2.1	5.4	10.8
All industries					
Employment size band	<50	3.4	*	*	5.8
	50-249	0.8	1.9	9.5	12.2
	250+	6.4	*	*	20.5
	Total	10.5	8.3	19.7	38.5

*Disclosive

Totals may not sum due to rounding

Annex Table 4: 2015 R&D expenditure by company size, 2001-2015 (£m)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
SMEs															
In- house	40.2	63.2	53.2	54.8	69.4	73.4	110.5	98.3	123.0	119.7	119.4	157.0	165.1	169.5	236.4
Purchased	3.3	3.6	3.2	7.5	5.5	8.2	6.8	7.9	21.3	13.7	21.2	16.8	15.4	22.0	18.0
Total	43.4	66.8	56.4	62.3	74.9	81.6	117.2	106.1	144.3	133.4	140.6	173.7	180.5	191.6	254.4
250+															
In- house	109.8	86.1	63.3	65.4	78.4	83.2	66.4	72.3	174.2	204.5	234.6	258.0	275.6	188.8	265.0
Purchased	1.8	3.8	1.6	1.4	1.0	2.2	1.4	5.5	5.3	6.1	13.5	21.5	23.2	30.1	20.5
Total	111.6	89.9	64.9	66.8	79.4	85.4	67.9	77.8	179.4	210.6	248.1	279.5	298.7	218.9	285.6
TOTAL															
In- house	149.9	149.3	116.5	120.2	147.8	156.6	176.9	170.6	297.2	324.2	354.1	415.0	440.6	358.3	501.5
Purchased	5.1	7.3	4.8	8.8	6.5	10.4	8.2	13.3	26.5	19.8	34.7	38.2	38.6	52.2	38.5
Total	155.0	156.6	121.3	129.0	154.3	167.0	185.1	183.9	323.7	344.0	388.8	453.2	479.3	410.5	540.0

Totals may not sum due to rounding

Annexe Table 5: 2015 R&D employment by gender, employment size-band and Full time Equivalent (FTE) (rounded to nearest 10)

		Researchers				Technicians				Other				All Types			
		M	F	Total	FTE	M	F	Total	FTE	M	F	Total	FTE	M	F	Total	FTE
Manufacturing																	
Employment size band	<50	230	30	260	200	160	10	170	100	290	60	340	160	680	100	780	460
	50-249	390	90	480	390	430	80	510	280	520	160	680	240	1330	330	1660	910
	250+	1130	220	1340	1070	440	170	610	480	430	80	500	300	1990	460	2450	1860
	Total	1750	340	2080	1660	1030	260	1290	860	1230	300	1520	710	4010	890	4890	3230
Services & Other																	
Employment size band	<50	590	110	700	470	410	80	480	310	230	110	340	240	1230	290	1520	1030
	50-249	410	90	500	420	590	170	760	540	430	200	630	370	1430	460	1890	1330
	250+	320	120	430	330	290	70	360	150	80	40	120	90	680	230	910	560
	Total	1310	320	1630	1220	1290	320	1600	1010	740	350	1090	700	3350	980	4330	2920
All Industries																	
Employment size band	<50	820	140	960	670	570	90	660	410	520	160	680	400	1910	390	2300	1490
	50-249	790	180	980	800	1030	240	1270	820	950	370	1310	610	2760	790	3560	2240
	250+	1440	330	1770	1400	720	240	970	630	510	110	620	390	2680	690	3360	2420
	Total	3060	650	3720	2880	2320	570	2890	1860	1970	640	2610	1410	7350	1870	9220	6150

*Disclosive

Totals may not sum due to rounding