

# Northern Ireland Research and Development Statistics 2014



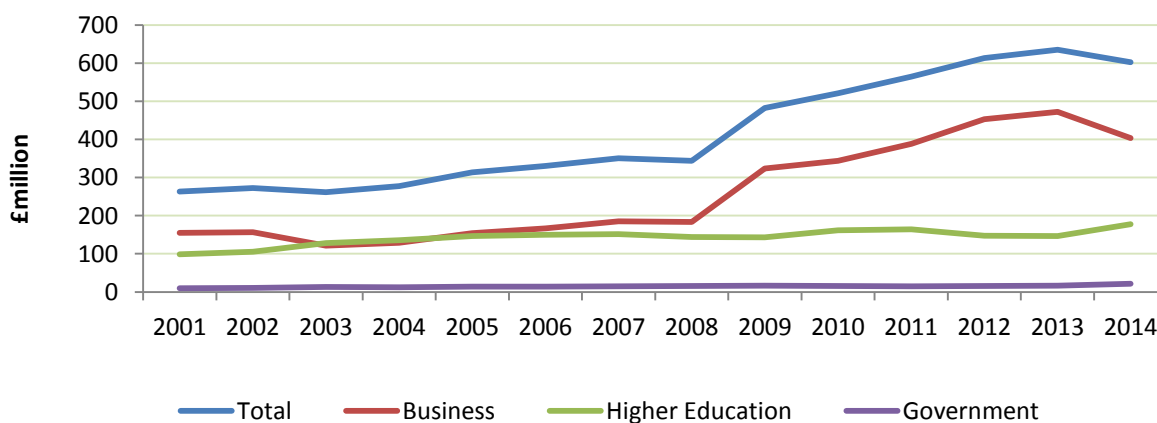
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## Key Points

- Total expenditure on R&D in Northern Ireland in cash terms was £602.3 million in 2014, of which £403.5m (67%) was spent by Businesses, £177.7m (30%) by the Higher Education sector and £21.1m (4%) by the Government expenditure. There was a fall of £33.6m (-5%) in cash terms in total R&D expenditure between 2013 and 2014, driven by the Business sector.
- Total Business R&D expenditure in 2014 was £403.5m, down £69.1m (15%) in cash terms on the previous year. Between 2009 and 2014, overall Business R&D expenditure has risen by 25% in cash terms.
- The percentage decrease in Northern Ireland (in-house) business R&D expenditure (18.9%) between 2013 and 2014 was the largest fall of the 12 UK regions.
- The ten biggest spending companies accounted for 43% of the total R&D spend in Northern Ireland in 2014, lower than in 2013 (60%).
- R&D spend by locally owned companies reported an annual increase of 24%.

**Figure 1: Expenditure on R&D in Cash Terms 2001-2014 (£million)**



## **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. 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.

<http://www.statisticsauthority.gov.uk/assessment/assessment/assessment-reports/confirmation-of-designation-letters/letter-of-confirmation-as-national-statistics---assessment-report-227--2-.pdf>

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# 1

## Introduction and context

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 work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications'. The 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 NI<sup>1</sup>.

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 1,307 returns were received by the Department – some 86.1% 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 5 - 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.

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<sup>1</sup> The latest details are available on the Office for National Statistics website at <http://www.ons.gov.uk/ons/rel/rdit1/science--engineering-and-technology-statistics/2012/stb-set-2012.html>

# 2

## Summary and commentary

### Total Expenditure on R&D in Cash Terms

Total expenditure on R&D in Northern Ireland (NI) in cash terms was £602.3 million (m) in 2014, of which £403.5m (67%) was spent by businesses, £177.7m (30%) by the Higher Education sector and the remainder, £21.1m (4%) was Government expenditure. (Table 1).

There was a decrease of £33.6m (-5%) in cash terms in NI total R&D expenditure between 2013 and 2014. This was comprised of a fall in Business R&D expenditure of £69.1m (-15%) and rises in Higher Education expenditure of £30.7m (21%) and in Government expenditure of £4.8m (29%). Over the last five years total R&D spending in cash terms in NI has risen by 25% and by 128% since 2001.

**Table 1: Total Expenditure on R&D in Cash Terms 2001-2014 (£million)**

	Business	Higher Education	Government	Total
<b>2001</b>	155.0	98.8	10.0	263.8
<b>2002</b>	156.6	105.8	10.1	272.5
<b>2003</b>	121.3	127.8	12.7	261.8
<b>2004</b>	129.0	136.1	12.3	277.4
<b>2005</b>	154.3	146.2	13.6	314.1
<b>2006</b>	167.0	150.1	13.7	330.8
<b>2007</b>	185.1	151.3	14.7	351.1
<b>2008</b>	183.9	144.2	15.9	344.0
<b>2009</b>	323.7	143.0	16.1	482.8
<b>2010</b>	344.0	161.8	15.6	521.4
<b>2011</b>	388.8	164.3	14.4	567.5
<b>2012</b>	453.2	147.3	15.5	616.0
<b>2013</b>	472.6	147.0	16.3	635.9
<b>2014</b>	403.5	177.7	21.1	602.3

## Total Expenditure on R&D in Real Terms

In real terms, total expenditure decreased by £44.4m or 7% from £646.8m in 2013 to £602.3m in 2014.

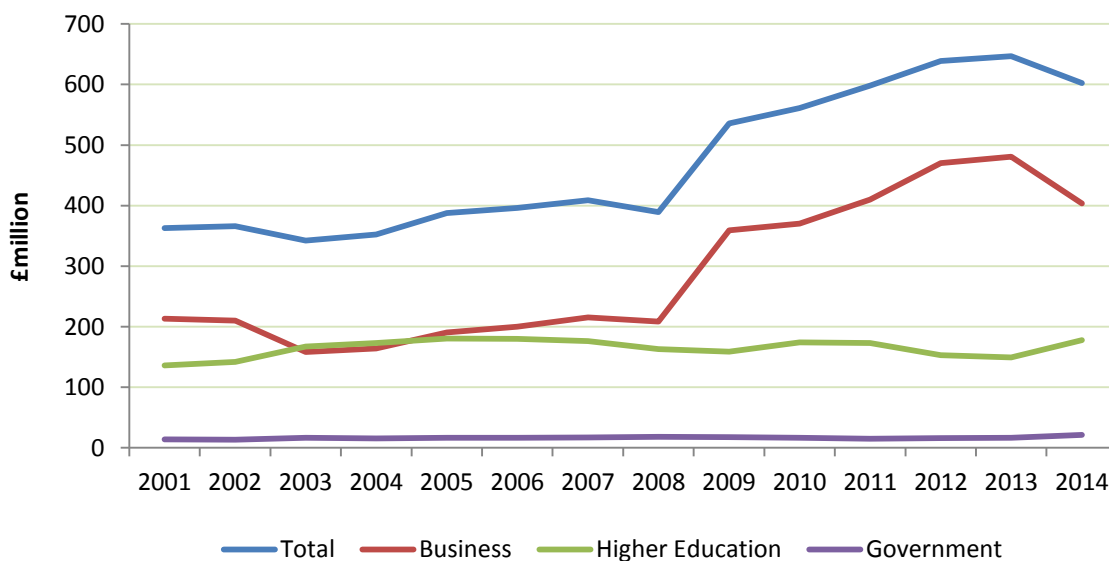
In 2014 the NI business sector again accounted for a greater share of total R&D expenditure (67%) than the Higher Education sector (30%). In 2013 the figures were 74% and 23% respectively.

Over the last five years (2009-2014) total R&D spending in real terms in NI has risen by 12% and by 66% since 2001.

Over the year to 2014 there was a decrease in expenditure by businesses while an increase occurred in Government and in Higher Education expenditure. In real terms, expenditure by businesses decreased by £77.2m (-16%), Higher Education increased by £28.2m (19%) and Government expenditure increased by £4.5m (27%) in real terms over the year.

Business R&D expenditure rose by 12% between 2009 and 2014 in real terms and by 89% between 2001 and 2014.

**Figure 2: Expenditure on R&D in Real Terms 2001-2014 (£million)<sup>2</sup>**



<sup>2</sup> GDP deflator used to convert cash terms to real terms: e.g. 2007 (85.8), 2008 (88.3), 2009 (90.1), 2010 (92.9), 2011 (94.9), 2012 (96.4), 2013 (98.3), 2014=100

## 3

## Business Expenditure on Research and Development (BERD)

Detailed analysis of company spend in the rest of this publication is undertaken in cash terms, except where otherwise stated.

### 3.1: BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT IN 2014

Table 2 details the headline results for 2014 Business Expenditure on Research & Development (BERD). In 2014, total expenditure (in cash terms) on R&D by NI businesses was an estimated £403.5 million.

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). The vast majority of total BERD was in-house expenditure (£352.1m or 87%) with £51.4m or 13% being purchased R&D expenditure which increased from £38.6m in the previous year.

85% of funding for in-house R&D in 2014 came from the companies' own resources (£345.8m) while government provided a further 7% (or £23.9m) and the remainder came from overseas and other sources (8% or £28.5m).

**Table 2: Business Expenditure on R&D – 2014**

	Total Expenditure by Business (£million)	As % of Total Expenditure
<b>Total Expenditure</b>	403.5	100
<b>In-house R&amp;D Expenditure<sup>3</sup></b>	352.1	87
of which:		
Non Capital Expenditure	321.0	80
Capital Expenditure	31.1	8
<b>Purchased R&amp;D Expenditure<sup>4</sup></b>	51.4	8
Of which:		
Undertaken by Higher Education	1.3	0.3

<sup>3,4</sup> For definitions see Section 5, Background Notes.

### **3.2: BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT COMPARISONS OVER TIME**

As shown in Table 3, between 2009 and 2014 total business expenditure on R&D increased by 25% in cash terms, with in-house R&D increasing by 618.5% and purchased R&D expenditure increasing by 94%. The share of business expenditure from own funds as a proportion of all funding decreased by 16% over the year, Government funding decreased by 55% and other sources of funding increased by 17%.



**Table 3: Business Expenditure on R&D 2009 – 2014<sup>5</sup>**

	Cash Terms						% Change Cash Terms		Real Terms (2013 Prices) <sup>6</sup>						% Change Real Terms	
	2009	2010	2011	2012	2013	2014	13-14	09-14	2009	2010	2011	2012	2013	2014	13-14	09-14
<b>Total Business Expenditure (£m)</b>	323.7	344.0	388.8	453.2	472.6	403.5	-14.6%	24.7%	359.2	370.2	409.8	470.1	480.7	403.5	-16.1%	12.3%
<b>In-house R&amp;D (£m)</b>	297.2	324.2	354.1	415.0	434.0	352.1	-18.9%	18.5%	329.8	348.9	373.2	430.4	441.4	352.1	-20.2%	6.8%
<b>Non capital (£m)</b>	235.0	230.0	321.2	372.6	373.8	321.0	-14.1%	36.6%	260.8	247.5	338.6	386.5	380.2	321.0	-15.6%	23.1%
<b>Capital (£m)</b>	62.2	94.2	32.8	42.4	60.3	31.1	-48.3%	-49.9%	69.0	101.4	34.6	44.0	61.3	31.1	-49.2%	-54.9%
<b>Purchased R&amp;D (£m)</b>	26.5	19.8	34.7	38.2	38.6	51.4	31.0%	74.8%	29.4	21.3	36.6	39.6	39.2	51.4	31.0%	74.8%

<sup>5</sup> A more detailed Breakdown of Business expenditure, including funding, ownership, research, size and sector can be found in Annex table 1

<sup>6</sup> GDP deflator used to convert cash terms to real terms: 2009 (90.1), 2010 (92.9), 2011 (94.9), 2012 (96.4), 2013 (98.3), 2014=100

### 3.3: R&D Spend

The ten biggest R&D spenders in 2014 accounted for 43% of total expenditure which is lower than the proportion in 2013 (60%).

In 2014, 63 companies spent more than £1 million on R&D, ten more companies than in 2013. Average in-house R&D expenditure was £71,000 per R&D employee in 2014, 23% lower than the figure of £92,000 per R&D employee in 2013, (employees are on a Full-Time Equivalent basis).

#### 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 87% (£352.1m) of total business expenditure in 2014. In-house expenditure decreased by 18.9% between 2013 and 2014.

#### In-house Business R&D: UK and Regional Comparisons

Of the 12 UK regions, three showed a decline in in-house business R&D expenditure in cash terms over the year to 2014, including NI which decreased by 19%, as detailed in Table 6. This was the largest percentage decrease across the UK regions. In the UK as a whole such expenditure increased by 6%.

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.

**Table 4: In-house Expenditure by UK Government Office Region (Cash Terms)**

	Expenditure (£million)		%Change (2013-2014)
	2014	2013	
<b>UK</b>	19,935	18,799	6%
<b>England</b>	18,281	17,100	7%
<b>North East</b>	283	323	-12%
<b>North West</b>	1,798	1,788	1%
<b>Yorkshire &amp; The Humber</b>	679	629	8%
<b>East Midlands</b>	1,474	1,340	10%
<b>West Midlands</b>	1,967	1,689	16%
<b>South West</b>	1,616	1,459	11%
<b>East of England</b>	4,231	4,293	-1%
<b>London</b>	1,826	1,336	37%
<b>South East</b>	4,405	4,244	4%
<b>Wales</b>	397	368	8%
<b>Scotland</b>	905	897	1%
<b>Northern Ireland</b>	352	434	-19%

Note: Data for UK and GB regions are from the Office for National Statistics and Department of Finance and Personnel

## R&D Investment Rate

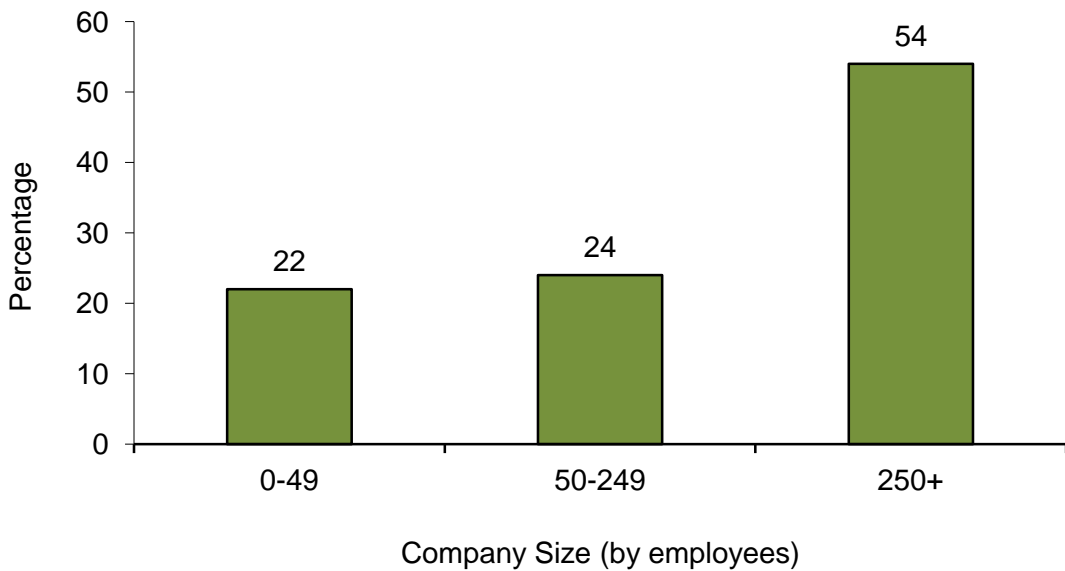
Regional Gross Value Added (GVA) for 2014 (released by the Office for National Statistics (ONS) on the 9th December 2015) shows that Northern Ireland 2014 in-house R&D as a proportion of GVA was 1.0% and was the seventh highest of the twelve UK regions (a lower proportion was recorded in Scotland (0.7%), Wales (0.7%), North East (0.6%), Yorkshire & The Humber (0.6%) and London (0.5%). Northern Ireland in-house R&D as a proportion of GVA is lower than the UK average rate (1.2%). UK R&D results can be found at the following link:

<http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Research+and+Development+in+Business>

As shown in figure 3, companies with 250 or more employees accounted for 54% of business R&D expenditure in 2014, although they represented only 7% of R&D performing companies. Small firms (i.e. those with less than 50 employees) represented some 71% of R&D performing companies and accounted for 22% of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs)\* accounted for 46% of the total business expenditure.

Total SME expenditure increased by £12m (7%) from 2013 to 2014, in cash terms; and since 2009, SME expenditure has increased by 29% to £186m. The proportion that large companies (250+ employees) make to total R&D expenditure (54%) was slightly higher than the previous year (2013: 63%). See Annex Table 4 for further details.

**Figure 3: Percentage of Total BERD Expenditure in 2014 by Company Size**

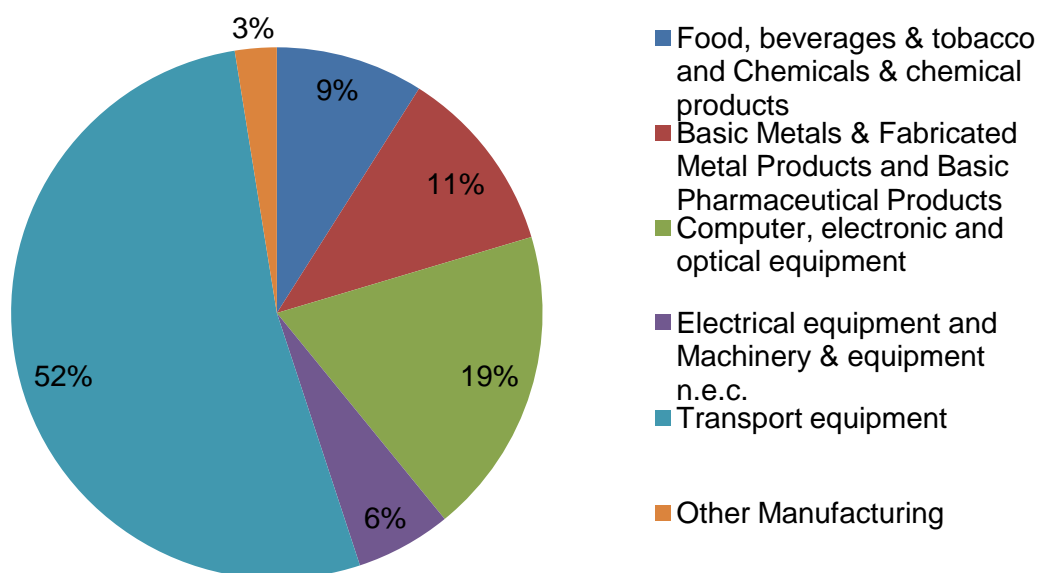


### 3.4: BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – SECTORAL BREAKDOWNS

In 2014, the majority of R&D was carried out within the Manufacturing sector (63%) with the remaining 37% carried out in the Services & Other industries category. After a period of decline, this is the second year the Services and Other industries sector category has reported an increase (2013: 24%).

The manufacture of transport equipment sub-section (CL) accounted for 53% of all Manufacturing R&D (see Figure 4), a slight increase from 52% in 2013, with the manufacture of computer, electronic and optical products (CI) accounting for 19%.

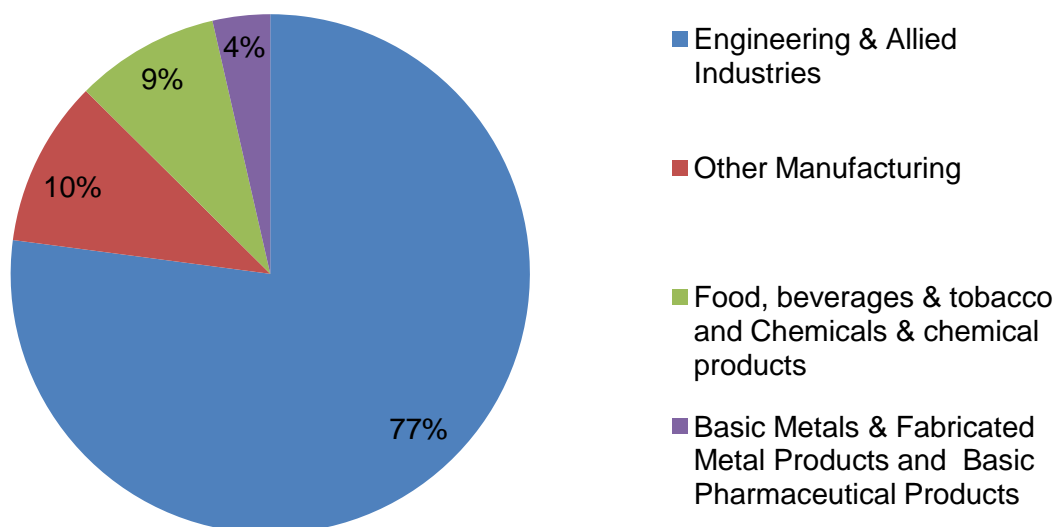
**Figure 4: Percentage of Manufacturing R&D Expenditure in 2014 by Sub-section (SIC 2007 basis)<sup>7</sup>**



<sup>7</sup> For a description of subsection headings see Section 6, Background Notes - Results.

Figure 5 below, highlights that 77% 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<sup>8</sup> 2014**



As Table 5 details, in-house R&D expenditure, i.e. spending carried out within the company, accounted for 75% (£352.1 million) of total expenditure in NI in 2014. This was lower than the proportion in 2013 (92%) and 2012 (91%).

**Table 5: In-house and Purchased R&D Expenditure by Sector 2014**

	IN-HOUSE		PURCHASED	
	£m	% of Total BERD Expenditure	£m	% of Total BERD Expenditure
<b>Manufacturing</b>	217.7	46	36.3	8
<b>Services &amp; Other</b>	134.4	28	15.1	3
<b>All Industries<sup>8</sup></b>	352.1	75	51.4	11

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

Non capital expenditure makes up 91% of in-house expenditure, higher than in 2013 (86%). Table 6 and Figure 6 highlight that there were differences between sectors in the categories of in-house R&D spend.

<sup>8</sup> 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.

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 (71% of total in-house expenditure) compared to 50% in the Manufacturing Sector.

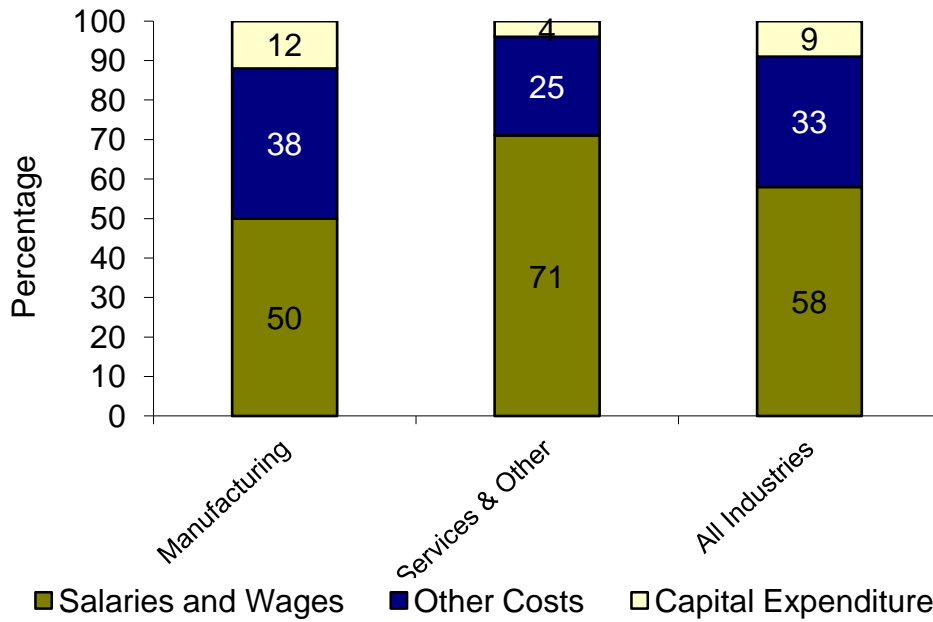
Salaries and Wages as a proportion of in-house expenditure have increased in the Services & Other sector from 66% (£70.6m) in 2013 to 71% (£95.1m) in 2014. Although the Manufacturing sector decreased from £127.3m in 2013 to £109.9m in 2014, it also saw an increase as a proportion of in house expenditure from 39% in 2013 to 50% in 2014. This expenditure appears to have been transferred to Plant and Machinery expenditure, which saw decreases in both the Manufacturing (£48.8m (15%) in 2013 to £23.1m (11%) in 2014) and Services and Other (£9.7m (9%) in 2013 to £5.3m (4%) in 2014)

Over the year to 2014 the proportion spent on capital expenditure decreased from 14% to 9%.

**Table 6: Breakdown of In-house R&D Expenditure by Sector (£million) 2014**

	Manufacturing		Services & Other		All Industries	
	£m	%	£m	%	£m	%
<b>Non Capital Expenditure</b>						
Salaries & Wages	110.0	<b>50%</b>	95.1	<b>71%</b>	205	<b>58%</b>
Other Costs	82.6	<b>38%</b>	33.4	<b>25%</b>	116	<b>33%</b>
<b>Capital Expenditure</b>						
Land & Buildings	2.0	<b>1%</b>	0.6	<b>0%</b>	2.7	<b>1%</b>
Plant & Machinery	23.1	<b>11%</b>	5.3	<b>4%</b>	28.5	<b>8%</b>
<b>In-house Expenditure</b>	217.7	<b>100%</b>	134.4	<b>100%</b>	352.1	<b>100%</b>

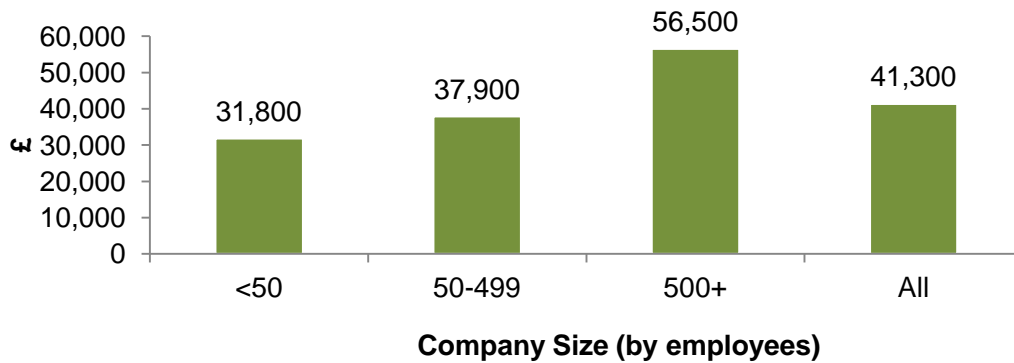
**Figure 6: Percentage of In-house R&D Expenditure by Sector 2014**



**3.5: BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – NON CAPITAL EXPENDITURE**

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 (rounded to nearest £100) 2014**



Overall the salaries and wages per R&D FTE was £41,300, a decrease of 2% from £42,000 in the previous year. Salaries and wages per head for companies with 500 or more employees were £46,500. This compares with £31,800 per head for companies with less than 50 employees (figure 8).

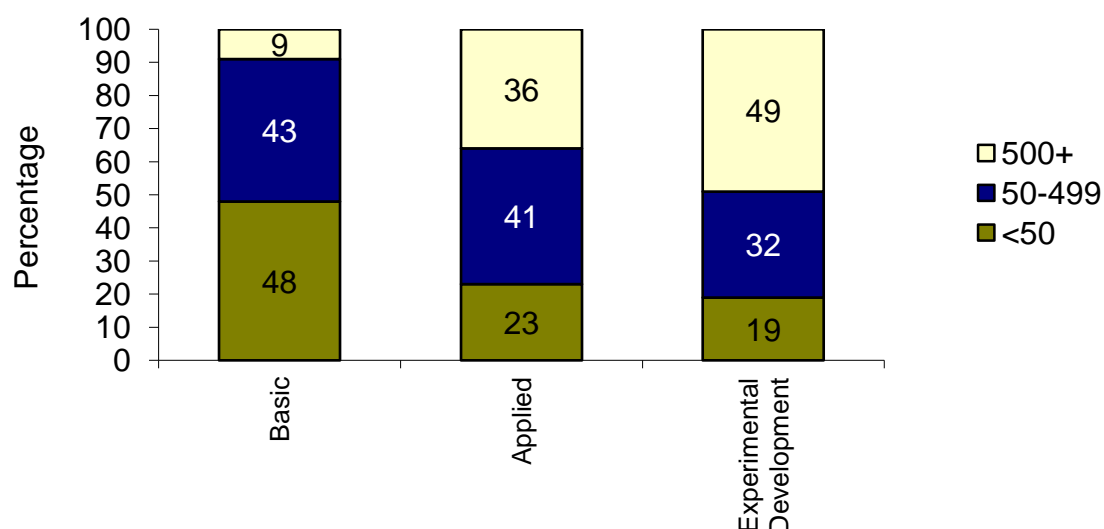
The majority of R&D expenditure occurred in Manufacturing and 54% of all R&D expenditure was in experimental development, shown in Table 7.

**Table 7: Type of Research by Sector as percentage of All Research (Non Capital Expenditure) (percentages) 2014<sup>9</sup>**

	Manufacturing %	Services and Other %	All Industries %
<b>Basic</b>	2	2	4
<b>Applied</b>	21	21	42
<b>Experimental Development</b>	37	17	54
<b>All Research</b>	60	40	100

Non capital expenditure can also be analysed in terms of type of research carried out. Experimental development accounted for 54% of non capital expenditure in 2014, lower than that in 2013 (61%), with applied research and basic research accounting for 42% and 4% respectively. Figure 8 shows that the majority of spending on applied research and basic development is carried out by companies with between 0 and 499 employees (64% and 91% respectively). A detailed breakdown of the type of research carried out by both industry and company size is given in Annex Table 2.

**Figure 8: Type of Research by Company Size (percentage) 2014**



<sup>9</sup> For definitions see Section 6, Background Notes - Definition of Terms.



### 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 8 shows that the greatest proportion of R&D funding was from Own Funds NI – 72% in 2014, down from 77% in 2013. 80% of R&D was funded by Own Funds NI in firms with over 500 employees compared to 70% and 64% in firms with fewer than 50 and between 50 and 499 employees, respectively.

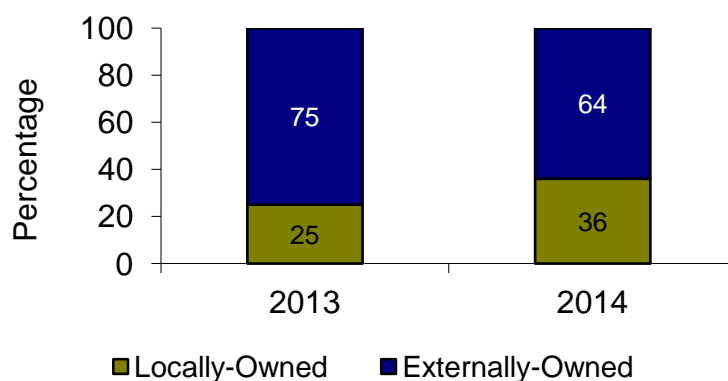
**Table 8: In-house BERD R&D Funding by Source and Company Size 2014**

	<50	50-499	500+	All
	%	%	%	%
<b>Own Funds NI</b>	70	63	80	72
<b>Own Funds Parent</b>	6	16	14	13
<b>Government</b>	12	7	4	7
<b>Overseas/Other</b>	12	14	2	8
<b>Total</b>	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 (75%), compared with the Services & Other sector (44%). Since 2008, the percentage has been at least 60%.

**Figure 9: Expenditure by Ownership 2012-2014 (percentages)**



Expenditure by locally owned companies (£147.1m) increased by 24% from £118.5m in 2013 while the number of these companies who reported R&D expenditure increased to 547 (from 438 in 2013).

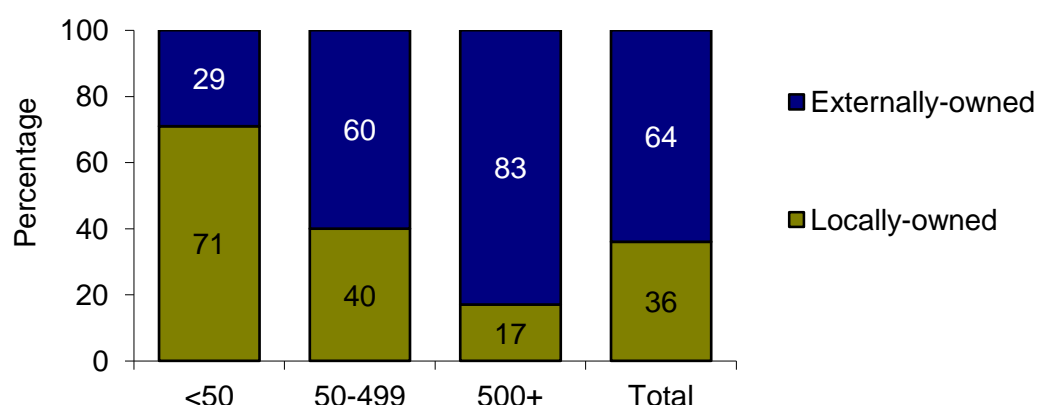
NI owned companies in 2014 accounted for 83% of all R&D performing companies and 37% of the total expenditure (Table 9). This can be compared with externally-owned companies accounting for 64% of the R&D expenditure and 17% of R&D performing companies. Their contribution to the total R&D spend was lower than in 2013 (75%) and their cash value decreased by £97.7m over the same period.

**Table 9: Breakdown of R&D expenditure by ownership of company 2014**

	£m	%	Number of companies	%
<b>Locally-owned companies</b>	147.1	36	547	83
<b>Externally-owned companies</b>	256.4	64	110	17
<b>Total (All companies)</b>	403.5	100	657	100

As shown in Figure 10 the majority of R&D spend in companies with under 50 employees (71%) 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 (60% and 64% respectively).

**Figure 10: Expenditure by ownership by company size (percentages) 2014**

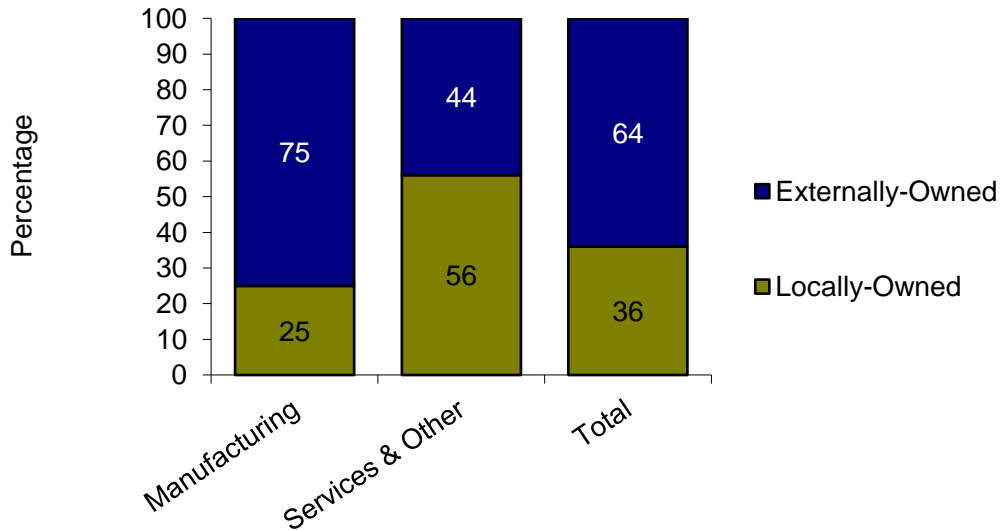


Analysis of R&D spend split by ownership and sector showed that 75% of R&D spend in the Manufacturing sector was by externally-owned companies (figure 11).

In the Services & Other sector, NI owned companies accounted for 56% of R&D expenditure.

Compared to the previous year locally-owned companies increased their proportion of expenditure in both the Manufacturing (from 19% to 25%) and Services & Other sectors (from 44% to 56%).

**Figure 11: Expenditure by ownership by sector (percentages) 2014**



**3.8: BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – EMPLOYMENT ON R&D**

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 2014, surveyed companies reported a total of 8,160<sup>10</sup> employees working on R&D, approximately 14% of all employees in companies carrying out R&D which is higher than in 2013 (13%). The full time equivalent figure (FTE) for 2014 was 4,970 (Table 10).

**Table 10: R&D Employment 2005-2014**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>Number of Employees</b>	2,720	3,040	3,310	3,750	4,690	5,230	5,440	6,320	6,730	8,160
<b>FTE</b>	2,600	2,870	2,760	2,940	3,520	3,950	4,240	4,560	4,710	4,970

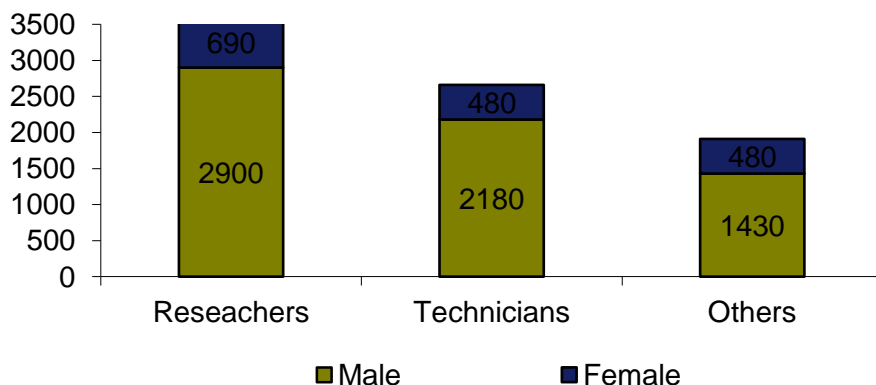
Of the total employees involved in R&D activities, 6,510 (80%) were males and 1,650 (20%) were females. This compared to 6,728 employees in 2013 with 5,400 males and 1,330 females, representing 80% and 20% respectively. Figure 12 represents the split of employees by gender and type.

By type of R&D employee, researchers accounted for 44%, technicians for 33% and other employees (e.g. support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects) for 23% of all R&D employees. Comparable full-

<sup>10</sup> Please note: All employment figures have been rounded to the nearest 10

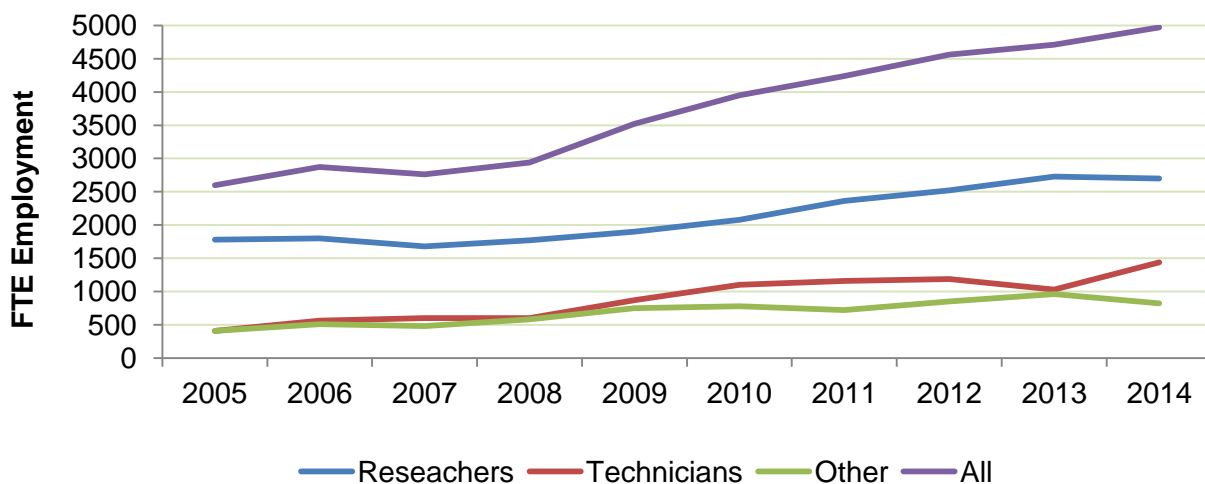
time equivalent figures show that 2,700 employees were researchers (54%), 1,440 employees were technicians (29%) and the number of other employees was 820 (16%).

**Figure 12: Employment on R&D in 2014 by gender (Headcount)**



The number of R&D employees increased by 21% over the year to 2014. The FTE rise from 2013 to 2014 was 5%. The change in FTE levels is shown in Figure 13.

**Figure 13: Employment on R&D 2005-2014 (FTE)**



On a full-time equivalent basis there were 2,400 employees in Manufacturing and 1,570 in the Services & Other sectors. Within Manufacturing, researchers accounted for 56% of R&D employees with the level of technicians at 24% and other employees at 20%.

Within the Services & Other sectors, researchers made up 53% of R&D employees, technicians 34% and other employees 13%.

### 3.9: TAX CREDITS

Businesses were asked if they received any R&D tax credits and if their R&D work was part of a joint project in 2014, following the introduction of the question in the 2004 survey.

As shown in Table 11, 139 R&D performing companies reported that they received tax credits amounting to £56.8million in total. This represents an increase in the number of R&D performing companies receiving tax credits and an increase in the amount received when compared with last year.

**Table 11: Breakdown of R&D Tax Credits 2008-2014**

	2008	2009	2010	2011	2012	2013	2014
<b>Number of companies</b>	57	77	80	136	161	104	139
<b>Tax credit (£m)</b>	9.5	21.7	19.2	35.3	37.3	41.5	56.8

### 3.10: JOINT PROJECTS

59 companies reported that their R&D work was part of a joint project with a source outside their company. 21 companies had a joint project with Higher Education Establishments, 22 with other Businesses and 16 with both. This shows an increase in the number of companies engaging in joint projects since last year (46 companies in 2013).

### 3.11 R&D Information from other sources

#### **Business Expenditure on Research & Development in the Republic of Ireland**

The biennial Business Expenditure on Research and Development (BERD) Survey 2013/2014 is jointly conducted by the Central Statistics Office (CSO) and Forfás 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 (2013) 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. Innovation covers a wide range of activities of which R&D is just one element. According to the latest results, during 2010-12 40% of NI SMEs were innovation active, compared to 33% during 2008-10 (2011 survey). The equivalent UK figures also showed an increase from 37% to 45%. 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 and earlier Innovation Surveys are available at:

[http://www.detini.gov.uk/index/what-we-do/deti-stats-index/stats\\_publications\\_2014\\_onwards/innovation\\_survey.htm](http://www.detini.gov.uk/index/what-we-do/deti-stats-index/stats_publications_2014_onwards/innovation_survey.htm)

The methodology, sample details and first UK-level findings from the UK Innovation Survey 2013 can be found on the Office for National Statistics website at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/301385/14-p107a-first-findings-from-the-ukis-2013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/301385/14-p107a-first-findings-from-the-ukis-2013.pdf)

## 4

## Northern Ireland Higher Education Expenditure (HERD) and Government Expenditure on Research & Development (GERD) during 2014

### 4.1: Higher Education Expenditure on Research and Development (HERD)

Table 12 details the headline results from the 2012-2014 Higher Education Expenditure on Research & Development (HERD) surveys.

Total HERD expenditure increased by 20.7% from £148.3m in 2013 to £179.0m in 2014, compared with a decrease of 0.4% from 2012 to 2013. The increase in 2014 in-house expenditure was comprised of a 121.1% increase in capital expenditure and 14.3% in non capital expenditure. This compares to the previous period where capital expenditure increased by 23.6% and non capital expenditure decreased by 1.6%.

Employment totals increased between 2013 and 2014, from 1,610 full-time equivalent persons in 2013 to 1,750 in 2014. The change in R&D employment consisted of an increase in the number of academic staff (from 1,210 to 1,340), a decrease in the number of technicians (from 200 to 180) and an increase in the number of other employees employed in R&D (from 200 to 230).

Block grants remained the largest source of funds with their relative contribution decreasing from 52.8% in 2013 to 47.2% in 2014. Funding from UK Central Government/Local Authorities and Health Trusts/Hospitals increased by 19% from £24.4m in 2013 to £29.0m in 2014, accounting for 16.2% of HERD funding in 2014 compared to 16.4% in 2013. Funding from UK industry/commerce/public corporations also showed an increase (24.8%) from £4.0m in 2013 to £5.0m in 2014, accounting for 2.8% of HERD funding in 2014 compared to 2.7% in 2013.



**Table 12: Higher Education Expenditure on R&D**

	2012	2013	2014
	£million	£million	£million
<b>HERD Expenditure<sup>11</sup></b>	148.9	148.3	179.0
<b>of which:</b>			
Non Capital Expenditure	141.7	139.4	159.4
Capital Expenditure	7.2	8.9	19.7
<b>Source of funding of R&amp;D:</b>			
Government Block Grant <sup>12</sup>	78.9	78.3	84.4
OST Research Councils <sup>13</sup>	12.4	12.8	20.7
UK-based charities	10.8	10.7	14.1
UK Cent Gov/Local Auth/Health <sup>14</sup>	25.4	24.4	29.0
UK Ind/Comm/Pub Corp <sup>15</sup>	5.3	4.0	5.0
EU Government	8.8	9.1	13.6
EU Other	2.1	3.0	2.9
Other Overseas	3.1	4.0	7.7
Other Sources	2.1	2.0	1.6
	<b>Number</b>	<b>Number</b>	<b>Number</b>
<b>HERD Employment<sup>16</sup></b>	1,500	1,610	1,750
<b>of which:</b>			
Academic staff	1,120	1,210	1,340
Technicians <sup>17</sup>	200	200	180
Other <sup>18</sup>	180	200	230

<sup>11</sup>Expenditure for 2014 includes £1.3 million of expenditure funded by Northern Ireland businesses (1.3 m in 2013 and £1.6m in 2012). Therefore, net HERD in 2013 was £177.7m (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.

<sup>12</sup> Figure also includes funding from other sources such as fees, used to fund day-to-day R&D activity.

<sup>13</sup> Office of Science and Technology Research Councils

<sup>14</sup> Funding from UK Central Government, Local Authorities and Health Trusts/Hospitals

<sup>15</sup> Funding from UK industry/commerce/public corporations

<sup>16</sup> This is the number of full-time equivalents. Figures are rounded to the nearest 10 and constituent parts may not add due to rounding

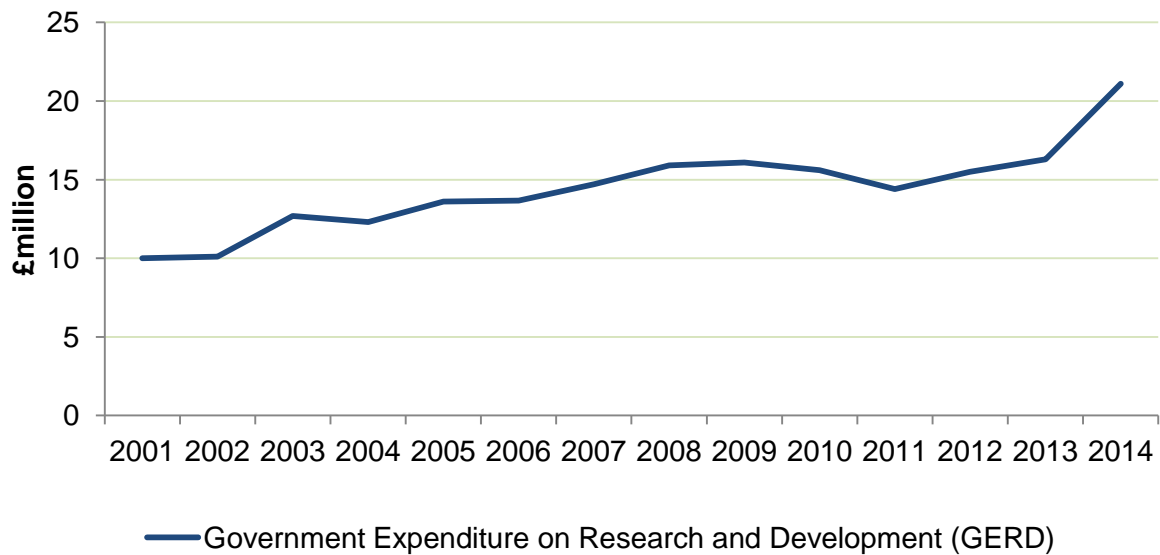
<sup>17</sup> Technicians – Perform scientific and technical tasks normally under the supervision of researchers.

<sup>18</sup> Others -Support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects.

#### 4.2: Government Expenditure on Research and Development (GERD)

Government R&D expenditure rose in cash terms by £4.8m (29%) over the year to 2014 (Figure 14). Over the five year period from 2009 to 2014 Government R&D expenditure increased by 31%.

Figure 14: Government Expenditure on R&D (GERD)



A quality report for the Northern Ireland Research and Development Statistic publication can be found at the following link:

<http://www.detini.gov.uk/deti-stats-index/stats-surveys/stats-research-development.htm>

### 5.1: Business Expenditure on Research & Development

The survey of Northern Ireland Business Expenditure on Research and Development during 2014 was undertaken by the Northern Ireland Statistics and Research Agency (NISRA). The sample and survey results only cover business enterprises. 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 and comes from the Frascati manual:

"The guiding line to distinguish between research and technological development activity (R&D) from non-research activity is the presence or absence of an appreciable element of novelty or innovation. If the activity departs from routine and breaks new ground it should be included; if it follows an established pattern it should be excluded".

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. According to the Department for Business Innovation and Skills (BIS), R&D is defined as "any project to resolve scientific or technological uncertainty aimed at achieving an advance in science or technology".

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 work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications".

The Frascati Manual was originally written by, and for, the experts in OECD member countries that collect and issue national data on R&D. The definitions provided in this manual are internationally accepted and now serve as a common language for designing, 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 2014, although companies were given the option of supplying data for a business year ending on any date between 6 April 2014 and 5 April 2015.

## **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 2013 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 2014 survey, businesses were stratified into 4 groups:

- (i) Businesses responding to the 2013 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 2013); 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 2014 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 2014, 1,518 forms were sent out to businesses believed to be performing R&D. Completed forms were returned by 1,3307 businesses representing a response rate of 86.1%. The total number of companies spending on R&D is relatively small – 661 in 2014 (and 534 in 2013).

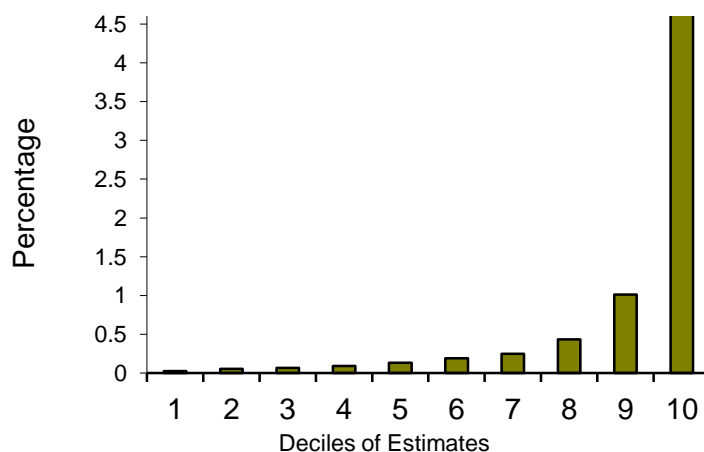
## **Survey Design – Validation and Estimation**

Variations may occur in NI R&D data from year to year due to the influence of one or two large-scale projects. Estimates were made for the R&D activity of non-responding businesses. 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 32.8% of the total non-respondent companies. The remaining 67.2% - non Invest NI estimates were based on historical information and other administrative surveys within Economic and Labour Market Statistics Branch.

Overall, all estimates make up 10% of total BERD spend for 2014 (compared to 7% in 2013) as shown in Figure 15.

When estimates are ranked according to ascending size of spend, the last two deciles (i.e. the top 20% of companies) accounted for 87% 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. Estimates for Invest NI companies account for 2% of total BERD spend while estimates for non Invest NI companies account for 8% of total BERD spend. This should be borne in mind when considering the results.

**Figure 15: Deciles of Estimates as a percentage of 2014 BERD**



### Status of Figures in Current Bulletin

The results are provisional and may be revised should additional information become available usually due to business misreporting and late returns.

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 at the link below.

<http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html>

### Definition of Terms

#### a) Type of R&D Expenditure

Total Expenditure on R&D - This covers expenditure by businesses, expenditure by higher education and other expenditure by Government.

Other Expenditure by Government - The ONS also collect annual data on Government-funded Science, Engineering and Technology for the UK as a whole and publish this in the Forward Look report. By utilising Forward Look 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. Forward Look figures will include financial assistance to both higher education and to businesses by Government as well as expenditure on R&D conducted within

Government Departments. The figures shown in Tables 1, 2 and 3, expenditure by businesses and higher education and other expenditure by Government, should complement each other; i.e. there should be no double counting.

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.

## **b) Type of Research**

Basic Research - work undertaken primarily for the advancement of scientific knowledge without a specific practical application in view.

Applied Research - Research undertaken with a general or a particular application in view.

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.

## **c) 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.

## **d) Employment on R&D**

Staff Types - Employment on 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,	Engineering & Allied Industries
CK, CL	
CB, CC,	Other Manufacturing
CD, CF,	
CG, CM	

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, 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

### 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 of Enterprise, Trade and Investment (DETI) 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. Below is a link to the Research, Development and Innovation page of the DETI website which outlines recent policy developments and how these are supported by the use of R&D statistics; and a second link providing an example of how the statistics are further utilised in a government research setting:

<http://www.detini.gov.uk/deti-eco-dev-research-development.htm>

[http://www.niassembly.gov.uk/Documents/RaISe/Publications/2012/enterprise\\_trade\\_investment/2312.pdf](http://www.niassembly.gov.uk/Documents/RaISe/Publications/2012/enterprise_trade_investment/2312.pdf)

Invest NI use the data to better inform their decision making and investment strategies and to enhance their own internal research. The below link provides an example:

[http://www.investni.com/index/already/product/research\\_and\\_development.htm](http://www.investni.com/index/already/product/research_and_development.htm)

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.

[http://www2.warwick.ac.uk/fac/soc/wbs/research/csme/research/working\\_papers/wp107.pdf](http://www2.warwick.ac.uk/fac/soc/wbs/research/csme/research/working_papers/wp107.pdf)

<http://www.agendani.com/reversing-rd-under-performance>

The Research and Development Society is a UK-based organisation formed to promote the better understanding of R&D in all its forms. The Society makes use of UK BERD data as a key source of information, for understanding how much UK businesses are investing in R&D on an annual basis and to inform wider debates on the subject.

<http://www.rdsoc.org>



## 5.2: Northern Ireland Higher Education Expenditure on Research & Development

Table 12 (page26) details Higher Education Expenditure on R&D (HERD). The table gives 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. 2013/2014 ending 31/7/2014. The universities have made data available for this period on the basis of Transparency Review data collected within each respective institution.

### Transparency Review

The Transparency Review is a Government initiative, introduced with the Comprehensive Spending Review (CSR) in 1998. The CSR awarded £1.5bn of additional funding for Higher Education, but the Treasury made this conditional on the sector becoming more open about the way public funds are spent in universities and colleges.

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

<http://www.qub.ac.uk/directorates/FinanceDirectorate/CapitalandCosting/Costing/> for QUB and at [http://www.ulster.ac.uk/finance/transparency\\_reviews.html](http://www.ulster.ac.uk/finance/transparency_reviews.html) for UU.

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 14. 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.

Employment on R&D – 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

## 5.3: Northern Ireland Government Expenditure on Research & Development

Government Expenditure on Research and Development is conducted annually by the Office of National Statistics (ONS) as a census survey. Approximately 15 government departments and research councils are sent a questionnaire. Government departments are asked to include their in-house R&D as part of their estimates – this includes estimates for R&D performed by local authorities and NHS trust.

## **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@dfpni.gov.uk](mailto:statistics@dfpni.gov.uk)

## **Next Publication**

The next bulletin will be published in November 2016.

## **FOR FURTHER INFORMATION**

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## 6

## Annex

Annex Table 1: Business Expenditure on R&amp;D 2009 – 2014

	Cash Terms						Real Terms (2013 Prices) <sup>19</sup>						% Change Real Terms	
	2009	2010	2011	2012	2013	2014	2009	2010	2011	2012	2013	2014	13-14	09-14
<b>Total Business Expenditure (£m)</b>	323.7	344	388.8	453.2	472.6	403.5	359.2	370.2	409.8	470.1	480.7	403.5	-16.1%	12.3%
<b>In-house R&amp;D (£m)</b>	297.2	324.2	352	415.0	434.0	352.1	329.8	348.9	371.0	430.4	441.4	352.1	-20.2%	6.8%
Non capital (£m)	235	230	321.2	372.6	373.8	321.0	260.8	247.5	338.6	386.5	380.2	321.0	-15.6%	23.1%
Capital (£m)	62.2	94.2	32.8	42.4	60.3	31.1	69.1	101.4	34.6	44.0	61.3	31.1	-49.2%	-54.9%
<b>Purchased R&amp;D (£m)</b>	26.5	19.8	34.7	38.2	38.6	51.4	29.4	21.3	36.6	39.6	39.2	51.4	31.0%	74.8%

<sup>19</sup> GDP deflator used to convert cash terms to real terms: 2009 (90.1), 2010 (92.9), 2011 (94.9), 2012 (96.4), 2013 (98.3), 2014=100

**Annex Table 1 continued: Business Expenditure on R&D 2009 – 2014**

	Cash Terms						Real Terms (2013 Prices) <sup>19</sup>						% Change Real Terms	
	2009	2010	2011	2012	2013	2014	2009	2010	2011	2012	2013	2014	13-14	09-14
<b>In-house R&amp;D Funding</b>														
R&D Funded from own funds (£m)	242.5	264	294.1	345.8	356.7	299.7	269.1	284.1	310.0	351.7	358.7	299.7	-17.4%	11.4%
R&D Funded by Government (£m)	50.4	57.3	54.2	41.8	52.9	23.9	55.9	61.7	57.1	43.4	53.9	23.9	-55.6%	-57.3%
R&D (£m) Overseas/ Other	4.3	2.8	5.8	27.4	24.4	28.5	4.8	3.0	6.1	28.4	24.8	28.5	14.9%	497.2%
<b>Ownership</b>														
External Ownership (%)	73	68	74	78	75	64	73	68	74	78	75	64	-14.7%	-12.3%
Local Ownership (%)	27	32	26	22	25	36	27	32	26	22	25	36	44.0%	33.3%

**Annex Table 1 continued: Business Expenditure on R&D 2009 – 2014**

	Cash Terms						Real Terms (2013 Prices) <sup>19</sup>						% Change Real Terms	
	2009	2010	2011	2012	2013	2014	2009	2010	2011	2012	2013	2014	13-14	09-14
<b>Type of In-house Non capital Research</b>														
Basic Research (£m)	13.5	18.4	7.3	11.8	9.8	13.0	15.0	19.8	7.7	12.2	9.9	13.0	31.0%	-13.2%
Applied Research (£m)	83.9	96.7	114	143.4	134.4	136.0	93.1	104.1	120.2	148.7	136.7	136.0	-0.5%	46.1%
Experimental Development (£m)	137.7	114.9	200	217.5	229.6	172.0	152.8	123.7	210.8	225.6	233.5	172.0	-26.4%	12.5%
<b>Size</b>														
SME <sup>20</sup> (£m)	144.3	133.4	140.6	173.7	173.9	186	160.1	143.6	148.2	180.2	176.9	186.0	5.2%	16.2%
250+ (£m)	179.4	210.6	248.1	279.5	298.7	217.5	199.1	226.7	261.5	289.9	303.8	217.5	-28.4%	9.3%
<b>Sector<sup>21</sup></b>														
Manufacturing (%)	71	71	79	79	76	63	71	71	79	79	76	63	-17.1%	-11.3%
Services and Other (%)	29	29	21	21	24	37	29	29	21	21	24	37	54.2%	27.6%

<sup>20</sup> 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.

<sup>21</sup> SIC 2003 basis up to 2008, SIC 2007 basis thereafter. For definitions see Section 6, Background Notes

**Annex Table 2: Breakdown of In-House R&D Expenditure 2014 by employment size-bands (< 50 employees, 50 to 249 employees and 250+ employees) in £000s (rounded to nearest £100,000)**

	Non Capital Expenditure						Capital Expenditure			Total In-House R&D Expenditure
	Salaries & Wages	Other Costs	Total Expenditure	Basic Research	Applied Research	Experimental Development	Land & Building	Plant & Machinery	Total Expenditure	
<b>Manufacturing</b>										
<50	9,100	7,100	16,100	3,200	7,000	5,900	200	2,000	2,200	18,400
50-249	25,800	15,000	40,800	*	15,200	24,200	*	*	*	43,400
250+	75,000	60,500	153,600	*	44,900	87,700	*	*	*	155,800
<b>Total</b>	<b>109,900</b>	<b>82,600</b>	<b>192,500</b>	<b>7,500</b>	<b>67,200</b>	<b>117,800</b>	<b>2,000</b>	<b>23,100</b>	<b>25,100</b>	<b>217,700</b>
<b>Services &amp; Other</b>										
<50	37,400	17,400	54,700	3,000	24,200	27,500	300	2,200	2,500	57,300
50-249	30,500	11,100	41,600	*	25,500	14,600	*	*	*	44,400
250+	27,200	4,900	32,200	*	19,100	12,000	*	*	*	32,800
<b>Total</b>	<b>95,100</b>	<b>33,400</b>	<b>128,500</b>	<b>5,500</b>	<b>68,900</b>	<b>54,100</b>	<b>630</b>	<b>5,300</b>	<b>6,000</b>	<b>134,400</b>
<b>All Industries</b>										
<50	46,500	24,400	70,900	6,200	31,300	33,400	500	4,200	4,800	75,600
50-249	56,300	26,000	82,300	2,700	40,700	38,800	700	4,800	5,500	87,800
250+	102,300	65,500	167,800	4,000	64,000	99,700	1,400	19,500	20,900	188,700
<b>Total</b>	<b>205,000</b>	<b>116,000</b>	<b>321,000</b>	<b>13,000</b>	<b>136,000</b>	<b>172,000</b>	<b>2,700</b>	<b>28,500</b>	<b>31,100</b>	<b>352,100</b>

\*Disclosive

Totals may not sum due to rounding

**Annex Table 3: Breakdown of Purchased R&D Expenditure 2014 by employment size-bands (< 50 employees, 50 to 249 employees and 250+ employees) in £000s (rounded to nearest £100,000)**

		Purchased R&D Expenditure			
		Work commissioned within NI	Work commissioned within GB	Work carried out outside the UK	Total Purchased R&D Expenditure
<b>Manufacturing</b>					
	<50	100	100	200	400
	50-249	*	*	*	7500
	250+	*	*	*	28400
	<b>Total</b>	<b>7,700</b>	<b>10,200</b>	<b>18,400</b>	<b>36,300</b>
<b>Services &amp; Other</b>					
	<50	2800	1100	7600	11,500
	50-249	*	*	*	3200
	250+	*	*	*	400
	<b>Total</b>	<b>3,500</b>	<b>1200</b>	<b>10,300</b>	<b>15,100</b>
<b>All Industries</b>					
	<50	2,900	1100	7,900	11,900
	50-249	*	*	8200	10,700
	250+	*	*	12600	28,800
	<b>Total</b>	<b>11,200</b>	<b>11,500</b>	<b>28,700</b>	<b>51,400</b>

\*Disclosive

Totals may not sum due to rounding

**Annex Table 4: Breakdown of Business Expenditure on R&D (BERD) by Small and Medium Sized Enterprises (SMEs <250 employees) 2001-2014 (£m)<sup>22</sup>**

		R&D Expenditure													
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>SMEs (&lt;250)</b>															
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	158.5	163.5
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	22.6
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	173.9	186.0
<b>(250+)</b>															
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	188.7
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	28.8
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	217.5
<b>All</b>															
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	434.0	352.1
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	51.4
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	472.6	403.5

Totals may not sum due to rounding

<sup>22</sup>The European Commission definition of Small Medium Enterprises (SME) used is defined as being enterprises with less than 250 employees.



**Annex Table 5: Breakdown of 2014 R&D Employment by gender, employment size-band and Full time Equivalent (FTE) (rounded to nearest 10)**

		Researchers				Technicians				Other				All Types			
		Male	Female	Total	FTE	Male	Female	Total	FTE	Male	Female	Total	FTE	Male	Female	Total	FTE
<b>Manufacturing</b>																	
Employment Size-bands	<50	200	30	230	150	180	20	190	100	240	40	280	110	620	80	700	360
	50-249	370	100	470	390	390	60	450	190	410	90	500	190	1170	250	1420	770
	250+	900	200	1100	810	360	100	460	270	290	50	340	180	1550	350	1890	1260
	Total	1470	320	1790	1350	930	170	1100	570	940	180	1120	480	3340	670	4010	2400
<b>Services &amp; Other</b>																	
Employment Size-bands	<50	610	110	720	520	830	170	1000	420	190	110	300	160	1630	390	2020	1100
	50-249	270	100	370	310	310	110	420	360	240	170	410	140	820	380	1200	820
	250+	550	160	710	530	120	30	150	90	50	20	70	30	720	210	930	650
	Total	1430	370	1800	1360	1260	310	1570	880	480	290	780	340	3170	980	4140	2570
<b>All Industries</b>																	
Employment Size-bands	<50	810	130	950	670	1010	190	1190	520	430	150	580	270	2250	470	2720	1470
	50-249	640	190	840	700	700	170	870	560	650	260	910	330	1990	620	2610	1590
	250+	1450	360	1810	1340	480	130	610	360	340	70	410	210	2270	560	2820	1910
	Total	2900	690	3590	2700	2180	480	2670	1440	1430	480	1900	820	6510	1650	8160	4970

\*Disclosive

Totals may not sum due to rounding