



Department of  
**Enterprise, Trade  
and Investment**  
[www.detini.gov.uk](http://www.detini.gov.uk)

**Business Activity**

**Statistics Bulletin**

# Northern Ireland Research & Development Statistics 2007

28 November 2008



 Northern Ireland  
Statistics &  
Research  
Agency



## **NORTHERN IRELAND RESEARCH AND DEVELOPMENT STATISTICS 2007**

Published 28<sup>th</sup> November 2008

- **Total expenditure on Research and Development in Northern Ireland was £351.1 million in 2007, of which £185.1 million (52.7%) was spent by businesses, £151.3 million (43.1%) by the Higher Education sector and the remainder (£14.7m) was Government expenditure.**
- **There was a rise of £20.4 million (6.2%) in cash terms and a rise of £10.7 million (3.1%) in real terms in Northern Ireland total R&D expenditure between 2006 and 2007 (from £340.4m to £351.1m).**
- **Total business R&D expenditure in 2007 was £185.1 million, up £13.3 million (7.7%) in real terms on the previous year. However, between 2002 and 2007, overall Business R&D expenditure had only risen by 3.5% in real terms from £178.8 million to £185.1 million. 2007 was therefore the first year in which such business R&D expenditure exceeded the level of spend in 2002.**
- **There was a decrease (-1.5%) in R&D expenditure in cash terms by the Manufacturing sector from £105.3 million in 2006 to £103.7 million in 2007. A large increase occurred in the Services and Other sector with R&D expenditure which increased by 31.9% from £61.7 million to £81.4 million in the same period.**
- **R&D expenditure by locally owned companies increased by 2.8% (£2.2m) between 2006 and 2007 while R&D expenditure by externally-owned owned companies increased by 18.0% (£15.9m).**
- **Higher Education R&D expenditure fell in real terms by £3.2 million (-2.1%) while Government expenditure increased by £0.6 million (4.5%) over the year.**
- **For the last three years Northern Ireland Business has accounted for a greater share of total R&D expenditure than the Higher Education sector (52.7% compared with 43.1% in 2007, 50.5% compared with 45.4% in 2006 and 49.1% compared with 46.5 in 2005).**

Department of Enterprise,  
Trade and Investment

# **Northern Ireland Research & Development Statistics 2007**

28 November 2008

Crown Copyright

# Contents

**1**  
Executive Summary  
Pages 1-3

**2**  
Introduction  
Pages 4-5

**3**  
Business Expenditure  
on Research &  
Development in 2007  
Pages 6-15

**4**  
Research &  
Development  
information from  
other sources  
Page 16

**5**  
Business Expenditure  
on Research &  
Development in the  
Republic of Ireland  
Page 17

**6**  
Business Expenditure  
on Research &  
Development – Notes  
to Editor  
Pages 18-21

**7**  
Northern Ireland  
Higher Education  
Expenditure on  
Research &  
Development during  
2007  
Pages 22-23

**8**  
Higher Education  
Expenditure on  
Research &  
Development – Notes  
to Editor  
Page 24

**9**  
Annexes  
Pages 25-27

# 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 601 returns were received by the Department – some 83% 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 5.3% of the value of total Business Expenditure on R&D (BERD) for 2007. For further information see Chapter 6 - Notes to Editors, note 1.

**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. Revisions have been made to results previously published for 2004, 2005 and 2006.**

## Total Expenditure on R&D in Cash Terms

Total expenditure on Research and Development in Northern Ireland in cash terms was £351.1 million(m) in 2007, of which £185.1m (52.7%) was spent by businesses, £151.3m (43.1%) by the Higher Education sector and the remainder was other government expenditure.

There was a rise of £20.4m (6.2%) in cash terms in Northern Ireland total R&D expenditure between 2006 and 2007 to £351.1m. Over the last five years total R&D spending in cash terms in NI has risen by 28.8%.

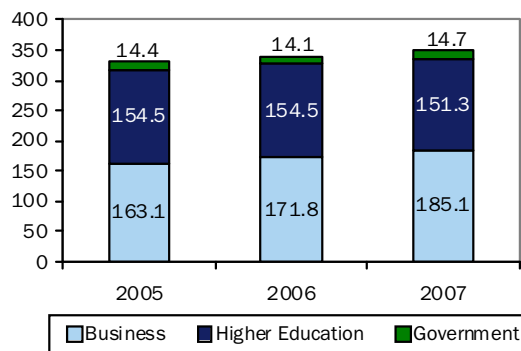
## Total Expenditure on R&D in Real Terms

In real terms, total expenditure increased by £10.7m or 3.1% from £340.4m in 2006 to £351.1m in 2007.

In 2007 the Northern Ireland Business sector accounted for a greater share of total R&D expenditure (52.7%) than the Higher Education sector (43.1%). In 2006 the figures were 50.5% and 45.4% respectively.

Over the last five years (2002-2007) total R&D spending in real terms in NI has risen by 12.8%.

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



Over the year to 2007 there was an increase in expenditure by Businesses and Government while there was a decrease in expenditure by Higher Education. In real terms, expenditure by Business increased by £13.3m (7.7%) whilst Government expenditure increased by £0.6m (4.5%). Expenditure by Higher Education decreased over the year by £3.2m (-2.1%) in real terms while it increased slightly (0.8%) in cash terms.

Overall business R&D expenditure rose by 3.5% between 2002 and 2007 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 95.6% (£176.9 million) of total business expenditure in 2007. In-house expenditure increased by 13.0% between 2006 and 2007.

**Business R&D: Sectoral Analysis**

In 2007, the majority of R&D was carried out within the Manufacturing sector (56.0%) with the remaining 44.0% carried out in Services & Other sector. This shows an increased share of expenditure in the Services & Other sector compared to previous years (for example, in 2006 Manufacturing accounted for 63.0% and Services & Other 37.0%).

Over the year to 2007, an increase in expenditure occurred in the Services & Other sector, while the Manufacturing sector reported a decrease. The increase in expenditure in the Services & Other sector, (£19.7m or 31.9%) was larger in value and proportional terms than the decrease of £1.6m (-1.5%) in the Manufacturing sector.

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

Companies with 250 or more employees accounted for 36.7% of business R&D expenditure in 2007, although they represented only 7.6% of R&D performing companies. Smaller firms (i.e. those with less than 50 employees) represented some 69.7% of R&D performing companies and accounted for just under a quarter (23.5%) of total business R&D expenditure while R&D expenditure by Small and Medium-sized companies (SMEs)\* accounted for 63.3% of the total business expenditure. The proportion that large companies make to total R&D expenditure (36.7%) was less than in the previous two years (2006: 51.2% and 2005: 51.4%) See Annex 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 (78.9%), with 10.9% from Government, 1.3% from overseas and 8.9% from other sources. The proportion of funding from own funds increased from 76.4% in 2006 to 78.9% in 2007.

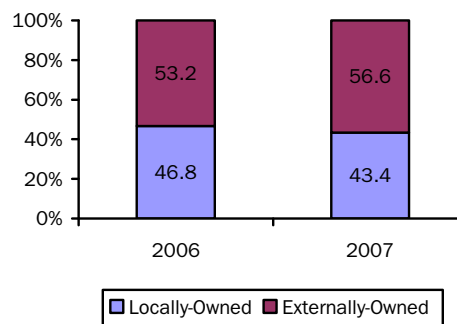
**Business R&D: Ownership**

Companies with ownership outside NI play an important role in financing R&D activities in the region. Over half, £104.7m (56.6%) of total R&D spend was by such externally-owned companies although they accounted for just under one-fifth (18.8%) of all R&D performing companies. Their contribution to the total R&D spend was higher than in 2006 (53.2%) and their cash value increased by £15.9m over the same period.

R&D expenditure by locally-owned companies increased by 2.8% (£2.2m) between 2006 and 2007 while R&D Expenditure by externally-owned companies increased by 18.0% (£15.9m).

The majority of R&D expenditure in Manufacturing is carried out by externally-owned companies (64.4%), whereas the converse is true for Services & Other sector (46.5%).

**Figure 2  
Expenditure by Ownership 2006-2007  
(percentages)**



**Business R&D: Employment**

In 2007, companies surveyed reported a total of 3,310 employees working on R&D, some 6.8% of all employees in companies carrying out R&D. The full time equivalent figure (FTE) for the same period was 2,760.

The number of R&D employees increased by nearly 9% over the year to 2007.

**Table 1: R&D Employment**

	2004	2005	2006	2007
Number	2,880	2,720	3,040	3,310
FTE	2,660	2,600	2,870	2,760

Of all R&D employees, 57.6% were researchers, 21.0% were technicians and a further 21.4% were classed as other employees. In terms of FTE the proportions were 60.9%, 21.7%, and 17.4% for researchers, technicians and other employees respectively.

### Higher Education R&D: Summary

R&D expenditure in the Higher Education sector increased by 0.9% in cash terms between 2006 and 2007 (from £150.7m to £152.0m) reflecting its importance to Northern Ireland. Net expenditure in 2007 (excluding spend by businesses undertaken by higher education) was £151.3m.

Half of funding (50.3%) for Higher Education R&D in 2007 came from the Government block grant (£76.5m). In 2007, there were some 1,680 full-time equivalent employees in the Higher Education sector engaged in R&D, decreasing from 1,700 employees in 2006.

### Other Sources

The most recent UK Innovation (2007) Survey estimated that 57% of enterprises in NI had undertaken some form of innovation activity over the 3-year sample period 2004-06. This was lower than the equivalent UK figure of 64%. While NI's performance had remained relatively constant since 2002-04 (56%), the UK rate increased from 57% to 64%.

A lower proportion of NI enterprises had innovation related expenditure during 2004-06 (56%), compared to the UK (62%). However, in terms of introducing new products (20% of businesses) and processes (11%) NI business activity was similar to that in the UK (22% and 12% respectively).

Northern Ireland results from the 2007 and earlier Innovation Surveys are available at:

[http://www.detini.gov.uk/cgi-bin/get\\_builder\\_page?page=3933&site=4&parent=57&prevpage=4173](http://www.detini.gov.uk/cgi-bin/get_builder_page?page=3933&site=4&parent=57&prevpage=4173)

UK first findings and statistical annex from the 2007 Innovation Survey are available at:

[http://www.statistics.gov.uk/elmr/04\\_08/downloads/ELMR\\_Apr08\\_Robson.pdf](http://www.statistics.gov.uk/elmr/04_08/downloads/ELMR_Apr08_Robson.pdf)  
[http://dius.ecgroup.net/files/52-08-S\\_on.xls](http://dius.ecgroup.net/files/52-08-S_on.xls)

According to the 2006 Northern Ireland Annual Business Inquiry (NIABI) 6.2% of companies had someone in their business engaged in research and development work during the year. This is about the same as the 6.0% of companies reported by the 2005 NIABI. The Manufacturing sector was the sector with the highest proportion (15.4%), while the proportion in the Service sector was 2.9%. Results from the 2007 NIABI are due to be published in March 2009.



# 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 £351.1 million in 2007, of which £185.1 million (52.7%) was spent by businesses, £151.3 million (43.1%) by the Higher Education sector and the remainder was other government expenditure.

Total expenditure was 6.2% higher than that in 2006 (£330.8m) and 11.8% higher than that in 2005 (£314.1m).

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

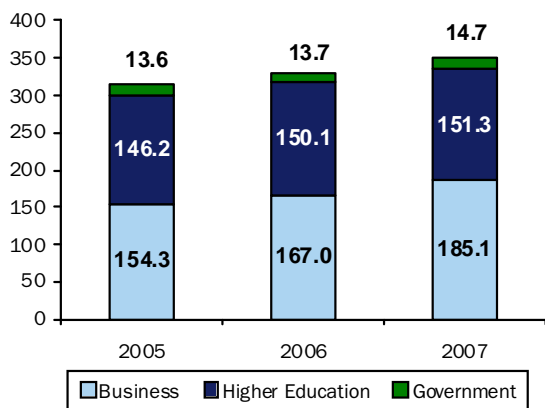
	2005	2006	2007
<b>Total expenditure on R&amp;D (of which)</b>	314.1	330.8	351.1
<b>Expenditure by Businesses</b>	154.3	167.0	185.1
<b>Expenditure by Higher Education<sup>3</sup></b>	146.2	150.1	151.3
<b>Other expenditure by Government</b>	13.6	13.7	14.7

<sup>1</sup> The latest details are available on the Department for Business Enterprise & Regulatory Reform website at [www.berr.gov.uk](http://www.berr.gov.uk)

<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 £0.7m in 2007, £0.6m in 2006, £0.7m in 2005 of expenditure on R&D by businesses that was undertaken by universities or higher education establishments.

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



In 2007 expenditure by Business was greater than Higher Education (52.7% and 43.1% respectively). Business also accounted for the greater proportion of expenditure in the previous two years, (50.5% in 2006 and 49.1% in 2005).

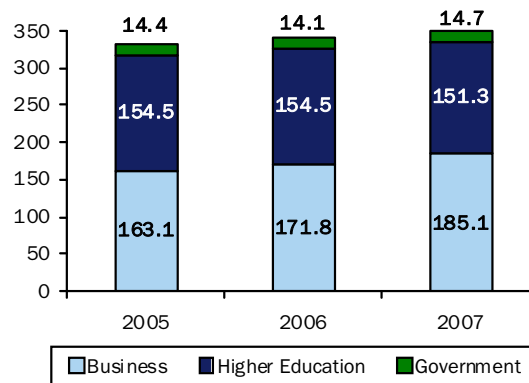
**Table 3: Total Expenditure on R&D in real terms<sup>4</sup> (£million)**

	2005	2006	2007
<b>Total expenditure on R&amp;D (of which)</b>	332.0	340.4	351.1
<b>Expenditure by Businesses</b>	163.1	171.8	185.1
<b>Expenditure by Higher Education<sup>5</sup></b>	154.5	154.5	151.3
<b>Other expenditure by Government</b>	14.4	14.1	14.7

<sup>4</sup> GDP deflator used to convert cash terms to real terms: 94.6 (2005) and 97.2 (2006) where 2007 = 100

<sup>5</sup>To avoid double counting, this figure excludes £0.7m in 2007, 0.6m in 2006, £0.7m in 2005 of expenditure on R&D by businesses that was undertaken by universities or higher education establishments.

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



In real terms total expenditure in 2007 (£351.1m) has increased by 3.1% (£10.7m) from expenditure in 2006 (£340.4m).

Figure 3 shows that over the year to 2007 there was an increase in expenditure by Businesses, Higher Education and Government. However, in real terms, expenditure by Businesses increased by £13.3m (7.7%) whilst Government expenditure increased by £0.6m (4.5%). Expenditure by Higher Education decreased over the year by £3.2m (-2.1%).

# Business Expenditure on Research & Development in 2007

## 3

Table 4 details the headline results from the 2007 Business Expenditure on Research & Development (BERD) survey. The table shows that in 2007, total expenditure (in cash terms) on R&D by Northern Ireland businesses was an estimated £185.1 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 (£176.9m or 95.6%) with £8.2m or 4.4% being purchased R&D expenditure which decreased from £10.4m in the previous year. Of this £8.2m of purchased R&D expenditure in Northern Ireland, some £0.7m was undertaken by the Higher Education sector.

78.9% of funding for R&D in 2007 came from the companies' own resources (£139.6m) while government provided a further 10.9% (or £19.3m) and the remainder came from overseas (1.3% or £2.3m) and other sources (8.9% or £15.8m).

**Table 4: Business Expenditure on R&D - 2007**

	Total Expenditure by Business (£million)	As % of Total Expenditure
Total Expenditure	185.1	100.0
In-house R&D Expenditure <sup>6</sup>	176.9	95.6
of which:		
Non Capital Expenditure	165.3	89.3
Capital Expenditure	11.6	6.3
Purchased R&D Expenditure <sup>7</sup>	8.2	4.4
Of which:		
Undertaken by Higher Education	0.7	0.4
Source of funding:		
Business	139.6	78.9
Government	19.3	10.9
Overseas	2.3	1.3
Other <sup>8</sup>	15.8	8.9

Total employment on R&D in businesses for 2007 was 2,760 (based on full time equivalent figures), which was higher than that in 2006 (2,870) and 2005 (2,600).

<sup>6,7,8</sup> For definitions see Notes to Editors, note 5

## 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 5 below makes comparisons with earlier DETI surveys. To allow comparability of current with previous results, all figures relate to Total Business Expenditure - i.e. civil and defence 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 2006 and 2007 total business expenditure on R&D increased by 7.7% in real terms, with in-house R&D increasing by 9.8% and purchased R&D expenditure decreasing by 23.4%. Government funding decreased by 17.3% over the year, business expenditure from own funds increased by 6.4% and other sources of funding increased by 7.4%.

**Table 5: 2007 Business Expenditure on R&D compared with 2006, 2005, 2004 and 2003 (figures in £millions).**

	Cash Terms					Real Terms (2005 Prices) <sup>9</sup>					% Change Real Terms	
	2007	2006	2005	2004	2003	2007	2006	2005	2004	2003	06-07	03-07
Total Expenditure	185.1	167.0	154.3	129.0	121.3	185.1	171.8	163.1	139.3	134.6	7.7	37.5
In-house R&D	176.9	156.6	147.8	120.2	116.5	176.9	161.2	156.2	129.8	129.3	9.8	36.8
Purchased R&D	8.2	10.4	6.5	8.8	4.8	8.2	10.7	6.9	9.5	5.3	-23.4	53.9
R&D Funded by Government	20.6	24.2	17.3	19.0	15.8	20.6	24.9	18.3	20.5	17.5	-17.3	17.5
R&D Funded from own funds	139.6	127.5	129.3	103.3	99.9	139.6	131.2	136.7	111.5	110.9	6.4	25.9
R&D Other	16.8	15.2	7.6	6.8	5.6	16.8	15.6	8.0	7.3	6.2	7.4	170.3

<sup>9</sup> GDP deflator used to convert cash terms to real terms: 2003 (90.1), 2004 (92.6), 2005 (94.6), 2006 (97.2), 2007=100

The ten biggest R&D spenders in 2007 accounted for 49% of total expenditure which is higher than the proportion in 2006 (44%). This is the highest proportion of total spend since 2002. The proportion of total expenditure by the top ten companies for each R&D survey from 2001 is as follows – 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 six DETI surveys (i.e. 2002, 2003, 2004, 2005, 2006 and 2007). Four companies have appeared in the top ten in the last four surveys and six companies have appeared in the last two surveys.

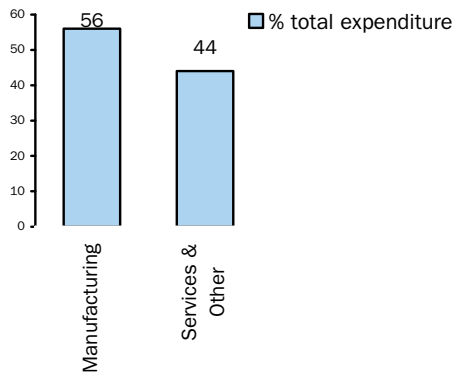
### In cash terms

In 2007, thirty four companies spent more than £1 million on R&D, three more than the number in 2006 and four 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 £67,013 per R&D employee in 2007, 15% higher than the figure of £58,141 for 2006 (employees are on a Full-Time Equivalent basis).

In 2007, 2,760 employees (on a Full-time Equivalent (FTE) basis) were engaged in R&D work - 5.7% of all employees of companies involved in R&D. Comparable figures for 2006 were 2,870 employees or 5.9% of all employees of R&D companies (2005: 5.2%, 2004: 5.2% and 2003: 6.3%).

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

**Figure 5: Total R&D Expenditure in 2007**



In 2007, the majority of R&D was carried out within the Manufacturing sector (56%) with the remaining 44% carried out in the Services & Other industries category. This continues the upward trend in contribution of the Services & Other industries to total expenditure, increasing from 29% in 2003, 33% in 2004, 35% in 2005 and 37% in 2006.

The Electrical and Optical Equipment division (DL) accounted for 25% of all Manufacturing R&D (see Figure 6) with the manufacture of machinery and equipment division (DK) accounting for 19% and food products, beverages and tobacco division (DA) a further 14%.

**Figure 6: % of Manufacturing R&D Expenditure in 2007 by Division (SIC 2003 basis)<sup>10</sup>**

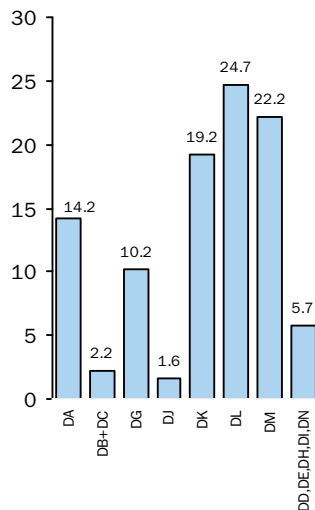
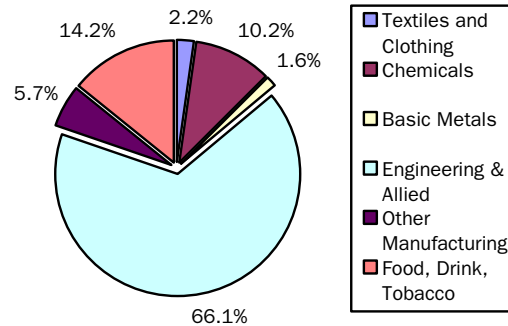


Figure 7 below, highlights that 66% of R&D spending within the Manufacturing sector was

<sup>10</sup> For a description of subsection headings see Notes to Editors note 6.

accounted for by companies involved in Engineering & Allied Industries (DK, DL & DM).

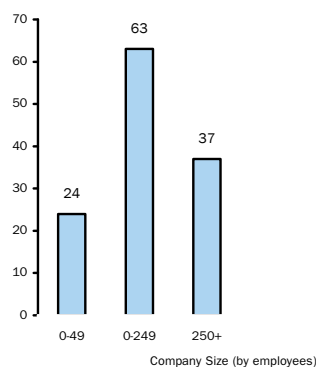
**Figure 7: % of Manufacturing Expenditure by SIC 2003 Subsection**



Companies with 250 or more employees accounted for 37% of business R&D expenditure in 2007, although they represented only 8% of R&D performing companies.

Smaller firms (i.e. those with less than 50 employees) represented some 70% of R&D performing companies and accounted for nearly a quarter (24%) 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 63% of the total business expenditure. The proportion that large companies make to total R&D expenditure (37%) was lower than in the previous six years (2006: 51%, 2005: 51%, 2004: 52%, 2003: 54%, 2002: 57% and 2001: 72%). See Annex 3 for further details.

**Figure 8: % of Total BERD Expenditure in 2007 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 13.0% between 2006 and 2007.

**Table 6: In-house and Purchased R&D Expenditure by Sector**

	IN-HOUSE		PURCHASED	
	£m	% of Total Expenditure	£m	% of Total Expenditure
Manufacturing	98.4	53.1	5.4	2.9
Services & Other	78.6	42.4	2.8	1.5
All Industries <sup>11</sup>	176.9	95.6	8.2	4.4

As Table 6 shows, in-house R&D expenditure, i.e. spending carried out within the company, accounted for almost 96% (£176.9 million) of total expenditure in Northern Ireland in 2007, higher than the proportion in 2006 (94%) but equal to the proportion in 2005. The majority of both in-house and purchased R&D expenditure was in the Manufacturing sector.

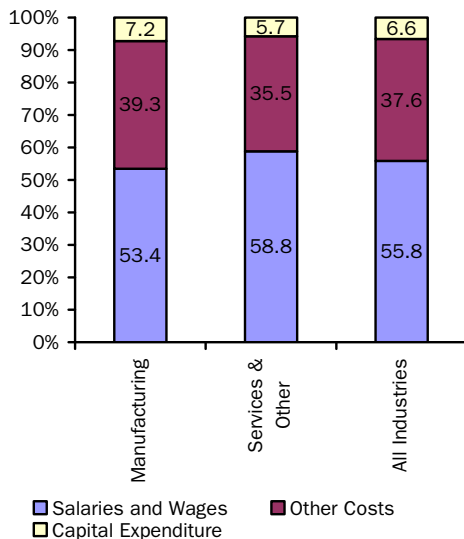
The two components of in-house R&D expenditure are non capital expenditure (salaries & wages and other costs) and capital expenditure (land & buildings and plant & machinery).

<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 Notes to Editors note 6.

**Table 7: Breakdown of In-house R&D Expenditure by Sector (£m)**

	Manufacturing		Services & Other		All Industries	
	£m	%	£m	%	£m	%
<b>Non Capital Expenditure</b>						
Salaries & Wages	52.5	53.4	46.2	58.8	98.8	55.8
Other Costs	38.7	39.3	27.9	35.5	66.5	37.6
<b>Capital Expenditure</b>						
Land & Buildings	1.3	1.3	0.3	0.3	1.6	0.9
Plant & Machinery	5.8	5.9	4.2	5.4	10.1	5.7
<b>In-house Expenditure</b>	<b>98.4</b>	<b>100.0</b>	<b>78.6</b>	<b>100.0</b>	<b>176.9</b>	<b>100.0</b>

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



Non Capital expenditure makes up 93% of in-house expenditure, higher than in 2006 (91%) and 2005 (88%). Table 7 and Figure 9 highlight that there were differences between sectors in the categories of in-house R&D spend.

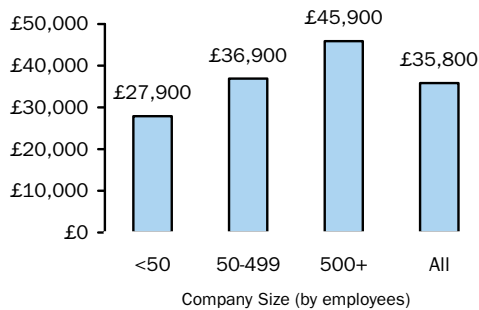
The proportion spent on non capital is much greater than capital expenditure in both Manufacturing and in Services & Other. A larger proportion of non capital expenditure was spent on salaries and wages in the Services & Other sector (59% of total in-house expenditure) compared to 53% in the Manufacturing Sector. Within capital expenditure both sectors had more expenditure in Plant & Machinery than Land & Buildings. Plant & Machinery formed a higher proportion in Manufacturing than in Services & Other, (6% and 5% of total in-house R&D expenditure respectively). Salaries and Wages as a proportion of in-house expenditure has decreased from the proportion in 2006 in both Manufacturing (54% in 2006) and in Services & Other (60% in 2006).

Over the year to 2007 the proportion spent on capital expenditure in both Manufacturing and Services & Other decreased from 9% to 6.6%.

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

As Figure 10 below shows, there is a distinct difference in the level of salaries & wages per head between companies of different size (based on full-time equivalent (FTE) figures).

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

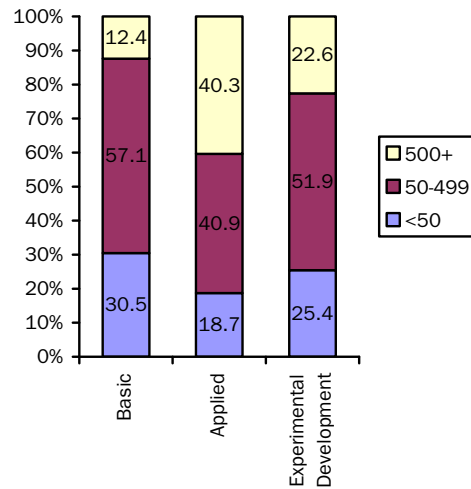


Overall the salaries and wages per R&D FTE was £35,800, an increase of 16.6% from £30,700 in the previous year. Salaries and wages per head for large companies (500+ employees) are £45,900 per head, while for small and medium sized companies the figure is considerably lower at £27,900 and £36,900 respectively. Average salaries in 2006 were £23,900 for small companies and £27,400 for medium sized.

**Table 8: Type of Research by Sector as % of All Research (Non Capital Expenditure)**

	Manufacturing	Services and Other	All Industries
Basic	3.5	6.1	9.5
Applied	30.0	19.1	49.2
Experimental Development	21.7	19.6	41.3
All Research	55.2	44.8	100.0

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



Non capital expenditure can also be analysed in terms of type of research carried out. Experimental development accounts for 41.3% of current expenditure, lower than that in 2006 (47.3%) and 2005 (52.2%), with applied research and basic research accounting for 49.2% and 9.5% respectively.

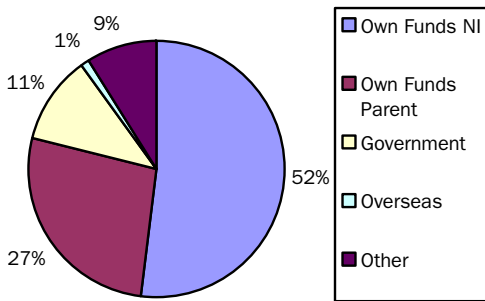
Figure 11 shows that the majority of spending on basic research is carried out by small and medium sized companies (i.e. those firms with between 0 and 499 employees) (87.6%), just over 40% of spending on applied is carried out by both medium (50-499 employees) firms and large sized companies (500+ employees) and that medium companies (50 to 499 employees) are dominant in terms of spend on all three types of research. 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 (%)**



The majority of funding (79%) came from the companies' own funds, with 11% from government, 1% from overseas and 9% from other sources. The proportion of funding from own funds increased from 76% in 2006 but was lower than in 2005. Funding from overseas was lower than that in 2006 while funding from government was down.

**Table 9: Percentage of R&D Funding by Source split by Company Size**

	<50	50-499	500+	All
Own Funds NI	53.2	42.9	65.7	52.0
Own Funds Parent	28.8	36.0	10.8	26.9
Government	11.0	4.2	21.5	10.9
Overseas	2.7	0.6	1.5	1.3
Other	4.3	16.3	0.5	8.9
Total	100.0	100.0	100.0	100.0

Table 9 shows that the greatest proportion of R&D funding was from Own Funds NI. Under half of R&D (43%) was funded by Own Funds NI in medium sized firms compared to 53% and 66% in small and large firms respectively.

Small and medium firms received a greater proportion of funds from parent companies (29% and 36% respectively) than large firms (11%) while the proportion of funding for R&D from own funds, NI and parent, was similar for small, medium and large firms.

Large firms reported the greatest proportion of funds from Government at 22% of expenditure, with a lower proportion for small firms (11%), while medium sized firms received 4% 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. In 2007 R&D spend was higher for externally-owned companies compared to locally-owned companies (56.6% and 43.4% respectively).

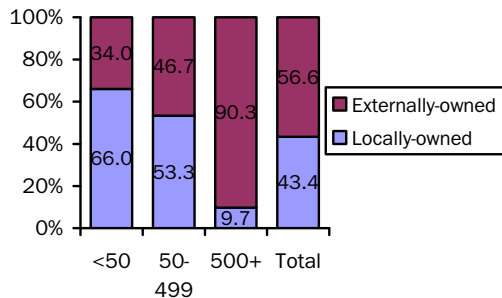
**Table 10: Breakdown of R&D expenditure by ownership of company**

	£m	%	Number of companies	%
Locally-owned companies	80.4	43.4	350	81.2
Externally-owned companies	104.7	56.6	81	18.8
Total (All companies)	185.1	100.0	431	100.0

Expenditure by locally owned companies (£80.4m) has increased by 3% from £78.2m in 2006 while the number of these companies who reported R&D expenditure increased by 29% from 271 to 350.

Northern Ireland owned companies in 2007 accounted for just over four-fifths of all R&D performing companies and approximately 43% of the total £185.1m expenditure. This can be compared with externally-owned companies accounting for approximately 57% of the R&D expenditure and slightly less than one-fifth of R&D performing companies.

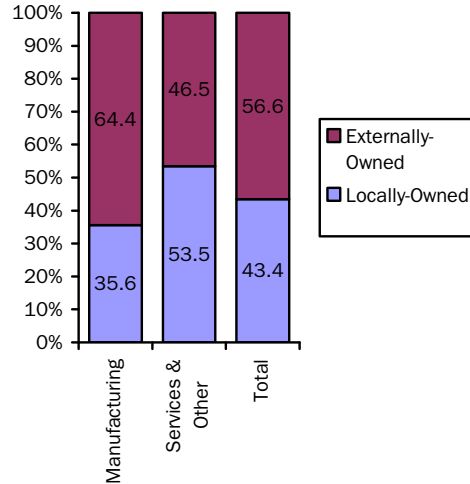
**Figure 13: Expenditure by ownership by company size**



The majority of R&D spend in small companies (66.0%) and medium-sized companies (53.3%) was by Northern Ireland owned firms.

However, the analysis shows that, in large companies (500+ employees) the majority of R&D expenditure (90.3%) was by externally-owned firms.

**Figure 14: Expenditure by ownership by sector**



Analysis of R&D spend split by ownership and sector showed that 64.4% of R&D spend in the Manufacturing sector was by externally-owned companies.

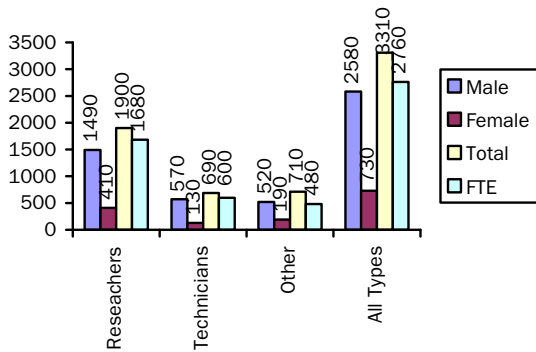
However, the situation was reversed in the Services & Other sector, where Northern Ireland owned companies accounted for 53.5% of R&D expenditure.

Compared to the previous year externally-owned companies slightly increased their proportion of expenditure in Manufacturing (from 63.4% to 64.4%) and increased their share of the Services & Other sector (from 35.6% to 46.5%).

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

In 2007, companies surveyed reported a total of 3,310 employees working on R&D, approximately 6.8% of all employees in companies carrying out R&D which is slightly higher than in 2006 (6.3%). [The full-time equivalent figure<sup>12</sup> for the same period was 2,760 or 5.7%].

**Figure 15: Total R&D Employment – Male, Female and Full Time Equivalent**



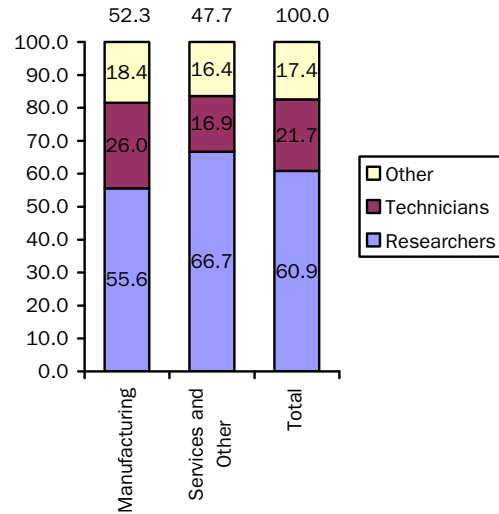
**Table 11: Number of R&D Employees by Type**

	Male	Female	Total
Researchers	1,490	410	1,900
Technicians	570	130	690
Other	520	190	710
All Types	2,580	730	3,310

In 2007 there were 3,310 employees involved in R&D activities, 2,580 males and 730 females. This compared to 3,130 employees in 2006 with 2,410 males and 730 females.

Approximately 78% of all R&D employees were male. By type of R&D employee, researchers accounted for 58%, technicians for 21% and other employees (e.g. support staff including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects) for 21% of all R&D employees. Comparable full-time equivalent figures show that 1,680 employees were researchers (61%), 600 employees were technicians (22%) and the number of other employees was 480 (17%).

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



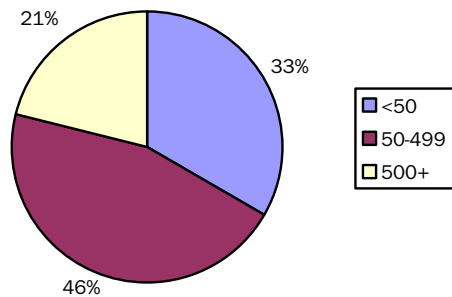
On a full-time equivalent basis there were 1,450 employees in Manufacturing and 1,320 in the Services & Other sectors. Within Manufacturing, researchers accounted for 56% of R&D employees with the level of technicians at 26% and other employees at 18%.

Within the Services & Other sectors, researchers made up 67% of R&D employees, technicians 17% and other employees 16%.

<sup>12</sup> For an explanation of full time equivalent employment see Notes to Editors note 5

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

**Figure 17: R&D Employment by Company Size**

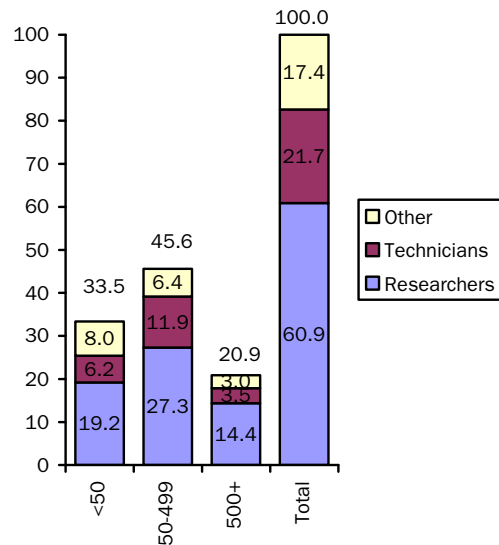


Using full time equivalent employment figures, Figure 17 shows how total R&D employment is split across companies of different sizes. The greater proportion of R&D employees is in the medium sized companies (46%), followed by small companies (33%) and large companies (21%). These show an increase in the proportion of R&D employment in medium sized and small companies from 39% and 29% respectively in 2006. However, a decrease occurred in the proportion of R&D employment in large companies from 32% in 2006.

The proportion of R&D employees who are researchers is greatest in large firms (68.8%). Researchers in medium and small firms accounted for 59.8% and 57.4% of R&D employees respectively. Small companies employ more persons in the 'other' category (24.1%) than either medium (14.1%) or large (14.3%) companies, while the greatest proportion of technicians' was in medium firms (26.1%) followed by small (18.5%) and large firms (16.9%).

Figure 18 also shows the spread of R&D employees across different size bands, with 34% of all R&D employees working in firms with less than 50 employees, 46% in medium-sized firms and 21% of all R&D workers employed by large companies.

**Figure 18: % 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 2007, following the introduction of the question in the 2004 survey.

52 R&D performing companies reported that they received tax credits amounting to £26.3 million in total. This represents a decrease in the number of R&D performing companies receiving tax credits and an increase the amount received when compared with last year. In 2006 57 companies reported receiving tax credits which amounted to £9.6m and in 2005 31 companies reported receiving tax credits which amounted to £5.6m.

**JOINT PROJECTS**

47 companies reported that their R&D work was part of a joint project with a source outside their company. 13 companies had a joint project with Higher Education Establishments, 20 with other Businesses and 14 with both. This shows a decrease in the number of companies engaging in joint projects from last year (62 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 2006 NIABI reported that out of approximately 3,500 business returns to the survey, 6% (219) had someone in the business engaged in research and development work during the year. The Manufacturing sector was the sector with the highest proportion of businesses that carried out R&D work (16%), while the proportion for the Service industries was 3%.

Figure 19 shows the percentage of businesses who carried out R&D work in 2006, for those sectors and sub-sectors of the Manufacturing industries where there were ten or more businesses who did so. These were concentrated in the Manufacturing sector, where nearly two fifths (37%) of businesses in the manufacture of chemicals, chemical products and man-made fibres did so. The only other non-manufacturing sector with ten or more businesses that carried out R&D work was Real Estate, Renting and Business activities (K) (which includes businesses in the Computer and related activities (SIC 72) and Research and Development (SIC 73) industries).

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



DA Manufacture of Food Products, Beverages and Tobacco  
DG Manufacture of Chemicals, Chemical Products and Man-made Fibres  
DH Manufacture of Rubber and Plastic Products  
DJ Manufacture of Basic Metals and Fabricated Metal Products  
DK Manufacture of Machinery and Equipment  
DL Manufacture of Electrical and Optical Equipment  
DM Manufacture of Transport Equipment  
K Real Estate, Renting and Business activities

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

## 5

The Business Sector Research and Development Survey has been conducted biennially by Forfas and its predecessors for over two decades. The latest survey was carried out in the period May to October 2006, with the reference year for data collected being the calendar year 2005. The next survey will relate to the period 2007/2008 and is expected to be published in 2009.

Research & development expenditure performed by the business sector in Ireland rose to €1.33 billion in 2005. This represented an annual average increase of 9.7% between 2003 and 2005. R&D spending in real terms in the business sector has nearly tripled in the last decade.

A small number of sectors dominated business R&D activity, Software and Computer sector (30.4%), Electrical and Electronics sector (21%), Pharmaceuticals (20%). The largest performing sector for business R&D in Ireland continued to be the Software/Computer Related areas accounting for 30.4% of all R&D investments in 2005. However, R&D spending growth in this sector was a relatively sluggish 6.8% between 2003 and 2005. R&D performed by business in the Irish Pharmaceuticals sector increased by 40.4% between 2003 and 2005. This sector now accounts for 20.1% of total business R&D.

R&D expenditure by foreign-owned firms rose to €939 million in 2005, with spending by Irish-owned firms increasing to €390 million. Spending growth of 10% per annum in foreign-owned firms slightly outpaced the overall 9% annual average increase for Irish-owned firms.

R&D spending by medium/large sized firms (>50 employees) rose by 9.6% per annum on average

between 2003 and 2005. R&D expenditure by small firms (<50 employees) also increased during this period by 9.9% on average per annum.

The number of full-time equivalent (FTE) R&D human resources has increased sharply in the last 10 years from 5,680 FTE in 1995 to 10,338 FTE in 2005. Over the period 2003 to 2005 the total number of R&D personnel (FTE) increased by 11%. In 2005, just less than two thirds of the FTE R&D staff were researchers (65.5%).

The bulk of the funding for business R&D in the Republic of Ireland continues to come from private sources with private funding representing 95.5% of total funding in 2005. Funding of €55.0 million for business R&D activities performed was sourced from the Irish government (4.1% of the total, up from 2.9% in 2003).

# Business Expenditure on Research & Development – Notes to Editors

## 6

1. The survey of Northern Ireland Civil and Defence Expenditure on Research and Development during 2007 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.

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 2006 survey carried out by DETI) and extra information from various sources such as ONS, Invest NI and filter questions on the Annual Business Inquiry and Community Innovation Survey. For the purposes of the 2007 survey, businesses were stratified into 4 groups:

- (i) Businesses responding to the 2006 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 2006 or 2007); 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 2007 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.

For 2007, 725 forms were sent out to businesses believed to be performing R&D. Completed forms were returned by 601 businesses representing a response rate of 83 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 76% of the total non-respondent companies. The remaining 24% - non Invest NI estimates were based on historical information and other administrative surveys within Statistics Research Branch.

Overall, all estimates make up 5.3% of total BERD spend for 2007 (compared to 3.5% in 2006). Estimates for Invest NI companies account for 2.9% of total BERD spend while estimates for non Invest NI companies account for 2.3% 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.

**Figure 20: Deciles of Estimates as a % 2007 BERD**

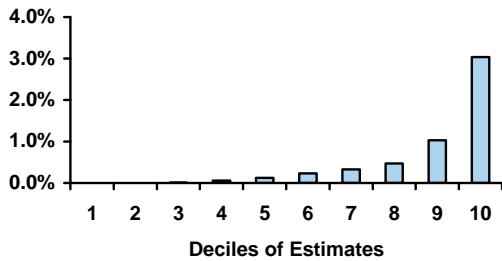


Figure 20 Shows that all estimates made up 5.3% of total 2007 BERD spend. The bulk of the value of the estimates has been accounted for by a relatively small number of companies. The last two deciles (i.e. top 20% of companies) accounted for nearly 80% of the total BERD estimated spend indicating that most of the estimates were small in magnitude.

2. This is the tenth 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 therefore are equal.

3. 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 has been modified inline with GB after a GB review.

4. The survey covers expenditure in the year ending December 2007, although companies were given the option of supplying data for a business year ending on any date between 6 April 2007 and 5 April 2008.

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.

## 5. Definition of Terms

### a) Type of R&D Expenditure

Total Expenditure on R&D - This covers civil expenditure by businesses, defence expenditure by businesses and other expenditure by Government. Due to disclosure rules, it is not possible to obtain a split between civil and defence R&D expenditure, for the 2007 survey.

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' document. 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.

**6.** 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 (or SIC 2003 classification) of industries.

Manufacturing is defined to cover Section D, which includes the following subsections:

DA	Food products, Beverages & Tobacco
DB	Textiles & Textile Products
DC	Leather & Leather Products
DD	Wood & Wood Products
DE	Pulp, Paper & Paper Products; Publishing and Printing
DG	Chemicals, Chemical Products & Man-Made Fibres
DH	Rubber & Plastic Products
DI	Other Non-metallic Mineral Products
DJ	Basic Metals & Fabricated Metal Products
DK	Machinery & Equipment Not Elsewhere Classified
DL	Electrical & Optical Equipment
DM	Transport Equipment
DN	Other Manufacturing Not Elsewhere Classified

Where aggregation of subsections within Manufacturing is required this would normally be as follows (for example, see Figure 7):

DA Food, Drink & Tobacco  
DB+DC Textiles, Leather, Footwear & Clothing  
DG Chemicals & Chemical Products  
DJ Basic Metals & Fabricated Metal Products  
DK, DL Engineering & Allied Industries  
+ DM  
DD, DE, Other Manufacturing  
DH, DI, DN

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

G Wholesale & Retail Trades  
H Hotels & Restaurants  
I Transport, Storage & Communication  
J Financial Intermediation  
K Real Estate, Renting & Business Activities  
L Public Administration and Defence  
M Education  
N Health & Social Work  
O Other Community, Social & Personal Service Activities

The Other Industries category covers:

A Agriculture, Hunting and Forestry  
B Fishing  
C Mining & Quarrying  
E Electricity, Gas & Water  
F Construction

**7.** 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.

**8.** The annual NIABI conducted by the Department of Enterprise Trade and Investment (DETI) provides estimates for the year of the value of mainly business based 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.

# Northern Ireland Higher Education Expenditure on Research & Development during 2007

## 7

Table 12 details the headline results from the 2005, 2006 and 2007 Higher Education Expenditure on Research & Development (HERD) surveys.

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

	£million	£million	£million
	2007	2006	2005
HERD Expenditure <sup>13</sup>	152.0	150.7	146.8
of which:			
Non Capital Expenditure	129.3	127.0	125.4
Capital Expenditure	22.7	23.7	21.5
<u>Source of funding of R&amp;D:</u>			
Government Block Grant	76.5	76.7	73.6
OST Research Councils <sup>14</sup>	8.5	9.1	7.9
UK-based charities	6.5	6.3	5.6
UK Cent Gov/Local Auth/Health <sup>15</sup>	38.4	37.9	36.8
UK Ind/Comm/Pub Corp <sup>16</sup>	2.8	3.0	3.2
EU Government	5.9	6.2	7.1
EU Other	2.7	3.3	2.8
Other Overseas	7.6	5.0	3.8
Other Sources	3.1	3.3	6.0
	<b>Number</b>	<b>Number</b>	<b>Number</b>
HERD Employment <sup>17</sup>	1,680	1,700	1,770
of which:			
Academic staff	1,260	800	930
Technicians <sup>18</sup>	230	720	700
Other <sup>19</sup>	200	180	150

<sup>13</sup>Expenditure for 2007 includes £0.7 million of expenditure funded by Northern Ireland businesses (£0.6m in 2006, £0.7m in 2005 and £0.9m in 2004). Therefore, net HERD in 2007 was £151.3m (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 increased by 0.9% from £150.7 in 2006 to £152.0m in 2007, lower than the increase of 2.6% from 2005 to 2006. The increase in in-house expenditure was comprised of a 1.9% increase in non capital expenditure and a 4.4% decrease in capital expenditure. This is in contrast to the previous period where non capital expenditure increased by 1.3% and capital expenditure increased by 10.5%.

Employment totals decreased between 2006 and 2007, from 1,700 full-time equivalent persons in 2006 to 1,680 in 2007. The change in R&D employment consisted of an increase in the number of academic staff (from 800 to 1260) and other staff (from 180 to 200) and a decrease in the number of technicians (from 720 to 230) employed in R&D. The shift between academic staff and technicians is due to a reclassification of PHD students, graduates and scientist.

Block grants remained the largest source of funds with their relative contribution decreasing slightly from 51% in 2006 to 50% in 2007. Funding from UK Central Government/Local Authorities and Health Trusts/Hospitals increased by 1.4% from £37.9m in 2006 to £38.4m in 2007, accounting for one quarter of HERD funding in 2007 as in 2006. EU Government funding decreased by 4.6% between 2006 and 2007, from £6.2m to £5.9m.

See Notes to Editors overleaf.

# Higher Education Expenditure on Research & Development – Notes to Editors

## 8

Table 12 details Higher Education Expenditure on R&D (HERD). The table gives combined results from the two main Northern Ireland universities - i.e. Queen's University Belfast (QUB) and the University of Ulster (UU). The data collected refers to the academic year 2006/2007 ending 31/7/2007. 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 12.

More detailed information on Transparency Review procedures in each of the local universities can be found at <http://www.qub.ac.uk/bo/man-acc/costing.htm> 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 12. 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.

# Annexes

# 9

## ANNEX 1

Breakdown of In-House R&D Expenditure (Civil & Defence) 2007  
by employment size-bands (< 50 employees and 50+ employees)  
in £000's (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	6,800	4,800	11,600	1,200	4,100	6,300	100	600	700	12,300	
50+	45,800	33,800	79,600	4,500	45,600	29,500	1,200	5,200	6,500	86,100	
Total	52,500	38,700	91,200	5,700	49,700	35,800	1,300	5,800	7,100	98,400	
<b>Services &amp; Other</b>											
<50	19,000	6,800	25,800	3,600	11,100	11,000	100	1,000	1,100	26,900	
50+	27,200	21,100	48,300	6,400	20,500	21,400	200	3,200	3,400	51,700	
Total	46,200	27,900	74,100	10,100	31,600	32,400	300	4,200	4,500	78,600	
<b>All Industries</b>											
<50	25,800	11,600	37,400	4,800	15,200	17,300	200	1,600	1,800	39,100	
50+	73,000	54,900	127,900	10,900	66,100	50,900	1,400	8,500	9,900	137,800	
Total	98,800	66,500	165,300	15,800	81,300	68,200	1,600	10,100	11,600	176,900	

## ANNEX 2

Breakdown of Purchased R&D Expenditure (Civil & Defence) 2007  
by employment size-bands (< 50 employees and 50+ employees)  
in £000's (rounded to nearest £100,000)

		Purchased R&D Expenditure			
		Work commissioned within NI	Work commissioned within GB	Worked carried out outside the UK	Total Purchased R&D Expenditure
<b>Manufacturing</b>					
	Total	2,800	1,200	1,200	5,400
<b>Services &amp; Other</b>					
	<50	400	300	400	1,100
	50+	200	200	1,300	1,700
	Total	600	500	1,700	2,800
<b>All Industries</b>					
	<50	2,600	600	1,100	4,400
	50+	700	1,100	1,800	3,800
	Total	3,400	1,600	2,900	8,200

## ANNEX 3

Breakdown of Business Expenditure on R&D (BERD) Expenditure by  
Small and Medium Sized Enterprises (SMEs <250 employees) 2002-2007 (£m)<sup>20</sup>

	R&D Expenditure						
	2001	2002	2003	2004	2005	2006	2007
<b>SMEs (&lt;250)</b>							
In- house	40.2	63.2	53.2	54.8	69.4	73.4	110.5
Purchased	3.3	3.6	3.2	7.5	5.5	8.2	6.8
Total	43.4	66.8	56.4	62.3	74.9	81.6	117.2
<b>(250+)</b>							
In- house	109.8	86.1	63.3	65.4	78.4	83.2	66.4
Purchased	1.8	3.8	1.6	1.4	1.0	2.2	1.4
Total	111.6	89.9	64.9	66.8	79.4	85.4	67.9
<b>All</b>							
In- house	149.9	149.3	116.5	120.2	147.8	156.6	176.9
Purchased	5.1	7.3	4.8	8.8	6.5	10.4	8.2
Total	155.0	156.6	121.3	129.0	154.3	167.0	185.1

<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.

## ANNEX 4

### Breakdown of 2007 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	110	20	130	110	80	20	100	70	110	20	130	60	300	60	360	240
	50-499	270	140	400	310	200	40	240	210	170	40	220	130	640	220	860	650
	500+	410	40	450	390	70	30	100	100	60	20	80	80	540	100	640	560
	Total	790	200	980	800	350	90	440	380	340	90	430	270	1,480	370	1,850	1,450
<b>Services &amp; Other</b>																	
Employment Size-bands	<50	380	70	450	430	110	20	130	100	130	90	210	160	610	170	790	690
	50+	330	150	480	460	100	20	130	120	50	10	70	50	490	180	670	630
	Total	710	220	920	880	210	40	250	220	180	100	280	220	1,100	360	1,460	1,320
<b>All Industries</b>																	
Employment Size-bands	<50	490	90	580	530	190	30	220	170	240	110	350	220	920	230	1,140	920
	50-499	580	280	870	750	300	60	370	330	230	50	280	180	1,110	400	1,510	1,260
	500+	420	40	460	400	70	40	110	100	60	30	90	80	550	100	660	580
	Total	1,490	410	1,900	1,680	570	130	690	600	520	190	710	480	2,580	730	3,310	2,760