

**Business Activity**

**Statistics Bulletin**

# Northern Ireland Research & Development Statistics 2009

**1 December 2010**





## **NORTHERN IRELAND RESEARCH AND DEVELOPMENT STATISTICS 2009**

Published 1 December 2010

- **Total expenditure on Research and Development in Northern Ireland was £482.8 million (m) in 2009, of which £323.7m (67.0%) was spent by businesses, £143.0m (29.6%) by the Higher Education sector and the remainder (£16.1m or 3.3%) was Government expenditure. There was an increase of £138.8m (40.3%) in cash terms in Northern Ireland total R&D expenditure between 2008 and 2009 (from £344.0m to £482.8m), driven almost exclusively by businesses.**
- **Total business R&D expenditure in 2009 was £323.7m, up £139.8m (76.0%) in cash terms on the previous year. This is the largest annual increase in Business R&D expenditure since the annual R&D survey began in 2001. Between 2004 and 2009, overall Business R&D expenditure has risen by 150.9% in cash terms (from £129.0m to £323.7m).**
- **Higher Education R&D expenditure fell in cash terms by £1.2m (-0.8%) while Government expenditure increased by £0.2m (1.3%) over the year.**
- **There was a large increase (100.4%) in R&D expenditure in cash terms by the Manufacturing sector from £114.3m in 2008 to £228.9m in 2009. An increase also occurred in the Services and Other sector with R&D expenditure rising by 36.1% from £69.7m to £94.8m in the same period.**
- **Northern Ireland is dependant on a relatively small number of companies for a significant proportion of R&D expenditure. The ten biggest spending companies accounted for 57% of the total R&D spend in Northern Ireland in 2009, higher than in 2008 (41%).**
- **Companies with ownership outside Northern Ireland continue to play an important role in financing R&D. Externally owned companies accounted for 73.2% of such expenditure compared to 26.8% by locally owned companies.**
- **Total Small Medium Enterprises (SME) expenditure rose by £38.2m (36.0%) from 2008 to 2009, in cash terms. Since 2004 SME expenditure has increased by 131.6% to £144.3m.**
- **In real terms, total R&D expenditure rose by £134.0m (38.4%). Business R&D expenditure rose by £137.2m (73.6%), Higher Education R&D expenditure fell by £3.2m (-2.2%) and Government expenditure remained constant over the year.**

Department of Enterprise,  
Trade and Investment

# **Northern Ireland Research & Development Statistics 2009**

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# Executive Summary

# 1

## Introduction

This bulletin provides information on the level of Research & Development (R&D) activity 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.

It includes information on: the level of R&D; sources of funding for R&D; employment in R&D.

It provides important indicators of the extent to which Northern Ireland companies and higher education establishments are investing in the activities that underlie future economic development.

## Coverage and Results

All companies believed to be performing R&D were included in the survey - in effect, therefore, a census of known R&D performers was carried out. A total of 1,010 returns were received by the Department – some 95% 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. Overall, estimates accounted for 1.1% of the value of total Business Expenditure on R&D (BERD) for 2009. For further information see Chapter 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.**

## Total Expenditure on R&D in Cash Terms

Total expenditure on Research and Development in Northern Ireland in cash terms was £482.8 million(m) in 2009, of which £323.7m (67.0%) was spent by businesses, £143.0m (29.6%) by the Higher Education sector and the remainder, £16.1m (3.3%) was Government expenditure.

There was an increase of £138.8m (40.3%) in cash terms in Northern Ireland total R&D expenditure between 2008 and 2009 to £482.8m. This increase was comprised of rises in Business R&D expenditure of £139.8m (76.0%) and in Government expenditure of £0.2m (1.3%) and a decrease in Higher Education expenditure of £1.2m (-0.8%). Over the last five years total R&D spending in cash terms in NI has risen by 74.0%.

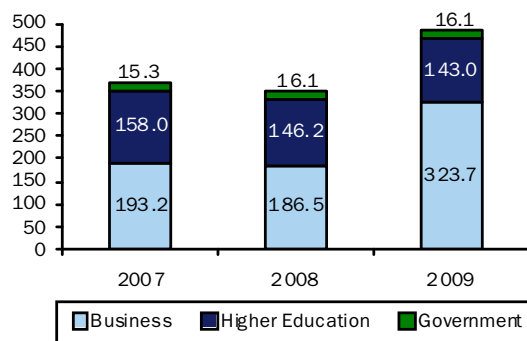
## Total Expenditure on R&D in Real Terms

In real terms, total expenditure increased by £134.0m or 38.4% from £348.8m in 2008 to £482.8m in 2009.

In 2009 the Northern Ireland Business sector again accounted for a greater share of total R&D expenditure (67.0%) than the Higher Education sector (29.6%). In 2008 the figures were 53.5% and 41.9% respectively.

Over the last five years (2004-2009) total R&D spending in real terms in NI has risen by 53.9%.

**Figure 1: Main Split of R&D Expenditure in Real Terms (£million)**



Over the year to 2009 there was an increase in expenditure by Businesses, while expenditure by Higher Education decreased, and Government expenditure remained constant. In real terms, expenditure by Businesses increased by £137.2m (73.6%) over the year and expenditure by Higher Education decreased over the year by £3.2m (-2.2%). Government expenditure remained constant in real terms over the year.

Business R&D expenditure rose by 121.9% between 2004 and 2009 in real terms.

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

**Business R&D: In-house Expenditure**

Spending carried out within a company in Northern Ireland (in-house), accounted for 91.8% (£297.2m) of total business expenditure in 2009. In-house expenditure increased by 74.2% between 2008 and 2009.

**Business R&D: Sectoral Analysis**

In 2009, the majority of R&D was carried out within the Manufacturing sector (70.7%) with the remainder (29.3%) carried out in the Services & Other sector. This shows an increased share of expenditure in the Manufacturing sector compared to the previous year (for example, in 2008 Manufacturing accounted for 62.1% and Services & Other for 37.9%).

Over the year to 2009, increases in expenditure occurred in both the Manufacturing sector and the Services & Other sector. The increase in expenditure in the Manufacturing sector, (£114.7m or 100.4%) was bigger in value and proportional terms than the increase of £25.1m (36.1%) in the Services & Other sector.

The sectoral analyses are based on the Standard Industrial Classification 2007 (or SIC 2007) of industries for the first time in this publication, having previously been on a SIC 2003 basis. Care should therefore be taken when making comparisons with previous reports. For more information see Chapter 6, Background Notes.

**Business R&D: by Company Size**

Companies with 250 or more employees accounted for 55.4% of business R&D expenditure in 2009, although they represented only 7.8% of R&D performing companies. Smaller firms (i.e. those with less than 50 employees) represented some 68.6% of R&D performing companies and accounted for over a fifth (21.7%) of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs)\* accounted for 44.6% of the total business expenditure. Total SME expenditure rose by £38.2m (36.0%) from 2008 to 2009, in cash terms. However, since 2004 SME expenditure has increased by 131.6% to £144.3m. The proportion that large companies (250+ employees) make to total R&D expenditure (55.4%) was more than in the previous two years (2008: 42.3%; 2007: 36.7%) See Annex 1 Table 3 for further details.

\*The definition of Small Medium Enterprises (SME) used is that under the European Commission Recommendation (96/280/EC) of 3 April 1996, in which SMEs are defined as being enterprises with less than 250 employees and large companies as being enterprises with more than 250 employees.

**Business R&D: Source of funds**

The majority of funding came from companies' own funds (81.6%), with 16.9% from Government, 0.7% from overseas and 0.7% from other sources. The proportion of funding from own funds decreased from 85.5% in 2008 to 81.6% in 2009.

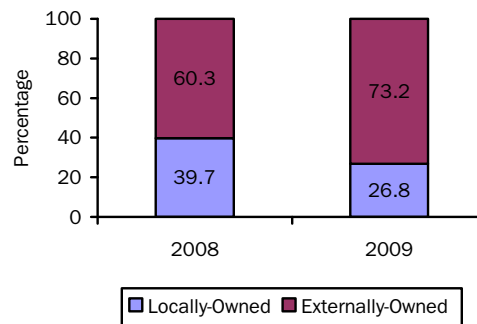
**Business R&D: Ownership**

Companies with ownership outside NI play an important role in financing R&D activities in the region. Almost three quarters, £237.1m (73.2%) of total R&D spend was by such externally-owned companies although they accounted for under one-fifth (18.9%) of all R&D performing companies. Their contribution to the total R&D spend was higher than in 2008 (60.3%) and their cash value increased by £126.2m over the same period.

R&D expenditure by locally-owned companies increased by 18.6% (£13.6m) between 2008 and 2009 while R&D Expenditure by externally-owned companies increased by 113.9% (£126.2m).

The majority of R&D expenditure in Manufacturing is carried out by externally-owned companies (81.4%), similar to the Services & Other sector (53.6%).

**Figure 2: Expenditure by Ownership 2008-2009** (percentages)



## Business R&D: Employment

In 2009, companies surveyed reported a total of 4,690 employees working on R&D, some 7.8% of all employees in companies carrying out R&D. The full time equivalent figure (FTE) for the same period was 3,520.

The number of R&D employees increased by 25.2% over the year to 2009.

**Table 1: R&D Employment**

	2005	2006	2007	2008	2009
Number	2,720	3,040	3,310	3,750	4,690
FTE	2,600	2,870	2,760	2,940	3,520

Of all R&D employees, 53.4% were researchers, 22.8% were technicians and a further 23.8% were classed as other employees. In terms of FTE the proportions were 54.0%, 24.8%, and 21.2% for researchers, technicians and other employees respectively.

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

Of the 12 UK regions, five showed an increase in in-house business R&D expenditure in cash terms over the year to 2009 including Northern Ireland which increased by 74.2%. This was the highest percentage increase across the UK regions. In the UK as a whole such expenditure decreased by 2.5%. Changes varied from an increase of 74.2% in Northern Ireland to a decrease of 15.7% in London.

Over the two year period 2007 to 2009, in-house business R&D expenditure in cash terms in Northern Ireland increased by 67.8%. In the UK as a whole such expenditure fell by 0.3%.

## Higher Education R&D: Summary

R&D expenditure in the Higher Education sector decreased by 0.7% in cash terms between 2008 and 2009 (from £145.2m to 144.1m). Net expenditure in 2009 (excluding spend by businesses undertaken by higher education) was £143.0m.

Over half of funding (52.5%) for Higher Education R&D in 2009 came from the Government block grant (£75.7m). In 2009, there were some 1,700

full-time equivalent employees in the Higher Education sector engaged in R&D, increasing from 1,600 employees in 2008.

## R&D Investment Rate

Regional Gross Value Added (GVA) released by the Office for National Statistics (ONS) on 9<sup>th</sup> December 2009 shows that Northern Ireland 2009 in-house R&D as a proportion of GVA (1.0%) and was the sixth highest of the twelve UK regions (a lower proportion was recorded in West Midlands (0.9%), North East (0.8%), Wales (0.7%), Scotland (0.6%), Yorkshire & The Humber (0.5%) and London (0.3%). Northern Ireland businesses would have needed to invest some £48m more in R&D in 2009 to reach the UK average rate (1.2%). Regional GVA figures for 2009 are due to be released by ONS on 8<sup>th</sup> December 2010.

## Other Sources

The most recent UK Innovation Survey (2009) estimated that 55% of enterprises in NI had undertaken some form of innovation activity over the 3-year sample period 2006-08. This was lower than the equivalent UK figure of 58%. While NI's performance had remained relatively constant since 2004-06 (57%), the UK rate decreased from 64%.

The difference between the proportions of enterprises that were product innovators in NI (17 per cent) and the UK (24 per cent) widened during 2006-08, while the proportions of process innovators (NI: 11 per cent; UK: 13 per cent) remained similar.

Northern Ireland results from the 2009 and earlier Innovation Surveys are available at: <http://www.detini.gov.uk/deti-stats-index/stats-surveys/stats-innovation-survey.htm>

The methodology, sample details and first UK-level findings from the UK Innovation Survey 2009 can be found on the Office for National Statistics website at: [http://www.statistics.gov.uk/elmr/03\\_10/download/ELMR\\_Mar10.pdf](http://www.statistics.gov.uk/elmr/03_10/download/ELMR_Mar10.pdf) (see pages 28-35).

According to the 2008 Northern Ireland Annual Business Inquiry (NIABI), 5.8% of companies had someone in their business engaged in research and development work during the year. This is similar to the percentage reported the previous year (6.3%). The Manufacturing sector was one of the sectors with the highest proportion (19.5%), while the proportion in the Service sector was 3.3%. Results from the 2009 NIABI are due to be published in December 2010.

# Introduction

## 2

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 Department of Enterprise, Trade and Investment (DETI) carries out annual surveys of R&D expenditure in the Business sector and Higher Education Institutions in Northern Ireland (see Sections 3 and 7 respectively of this Statistics Bulletin). 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 Northern Ireland<sup>1</sup>.

Headline results from the surveys are provided in both cash and real terms while detailed analysis is provided mainly in cash terms.

### RESULTS

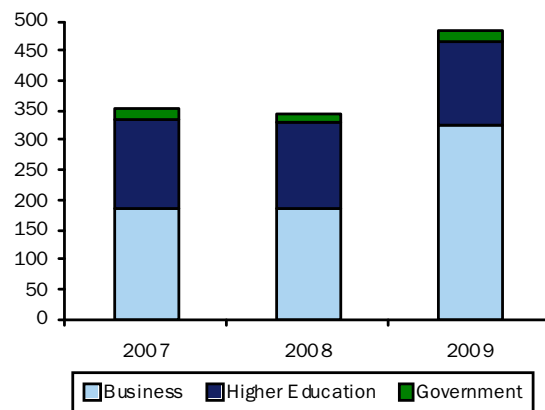
Total expenditure on Research and Development in Northern Ireland in cash terms was £482.8m in 2009, of which £323.7m (67.0%) was spent by Businesses, £143.0m (29.6%) by the Higher Education sector and the remainder was Government expenditure.

Total expenditure was 40.3% higher than that in 2008 (£344.0m) and 37.5% higher than that in 2007 (£351.1m).

**Table 2: Total Expenditure on R&D<sup>2</sup> in cash terms (£million)**

	2007	2008	2009
<b>Total expenditure on R&amp;D (of which)</b>	351.1	344.0	482.8
<b>Expenditure by Businesses</b>	185.1	183.9	323.7
<b>Expenditure by Higher Education<sup>3</sup></b>	151.3	144.2	143.0
<b>Other expenditure by Government</b>	14.7	15.9	16.1

**Figure 3: Main Split of R&D Expenditure in cash terms (£million)**



In 2009 expenditure by Business was greater than Higher Education (67.0% and 29.6% respectively). Business also accounted for the greater proportion of expenditure in the previous two years, (53.5% in 2008 and 52.7% in 2007).

<sup>1</sup> The latest details are available on the Department for Business, Innovation & Skills website at <http://www.bis.gov.uk/policies/science/science-innovation-analysis/statistics>

<sup>2</sup> Figures contained within all tables in this Bulletin may not add due to rounding.

<sup>3</sup>To avoid double counting, this figure excludes £1.1m in 2009, £1.0m in 2008 and £0.7m in 2007 of expenditure on R&D by businesses that was undertaken by universities or higher education establishments.

**Table 3: Total Expenditure on R&D in real terms<sup>4</sup>**  
(£million)

	2007	2008	2009
<b>Total expenditure on R&amp;D (of which)</b>	366.6	348.8	482.8
<b>Expenditure by Businesses</b>	193.2	186.5	323.7
<b>Expenditure by Higher Education<sup>5</sup></b>	158.0	146.2	143.0
<b>Other expenditure by Government</b>	15.3	16.1	16.1

In real terms total expenditure in 2009 (£482.8m) has increased by 38.4% (£134.0m) from expenditure in 2008 (£348.8m).

**Figure 4: Main Split of R&D Expenditure in real terms** (£million)

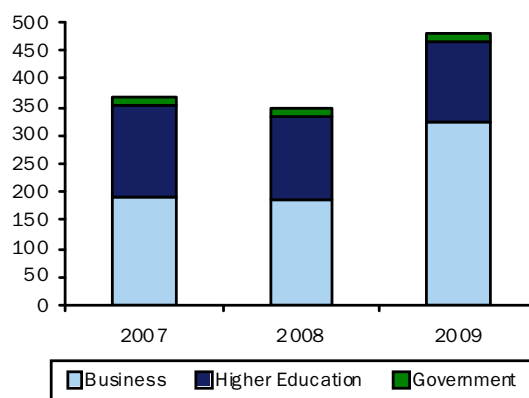


Table 2 and Figure 3 shows that over the year to 2009 there was an increase in expenditure by Businesses, with a decrease in expenditure by Higher Education, while expenditure by Government also increased. This can also be seen in real terms (Table 3 and Figure 4) where expenditure by Businesses increased by £137.2m (73.6%), expenditure by Higher Education decreased by £3.2m (-2.2%) whilst Government expenditure remained constant over the year.

### Historical Expenditure (cash terms)

**Table 4: Total Expenditure on R&D in Cash Terms 2001-2009** (£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

<sup>4</sup> GDP deflator used to convert cash terms to real terms: 95.8 (2007) and 98.6 (2008) where 2009 = 100.

<sup>5</sup> To avoid double counting, this figure excludes £1.1m in 2009, £1.0m in 2008, £0.7m in 2007 of expenditure on R&D by businesses that was undertaken by universities or higher education establishments.

# Business Expenditure on Research & Development in 2009

## 3

Table 5 details the headline results from the 2009 Business Expenditure on Research & Development (BERD) survey. The table shows that in 2009, total expenditure (in cash terms) on R&D by Northern Ireland businesses was an estimated £323.7 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 Northern Ireland but undertaken by other firms in the UK and abroad). The vast majority of total BERD was in-house expenditure (£297.2m or 91.8%) with £26.5m or 8.2% being purchased R&D expenditure which increased from £13.3m in the previous year. Of this £26.5m of purchased R&D expenditure in Northern Ireland, some £1.1m was undertaken by the Higher Education sector.

81.6% of funding for in-house R&D in 2009 came from the companies' own resources (£242.5m) while government provided a further 16.9% (or £50.4m) and the remainder came from overseas (0.7% or £2.2m) and other sources (0.7% or £2.2m).

**Table 5: Business Expenditure on R&D - 2009**

	Total Expenditure by Business (£million)	As % of Total Expenditure
Total Expenditure	323.7	100.0
In-house R&D Expenditure <sup>6</sup>	297.2	91.8
of which:		
Non Capital Expenditure	235.0	72.6
Capital Expenditure	62.2	19.2
Purchased R&D Expenditure <sup>7</sup>	26.5	8.2
Of which:		
Undertaken by Higher Education	1.1	0.3
Source of funding:		
Business	242.5	81.6
Government	50.4	16.9
Overseas	2.2	0.7
Other <sup>8</sup>	2.2	0.7

Total employment on R&D in businesses for 2009 was 3,520 (based on full time equivalent figures), which was higher than that in 2008 (2,940) and 2007 (2,760).

<sup>6,7,8</sup> For definitions see Chapter 6, Background Notes.

## BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – SOME HISTORICAL COMPARISONS

Prior to 2001, the Research and Development Survey was conducted every three years (in 1993, 1996 and 1999). Since 2001, DETI has undertaken to survey companies annually. Table 6 below makes comparisons with earlier DETI surveys. To allow comparability of current with previous results, all figures relate to Total Business Expenditure - i.e. total expenditure by business on R&D (including grants given by government). Higher Education spending and other direct expenditure by Government are excluded.

### Key Findings

Between 2008 and 2009 total business expenditure on R&D increased by 73.6% in real terms, with in-house R&D increasing by 71.8% and purchased R&D expenditure increasing by 96.5%. Government funding increased by 119.0% over the year, business expenditure from own funds increased by 64.0% and other sources of funding increased by 101.9%.

The ten biggest R&D spenders in 2009 accounted for 57% of total expenditure which is greater than the proportion in 2008 (41%). This is the largest proportion of total spend since 2002.

**Table 6: Business Expenditure on R&D 2005 – 2009 (£million)**

	Cash Terms					Real Terms (2009 Prices) <sup>9</sup>					% Change Real Terms	
	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005	08-09	05-09
Total Expenditure	323.7	183.9	185.1	167.0	154.3	323.7	186.5	193.2	179.6	171.0	73.6	89.3
In-house R&D	297.2	170.6	176.9	156.6	147.8	297.2	173.0	184.7	168.4	163.8	71.8	81.5
Purchased R&D	26.5	13.3	8.2	10.4	6.5	26.5	13.5	8.6	11.2	7.2	96.5	267.9
R&D Funded by Government	50.4	22.7	20.6	24.2	17.3	50.4	23.0	21.5	26.0	19.2	119.0	162.9
R&D Funded from own funds	242.5	145.8	139.6	127.5	129.3	242.5	147.8	145.7	137.1	143.3	64.0	69.3
R&D Other	4.3	2.1	16.8	15.2	7.6	4.3	2.1	17.5	16.3	8.4	101.9	-48.9

<sup>9</sup> GDP deflator used to convert cash terms to real terms: 2005 (90.2), 2006 (93.0), 2007 (95.8), 2008 (98.6), 2009=100

The proportion of total expenditure by the top ten companies for each R&D survey from 2001 is as follows – 49% in 2007, 44% in 2006, 47% in 2005, 44% in 2004, 46% in 2003, 60% in 2002 and 69% in 2001. Three companies have appeared in the top ten in the last eight DETI surveys (i.e. 2002, 2003, 2004, 2005, 2006, 2007, 2008 and 2009). Four companies have appeared in the top ten in the last four surveys and eight companies have appeared in the last two surveys.

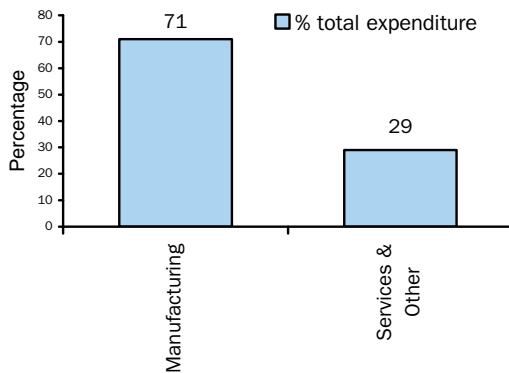
### In cash terms

In 2009, 47 companies spent more than £1 million on R&D, six more than the number in 2008, thirteen more than the number in 2007, sixteen more than the number in 2006 and seventeen more than in 2005 and 2004. This is compared with 26 in 2003, 25 companies in 2002, 19 in 2001, 20 in 1999, 16 in 1996 and 9 in 1993. Average expenditure was £91,946 per R&D employee in 2009, 47.2% higher than the figure of £62,478 for 2008 (employees are on a Full-Time Equivalent basis).

In 2009, 3,520 employees (on a Full-time Equivalent (FTE) basis) were engaged in R&D work - 5.8% of all employees of companies involved in R&D. Comparable figures for 2008 were 2,940 employees or 5.7% of all employees of R&D companies (2007: 5.7%, 2006: 5.9%, 2005: 5.2%, 2004: 5.2% and 2003: 6.3%).

**BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – SECTORAL BREAKDOWNS**

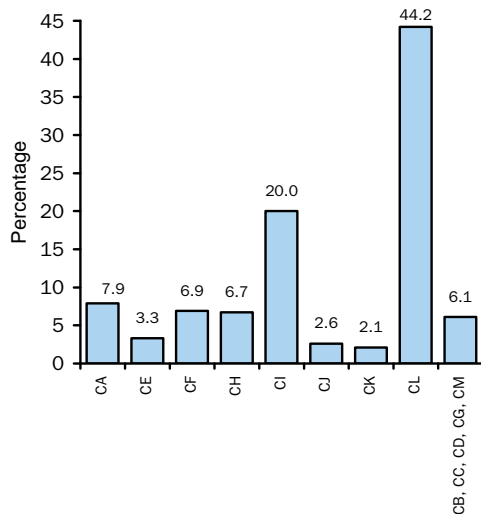
**Figure 5: Total R&D Expenditure in 2009** (percentages)



In 2009, the majority of R&D was carried out within the Manufacturing sector (71%) with the remaining 29% carried out in the Services & Other industries category. 2009 (29%) and 2008 (38%) have seen a reversal in the upward trend in the contribution of the Services & Other industries to total expenditure which had been increasing from 29% in 2003, 33% in 2004, 35% in 2005, 37% in 2006 and 44% in 2007.

The manufacture of transport equipment sub-section (CL) accounted for 44% of all Manufacturing R&D (see Figure 6) with the manufacture of computer, electronic and optical products (CI) accounting for 20%.

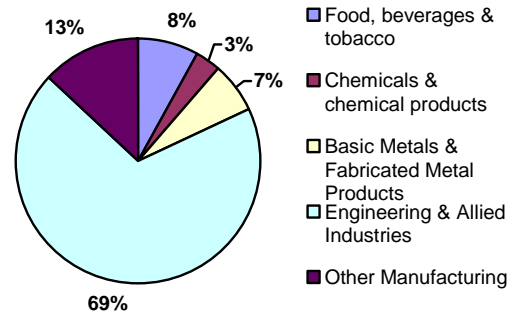
**Figure 6: Percentage of Manufacturing R&D Expenditure in 2009 by Sub-section (SIC 2007 basis)<sup>10</sup>**



<sup>10</sup> For a description of subsection headings see Chapter 6, Background Notes - Results.

Figure 7 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).

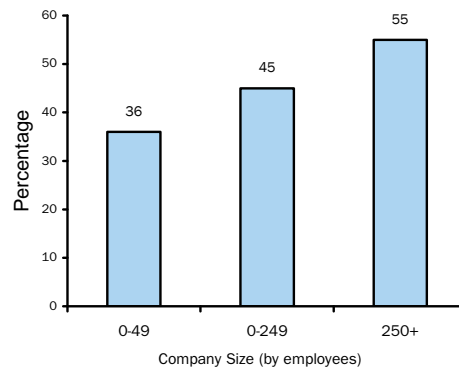
**Figure 7: Percentage of Manufacturing Expenditure by SIC 2007 Subsection<sup>10</sup>**



Companies with 250 or more employees accounted for 55% of business R&D expenditure in 2009, although they represented only 8% of R&D performing companies.

Smaller firms (i.e. those with less than 50 employees) represented some 96% of R&D performing companies and accounted for over a third (36%) of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs) (i.e. those firms with less than 250 employees (0-249) ) accounted for 45% of the total business expenditure. Total SME expenditure increased by £38.2m (36%) from 2008 to 2009, in cash terms. However, since 2004 SME expenditure has increased by 132% to £144.3m. The proportion that large companies make to total R&D expenditure (55%) was higher than in the previous two years (2008: 42%, 2007: 37%) but similar to the five years previous to that (2006: 51%, 2005: 51%, 2004: 52%, 2003: 54%, 2002: 57%). In 2001 the figure was 72%. See Annex 1 Table 3 for further details.

**Figure 8: Percentage of Total BERD Expenditure in 2009 by Company Size**



## BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – IN-HOUSE EXPENDITURE

In-house expenditure is perhaps the most important component of total R&D as it shows the amount spent on R&D by firms in NI that was undertaken within Northern Ireland (purchased R&D expenditure by companies in NI may be carried out in other parts of the UK or abroad). In-house expenditure in Northern Ireland (in cash terms) increased by 74.2% between 2008 and 2009: this is compared to a 2.5% decrease in the UK as a whole. Of the 11 other UK regions, four showed an increase in in-house expenditure and seven showed a decrease.

As Table 8 shows, in-house R&D expenditure, i.e. spending carried out within the company, accounted for almost 92% (£297.2 million) of total expenditure in Northern Ireland in 2009, lower than the proportion in 2008 (93%) and 2007 (96%). The majority of in-house R&D expenditure was in the Manufacturing sector while the majority of purchased R&D expenditure was in the Services and other sector.

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).

**Table 7: In-house Expenditure by UK Government Office Region (Cash Terms)**

	Expenditure (£million)		%Change (2008-2009)
	2009	2008	
UK	15,624	16,026	-2.5
England	14,361	14,985	-4.2
North East	313	320	-2.2
North West	2,050	2,291	-10.5
Yorkshire & The Humber	452	434	4.1
East Midlands	984	987	-0.3
West Midlands	873	897	-2.6
South West	1,267	1,349	-6.1
East of England	3,898	4,179	-6.7
London	926	1,099	-15.7
South East	3,598	3,430	4.9
Wales	321	313	2.6
Scotland	644	557	15.7
Northern Ireland	297	171	74.2

Note: Data for UK and GB regions are from the Office for National Statistics.

**Table 8: In-house and Purchased R&D Expenditure by Sector**

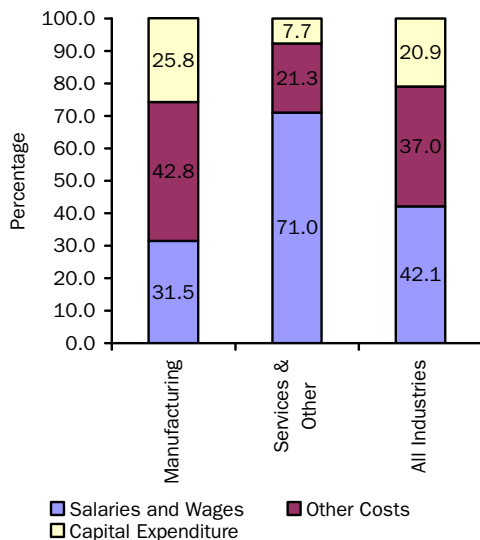
	IN-HOUSE		PURCHASED	
	£m	% of Total Expenditure	£m	% of Total Expenditure
Manufacturing	217.3	67.1	11.6	3.6
Services & Other	79.9	24.7	14.9	4.6
All Industries <sup>11</sup>	297.2	91.8	26.5	8.2

<sup>11</sup> All industries include Manufacturing, service sector industries plus a range of other industries. For full details of the other industries covered see Chapter 6, Background Notes.

**Table 9: Breakdown of In-house R&D Expenditure by Sector (£million)**

	Manufacturing		Services & Other		All Industries	
	£m	%	£m	%	£m	%
<b>Non Capital Expenditure</b>						
Salaries & Wages	68.4	31.5	56.7	71.0	125.1	42.1
Other Costs	92.9	42.8	17.0	21.3	109.9	37.0
<b>Capital Expenditure</b>						
Land & Buildings	27.5	12.7	0.8	0.9	28.3	9.5
Plant & Machinery	28.5	13.1	5.4	6.8	33.9	11.4
<b>In-house Expenditure</b>						
	217.3	100.0	79.9	100.0	297.2	100.0

**Figure 9: Percentage of In-house R&D Expenditure by Sector**



Non capital expenditure makes up 79% of in-house expenditure, lower than in 2008 (89%) and 2007 (93%). Table 9 and Figure 9 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 (71% of total in-house expenditure) compared to 32% in the Manufacturing Sector. Within capital expenditure both sectors had more expenditure in Plant & Machinery than Land & Buildings.

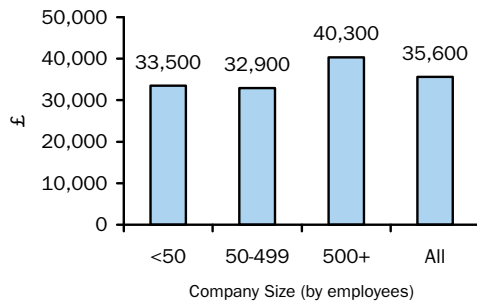
Salaries and Wages as a proportion of in-house expenditure has decreased from the proportion in 2008 in Manufacturing (57% in 2008) and increased from the proportion in 2008 in Services & Other (63% in 2008).

Over the year to 2009 the proportion spent on capital expenditure increased from 11% to 21%.

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

As Figure 10 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 10: Salaries & Wages per Head by Company Size** (rounded to nearest £100)

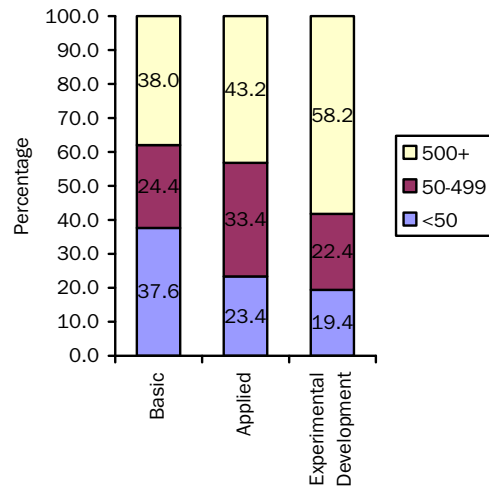


Overall the salaries and wages per R&D FTE was £35,600 an increase of 3.2% from £34,500 in the previous year. Salaries and wages per head for companies with 500 or more employees were £40,300. This compares with £33,500 per head for companies with less than 50 employees and £32,900 per head for companies with between 50 and 499 employees.

**Table 10: Type of Research by Sector as percentage of All Research (Non Capital Expenditure)** (percentages)

	Manufacturing %	Services and Other %	All Industries %
Basic	2.8	2.9	5.7
Applied	22.0	13.7	35.7
Experimental Development	43.8	14.8	58.6
All Research	68.6	31.4	100.0

**Figure 11: Type of Research by Company Size** (percentage)



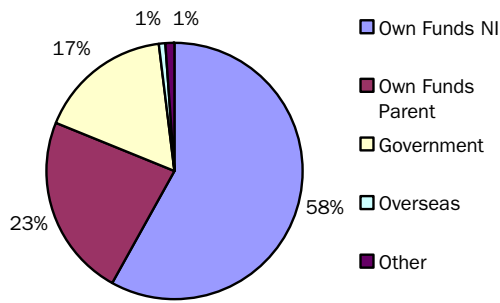
Non capital expenditure can also be analysed in terms of type of research carried out. Experimental development accounts for 58.6% of non capital expenditure, higher than that in 2008 (46.1%) and 2007 (41.3%), with applied research and basic research accounting for 35.7% and 5.7% respectively.

Figure 11 shows that the majority of spending on basic and applied research is carried out by companies with between 0 and 499 employees (62.0% and 56.8 respectively). Over 80% of spending on experimental development is carried out by companies with 50 or more employees and that companies with over 500 employees are dominant in terms of spend in all types of research in 2009. A detailed breakdown of the type of research carried out by both industry and company size is given in Annex 1.

## 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.

**Figure 12: Sources of R&D Funding** (percentages)



The majority of funding (82%) came from the companies' own funds, with 17% from government, 1% from overseas and 1% from other sources. The proportion of funding from own funds decreased from 86% in 2008 but was higher than the figure in 2007 (79%). Funding from overseas and other sources was the same as that in 2008.

**Table 11: Percentage of R&D Funding by Source split by Company Size**

	<50	50-499	500+	All
Own Funds NI	50.0	58.9	61.0	58.4
Own Funds Parent	28.4	33.9	16.8	23.2
Government	16.8	6.1	21.7	16.9
Overseas	1.0	1.0	0.5	0.7
Other	3.6	0.1	0.0	0.7
Total	100.0	100.0	100.0	100.0

Table 11 shows that the greatest proportion of R&D funding was from Own Funds NI. Over three fifths of R&D (61%) was funded by Own Funds NI in firms with over 500 employees compared to 50% and 59% in firms with fewer than 50 and between 50 and 499 employees respectively.

Firms with under 50 employees and between 50 and 499 employees received a greater proportion of funds from parent companies (28% and 34% respectively) than firms with 500 or more employees (17%) while the proportion of funding for R&D from own funds, NI and parent, was 79% for firms with under 50 employees, 93% for firms with between 50 and 499 employees and 78% for firms with 500 or more employees.

Firms with 500 or more employees reported the greatest proportion of funds from Government at 22% of funding, with a lower proportion for firms with fewer than 50 employees (17%), while firms with between 50 and 499 employees received 6% of funds from this source.

## BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – OWNERSHIP ANALYSIS

In 2002 externally-owned firms accounted for 65% of expenditure, 53% in 2003, 57% in 2004, before falling to 53% in both 2005 and 2006. It increased to 57% in 2007 and to 60% in 2008. In 2009 R&D spend was again higher for externally-owned companies compared to locally-owned companies (73.2% and 26.8% respectively).

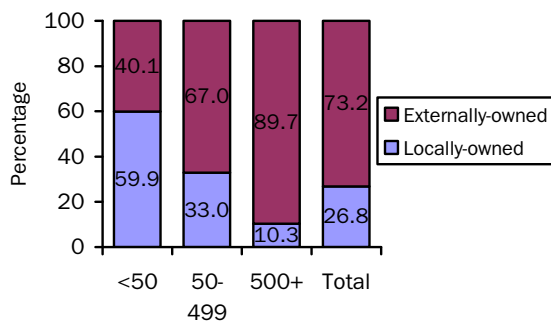
**Table 12: Breakdown of R&D expenditure by ownership of company**

	£m	%	Number of companies	%
Locally-owned companies	86.7	26.8	344	81.1
Externally-owned companies	237.1	73.2	80	18.9
Total (All companies)	323.7	100.0	424	100.0

Expenditure by locally owned companies (£86.7m) has increased by 19% from £73.1m in 2008 while the number of these companies who reported R&D expenditure decreased by 9% from 378 to 344.

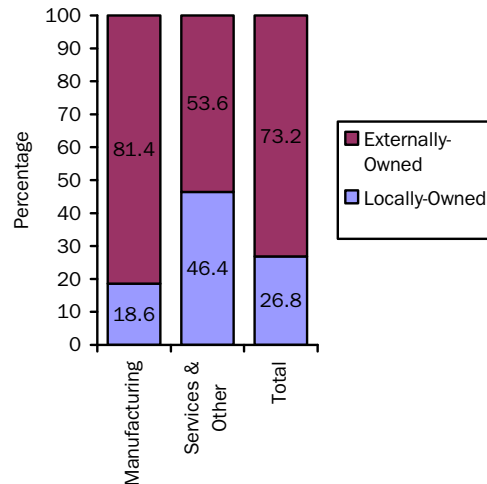
Northern Ireland owned companies in 2009 accounted for over four-fifths of all R&D performing companies and over one quarter (27%) of the total £323.7m expenditure. This can be compared with externally-owned companies accounting for just under three quarters (73%) of the R&D expenditure and under one-fifth of R&D performing companies.

**Figure 13: Expenditure by ownership by company size** (percentages)



The majority of R&D spend in companies with under 50 employees (59.9%) was by Northern Ireland owned firms. However, the analysis shows that, in companies with between 50 and 499 employees and companies with 500 or more employees the majority of R&D expenditure (67.0% and 89.7% respectively) was by externally-owned firms.

**Figure 14: Expenditure by ownership by sector** (percentages)



Analysis of R&D spend split by ownership and sector showed that 81.4% of R&D spend in the Manufacturing sector was by externally-owned companies.

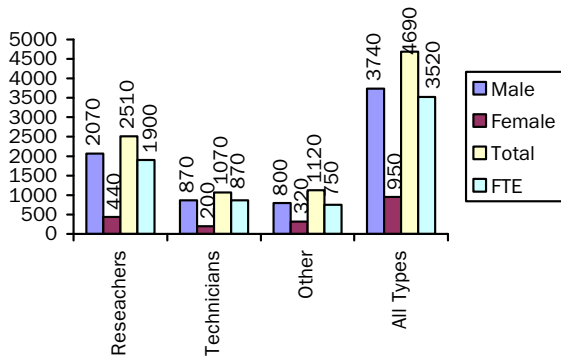
In the Services & Other sector, Northern Ireland owned companies accounted for 46.4% of R&D expenditure.

Compared to the previous year externally-owned companies increased their proportion of expenditure in Manufacturing (from 68.3% to 81.4%) and increased their share of the Services & Other sector (from 47.1% to 53.6%).

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

In 2009, companies surveyed reported a total of 4,690 employees working on R&D, approximately 7.8% of all employees in companies carrying out R&D which is slightly higher than in 2008 (7.2%). [The full-time equivalent figure<sup>12</sup> for the same period was 3,520 or 5.8%].

**Figure 15: Total R&D Employment – Male, Female and Full Time Equivalent** (rounded to nearest 10)



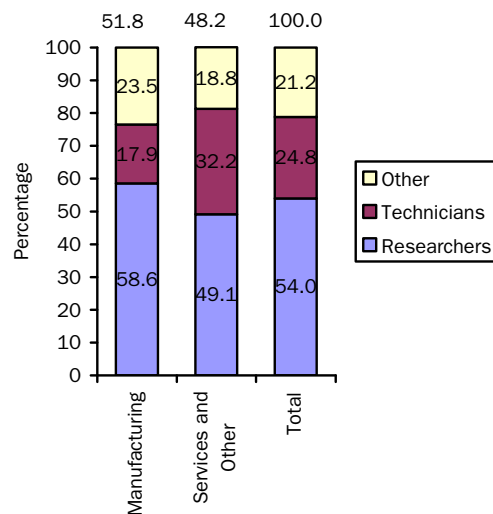
**Table 13: Number of R&D Employees by Type** (rounded to nearest 10)

	Male	Female	Total
Researchers	2,070	440	2,510
Technicians	870	200	1,070
Other	800	320	1,120
All Types	3,740	950	4,690

In 2009 there were 4,690 employees involved in R&D activities, 3,740 males and 950 females. This compared to 3,750 employees in 2008 with 3,030 males and 720 females.

Approximately 80% of all R&D employees were male. By type of R&D employee, researchers accounted for 53%, technicians for 23% and other employees (e.g. support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects) for 24% of all R&D employees. Comparable full-time equivalent figures show that 1,900 employees were researchers (54%), 870 employees were technicians (25%) and the number of other employees was 750 (21%).

**Figure 16: Percentage of R&D Employment (full-time equivalent) by Sector**



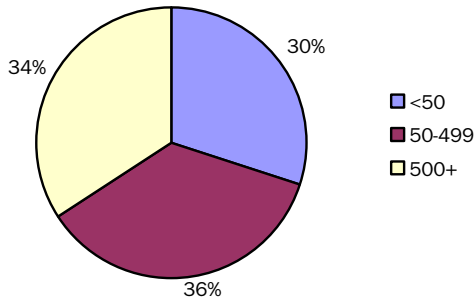
On a full-time equivalent basis there were 1,820 employees in Manufacturing and 1,700 in the Services & Other sectors. Within Manufacturing, researchers accounted for 59% of R&D employees with the level of technicians at 18% and other employees at 24%.

Within the Services & Other sectors, researchers made up 49% of R&D employees, technicians 32% and other employees 19%.

<sup>12</sup> For an explanation of full time equivalent employment see Chapter 6, Background Notes.

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

**Figure 17: R&D Employment by Company Size (percentages)**



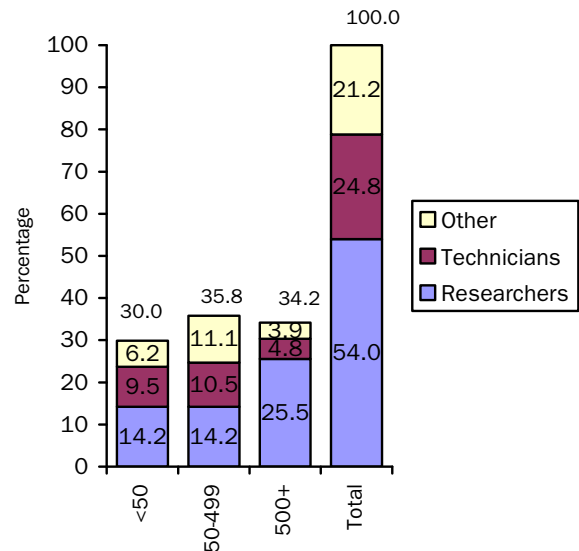
Using full time equivalent employment figures, Figure 17 shows how total R&D employment is split across companies of different sizes. The greater proportion of R&D employees is in the companies with between 50 and 499 employees (36%), followed by companies with 500 or more employees (34%) and companies with under 50 employees (30%). These show a decrease in the proportion of R&D employment in companies with between 50 and 499 employees and companies with fewer than 50 employees from 43% and 31% respectively in 2008. However, an increase occurred in the proportion of R&D employment in companies with 500 or more employees from 26% in 2008.

The proportion of R&D employees who are researchers is greatest in firms with 500 or more employees (74.6%). Researchers in firms with fewer than 50 employees and in firms with between 50 and 499 employees accounted for 47.5% and 39.7% of R&D employees respectively. Companies with between 50 and 499 employees employ more persons in the 'other' category (31.0%) than either companies with fewer than 50 employees (20.7%) or companies with 500 or more employees (11.5%), while the greatest proportion of technicians' was in companies with under 50 employees (31.9%) followed by companies with between 50 and 499 employees (29.3%) and companies with 500 or more employees (13.9%).

Figure 18 also shows the spread of R&D employees across different size bands, with 30% of all R&D employees working in firms with less than 50 employees, 36% in firms with between 50 and 499 employees and 34% of all R&D workers

employed by companies with 500 or more employees.

**Figure 18: Percentage of R&D Employment (full time equivalent) by Type and Company Size**



**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 2009, following the introduction of the question in the 2004 survey.

77 R&D performing companies reported that they received tax credits amounting to £21.7 million in total. This represents an increase in the number of R&D performing companies receiving tax credits and in the amount received when compared with last year. In 2008 57 R&D performing companies reported that they received tax credits amounting to £9.5 million in total and in 2007 52 companies reported receiving tax credits which amounted to £26.3m.

**JOINT PROJECTS**

50 companies reported that their R&D work was part of a joint project with a source outside their company. 15 companies had a joint project with Higher Education Establishments, 20 with other Businesses and 15 with both. This shows an increase in the number of companies engaging in joint projects from last year (42 in total).

# R&D Information from other sources

## 4

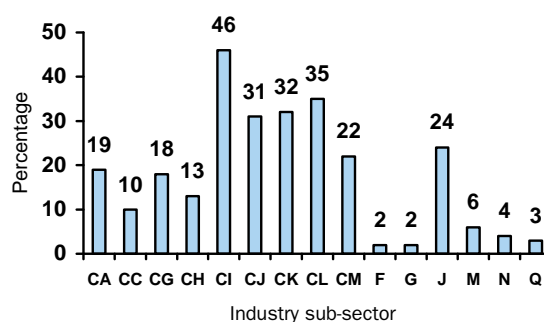
### Northern Ireland Annual Business Inquiry (NIABI)

Information on the extent to which research and development is carried out by businesses in Northern Ireland is available from the Northern Ireland Annual Business Inquiry (NIABI) carried out annually by DETI.

The latest 2008 NIABI reported that out of approximately 3,800 business returns to the survey, 6% (221) had someone in the business engaged in research and development work during the year. The Manufacture of computer, electronic and optical products sector had the highest proportion of businesses carrying out R&D (46%). The corresponding figure for the service sector was 3%. Whilst 20% of the manufacturing sector businesses overall were research active this varied by manufacturing sub-sector.

Figure 19 shows the percentage of businesses that carried out R&D work in 2008, for those sectors and sub-sectors of the Manufacturing industries where there were five or more businesses that did so. These were concentrated in the Manufacturing sector, where just over one third (35%) of businesses in the manufacture of transport equipment did so. The main non-manufacturing sector with five or more businesses that carried out R&D work was Information and communication (J). The Professional, Scientific and Technical Activities sector (M) also carried out some R&D in 2008.

**Figure 19: Percentage of businesses who carried out R&D work by industry**



- CA Manufacture of food products, beverages and tobacco products
- CC Manufacture of wood and paper products; printing and reproduction of recorded media
- 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
- F Construction
- G Wholesale and retail trade; repair of motor vehicles and motorcycles
- J Information & communication
- M Professional services
- N Administrative and support service activities
- Q Health & social

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

## 5

The Business Sector Research and Development Survey was conducted biennially by Forfás and its predecessors for over two decades. The most recent survey was jointly conducted by the Central Statistics Office (CSO) and Forfás and collected information about research and development activities of enterprises in 2007 and 2008. The next survey will relate to the period 2009/10 and is expected to be published in late 2010.

Research & development expenditure performed by the business sector in Ireland was more than €1.6 billion in 2007. Nearly 83% of all expenditure was on current (non capital) costs while 17% was spent on capital costs.

Research and development spending in 2007 was highest in the manufacturing sector which accounted for 57% of all spending. Spending in this sector was €915m in 2007 while the services and non manufacturing sector spent €690m. Three quarters of the spend in manufacturing was on current costs compared to services where current costs accounted for 92% of expenditure.

In excess of 68% of total R&D expenditure was concentrated in five sectors 'Computer and related activities', 'Manufacture of chemicals, chemical products and man-made fibres', 'Manufacture of medical, precision and optical instruments, watches and clocks', 'Research and development' and 'Manufacture of electrical machinery and apparatus not elsewhere classified'.

Foreign owned enterprises spent almost €1.2bn on research and development in 2007, (72% of all R&D expenditure) while Irish owned enterprises spent €445m. Almost 79% of all spending by foreign owned enterprises was on current costs compared to 93% for Irish owned enterprises.

R&D spending by medium/large sized firms (50 or more employees) accounted for more than €1.3 billion or 83% of the total spend on R&D in 2007 while R&D expenditure by small firms (less than 50 employees) accounted for €280 million or 17% of the total spend in the period.

There were 10,950 Full Time Equivalent (FTE) research staff in Ireland in 2007. There were approximately 7,250 FTE researchers of which 1,050 were FTE PhD qualified researchers. Just over 39% of all FTE research staff were engaged by Irish owned enterprises compared to 61% of such staff being engaged by foreign owned enterprises. Almost 6,100 FTE research staff worked in the services sectors accounting for 56% of all FTEs while 4,850 worked in the manufacturing sector.

Almost 87% of all research and development expenditure was funded by enterprises' own company/internal funds, while 6% of expenditure was funded from public funds.

# Business Expenditure on Research & Development – Background Notes

## 6

### Background

The survey of Northern Ireland Business Expenditure on Research and Development during 2009 was undertaken by Statistics Research Branch of the Department of Enterprise, Trade and Investment (DETI). The sample and survey results only cover business enterprises as defined in the Frascati manual. This excludes government organisations, higher education establishments and charities.

This is the twelfth business R&D survey carried out by DETI - it was carried out triennially between 1993 and 1999, but is now collected on an annual basis (from 2001 onwards). Prior to 2001, the Office for National Statistics (ONS) published regional intramural (now in-house) R&D estimates – including figures for Northern Ireland - from an annual UK-wide survey. The ONS Survey, as it relates to Northern Ireland, was based on a relatively small sample of companies and was not detailed enough for DETI requirements. DETI therefore conducted its own benchmark survey every three years. In those years when both a UK-wide and a separate DETI survey were conducted, two estimates of in-house business R&D expenditure for Northern Ireland were therefore available. However, from 2001 onwards data from the DETI survey is passed to ONS colleagues and in-house R&D figures for Northern Ireland from both sources are therefore equal.

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:

**"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 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. [The sources of funding question for the NI survey, for example, specifically identified Invest NI as one of the government sources.]

A new question was included in both the NI and GB questionnaires for 2005 to comply with a new EU directive, asking firms for a headcount and gender breakdown of all employees involved in R&D activities, regardless of the number of hours worked. The 2007 NI R&D questionnaire was modified inline with GB after a GB review.

The survey covers expenditure in the year ending December 2009, although companies were given the option of supplying data for a business year ending on any date between 6 April 2009 and 5 April 2010.

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.

### Survey Design

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 2008 survey carried out by DETI) 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 2009 survey, businesses were stratified into 4 groups:

- (i) Businesses responding to the 2008 DETI 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 2009); 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 2009 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 Response rate**

For 2009, 1,067 forms were sent out to businesses believed to be performing R&D. Completed forms were returned by 1,010 businesses representing a response rate of 95 per cent. 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 25% of the total non-respondent companies. The remaining 75% - non Invest NI estimates were based on historical

information and other administrative surveys within Statistics Research Branch.

Overall, all estimates make up 1.1% of total BERD spend for 2009 (compared to 5.5% in 2008). Estimates for Invest NI companies account for 0.06% of total BERD spend while estimates for non Invest NI companies account for 1.0% of total BERD spend. This should be borne in mind when considering the results.

The results are provisional and may be revised should additional information become available. Figures contained within all tables in this Bulletin may not add due to rounding. Percentages calculated on these rounded figures may differ from those that are detailed in the text.

**Figure 20: Deciles of Estimates as a percentage of 2009 BERD**

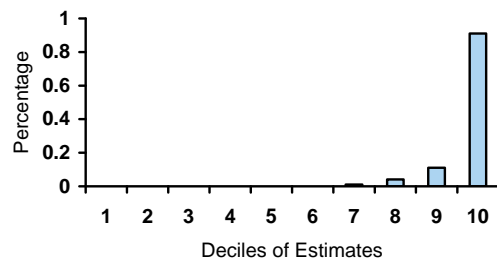


Figure 20 shows that all estimates made up 1.1% of total 2009 BERD spend. When estimates are ranked according to ascending size of spend, the last two deciles (i.e. the top 20% of companies) accounted for 95.3% of the total BERD estimated spend indicating that most of the estimates were small in magnitude. The bulk of the value of the estimates has been accounted for by a relatively small number of companies.

**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 DETI 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 Table 2, expenditure by businesses and higher education and other expenditure by Government, should compliment 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.

## **Results**

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 for the first time in this publication, having previously been on a SIC 2003 basis. Care should therefore be taken when making comparisons with previous reports.

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 7):

- 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, 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

The annual NI ABI conducted by the Department of Enterprise Trade and Investment (DETI) provides estimates for the year of the value of economic activity across some two thirds of the Northern Ireland economy. The survey covers most of the Production, Construction, Distribution and Service industries but excludes central government public sector activities for the most part. In particular, since 2002 it has contained a question on whether there is anyone in the business engaged in research and development work on a regular basis during the year.

#### Next Publication

The next bulletin will be published in December 2011.

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# Northern Ireland Higher Education Expenditure on Research & Development during 2009

## 7

Table 14 details the headline results from the 2007, 2008 and 2009 Higher Education Expenditure on Research & Development (HERD) surveys.

**Table 14: Higher Education Expenditure on R&D**

	2007	2008	2009
	£million	£million	£million
HERD Expenditure <sup>13</sup>	152.0	145.2	144.1
of which:			
Non Capital Expenditure	129.3	129.9	135.1
Capital Expenditure	22.7	15.3	9.0
<u>Source of funding of R&amp;D:</u>			
Government Block Grant	76.5	74.5	75.7
OST Research Councils <sup>14</sup>	8.5	10.6	11.8
UK-based charities	6.5	7.6	8.9
UK Cent Gov/Local Auth/Health <sup>15</sup>	38.4	33.0	27.8
UK Ind/Comm/Pub Corp <sup>16</sup>	2.8	3.3	3.4
EU Government	5.9	6.8	6.0
EU Other	2.7	2.8	3.1
Other Overseas	7.6	3.8	4.5
Other Sources	3.1	2.8	2.9
	<b>Number</b>	<b>Number</b>	<b>Number</b>
HERD Employment <sup>17</sup>	1,680	1,600	1,700
of which:			
Academic staff	1,260	1,190	1,270
Technicians <sup>18</sup>	230	220	220
Other <sup>19</sup>	200	190	220

<sup>13</sup>Expenditure for 2009 includes £1.1 million of expenditure funded by Northern Ireland businesses (£1.0m in 2008, £0.7m in 2007). Therefore, net HERD in 2009 was £143.0m (this is as detailed in Table 2). 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>14</sup> Office of Science and Technology Research Councils

<sup>15</sup> Funding from UK Central Government, Local Authorities and Health Trusts/Hospitals

<sup>16</sup> Funding from UK industry/commerce/public corporations

<sup>17</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>18</sup> Technicians – Perform scientific and technical tasks normally under the supervision of researchers.

<sup>19</sup> Others -Support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects.

Total HERD expenditure decreased by 0.7% from £145.2m in 2008 to £144.1m in 2009, compared with a decrease of 4.5% from 2007 to 2008. The decrease in 2009 in in-house expenditure was comprised of a 40.9% decrease in capital expenditure and an increase (4.0%) in non capital expenditure. This compares to the previous period where capital expenditure decreased by 32.6% and non capital expenditure increased by 0.4%.

Employment totals increased between 2008 and 2009, from 1,600 full-time equivalent persons in 2008 to 1,700 in 2009. The change in R&D employment consisted of an increase in the number of academic staff (from 1,190 to 1,270) and an increase in the number of other staff (from 190 to 220) employed in R&D. The number of technicians employed in R&D remained constant (220).

Block grants remained the largest source of funds with their relative contribution increasing slightly from 51.3% in 2008 to 52.5% in 2009. Funding from UK Central Government/Local Authorities and Health Trusts/Hospitals decreased by 15.6% from £33.0m in 2008 to £27.8m in 2009, accounting for 19.3% of HERD funding in 2009 compared to 22.7% in 2008.

See Background Notes overleaf.

# Higher Education Expenditure on Research & Development – Background Notes

## 8

Table 14 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. 2008/2009 ending 31/7/2009. 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.

A Steering Group was set up to implement the policy and their advice was referred to Government in the Transparency Review Report. This was endorsed in June 1999 and is now required policy for the sector. All institutions had to report transparently on the costs of their Teaching, Research, and other activities for 1999/2000 in July 2001 and each year thereafter. As a consequence, accurate and comparable R&D data for each university can now be obtained and this is presented in Table 14.

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.

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# Annex 1

# 9

**Table 1: Breakdown of In-House R&D Expenditure 2009 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	Lands & Building	Plant & Machinery	Total Expenditure	
<b>Manufacturing</b>											
	<50	10,600	8,700	19,300	2,000	6,400	10,900	90	700	700	20,000
	50- 249	14,400	9,800	24,200	1,100	8,700	14,400	7,900	800	8,700	33,000
	250+	43,400	74,400	117,800	3,500	36,500	77,700	19,500	27,100	46,600	164,300
	Total	68,400	92,900	161,300	6,600	51,700	103,000	27,500	28,500	56,000	217,300
<b>Services &amp; Other</b>											
	<50	24,600	7,500	32,100	3,100	13,200	15,800	200	4,600	4,800	36,900
	50 -249	23,400	8,900	32,300	1,400	17,400	13,400	*	*	900	33,200
	250+	8,700	700	9,400	2,300	1,600	5,500	*	*	500	9,900
	Total	56,700	17,000	73,700	6,800	32,100	34,700	800	5,400	6,200	79,900
<b>All Industries</b>											
	<50	35,200	16,200	51,400	5,100	19,600	26,700	200	5,300	5,600	56,900
	50-249	37,800	18,700	56,500	2,500	26,200	27,800	8,100	1,600	9,600	66,100
	250+	52,100	75,100	127,200	5,800	38,100	83,200	20,000	27,100	47,000	174,200
	Total	125,100	109,900	235,000	13,500	83,900	137,700	28,300	33,900	62,200	297,200

\*Disclosive

**Table 2: Breakdown of Purchased R&D Expenditure 2009 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	300	300	600	1,200
	50-249	200	100	5,200	5,500
	250+	1,700	1,900	700	4,900
	Total	2,100	2,300	6,600	11,600
<b>Services &amp; Other</b>					
	<50	2,500	1,700	7,700	12,100
	50-249	400	*	*	2,500
	250+	300	*	*	300
	Total	3,200	1,900	9,500	14,900
<b>All Industries</b>					
	<50	2,700	2,000	8,400	13,300
	50-249	600	400	7,000	7,900
	250+	2,000	1,900	700	5,300
	Total	5,300	4,200	16,100	26,500

\*Disclosive

**Table 3: Breakdown of Business Expenditure on R&D (BERD) by Small and Medium Sized Enterprises (SMEs <250 employees) 2001-2009 (£m)<sup>20</sup>**

	R&D Expenditure								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
<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
Purchased	3.3	3.6	3.2	7.5	5.5	8.2	6.8	7.9	21.3
Total	43.4	66.8	56.4	62.3	74.9	81.6	117.2	106.1	144.3
<b>(250+)</b>									
In- house	109.8	86.1	63.3	65.4	78.4	83.2	66.4	72.3	174.2
Purchased	1.8	3.8	1.6	1.4	1.0	2.2	1.4	5.5	5.3
Total	111.6	89.9	64.9	66.8	79.4	85.4	67.9	77.8	179.4
<b>All</b>									
In- house	149.9	149.3	116.5	120.2	147.8	156.6	176.9	170.6	297.2
Purchased	5.1	7.3	4.8	8.8	6.5	10.4	8.2	13.3	26.5
Total	155.0	156.6	121.3	129.0	154.3	167.0	185.1	183.9	323.7

<sup>20</sup>The definition of SME used is that under the European Commission Recommendation (96/280/EC) of 3 April 1996, in which SMEs are defined as being enterprises with less than 250 employees.

**Table 4: Breakdown of 2009 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	210	20	230	140	110	10	110	70	190	40	220	90	510	60	570	310
	50-249	280	60	340	160	110	20	130	90	190	20	210	190	570	110	680	440
	250+	770	170	940	760	150	50	200	170	140	120	260	150	1,060	340	1,400	1,070
	Total	1,260	260	1,510	1,060	370	70	440	330	510	180	690	430	2,140	510	2,640	1,810
<b>Services &amp; Other</b>																	
Employment Size-bands	<50	350	60	420	350	*	*	320	260	*	*	160	130	720	180	890	740
	50-249	290	70	360	260	220	80	300	250	190	70	260	180	700	220	920	690
	250+	170	40	210	220	*	*	10	40	*	*	10	10	180	50	230	270
	Total	810	180	980	830	500	130	630	550	290	140	430	320	1,590	450	2,040	1,700
<b>All Industries</b>																	
Employment Size-bands	<50	570	90	650	500	380	50	430	340	280	110	380	220	1,220	240	1,460	1,050
	50-249	560	130	700	420	330	100	430	340	380	90	470	370	1,270	330	1,600	1,130
	250+	930	220	1,150	980	160	50	210	200	150	120	270	160	1,240	380	1,630	1,330
	Total	2,060	430	2,500	1,900	870	200	1,070	870	800	320	1,120	750	3,730	950	4,680	3,510

\*Disclosive