



A Statistics Research Branch Publication

NORTHERN IRELAND RESEARCH & DEVELOPMENT STATISTICS 2003

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This report provides detailed results from the 2003 Northern Ireland Research & Development (R&D) Survey covering research activity in the business and higher education sectors and direct expenditure by government. Headline data from the surveys show that:

- Total expenditure on Research and Development in Northern Ireland was £261.8 million in 2003, of which £121.3 million (46%) was spent by businesses, £127.8 million (49%) by the Higher Education sector and the remainder was other government expenditure.
- There was a 4% fall in cash terms and an £18.4 million (6.6%) fall in real terms in Northern Ireland total R&D expenditure between 2002 and 2003 (from £280.2m to £261.8m).
- While Northern Ireland Higher Education expenditure rose in real terms by £19.1 million (18%) this was offset by a fall of £39.7 million (25%) in business R&D expenditure (from £161.0m to £121.3m).
- Within company expenditure on R&D fell by 22% in cash terms in Northern Ireland from 2002 to 2003 compared with a 4% rise in the UK.
- Most of the annual decrease in Northern Ireland business R&D expenditure occurred in the Manufacturing sector, down 27% or £31.9 million over the period. This compared with a decrease of 10% (£3.6m) in the Service sector.
- The relative importance of medium sized firms has increased compared to large firms since 2002. Medium sized firms spent £52.3 million (43% of total business expenditure) in 2003 compared with £44.4 million (28%) in 2002.
- R&D expenditure by locally-owned companies increased by 4% (£2.3m) in cash terms between 2002 and 2003 in contrast to the fall of 37% (£37.6m) by foreign-owned companies.

Northern Ireland Research & Development Statistics 2003

DETI Statistics Research Branch

26th November 2004

BACKGROUND

This report presents summary data from the 2003 Northern Ireland Business and Higher Education Research & Development Surveys. This is the sixth 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). Results from the third annual Higher Education R&D survey (relating to 2003) are also given. These surveys provide a wide range of information on Research & Development (R&D) activities. The main survey is the business R&D survey, the sample and results of which relate to business enterprises in Northern Ireland (NI). Statistics Research Branch of the Department of Enterprise, Trade & Investment (DETI), carries out the survey.

The business results provide the Northern Ireland element of an annual UK survey carried out by the Office for National Statistics – NI figures are made available at the same time as the UK results are released. Some results for UK and UK regions are also included to aid comparisons. This booklet contains detailed results from the business survey, summary results from the higher education survey and further comprehensive tables relating to business R&D spend in the annexes.

From the information given on survey returns, total expenditure on R&D in Northern Ireland can be derived. It is also possible to disaggregate the data including: expenditure on R&D carried out within or external to the company; sources of R&D funding; type of research and data split by company size and/or sector (e.g. manufacturing, services etc.). The survey also collects information on the number of employees working in R&D.

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Northern Ireland Research & Development Statistics 2003

Executive Summary

DETI Statistics Research Branch

26th November 2004

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.

and 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.

Sample Design

For the Business R&D Survey the sample is obtained by stratifying companies by the known level of R&D performance using information gained from previous surveys and other sources. All companies believed to be performing R&D are issued a questionnaire - in effect, therefore, a 'census' of known R&D performers was carried out. A total of 529 returns were received by the Department – some 87% of those sampled.

2. Total Expenditure on R&D in cash terms

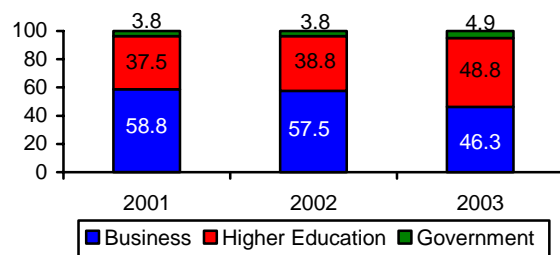
Total expenditure on Research and Development in Northern Ireland in cash terms was £261.8 million in 2003, of which £121.3 million (46%) was spent by businesses, £127.8 million (49%) by the Higher Education sector and the remainder was other government expenditure.

3. Total expenditure on R&D in real terms

For the first time in 2003 Northern Ireland Higher Education¹ accounts for a greater share of total R&D expenditure (48.8%) than the Business sector (46.3%). In contrast in 2002 business accounted for 57.5% of such expenditure, see figure 1.

In real terms total expenditure fell by £18.4m or 6.6% between 2002 and 2003, when the total expenditure was £261.8m.

Figure 1: Expenditure by type, 2001-2003 (Percentages)



While Northern Ireland Higher Education expenditure rose in real terms by £19.1 million (18%) this was more than offset by a fall of £39.7m (25%) in business R&D expenditure (from £161.0m to £121.3m). Overall R&D business expenditure rose by 8% between 1996 and 2003.

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

Most of the annual decrease in Northern Ireland business R&D expenditure occurred in the Manufacturing sector, down 27% or £31.9 m over the period. This compared with a decrease of 10% (£3.6m) in the Service sector.

The importance of large companies to R&D expenditure has been falling in recent years. Medium sized firms accounted for a greater proportion of R&D expenditure in 2003 than in 2002 (43% compared with 28%).

¹ Higher Education figures are not available prior to 2001. 2

R&D expenditure by locally-owned companies increased by 4% (£2.3m) between 2002 and 2003 in contrast to the fall of 37% (£37.6m) by foreign-owned companies.

4. Business R&D: Intramural Expenditure

Spending carried out within a company in Northern Ireland (intramural), accounted for 96% (£116.5 million) of total expenditure in 2003. Intramural expenditure fell by 22.0% between 2002 and 2003.

5. Business R&D: Sectoral Analysis

In 2003, the majority of R&D was carried out within the manufacturing sector (71%) with the remaining 29% carried out in services and the 'other' industries categories. This shows an increased share of expenditure in the services & other sector compared to previous years (for example, in 2002, manufacturing accounted for 76% and services & other 24%).

Manufacturing expenditure in 2003 (£87m) was down some 27% on 2002.

6. Business R&D: by Company Size

The importance of large companies to R&D activity has been declining over the last few years; while companies with more than 500 or more employees accounted for 35% of total business R&D expenditure in 2003, compared to 50% of total spend in 2002 and 65% in 2001.

Such companies represented only 7% of the total number of firms that performed R&D in 2003, compared with 6% in 2002.

The importance of medium sized companies (50-499 employees) has increased over the past year. The proportion of R&D expenditure carried out by medium sized companies increased from 22% in 2001 to 28% in 2002 and to 43% in 2003. The actual R&D expenditure also increased in cash terms from £33.6 million in 2001 to £44.4 million in 2002 and to £52.3 million in 2003.

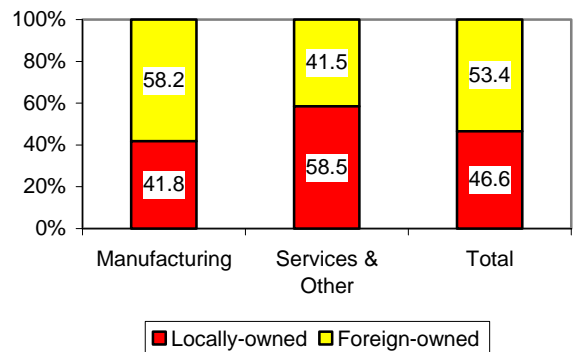
7. Business R&D: Source of funds

The majority of funding came from companies' own funds (82%), with 13% from Government, 1% from overseas and 3% from other sources. The proportion of funding from own funds rose from 78% in 2002 to 82% in 2003.

8. Business R&D: Ownership

Companies with ownership outside NI play an important role in financing R&D activities in the region. Just over a half £64.8m (53%) of total R&D spend was by such foreign owned companies although they accounted for only 23% of all R&D-performing companies. However, their contribution to the total R&D spend was lower than in 2002 (£102.4m or 65%). The question on ownership of companies was not asked in surveys prior to 2002.

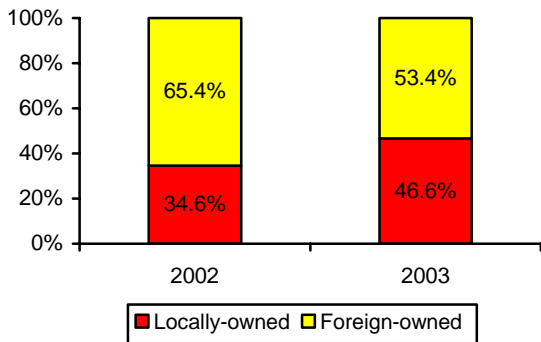
Figure 2: Expenditure by Sector and Ownership (Percentages)



The majority of R&D expenditure in Manufacturing is carried out by foreign-owned companies (58.2%), whereas the converse is true for services and 'other' sector (41.5%).

The majority of locally-owned companies funding came from their own funds in Northern Ireland (65%), higher than for foreign-owned companies (45%).

Figure 3: Expenditure by Ownership 2002-2003 (Percentages)



9. Business R&D: Employment

In 2003, companies surveyed reported a total of 2,930 employees working on R&D, some 6.7% of all employees in companies carrying out R&D. The whole time equivalent figure (WTE) for the same period was 2,770.

Both the number of employees and their WTE have been increasing year of the survey since 1999.

	1999	2001	2002	2003
Number	2,190	2,630	2,720	2,930
WTE	2,030	2,480	2,590	2,770

Approximately 90% of all R&D employees were full-time. Of all R&D employees, 68% were scientists, 17% were technicians and other employees accounted for 16% of such employees.

10. Intramural Business R&D: UK and Regional Comparisons

Of the 12 UK regions, six showed a rise in intramural business R&D expenditure in cash terms over the period 2002-2003. The percentage fall in Northern Ireland R&D spend (22%) in this period was the largest of the six UK regions which showed a decrease. In the UK as a whole such expenditure rose by 4%.

Over the period 2001-2003, intramural business R&D expenditure in cash terms in Northern Ireland fell by 23%, the largest fall of the three UK regions which showed a decrease. In the UK as a whole such expenditure rose by 11%.

11. Higher Education R&D: Summary

R&D expenditure in the Higher Education sector increased by 20% in cash terms between 2002 and 2003 (from £107.4m to £129.1m) reflecting its importance to Northern Ireland. Net expenditure in 2003 (excluding spend by businesses undertaken by higher education) was £127.8m.

Over one half of funding (56%) for Higher Education R&D in 2003 came from the Government block grant (£72.4 million). In 2003, there were some 1,850 full-time equivalent employees in the Higher Education sector engaged in R&D, which is 7% more than the number of employees in 2002.

12. R&D Investment Rate

The most recent information for R&D expenditure as a percentage of Regional Gross Value Added relates to 2002. This shows that Northern Ireland was the eighth highest of the twelve UK regions (lower proportions were recorded in London, Yorkshire & Humber, North East and Wales). However, the proportion for NI in 2002 at 0.73% is just over half the UK average of 1.42%. Northern Ireland businesses would have needed to invest some £142 million more in R&D in 2001 to reach the UK average rate.

13. Other Sources

The most recent UK Innovation (2001) Survey estimated that 46% of all NI businesses had undertaken some form of innovation **activity** over the 3-year sample period (1998-2000) compared to 47% of all firms in the UK. In addition, the survey showed that 32% of enterprises in NI undertook innovation related **expenditure**, slightly below the UK average of 36%. The next UK Innovation Survey will be conducted in 2005.

Further details from this survey are available at www.dti.gov.uk/iese/regional2001b.pdf.

According to the 2003 Northern Ireland Annual Business Inquiry (NIABI) 7% of companies had someone in their business engaged in research and development work during the year. This is the same proportion as reported by the 2002 NIABI. The Manufacturing sector was the sector with the highest proportion (17%), while the proportion in the service sector was 3%.

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SECTION 1

TOTAL EXPENDITURE ON RESEARCH AND DEVELOPMENT DURING 2003

INTRODUCTION

The performance and funding of most research & development (R&D) activity occurs in four main economic sectors:- the Business sector, Higher Education Institutions, Government and the Private Non-Profit sector.

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 2 and 3 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 Ireland¹.

One area that is not covered by the present suite of surveys in Northern Ireland is the Private Non-Profit sector. However, previous analysis by ONS shows that only around 1% of total R&D in the UK was carried out within this sector.

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

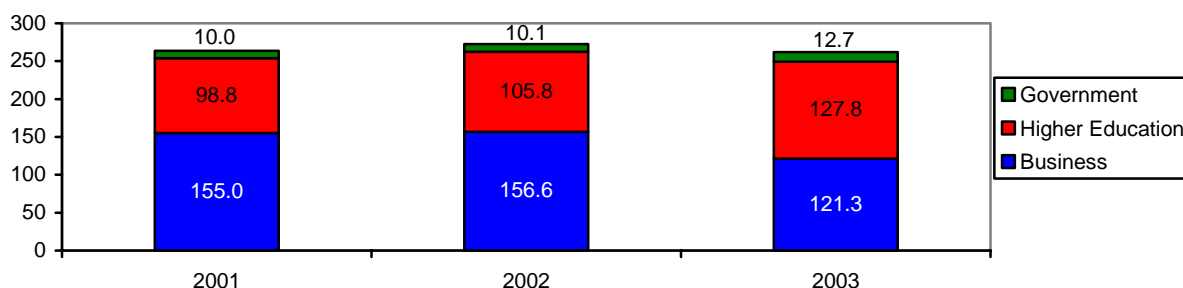
RESULTS

Total expenditure on Research and Development in Northern Ireland in cash terms was £261.8 million in 2003, of which £121.3 million (46%) was spent by businesses, £127.8 million (49%) by the Higher Education sector and the remainder was other government expenditure. Total expenditure in 2003 (£261.8m) was similar to that in 2001 (£263.8m) but was 4% lower than that in 2002 (£272.6m).

Table 1.1: Total Expenditure on R&D² in cash terms (£million)

	2001	2002	2003
Total expenditure on R&D (of which)	263.8	272.6	261.8
Expenditure by businesses	155.0	156.6	121.3
Expenditure by Higher Education ³	98.8	105.8	127.8
Other expenditure by Government ⁴	10.0	10.1	12.7

Figure 1.1: Main Split of R&D Expenditure in cash terms (£million)



¹ The latest detailed are available on the Office for Science and Technology's website at www.ost.gov.uk/setstats/index.htm

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

³ To avoid double counting, this figure excludes £1.2m in 2003, £1.6m in 2002, and £1.5m in 2001 of expenditure on R&D by businesses that was undertaken by universities or higher education establishments.

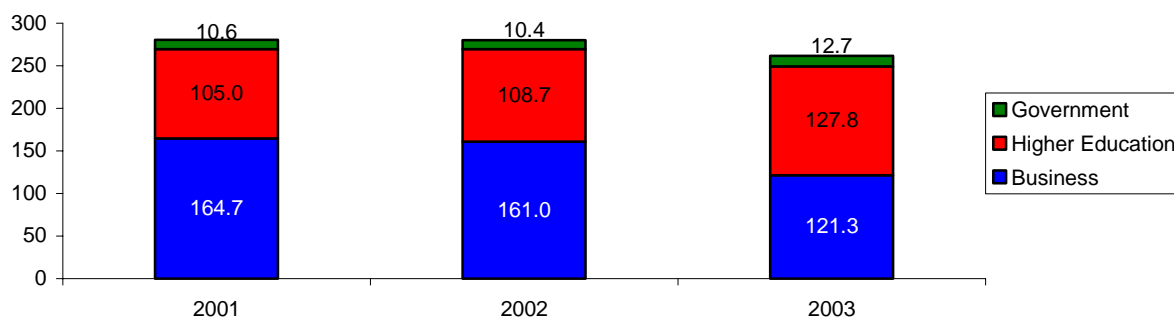
⁴ 2002/03 Forward Look expenditure by NI Departments (see Notes to Editors, note 5) excluding grants to businesses to conduct R&D and funding to higher education institutions. The figure does not include expenditure by higher education establishments as this is detailed separately.

In 2003 the share of expenditure by businesses and the Higher Education sector was similar (46.3% and 48.8% respectively), while in the previous two years the expenditure by businesses was more than that by the Higher Education sector (57.5% in 2002 and 58.8% in 2001).

Table 1.2: Total Expenditure on R&D in real terms⁵ (£million)

	2001	2002	2003
Total expenditure on R&D (of which)	280.3	280.2	261.8
Expenditure by businesses	164.7	161.0	121.3
Expenditure by Higher Education	105.0	108.7	127.8
Other expenditure by Government	10.6	10.4	12.7

Figure 1.2 Main Split of R&D Expenditure in real terms (£million)



In real terms total expenditure in 2003 (£261.8m) was down 6.6% (£18.4m) from expenditure in 2002 (£280.2m).

Although Northern Ireland Higher Education expenditure rose in real terms by £19.1 million (18%), there was a larger fall of £39.7 million (25%) in business R&D expenditure (from £161.0m to £121.3m).

There was a fall in real terms (-24.7%) in Northern Ireland business R&D expenditure between 2002 and 2003 (from £161.0 to £121.3m)

⁵ GDP deflator used to convert cash terms to real terms: 84.1 (1996), 90.7 (1999), 94.1 (2001) and 97.3 (2002) where 2003 = 100.

SECTION 2

BUSINESS EXPENDITURE ON RESEARCH AND DEVELOPMENT DURING 2003

NORTHERN IRELAND BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT DURING 2003

Table 2.1 below details the headline results from the 2003 Business Expenditure on Research & Development (BERD) survey. The table shows that in 2003, total expenditure (in cash terms) on R&D by Northern Ireland businesses was an estimated £121.3 million.

Total BERD consists of intramural expenditure (i.e. R&D carried out within the company) and extramural 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 intramural expenditure (£116.5m or 96.1%) with £4.8 or 3.9% being extramural expenditure. Of this £4.8m of extramural expenditure in Northern Ireland, some £1.2m was undertaken by the Higher Education sector.

Over 82% of funding for R&D in 2003 came from the companies' own resources (£99.9m) while government provided a further 13.0% (or £15.8m) and the remainder came from overseas (1.3% or £1.5m) and other sources (3.3% or £4.1m).

Table 2.1: Business Expenditure on R&D - 2003

	Total Expenditure by Business (£million)	As % of Total Expenditure
Total Expenditure	121.3	100.0
Intramural Expenditure ⁵	116.5	96.1
of which:		
Current Expenditure	105.8	87.2
Capital Expenditure	10.7	8.8
Extramural Expenditure ⁵	4.8	3.9
of which:		
Undertaken by Higher Education	1.2	1.0
Source of funding:		
Business	99.9	82.4
Government	15.8	13.0
Overseas	1.5	1.3
Other ⁶	4.1	3.3

Total employment on R&D in businesses for 2003 was 2,770 (based on whole time equivalent figures⁷).

^{4, 5, 6 & 7} 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 2.2 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.

Table 2.2: 2003 Results Compared with 2002, 2001, 1999 and 1996 (figures in millions)

	Cash Terms					Real Terms (2003 Prices) ⁸					% Change Real Terms	
	2003	2002	2001	1999	1996	2003	2002	2001	1999	1996	02-03	96-03
Total Expenditure	121.3	156.6	155.0	102.7	94.7	121.3	161.0	164.7	113.2	112.5	-24.6	7.8
Intramural	116.5	149.3	149.9	97.2	89.9	116.5	153.5	159.3	107.1	106.8	-24.1	9.0
Extramural	4.8	7.3	5.1	5.5	4.8	4.8	7.5	5.4	6.1	5.7	-36.0	-15.9
Funded by Government	15.8	11.3	8.6	10.6	17.4	15.8	11.6	9.1	11.7	20.7	36.0	-23.6
Funded from own funds	99.9	122.4	137.1	89.4	72.5	99.9	125.8	145.7	98.5	86.2	-20.6	15.9
Other	5.6	23.0	9.3	2.7	4.8	5.6	23.6	9.9	3.0	5.7	-76.3	-1.8

Key Findings

Between 2002 and 2003 total business expenditure on R&D decreased by 24.7% in **real** terms with intramural expenditure falling by 24.1%. Although, government funding increased by 36% over the year, small businesses own expenditure decreased by 20.6% and other sources of funding fell from the particularly high level reached in 2002.

The ten biggest R&D spenders in 2003 accounted for 46% of total R&D expenditure – this is compared with 60% in 2002, 69% in 2001, 59% in 1999 and 57% in 1996. Seven companies have appeared in the top ten in the last four DETI surveys (i.e. 1999, 2001, 2002 and 2003). With four further companies appearing in the top ten two times out of the last four surveys.

In cash terms:

In 2003, twenty-six companies spent more than £1 million on R&D (compared with twenty-five companies in 2002, nineteen companies in 2001, twenty companies in 1999, sixteen in 1996 and nine in 1993).

Average expenditure was £43,774 per R&D employee in 2003, 27.5% lower than the figure for 2002 (employees are on a whole time equivalent basis).

In 2003, 2770 employees (on a whole time equivalent basis) were engaged in R&D work – 6.3% of all employees of companies involved in R&D. Comparable figures for 2002 were 2,590 employees or 6.4 % of all employees of R&D companies (2001: 5.5% and 1999: 4.8%).

⁸ GDP deflator used to convert cash terms to real terms: 84.1 (1996), 90.7 (1999), 94.1 (2001) and 97.3 (2002) where 2003 = 100.

BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – SECTORAL BREAKDOWNS

Figure 2.1: Total R&D Expenditure in 2003 by Sector (SIC 2003 basis)

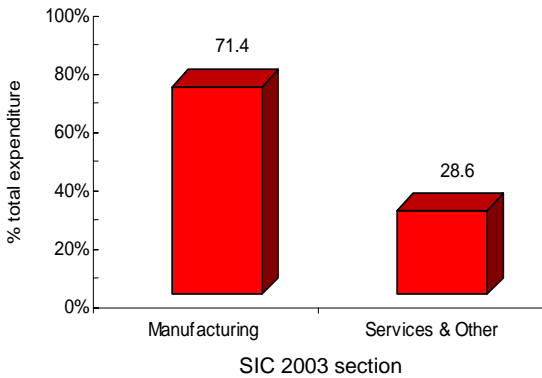
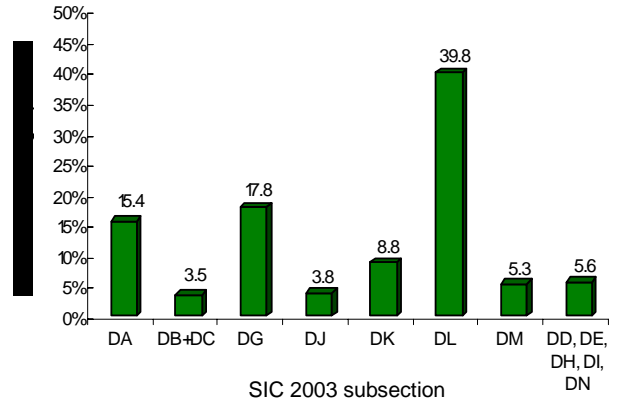


Figure 2.2: Manufacturing R&D Expenditure in 2003 by Division (SIC 2003 basis)⁹



In 2003, the majority of R&D was carried out within the manufacturing sector (71.4%) with the remaining 28.6% carried out in services and 'other' industries category. This shows an increase in spend in the services & other sector compared to previous years (in 2002 manufacturing accounted for 76% and services & other 24%). while in 2001 services accounted for just 10% of the total spend.

The Electrical and Optical Equipment division (DL) accounted for (39.8%) of all manufacturing R&D (see Figure 2.3) with chemicals division (DG) accounting for 18% and the food products, beverages and tobacco division (DA) a further 15%.

Figure 2.3 highlights that just over half 54% of R&D spending within the manufacturing sector was accounted for by companies involved in Engineering & Allied Industries (DK, DL & DM).

Figure 2.3: Manufacturing Expenditure by SIC 2003 Subsection

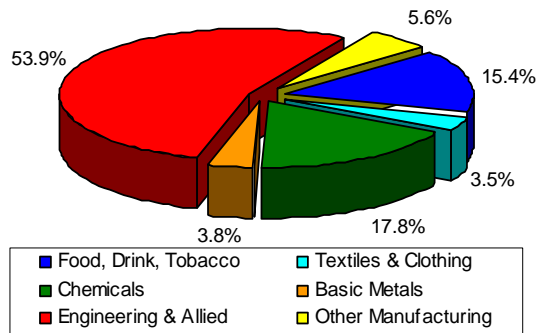
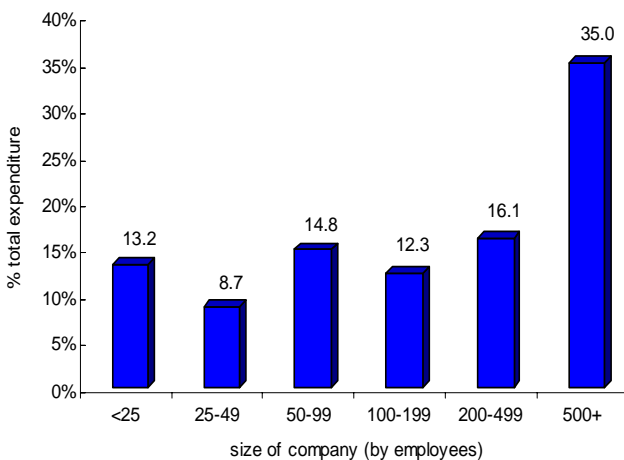


Figure 2.4: Total R&D Expenditure in 2003 by Company Size



Companies with 500 or more employees accounted for over a third (35%) of business R&D expenditure in 2003, although they represented only 7% of R&D performing companies.

Smaller firms (i.e. those with less than 50 employees) represented some 60% of R&D companies and accounted for 22% of total business R&D expenditure while R&D expenditure by medium-sized companies (i.e. those firms with between 50 and 499 employees) accounted for 43% of the total. However the proportion that these large companies make to total R&D expenditure has been declining over the last two years. It was 65% in 2001 and 50% in 2002.

⁹ For a description of subsection headings see Notes to Editors note 6.

BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – INTRAMURAL EXPENDITURE

Intramural 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 (extramural expenditure by companies in NI may be carried out in other parts of the UK or abroad). Intramural expenditure in Northern Ireland (in cash terms) fell by 22.1% between 2002 and 2003: this is compared to a 4.4% rise in the UK as a whole. Of the 11 other UK regions, six showed a rise in intramural expenditure and five showed a decrease.

Table 2.3: Intramural Expenditure by UK Government Office Region (Cash Terms)

	Expenditure (£million)		% Change 2002-2003
	2003	2002	
UK	13,687	13,110	4.4
England	12,786	12,138	5.3
North East	281	128	119.5
North West & Merseyside	1,559	1,661	-6.1
Yorkshire & Humber	382	357	7.0
East Midlands	929	1,063	-12.6
West Midlands	587	695	-15.5
Eastern	3,453	2,741	26.0
London	771	950	-18.8
South East	3,464	3,268	6.0
South West	1,359	1,274	6.7
Wales	264	182	45.1
Scotland	521	640	-18.6
Northern Ireland	116	149	-22.1

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

As Table 2.4 shows, intramural expenditure, i.e. spending carried out within the company, accounted for over 96% (£116.5 million) of total expenditure in Northern Ireland in 2003 similar to the proportion (95%) in 2002. The majority of both intramural and extramural expenditure was in the manufacturing sector.

Table 2.4: Intramural and Extramural Expenditure by Sector

	Intramural		Extramural	
	£m	% of Total Expenditure	£m	% of Total Expenditure
Manufacturing	83.3	68.6	3.4	2.8
Services & Other	33.2	27.4	1.4	1.2
All Industries ¹⁰	116.5	96.1	4.8	3.9

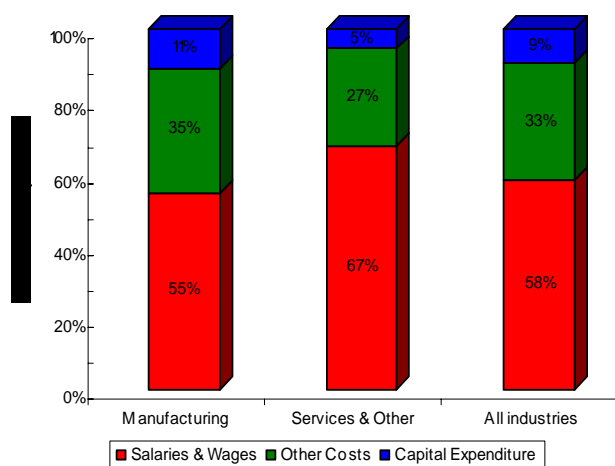
The two components of intramural expenditure are current expenditure (salaries & wages and other costs) and capital expenditure (land & buildings and plant & machinery).

¹⁰ 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 2.5: Breakdown of Intramural Expenditure by Sector (£m)

	Manufacturing		Services & Other		All industries	
	£m	%	£m	%	£m	%
Current Expenditure:						
Salaries & Wages	45.4	55%	22.4	67%	67.8	58%
Other Costs	28.9	35%	9.0	27%	38.0	33%
Capital Expenditure:						
Land & Buildings	2.6	3%	0.6	2%	3.2	3%
Plant & Machinery	6.3	8%	1.2	4%	7.5	6%
Intramural Expenditure	83.3	100%	33.2	100%	116.5	100%

Figure 2.5: Intramural Expenditure by Sector



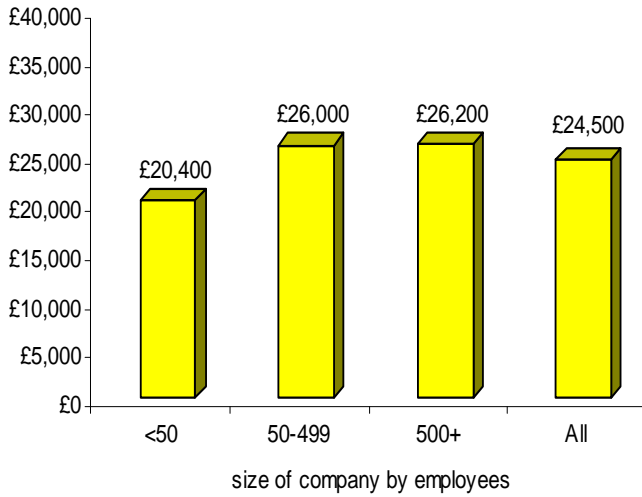
Current expenditure makes up 91% of intramural expenditure. Table 2.4 and Figure 2.5 highlights that there were differences between sectors in the categories of intramural R&D spend.

In the manufacturing sector, salaries and wages accounted for 55% of intramural expenditure, whilst in the services & other sector the corresponding figure was 67%. The proportion spent on salaries and wages has increased in both sectors from the proportion in 2002 (44% for manufacturing and 61% for the services and other sector). The proportion of intramural expenditure accounted for by capital expenditure has increased in Manufacturing to 11% compared to 5% in 2002 but has decreased in the Services & Other sector to 5% compared to 15% in 2002.

BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – CURRENT EXPENDITURE

As Figure 2.6 below shows, there is a distinct difference in the level of salaries & wages per head between companies of different size (based on whole time equivalent figures).

Figure 2.6: Salaries & Wages per Head



Salaries and wages per head for large companies (500+ employees) are £26,200 per head, while for small companies the figure is considerably lower at £20,400.

Analysis shows that, the larger the company, the greater the proportion of scientists that are employed (80% large, 65% medium and 58% small). It is likely that scientists earn more than other workers involved in R&D, which would account for the differences in average wages between R&D employees in small companies and those in medium and large companies.

Current expenditure can also be looked at in terms of the type of research carried out. Experimental development accounts for 53.7% of current expenditure with applied research and basic research accounting for 42.3% and 4.0% respectively.

Figure 2.7: Type of Research by Company Size

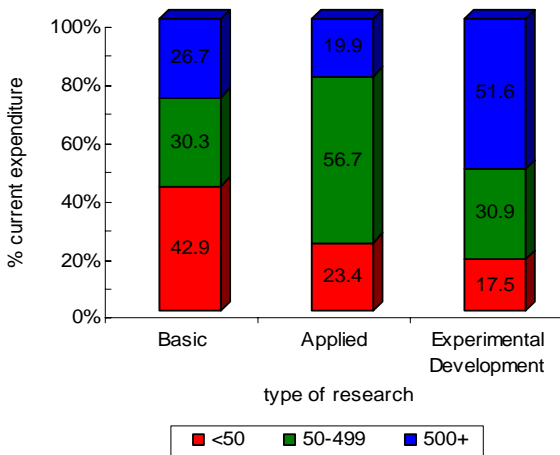


Table 2.6: Type of Research by Sector as % of All Research

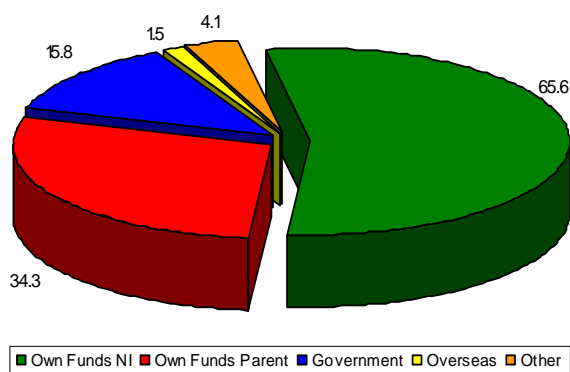
	Manufacturing	Services	All Industries
Basic	2.7	1.2	4.0
Applied	25.8	16.4	42.3
Experimental Development	41.8	11.7	53.7
All Research	70.3	29.4	100.0

Figure 2.7 shows that a significant part of spending on basic research is carried out by small-sized companies (i.e. those firms with less than 50 employees) (42.9%), the majority of spending on applied is carried out by medium sized companies (50-499 employees) (56.7%) and that large companies (500+ employees) are dominant in terms of spend on experimental development (51.6%). 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 R&D (intramural and extramural) comes from a number of sources: the companies' own funds, from Government, overseas funding (e.g. EU) and other businesses.

Figure 2.8: Sources of R&D Funding (£m)



The majority of funding (82%) came from the companies' own funds, with 13% from government, 1% from overseas and 3% from other sources. The proportion of funding from own funds rose from 78% in 2002 to 82% in 2003, still below the level of 88% in 2001. Funding from overseas was well below the proportion seen in the previous two years (12% in 2002 and 5% in 2001) while funding from government increased from 7% in 2002 to 13% in 2003.

Table 2.7: Percentage of R&D Funding by Source split by Company Size

	<50	50-499	500+	All
Own Funds NI	60.0	58.8	44.6	54.1
Own Funds Parent	19.2	25.7	37.2	28.3
Government	15.3	10.5	14.5	13.0
Overseas	2.5	0.3	1.7	1.3
Other	3.0	4.7	1.9	3.3
Total	100.0	100.0	100.0	100.0

Table 2.7 shows that, both small sized companies (<50 employees) and medium sized companies (50-499 employees) reported similar proportions (60.0% and 58.8% respectively) of R&D funding was from their own funds in Northern Ireland, while large businesses (i.e. 500+ employees) declared that only 44.6% of R&D funding was provided from own funds in Northern Ireland.

The proportion of funding supplied by parent companies was much higher for large firms. These large businesses have reported that 37.2% of funding came from parent companies, while medium-sized businesses stated that 25.7% of funding came from parent companies and small businesses sourced 19.2% of R&D spend from parent companies.

BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT – OWNERSHIP ANALYSIS

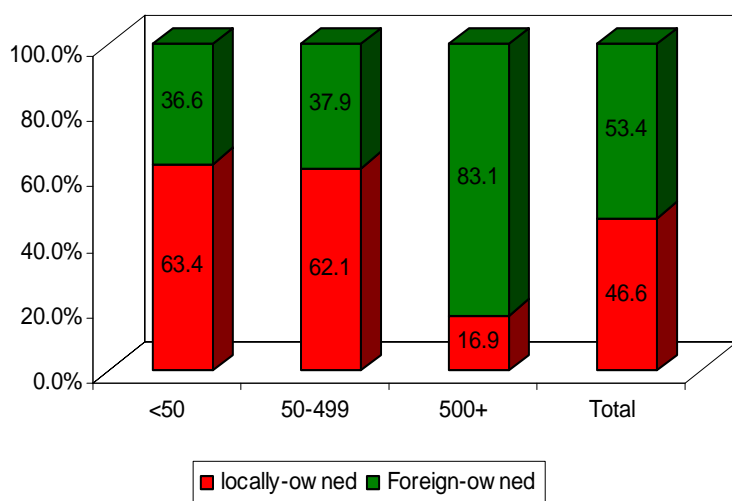
Analysis by company ownership to establish levels of R&D expenditure by local or foreign-owned firms was first published in the 2002 Northern Ireland Business R&D Survey.

Table 2.8: Breakdown of R&D expenditure by ownership of company

	£m	%	Number of companies	%
Locally-owned companies	56.5	46.6	220	77.2
Foreign-owned companies	64.8	53.4	65	22.8
Total (All companies)	121.3	100.0	285	100.0

Table 2.8 shows that of the £121.3 million total R&D spend in 2003, just over half was by foreign owned companies (i.e. not NI-owned companies) although they accounted for approximately only one-fifth of all R&D-performing companies. While almost four-fifths of all R&D-performing companies (77.2%) were Northern Ireland owned, they accounted for just under a half of total R&D spend. Although the proportion of Northern Ireland owned companies was practically the same as in 2002, the proportion of total R&D expenditure that they contributed rose considerably from 34.6% to 46.6%. This was due to spending by foreign-owned companies falling from £102.4m in 2002 to £64.8m in 2003.

Figure 2.9: Expenditure by ownership by company size



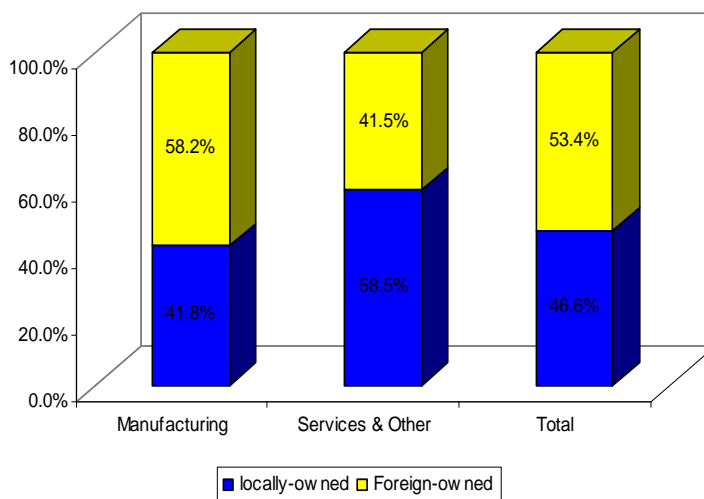
The majority of R&D spend in small companies (63.4%) and medium-sized companies (62.1%) was by Northern Ireland owned firms.

However, the analysis shows that, in large companies (500+ employees) the vast majority of R&D expenditure (over 83.1%) was by foreign-owned firms.

Figure 2.10: Expenditure by ownership by sector

Analysis of R&D spend split by ownership and sector shows that 58.2% of R&D spend in the manufacturing sector was by externally-owned companies.

In the Services & Other sector, however, Northern Ireland owned companies accounted for 58.5% of R&D expenditure.



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

In 2003, companies surveyed reported a total of 2,930 employees working on R&D, approximately 6.7% of all employees in companies carrying out R&D (the same proportion as in 2002). [The whole time equivalent figure¹² for the same period was 2,770 or 6.3%].

Figure 2.11: Total R&D Employment - Full-time, Part-time and Whole Time Equivalent

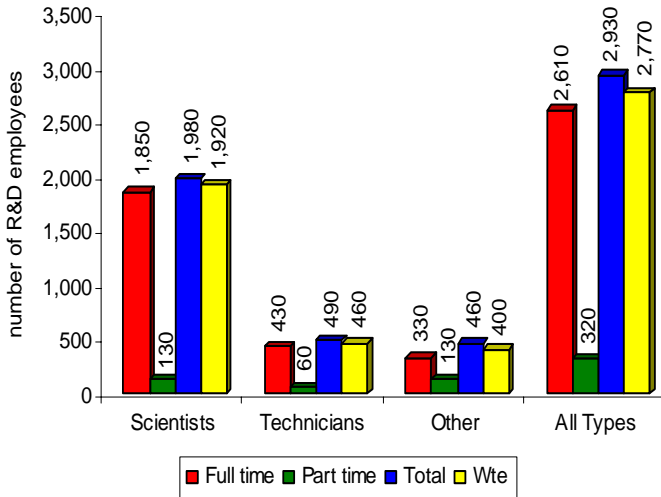
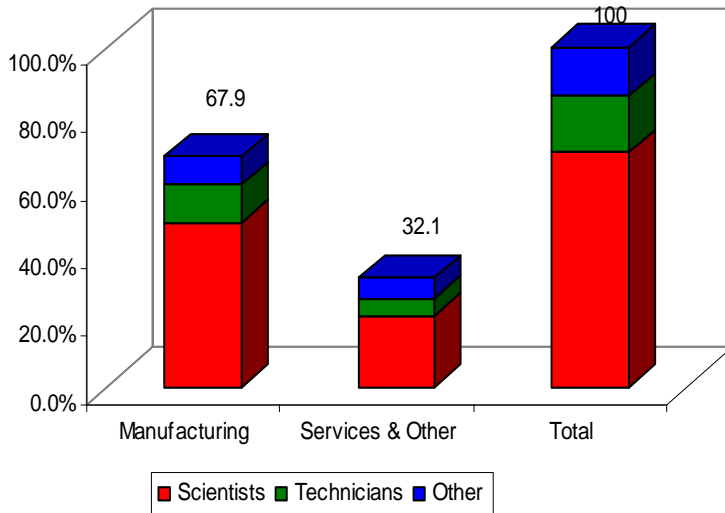


Table 2.9: Number of R&D Employees by Type

	Full time	Part time	Total
Scientists	1,850	130	1,980
Technicians	430	60	490
Other	330	130	460
All Types	2,610	320	2,930

Approximately 90% of all R&D employees were full-time. By type of R&D employee, scientists accounted for 68%, technicians for 17% and other employees (e.g. professional, administrative, clerical and industrial) for 16% of all R&D employees. Comparable whole time equivalent figures show that 1,920 employees were scientists (69%), 460 employees were technicians (17%) and the number of other employees was 400 (14%).

Figure 2.12: R&D Employment (whole time equivalent) by Sector



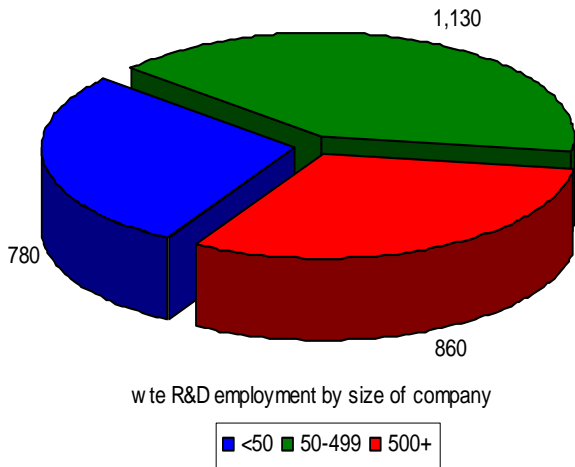
On a whole time equivalent basis there were 1,880 employees in manufacturing and 890 in the Services & Other sectors. Within manufacturing, scientists accounted for 71% of R&D employees with the level of technicians at 16% and other employees at 12%.

Within the Services & Other sectors, scientists made up 65% of R&D employees, technicians 17% and other employees 19%.

¹² For an explanation of how whole time equivalent employment figures are calculated see Notes to Editors note 5.

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

Figure 2.13: R&D Employment (whole time equivalent) by Company Size

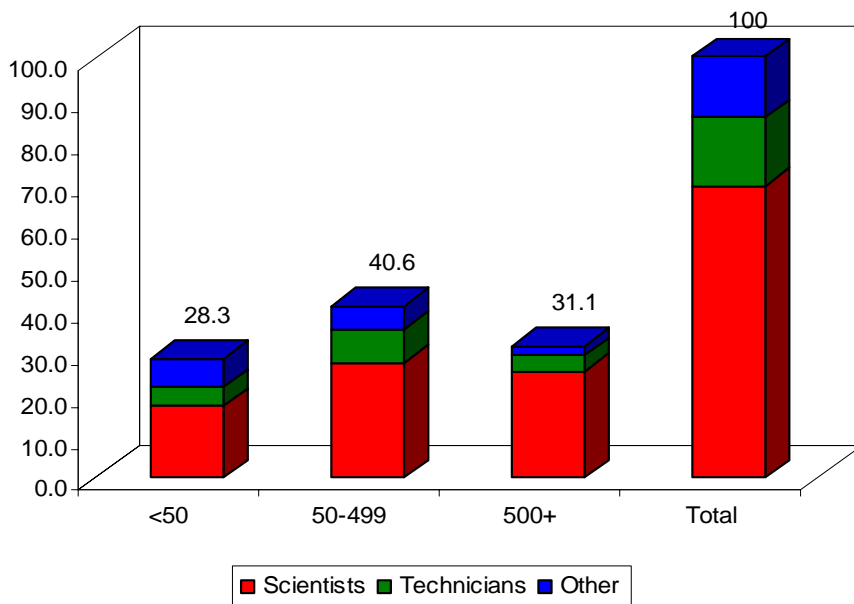


Using whole time equivalent employment figures, Figure 2.13 shows how total R&D employment is split across companies of different sizes. The greater proportion of R&D employees are in the medium sized companies (41%). Between 2002 and 2003 the proportion of whole time equivalent R&D employees in medium sized companies rose from 34% to 41%. In contrast the proportion of whole time equivalent R&D employees in large companies (500+) fell from 36% in 2002 to 31% in 2003, the same is true for small companies falling from 30% in 2002 to 28% in 2003.

There is a difference in the type of employee to be found in companies of different sizes. Just over four fifths (80.7%) of R&D employees in large firms are scientists, compared with 59.8% in small firms and 66.8% in medium-sized firms. Large companies employ fewer persons in the 'other' category (7.2%) than either small or medium-sized companies (24.1% and 13.1% respectively).

Figure 2.14 also shows the spread of R&D employees across different size bands, with 28% of all R&D employees working in firms with less than 50 employees, 41% in medium-sized firms and around 31% of all R&D workers employed by large companies. This differs slightly from 2002 where about equal proportions of R&D employees worked in medium-sized firms and in large companies (34% and 36%) respectively.

Figure 2.14: R&D Employment (whole time equivalent) by Type of Employee and Company Size



R&D Information from other sources

Northern Ireland Annual Business Inquiry (NIABI)

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

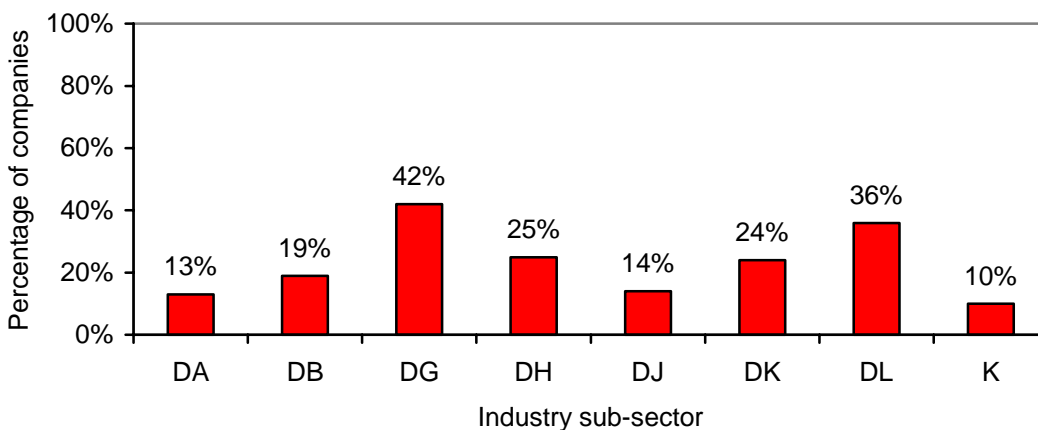
The latest 2003 NIABI reported that out of about 3,300 companies in the survey, 7% (231) had someone in the business engaged in research and development work during the year. The Manufacturing sector was the sector with the highest proportion of companies who carried out R&D work (17%), while the proportion for the Service industries was 3%.

Figure 2.15 shows, the percentage of companies who carried out R&D work in 2003, for those sectors and sub-sectors of the manufacturing industries where there were more than ten companies who did so. These were concentrated in the Manufacturing sector, where over two fifths (42%) of companies in the manufacture of chemicals, chemical products and man-made fibres did so. The only other sector included was Real Estate, Renting and Business activities (K), which includes companies in the Computer and related activities (SIC 72) and Research and development (SIC 73) industries.

2002 is the earliest year for which research and development information was available from the NIABI. Results from the 2002 NIABI were practically the same as the above results for 2003. In 2002, 7% (244) of companies reported that they had someone in the business engaged in research and development work during the year. Again this type of work was concentrated in the Manufacturing sector, with 16% of all companies in this sector carried out such work.

DA Manufacture of Food Products, Beverages and Tobacco
DB Manufacture of Textiles and Textile Products
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 nec
DL Manufacture of Electrical and Optical Equipment
K Real Estate, Renting and Business activities.

Figure 2.15: Percentage of companies who carried out R&D work by industry



Business Expenditure on Research and Development in the Republic of Ireland

The Business Sector Research and Development Survey has been conducted biennially by Forfas and its predecessors for over two decades. The latest survey was published in September 2003 and refers to the year 2001.

R&D activity in aggregate terms in the business sector continued to grow between 1999 and 2001. Total spend amounted to €917 in 2001, up from €784 in 1999. The average annual growth rate in the two year period was 8.2%, compared to a rate of 13.2% in the 1997-1999 period. In real terms, allowing for inflation, the average annual growth rate was 4% for 1999-2001 and 11.8% for the previous period 1997-1999. These growth rates reflect a real slowdown in expansion of R&D activity.

A small number of sectors dominated business R&D activity, namely Electrical and Electronic equipment (37.5%), Software and Computer related activities (27.5%), Pharmaceuticals (7.7%), Instruments (6.5%) and Food, Drink and Tobacco (5.5%). An important trend over the past decade has been the systematic and substantial increase in Software and Computer related services as well as the decline in the share accounted for by the Pharmaceutical sector.

Foreign owned enterprises accounted for 65% of activity in 2001, up slightly on 1999.

The total number of R&D personnel (FTE) rose by 10% from 1999 to 2001. Normalised by industrial employment numbers this amounted to practically the same number per 1,000 in the two years (6.8% and 6.9% respectively). In 2001 this was similar to the UK (7.1%), but lower than the EU average of 8.1%.

The number of researchers (FTE) increased by 13% from 1999 to 2001. Normalised by industrial employment numbers this amounted to 4.3 researchers per 1,000 in 1999, rising marginally to 4.5 researchers per 1,000 in 2001.

BUSINESS EXPENDITURE ON RESEARCH & DEVELOPMENT - NOTES TO EDITORS

1. The survey of Northern Ireland Civil and Defence Expenditure on Research and Development during 2003 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 2002 survey carried out by DETI) and extra information from various sources such as ONS, Invest NI and a filter question on the Annual Business Inquiry. For the purposes of the 2003 survey, businesses were stratified into 4 groups:

- (i) Businesses responding to the 2002 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; other identified potential R&D performers (principally, those companies who had received assistance from Invest NI during 2002 or 2003); 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.

This businesses making up strata (i) and (ii) formed a register of R&D performers and the sample for the 2003 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.

In 2003, 610 forms were sent out to businesses believed to be performing R&D. Completed forms were returned by 529 businesses representing a response rate of 87 per cent. Estimates were made for the R&D activity of non-responding businesses.

2. This is the sixth 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 R&D estimates – including figures for Northern Ireland - from an annual UK-wide survey. The ONS Survey, as it related 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 intramural business R&D expenditure for Northern Ireland were therefore available. However, from 2001 onwards data from the DETI survey will be passed to ONS colleagues and intramural R&D figures for Northern Ireland from both sources will be 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&TD) 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.]

4. The survey covers expenditure in the year ending December 2003, although companies were given the option of supplying data for the business year ending on any date between 6 April 2003 to 5 April 2004.

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 2003 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 1, expenditure by businesses and higher education and other expenditure by Government, should compliment each other; i.e. there should be no double counting.

Intramural R&D – This is R&D carried out within the company.

Extramural 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.

Capital Expenditure - Includes companies' expenditure on land, buildings, plant 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&TD 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 (including IFI) 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 individuals, private non-profit making bodies, higher education establishments and any other sources.

d) **Employment on R&D**

Staff Types - Average employment on R&D splits into the following categories; scientists and engineers, technicians, laboratory assistants and draughtsmen etc., and other (including Professional, Administrative, Clerical and Industrial Employees).

Whole Time Equivalent Employment - This is calculated by dividing the number of part-time employees by 2 and adding to the number of full-time employees.

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 2.3):

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

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.

SECTION 3

HIGHER EDUCATION EXPENDITURE ON RESEARCH AND DEVELOPMENT DURING 2003

NORTHERN IRELAND HIGHER EDUCATION EXPENDITURE ON RESEARCH & DEVELOPMENT DURING 2003

Table 3.1 below details the headline results from the 2002 and 2003 Higher Education Expenditure on Research & Development (HERD) surveys.

Table 3.1: Higher Education Expenditure on R&D

	£million	£million	£million
	2003	2002	2001
HERD Expenditure ¹³	129.1	107.4	100.3
of which:			
Current Expenditure	108.4	99.5	89.5
Capital Expenditure	20.7	7.9	10.8
<u>Source of funding of R&D:</u>			
Government Block Grant	72.4	70.7	60.7
OST Research Councils ¹⁴	6.7	6.4	6.7
UK-based charities	6.6	7.0	9.0
UK Cent Gov/Local Auth/Health ¹⁵	24.5	11.8	12.0
UK Ind/Comm/Pub Corp ¹⁶	3.2	3.7	3.5
EU Government	3.8	3.5	3.9
EU Other	1.0	0.7	0.7
Other Overseas	1.5	0.9	1.4
Other Sources	9.3	2.7	2.4
	Number	Number	Number
HERD Employment ¹⁷	1,850	1,730	1,720
of which:			
Academic staff	790	730	730
TLAD's ¹⁸	640	610	680
Other ¹⁹	410	390	300

¹³ Expenditure for 2003 includes £1.2 million of expenditure funded by Northern Ireland businesses (£1.6m in 2002, £1.5m in 2001 and £1.2 in 1999). Therefore, net HERD in 2003 was £127.8m (this is as detailed in Table 1.1). All university expenditure on R&D is intramural 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.

¹⁴ Office of Science and Technology Research Councils.

¹⁵ Funding from UK Central Government, Local Authorities and Health Trusts/Hospitals.

¹⁶ Funding from UK industry/commerce/public corporations.

¹⁷ This is the number of full-time equivalents. Figures are rounded to the nearest 10 and constituent parts may not add due to rounding.

¹⁸ Technicians, Laboratory Assistants and Draughtsmen etc.

¹⁹ Includes Administrative, Clerical and Industrial Employees.

Total HERD expenditure increased by 20% from £107.4m in 2002 to £129.1m in 2003, compared with an increase of 7% from 2001 to 2002. In particular, capital expenditure in 2003 at £20.7m was more than two and a half times the level in 2002 (£7.9m), while the rise in current expenditure was 9%.

Employment totals increased roughly in line with current expenditure increases, rising by 7% from 1,730 full-time equivalent persons in 2002 to 1,850 full-time equivalent persons in 2003.

Funding towards this increased total expenditure from UK Central Government/Local Authorities more than doubled from £11.8m in 2002 to £24.5m in 2003.

See Notes to Editors overleaf.

HIGHER EDUCATION EXPENDITURE ON RESEARCH & DEVELOPMENT - NOTES TO EDITORS

Table 3.1 details Higher Education Expenditure on R&D (HERD). The table gives combined results from the two main Northern Ireland universities - i.e. Queens University Belfast (QUB) and the University of Ulster (UU). The data collected refers to the academic year 2002/2003 ending 31/7/03. 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 3.1.

More detailed information on Transparency Review procedures in each of the local universities can be found at <http://www.qub.ac.uk/costing/> for QUB and at <http://www.ulst.ac.uk/finance/time/> for UU.

Total R&D Expenditure - Following consultation with the universities, it was agreed that all university expenditure on R&D is 'intramural' expenditure - i.e. R&D work carried out within the university.

Current Expenditure – Includes expenditure on salaries and wages and other costs (fuel, rent etc.).

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 a 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 3.1. 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. This has been converted to numbers of full-time equivalents in each of the three categories shown. Figures shown have been rounded to the nearest 10.

SECTION 4

ANNEXES TO BUSINESS EXPENDITURE ON RESEARCH AND DEVELOPMENT DURING 2003

ANNEX 1

**Breakdown of Intramural Expenditure (Civil & Defence) 2003
£000's (rounded to nearest £100,000)**

	Current Expenditure						Capital Expenditure			
	Salaries & Wages	Other Costs	Current Expenditure	Basic Research	Applied Research	Experimental Development	Land & Buildings	Plant & Machinery	Capital Expenditure	Total Intramural Expenditure
Manufacturing										
<50	6,000	3,000	8,900	600	4,400	4,000	400	1,400	1,800	10,700
50-499	17,000	9,300	26,200	1,200	14,100	11,000	1,200	4,000	5,200	31,400
	22,400	16,700	39,200	1,100	8,800	29,300	1,000	900	1,900	41,100
Total	45,400	28,900	74,300	2,900	27,300	44,200	2,600	6,300	8,900	83,300
500+ Services										
<50	9,900	3,300	13,200	1,200	6,100	5,900	500	500	1,000	14,200
50+	12,200	5,600	17,800	100	11,200	6,500	100	500	600	18,300
Total	22,100	8,900	31,100	1,300	17,300	12,400	500	1,000	1,600	32,600
All Industries										
<50	16,000	6,300	22,300	1,800	10,500	10,000	900	2,100	3,000	25,300
50-499	29,300	14,900	44,200	1,300	25,400	17,500	1,300	4,500	5,800	50,000
	22,600	16,800	39,300	1,100	8,900	29,300	1,000	900	2,000	41,300
Total	67,800	38,000	105,800	4,200	44,800	56,800	3,200	7,500	10,700	116,500

500+

ANNEX 2

**Breakdown of Extramural Expenditure (Civil & Defence) 2003
£000's (rounded to nearest £100,000)**

	Extramural Expenditure			
	Expenditure within NI	Expenditure within GB	Expenditure outside UK	Total Extramural Expenditure
Manufacturing				
<50	400	200	0	700
50-499	700	600	300	1,600
500+		200	400	1,100
Total	1,600	1,000	800	3,400
Services				
500				
<50	500	0	100	600
50+	700	100	0	800
Total	1,200	100	100	1,400
All Industries				
<50	900	200	100	1,300
50-499	1,400	600	300	2,400
500+		200	400	1,200
Total	2,800	1,100	900	4,800

ANNEX 3

**Breakdown of the Sources of R&D Funding 2003
£000's (rounded to nearest £100,000)**

	Own Funds		Government		Overseas			Other		Total
		Parent		Other	EU Structural		Other funds outside Uk	Private Industry		Total
Manufacturing										
	6,900	3,000	1,400	100	0	0	0	0	0	11,400
50-499	18,000	10,700	4,100	0	0	0	100	0	0	33,000
500+	18,700	15,800	4,300	1,900	0	600	100	800	0	42,200
Total	43,600	29,600	9,800	1,900	0	600	200	800	0	86,600
Services										
<50	8,800	2,000	2,500	0	0	0	700	300	500	14,800
50+	12,600	2,700	1,100	300	0	0	0	2,400	0	19,100
Total	21,400	4,800	3,600	300	0	0	700	2,700	500	34,000
All Industries										
<50	15,900	5,100	4,000	100	0	0	700	300	500	26,500
50-499	30,700	13,500	5,200	300	0	0	100	2,400	0	52,300
500+	18,900	15,800	4,300	1,900	0	600	100	800	0	42,400
Total	65,600	34,300	13,500	2,300	0	600	900	3,600	500	121,300

ANNEX 4

**Breakdown of Employment on R&D 2003
(rounded to nearest 10)**

	Scientists				Technicians				Other				All Types			
	Full-time	Part-time	Total	wte	Full-time	Part-time	Total	wte	Full-time	Part-time	Total	wte	Full-time	Part-time	Total	wte
Manufacturing																
<50	150	30	190	170	40	30	70	50	60	40	100	80	260	100	350	300
50+	1,150	50	1,190	1,170	250	20	270	250	120	50	180	150	1,520	120	1,640	1,580
Total	1,300	80	1,380	1,340	290	50	330	310	190	90	280	230	1,770	220	1,990	1,880
Services																
<50	280	30	310	290	70	10	80	70	70	30	110	90	420	70	490	460
50+	270	10	280	280	70	0	70	70	50	0	60	60	390	20	410	400
Total	550	40	590	570	140	10	150	150	130	40	160	140	810	90	910	860
All Industries																
<50	440	60	500	470	110	30	140	130	150	70	230	190	700	170	870	780
50-499	730	50	780	750	220	20	240	230	120	60	180	150	1,060	130	1,190	1,130
500+	690	10	700	700	100	10	110	100	60	0	60	60	850	30	880	860
Total	1,850	130	1,980	1,920	430	60	490	460	330	130	460	400	2,610	320	2,930	2,770

If you require further information about this survey, please contact:

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