



**Central Statistics Office**  
An Phríomh-Oifig Staidrimh

# **Business Expenditure on Research and Development**

## **2009/2010**

Published by the Stationery Office, Dublin, Ireland.

To be purchased from the:

Central Statistics Office, Information Section, Skehard Road, Cork,

Government Publications Sales Office, Sun Alliance House,  
Molesworth Street, Dublin 2,

or through any bookseller.

April 2011

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ISSN 2009-2121

ISBN 978-1-4064-2550-5

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# Chapter 1

## Overview and Summary

The Business Expenditure on Research and Development (BERD) Survey 2009/2010 is a survey of the research and development activities of enterprises in Ireland. The BERD Survey is required under Commission Regulation (EC) No 753/2004 implementing Decision No 1608/2003/EC. The survey collected information about the research and development activities of enterprises across all business sectors of the economy.

The BERD Survey is jointly conducted by the CSO and Forfás under Section 11 of the Statistics Act, 1993 to increase efficiency in the collection of statistical data and to reduce the burden on the participating enterprises. Data were collected in accordance with Section 33 of the Statistics Act, 1993 and with EU law. Detailed results from the survey are included in chapters 2 to 6. This publication expands on the previous first findings release of preliminary data issued jointly by the CSO and Forfás in December 2010.

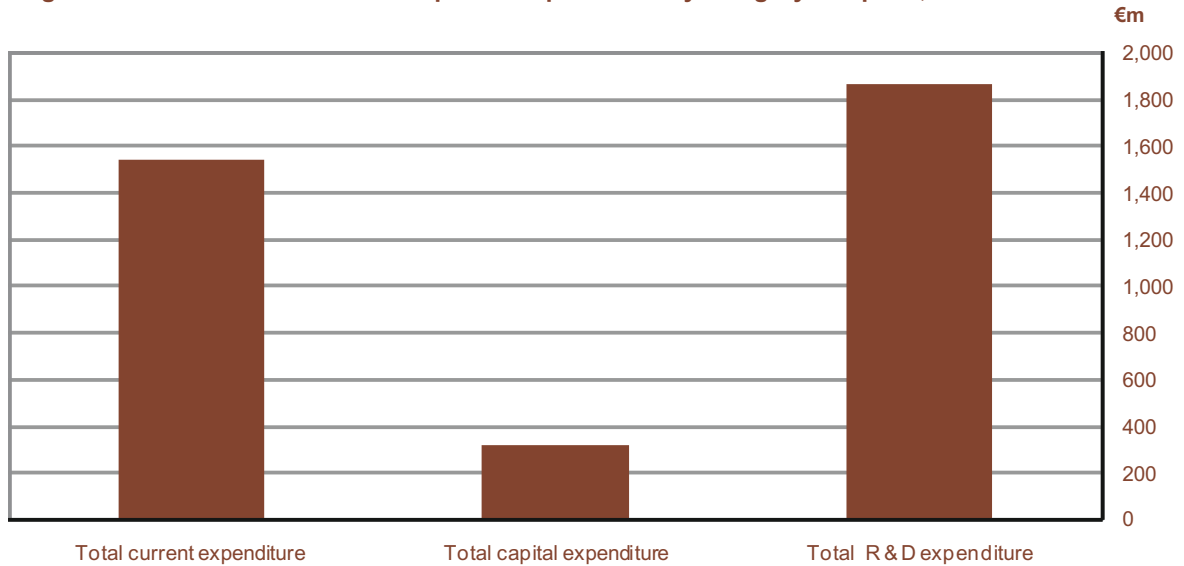
Methodological changes were introduced in the BERD 2009/2010 Survey. The business classification used for BERD 2007/2008 was the Statistical Classification of Economic Activities in the European Community NACE Rev.1.1. BERD 2009/2010 uses the NACE Rev.2 classification. Detailed tables that were previously published at 2 digit NACE level, using NACE Rev.1.1 classification are now presented at sectoral level using the NACE Rev.2 classification. The register of likely performers of research and development also changes between surveys. Therefore, conclusions should not be drawn regarding the direction or scale of any changes between BERD 2007/2008 and BERD 2009/2010.

Summary results for previous years are included in Appendix 3 but comparisons should be treated with caution. In particular, it is not advised to make any comparisons of results at a detailed level due to sectoral differences in the CSO Business Register, used for the 2007/2008 BERD and 2009/2010 BERD, when compared with the Forfás Business Register, used for previous editions of the BERD Survey. The CSO Business Register is used as the sampling frame for all CSO business surveys.

## Research and development expenditure in 2009

Enterprises across all business sectors spent almost €1.9bn on research and development activities in Ireland. Nearly 83% of all spending was on current expenditure while 17% was spent on capital expenditure. See figure 1.1.

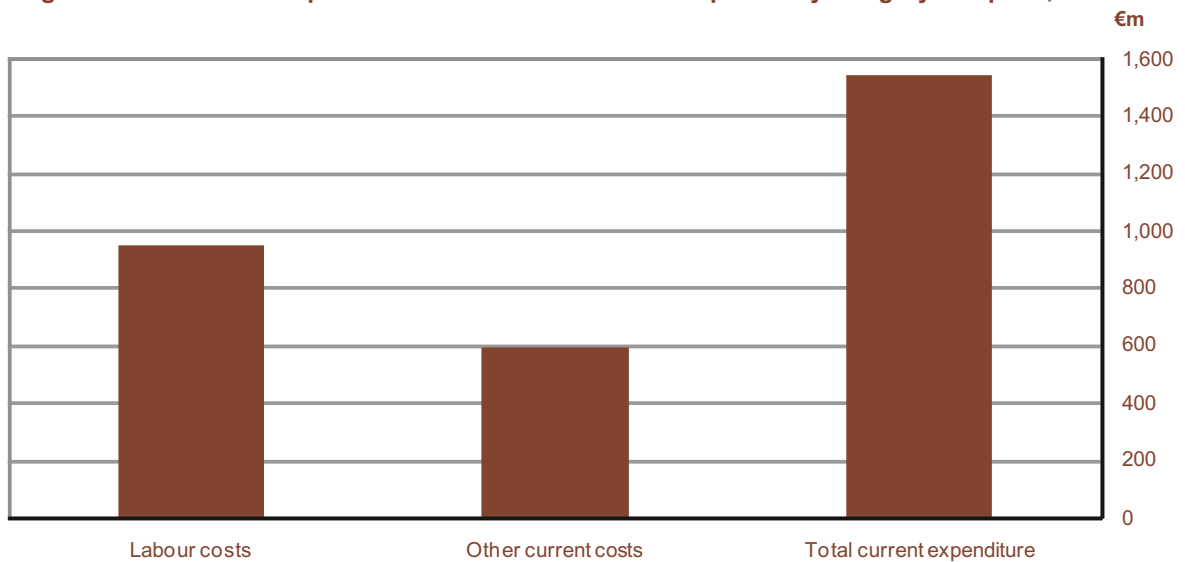
Figure 1.1 Research and development expenditure by category of spend, 2009



Source: CSO Forfás - BERD Survey 2009/2010

Enterprises spent €947m on labour costs and €595m on other current costs. See figure 1.2.

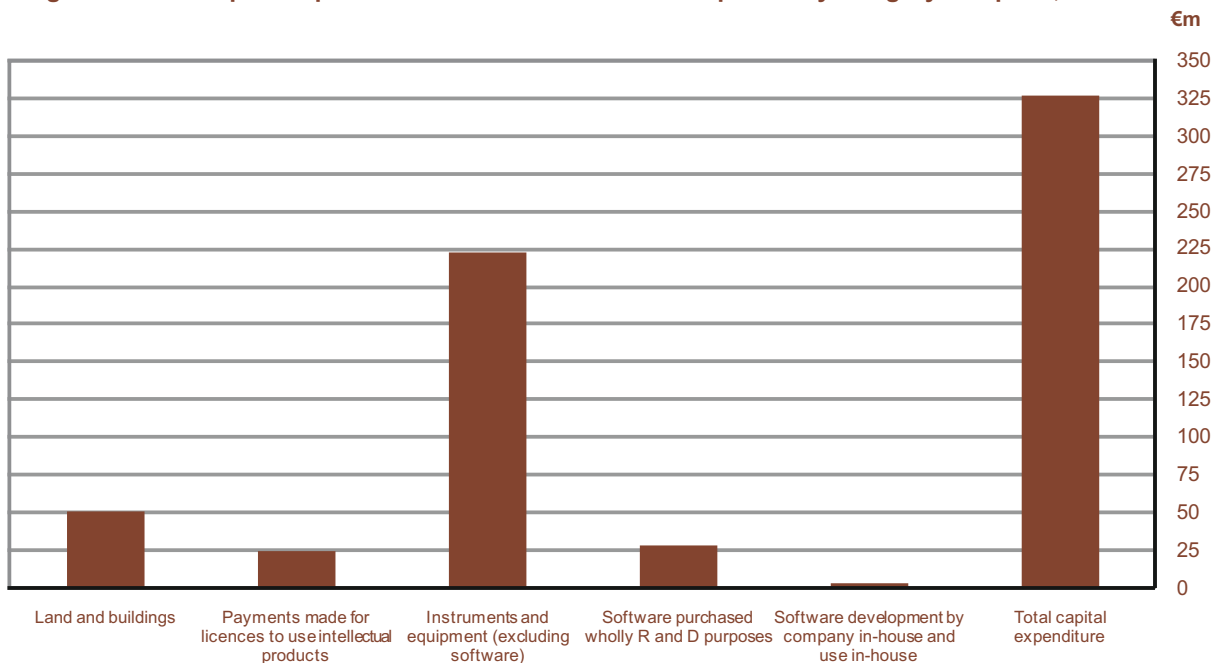
Figure 1.2 Current expenditure on research and development by category of spend, 2009



Source: CSO Forfás - BERD Survey 2009/2010

Enterprises spent €222m on instruments and equipment (excluding software) along with almost €50m on land and building costs. Almost €24m was spent on payments for licences to use intellectual products, while nearly €28m was spent on software purchased wholly for research and development purposes together with €2.7m on software development in house and used in house. See *Figure 1.3*.

**Figure 1.3 Capital expenditure on research and development by category of spend, 2009**



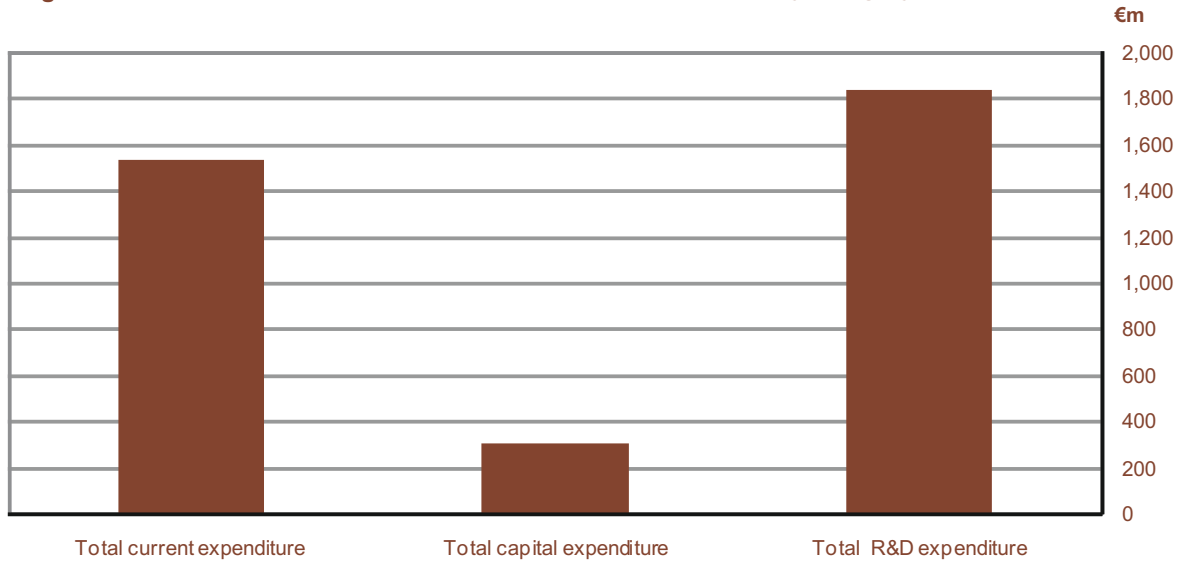
Source: CSO Forfás - BERD Survey 2009/2010

### Estimated research and development expenditure in 2010

Enterprises were asked for their expected research and development expenditure in 2010. As the survey was conducted before many enterprises would have had final expenditure figures for 2010, the figures returned by enterprises should be regarded as an estimate.

These estimates indicate that research and development expenditure will be over €1.8bn in Ireland in 2010. See *Figure 1.4*.

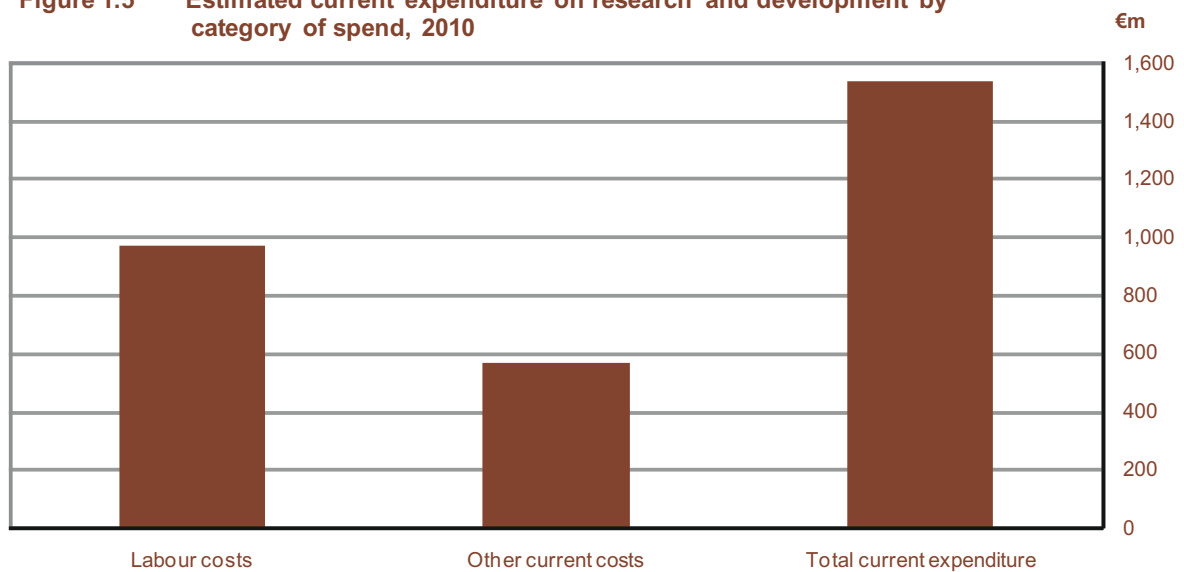
**Figure 1.4 Estimated research and development expenditure by category of spend, 2010**



Source: CSO Forfás - BERD Survey 2009/2010

Enterprises indicated that they expect to spend €966m on labour costs and €566m on other current costs. See figure 1.5.

**Figure 1.5 Estimated current expenditure on research and development by category of spend, 2010**

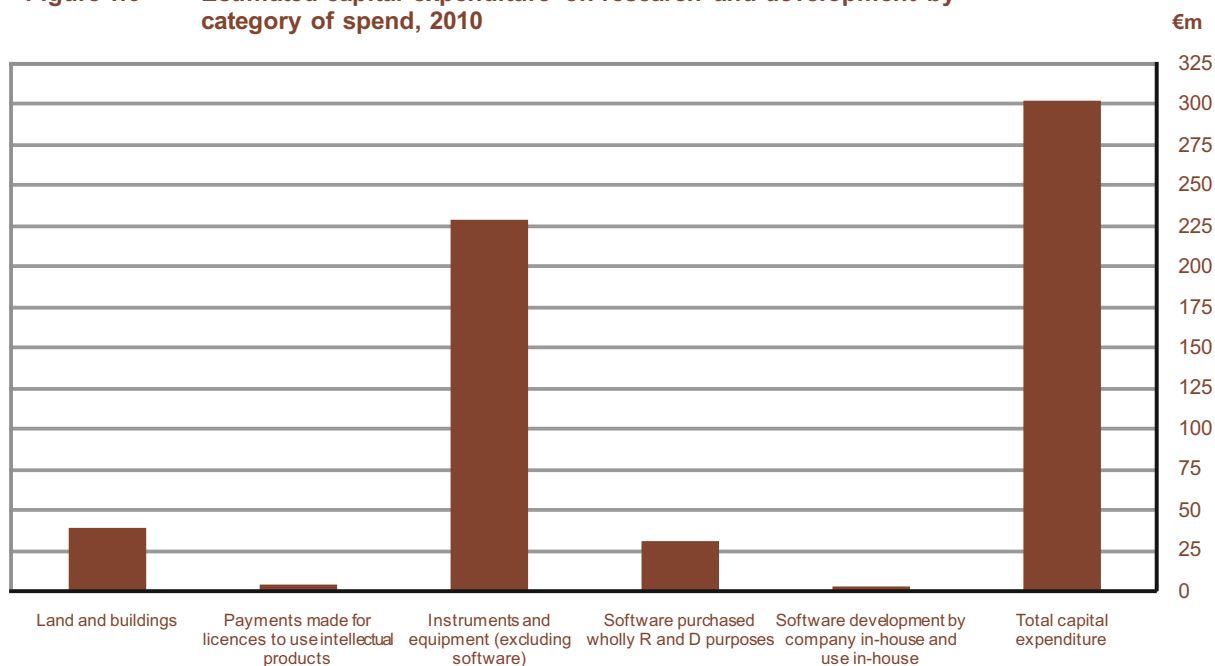


Source: CSO Forfás - BERD Survey 2009/2010

Enterprises indicated that they expect to spend over €228m on instruments and equipment (excluding software), €38m on land and building costs, €30m on software purchased wholly for research and development purposes, over €3m on payments made for licences to use intellectual products and almost €2m on software development in house and used in house. See Figure 1.6.



**Figure 1.6 Estimated capital expenditure on research and development by category of spend, 2010**

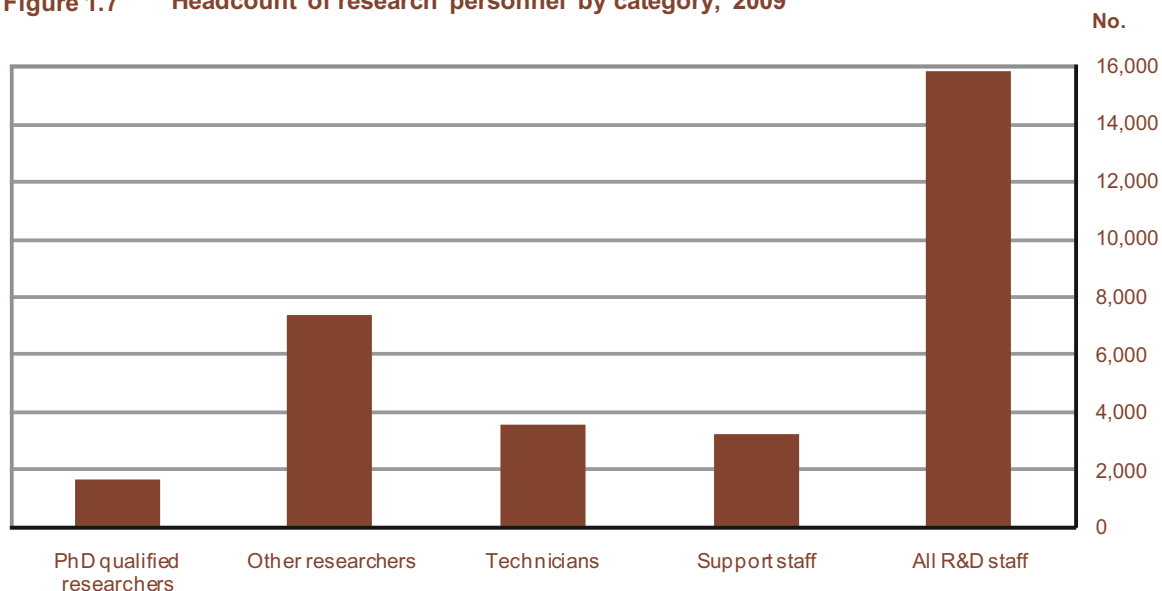


Source: CSO Forfás - BERD Survey 2009/2010

### Research and development - staff headcount

There were almost 15,800 persons engaged in research and development activities in Ireland in 2009. In total there were 8,960 researchers of which 1,639 were engaged as PhD qualified researchers, 3,572 technicians and 3,241 support staff. See Figure 1.7.

**Figure 1.7 Headcount of research personnel by category, 2009**

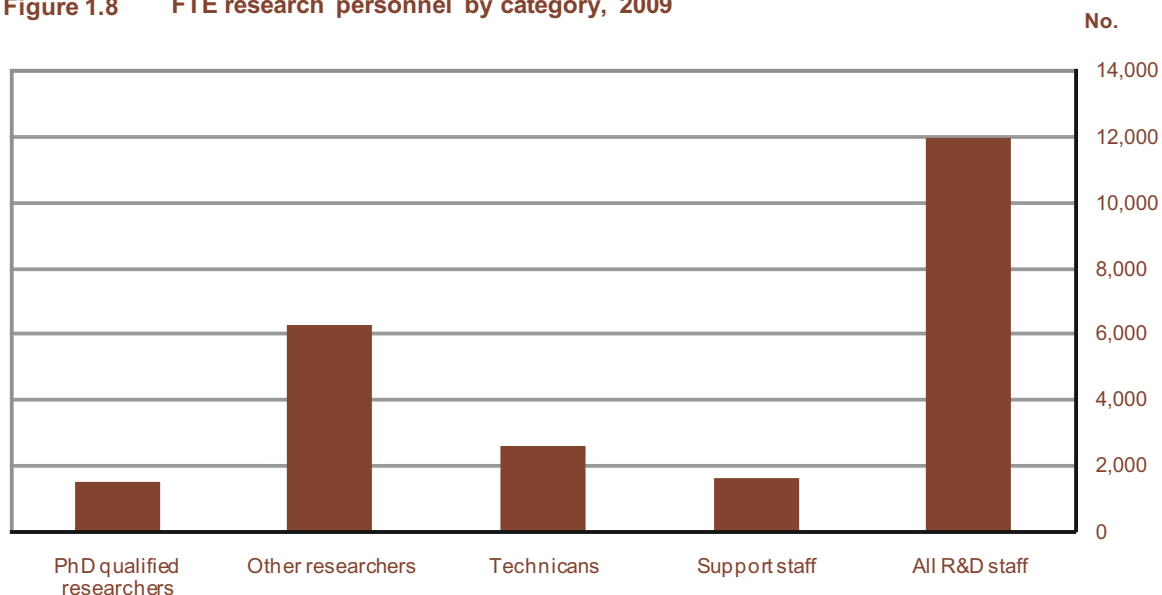


Source: CSO Forfás - BERD Survey 2009/2010

## Research and development – Full Time Equivalent (FTE) staff

There were 11,959 Full Time Equivalent (FTE) research staff in Ireland in 2009. Almost 1,500 of these FTEs were PhD qualified researchers while there were more than 6,250 other FTE researchers. See *Figure 1.8*.

**Figure 1.8 FTE research personnel by category, 2009**

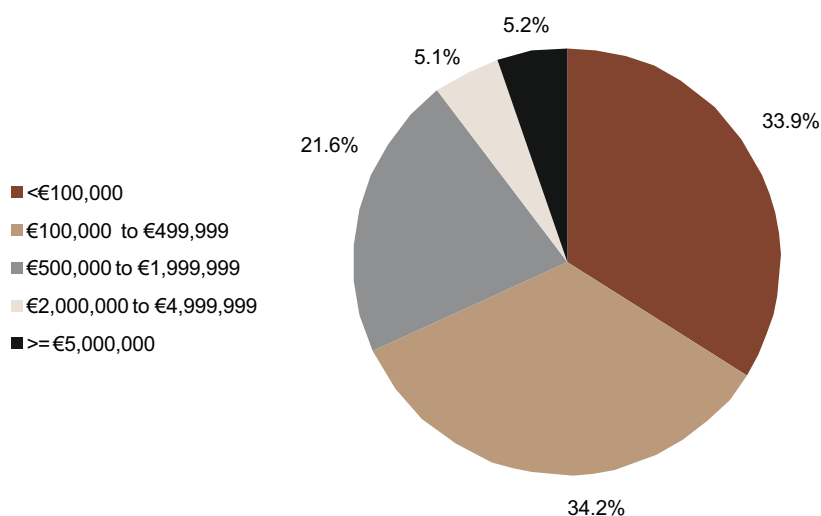


Source: CSO Forfás - BERD Survey 2009/2010

## Number of active enterprises

There were almost 1,300 enterprises engaged in research and development activities in Ireland in 2009. More than two thirds of all enterprises spent less than €500,000 on research and development activities, over one fifth spent more than €500,000 and less than €2m while over 10% spent €2m or more. See *Figure 1.9*.

**Figure 1.9 Share of enterprises engaged in research and development activities by size of spend, 2009**



Source: CSO/Forfás - BERD Survey 2009/2010

## Chapter 2

### Research and Development Expenditure

#### Introduction

Enterprises were asked to detail their expenditure on research and development for 2009. Details of current expenditure (broken into labour costs and other current costs) and capital expenditure (broken into land and buildings, payments made for licences to use intellectual products, expenditure on instruments and equipment excluding software, software purchased wholly for research and development purposes and software development and used in-house) were supplied. Enterprises were also asked to provide estimates of their spend in 2010. Respondents presented details of how these research and development expenditures were funded along with estimates of the type of activity that the funds were used for.

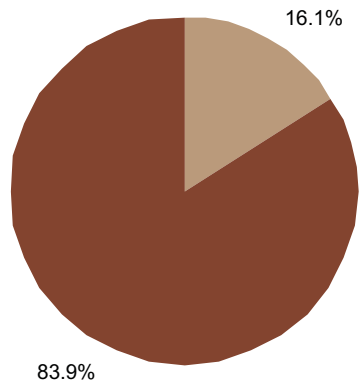
#### Research and development expenditure in 2009

Enterprises across all business sectors in Ireland spent almost €1.9bn on research and development activities with 83% being spent on current expenditure and 17% on capital expenditure. This spend was made up of €947m on labour costs, €595m on other current costs, €222m on instruments and equipment (excluding software) along with €50m on land and buildings, €28m on purchase of software (used wholly for research and development purposes), €24m on licences and €2.7m on software development and used in-house for research and development purposes. See *Tables 2.1, 2.2 and 2.3*.

Small enterprises with less than fifty persons engaged accounted for €300m or 16% of the total spend on research and development in 2009. Medium/large enterprises spent €1.6bn or 84% of the total figure which includes €763m on labour costs. See *Figure 2.1 and Tables 2.1 & 2.2*.

**Figure 2.1 Share of total research and development expenditure by size of enterprise, 2009**

- Small (<50 persons engaged)
- Medium/Large (50+ persons engaged)

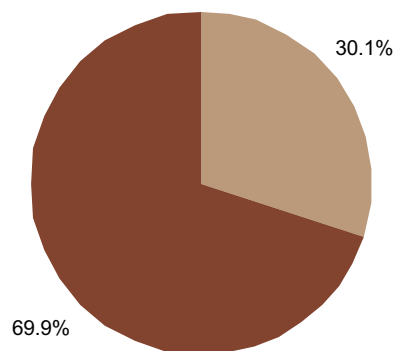


Source: CSO/Forfás - BERD Survey 2009/2010

Foreign owned enterprises spent over €1.3bn on research and development, which was almost 70% of all research and development expenditure, while Irish owned enterprises spent €563m. Current expenditure accounted for 82% of all spending by foreign owned enterprises compared to 84% for Irish owned enterprises. See Figures 2.2, 2.3 and Table 2.1.

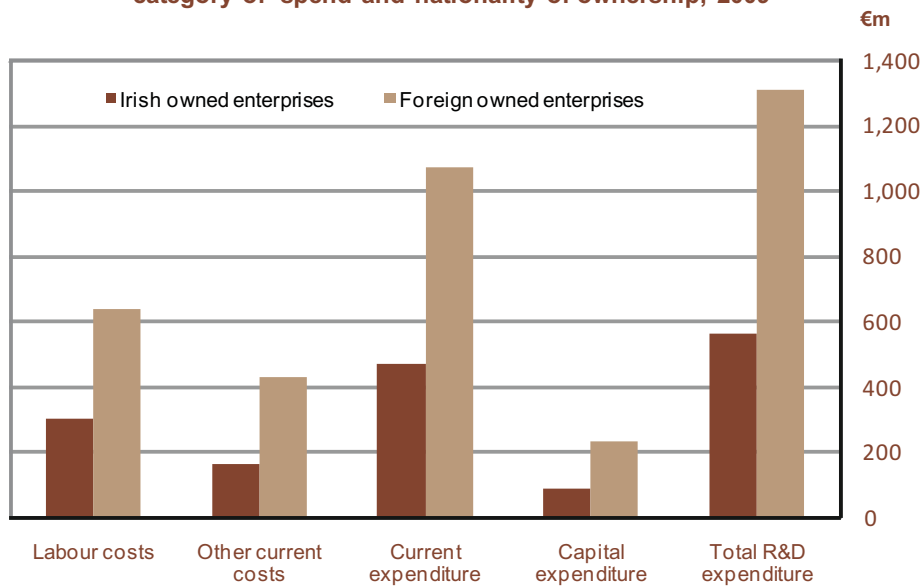
**Figure 2.2 Share of total research and development expenditure by nationality of ownership, 2009**

- Irish owned enterprises
- Foreign owned enterprises



Source: CSO/Forfás - BERD Survey 2009/2010

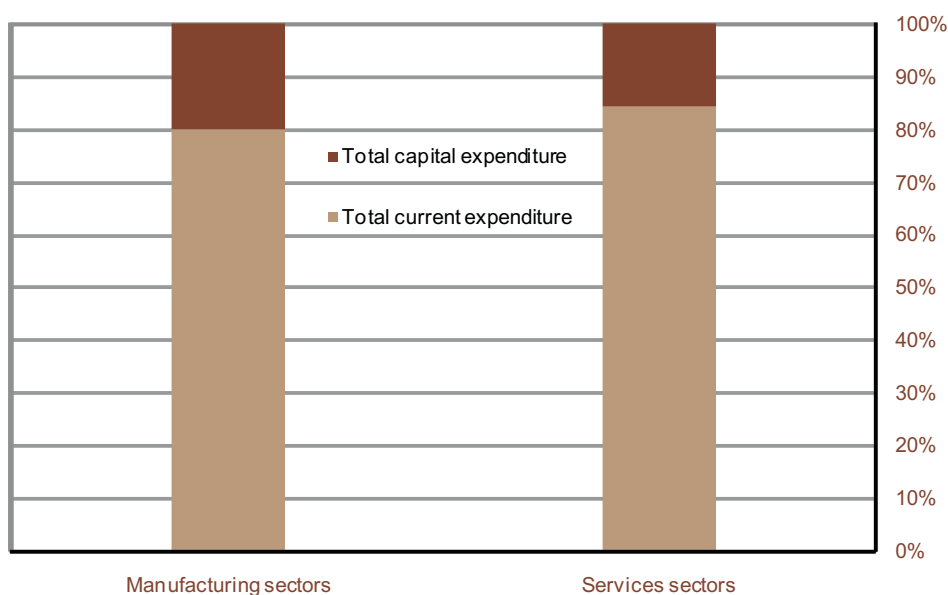
**Figure 2.3 Current expenditure on research and development by category of spend and nationality of ownership, 2009**



Source: CSO/Forfás - BERD Survey 2009/2010

Research and development spending was highest in the services sector which accounted for almost 60% of all expenditure. Spending in this sector was €1.1bn in 2009 while the manufacturing sector spent €743m on research and development. (It should be noted that spending in the services sector includes the spend from all other non-manufacturing sectors for reasons of confidentiality, however, the value of this contribution to the services sector total is not significant). In both the services and manufacturing sectors, around four fifths of total research and development expenditure was accounted for by current expenditure. See Figure 2.4 and Table 2.1.

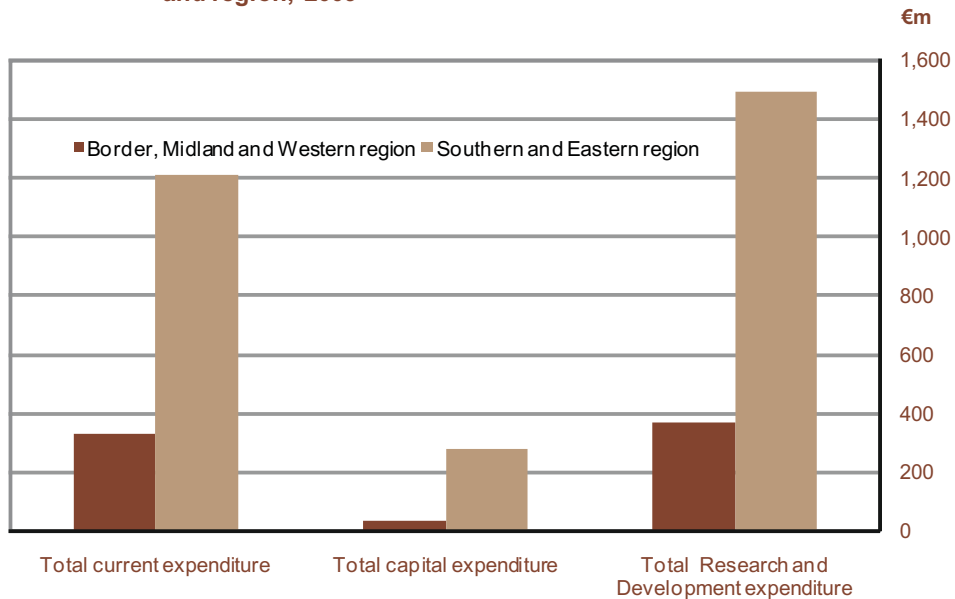
**Figure 2.4 Percentage spend on research and development by overall category of spend and sector of activity, 2009**



Source: CSO/Forfás - BERD Survey 2009/2010

Total research spending in the Southern and Eastern (SE) region was almost €1.5bn while €373m was spent in the Border, Midland and Western (BMW) region. See Figure 2.5 and Table 2.1.

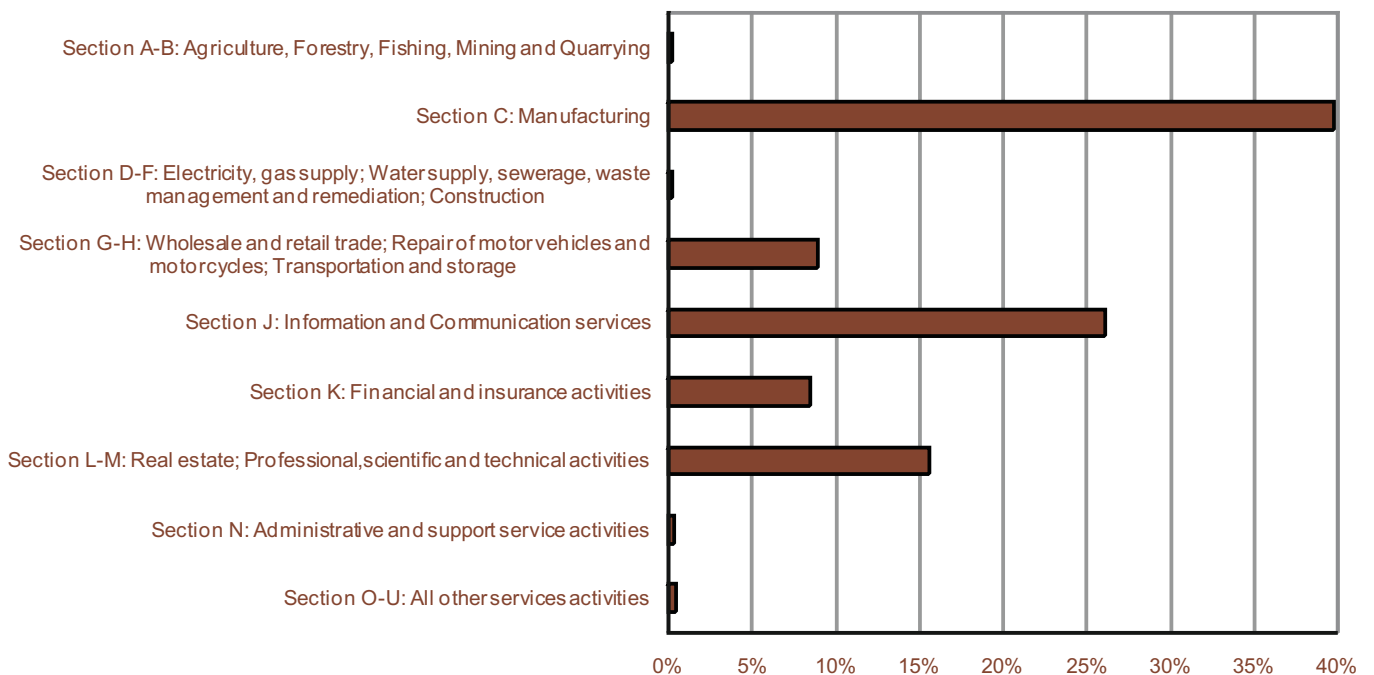
**Figure 2.5 Research and development by category of spend and region, 2009**



Source: CSO Forfás - BERD Survey 2009/2010

In excess of 80% of total research and development expenditure was concentrated in four sectors: 'Manufacturing'; 'Information and communication services'; 'Real estate activities' combined with 'Professional, scientific and technical activities'. See Figure 2.6 and Table 2.4.

**Figure 2.6 Share of research and development expenditure by sector, 2009**

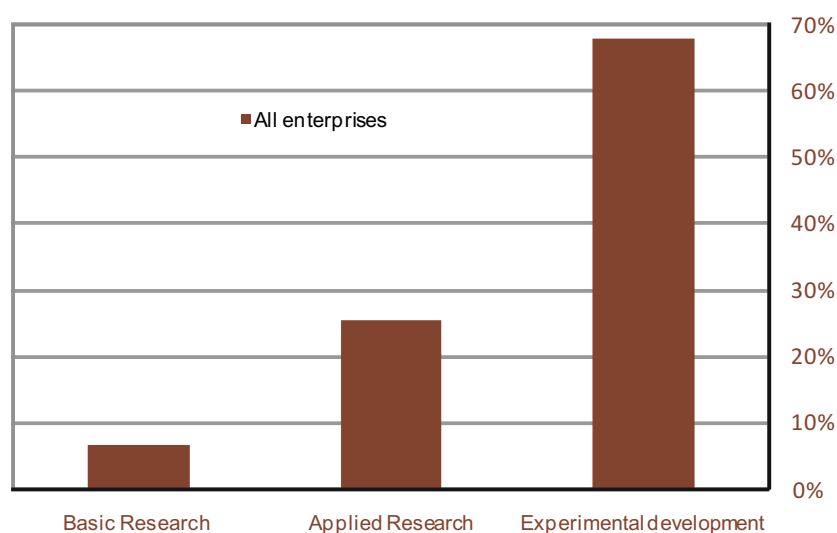


Source: CSO/Forfás - BERD Survey 2009/2010

## Type of research and development expenditure in 2009

Research and development expenditure was mostly concentrated in experimental development with 68% of all expenditure spent on this type of research. Over a quarter of expenditure was for applied research, while 6.5% of all research and development expenditure was for basic research. See *Figure 2.7 and Table 2.5*.

**Figure 2.7** Type of business expenditure on research and development by sector of activity, 2009



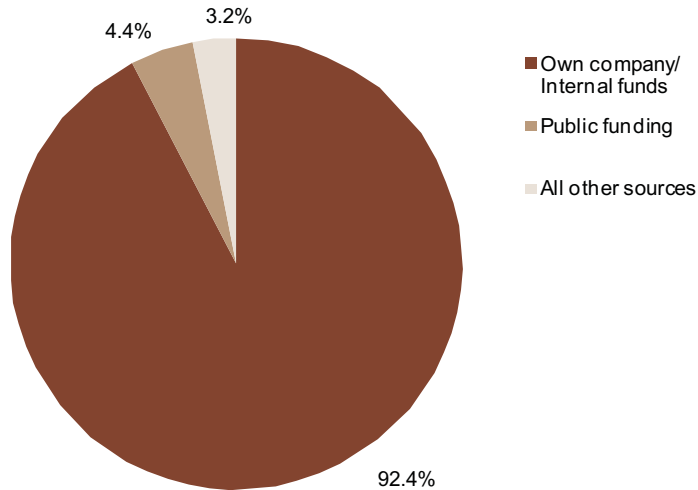
Source: CSO/Forfás - BERD Survey 2009/2010

Small enterprises were more likely to engage in basic and applied research compared to medium/large enterprises. Irish owned enterprises were more likely to engage in basic research compared to foreign owned enterprises while the opposite was evident with regard to applied research. Just under 70% of the expenditure of both the manufacturing and services sector enterprises were for experimental development while a quarter of enterprises in both sectors engaged in applied research. See *Table 2.5*.

## Source of funds of research and development expenditure in 2009

Over 92% of all research and development expenditure was funded by enterprises' own company/internal funds, while over 4% of expenditure was funded from public funds. The remainder of the funding came from other sources such as higher education institutes, private non-profit institutes etc. See *Figure 2.8 and Table 2.6*.

**Figure 2.8 Source of funds of research and development expenditure in all enterprises, 2009**

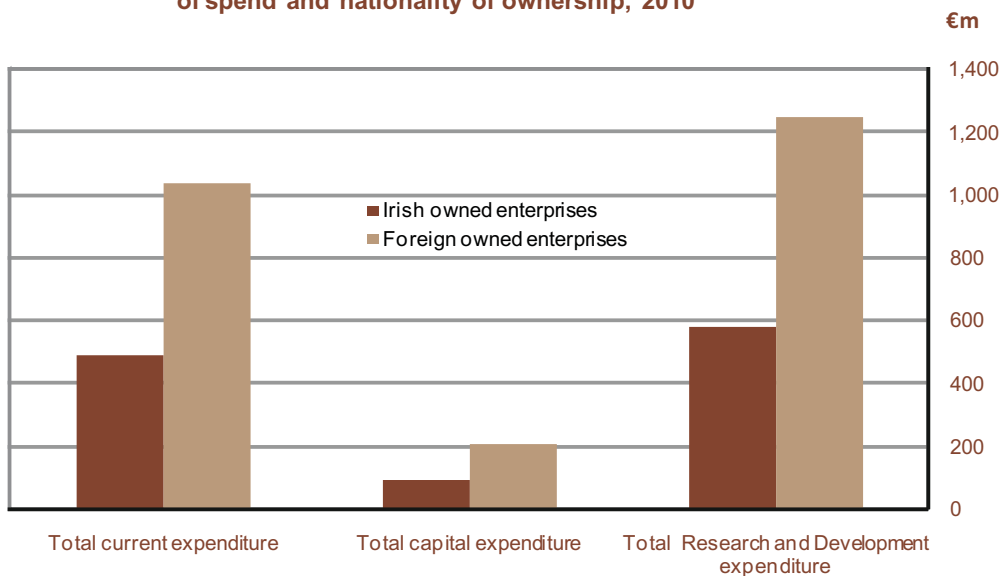


Source: CSO/Forfás - BERD Survey 2009/2010

### Estimated research and development expenditure in 2010

Enterprises were asked for their expected research and development expenditure in 2010. As the survey was conducted before many enterprises would have had final data for that year, the figures should be regarded as estimates. These estimates indicate that research and development expenditure would be in the region of €1.8bn. Foreign owned enterprises indicated that they expected their spend to be over €1.2bn while Irish owned enterprises forecasted their spend to be in the region of €583m. See Figure 2.9 and Table 2.7.

**Figure 2.9 Estimated spend on research and development by category of spend and nationality of ownership, 2010**



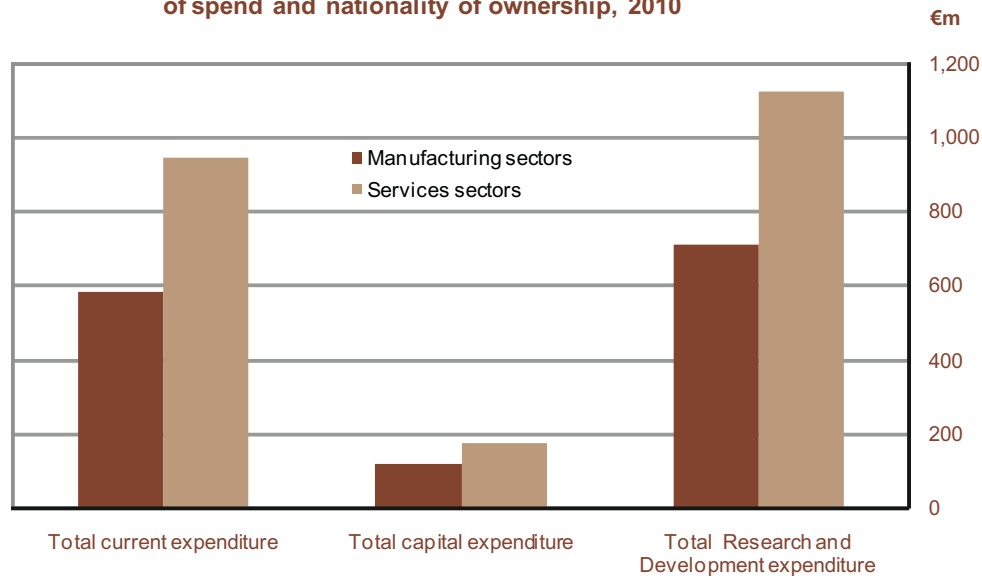
Source: CSO/Forfás Survey 2009/2010



Small enterprises expected that they would spend €326m while medium/large enterprises estimated that they would spend in excess of €1.5bn. See Table 2.7.

Estimated spend by sector indicate investment in research and development by the services sector would be over €1.1bn while the corresponding figure in the manufacturing sector is €710m. See Figure 2.10 and Table 2.7.

**Figure 2.10 Estimated spend on research and development by category of spend and nationality of ownership, 2010**



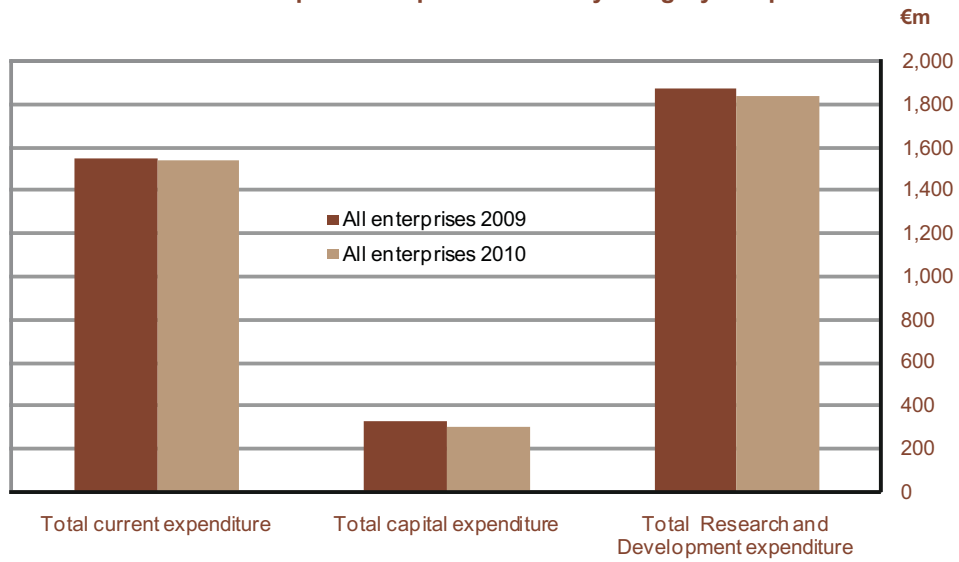
Source: CSO/Forfás - BERD Survey 2009/2010

Estimates indicate that the services sector expected to spend just over two thirds of current expenditure on labour costs while the corresponding figure for the manufacturing sector is 56%. See Table 2.8.

Capital investment accounts for almost 16% of the total research and development spend in the services sector compared to 17% in the manufacturing sector. See Table 2.7.

Comparisons of the research and development spend in 2009 and the expected spend for 2010 for all enterprises, indicate a fall of less than 2% in overall spend, and a fall of less than 1% in current expenditure. See Figure 2.11 and Tables 2.1 & 2.7.

**Figure 2.11 Estimates of expected spend on research and development in 2010 compared to spend in 2009 by category of spend**



Source: CSO/Forfás - BERD Survey 2009/2010

**Table 2.1 Total expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2009**

	€'000		
	Research & Development expenditure		
	Total current expenditure	Total capital expenditure	Total R&D expenditure
<b>Size of enterprise</b>			
Small (<50 persons engaged)	270,149	29,923	300,072
Medium/Large (50+ persons engaged)	1,272,694	295,689	1,568,383
<b>Nationality of ownership</b>			
Irish owned enterprises	472,177	91,040	563,217
Foreign owned enterprises	1,070,666	234,573	1,305,239
<b>Sector of activity</b>			
Manufacturing sectors	593,965	149,340	743,305
Services sectors <sup>1</sup>	948,878	176,272	1,125,150
<b>Region</b>			
Border, Midland and Western region	331,156	41,604	372,760
Southern and Eastern region	1,211,687	284,009	1,495,696
<b>Total - all enterprises</b>	<b>1,542,843</b>	<b>325,613</b>	<b>1,868,456</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 2.2 Current expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2009**

	Current expenditure		Total current expenditure
	Labour costs	Other current costs	
<b>Size of enterprise</b>			
Small (<50 persons engaged)	184,892	85,257	270,149
Medium/Large (50+ persons engaged)	762,605	510,089	1,272,694
<b>Nationality of ownership</b>			
Irish owned enterprises	307,620	164,557	472,177
Foreign owned enterprises	639,877	430,789	1,070,666
<b>Sector of activity</b>			
Manufacturing sectors	310,755	283,210	593,965
Services sectors <sup>1</sup>	636,742	312,136	948,878
<b>Region</b>			
Border, Midland and Western region	196,329	134,827	331,156
Southern and Eastern region	751,168	460,519	1,211,687
<b>Total - all enterprises</b>	<b>947,497</b>	<b>595,346</b>	<b>1,542,843</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 2.3 Capital expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2009**

	Capital Expenditure					€'000
	Land and buildings	Payments made for licences to use intellectual products	Instruments and equipment (excluding software)	Software purchased wholly for R and D purposes	Software development by company in-house and used in-house	Total capital expenditure
<b>Size of enterprise</b>						
Small (<50 persons engaged)	13,446	2,602	11,499	1,578	798	29,923
Medium/Large (50+ persons engaged)	36,167	21,365	210,227	26,062	1,868	295,689
<b>Nationality of ownership</b>						
Irish owned enterprises	12,425	22,521	31,491	22,192	2,412	91,040
Foreign owned enterprises	37,189	1,446	190,235	5,448	254	234,573
<b>Sector of activity</b>						
Manufacturing sectors	27,843	2,045	113,746	5,142	564	149,340
Services sectors <sup>1</sup>	21,770	21,922	107,980	22,499	2,101	176,272
<b>Region</b>						
Border, Midland and Western region	6,347	498	33,083	490	1,185	41,604
Southern and Eastern region	43,267	23,469	188,643	27,150	1,480	284,009
<b>Total - all enterprises</b>	<b>49,613</b>	<b>23,967</b>	<b>221,726</b>	<b>27,640</b>	<b>2,666</b>	<b>325,613</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 2.4 Business expenditure on research and development by sector, 2009**

	€'000
	Total R&D expenditure
Section A - B	3,625
Section C	743,305
Section D - F	4,564
Section G - H	166,574
Section J	487,918
Section K	157,522
Section L - M	291,027
Section N	6,048
Section I, O - U	7,873
<b>Total - all enterprises</b>	<b>1,868,456</b>

Source: CSO/Forrás - Business Expenditure on Research and Development, 2009-2010

**Table 2.5 Type of business expenditure on research and development by size of enterprise, nationality of ownership and sector of activity, 2009**

	Basic Research	Applied Research	Experimental development	Total
<b>%</b>				
<b>Size of enterprise</b>				
Small (< 50 persons engaged)	9.1	29.9	61.0	100.0
Medium/Large (50+ persons engaged)	6.0	24.7	69.3	100.0
<b>Nationality of Ownership</b>				
Irish owned enterprises	6.7	22.9	70.4	100.0
Foreign owned enterprises	6.4	26.6	66.9	100.0
<b>Sector of activity</b>				
Manufacturing sectors	6.9	24.3	68.8	100.0
Services sectors <sup>1</sup>	6.2	26.3	67.5	100.0
<b>Total - all enterprises</b>	<b>6.5</b>	<b>25.5</b>	<b>68.0</b>	<b>100.0</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 2.6 Sources of funds of business expenditure on research and development by size of enterprise, nationality of ownership and sector of activity, 2009**

	Own company/ Internal funds	Public funding <sup>1</sup>	All other sources <sup>2</sup>	Total R&D funding
€'000				
<b>Size of enterprise</b>				
Small (< 50 persons engaged)	223,939	31,921	44,214	300,074
Medium/Large (50+ persons engaged)	1,503,446	50,189	14,748	1,568,383
<b>Nationality of Ownership</b>				
Irish owned enterprises	479,882	40,794	42,539	563,215
Foreign owned enterprises	1,247,503	41,315	16,423	1,305,241
<b>Sector of activity</b>				
Manufacturing sectors	702,577	29,513	11,216	743,306
Services sectors <sup>3</sup>	1,024,808	52,596	47,746	1,125,150
<b>Total - all enterprises</b>	<b>1,727,385</b>	<b>82,110</b>	<b>58,962</b>	<b>1,868,457</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010

<sup>1</sup> Public Funding includes Government grants and Other public funding

<sup>2</sup> All other sources includes funds from other companies for R&D performed on their behalf; Funds from higher education institutes; Private non-profit institutes and Other sources

<sup>3</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal



**Table 2.7 Estimated total expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2010**

	€'000		
	Total current expenditure	Total capital expenditure	Total R&D expenditure
<b>Size of enterprise</b>			
Small (<50 persons engaged)	276,721	49,551	326,272
Medium/Large (50+ persons engaged)	1,255,460	251,876	1,507,336
<b>Nationality of ownership</b>			
Irish owned enterprises	490,141	93,311	583,452
Foreign owned enterprises	1,042,040	208,115	1,250,155
<b>Sector of activity</b>			
Manufacturing sectors	585,949	123,980	709,929
Services sectors <sup>1</sup>	946,232	177,447	1,123,679
<b>Total - all enterprises</b>	<b>1,532,181</b>	<b>301,427</b>	<b>1,833,608</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 2.8 Estimated current expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2010**

	Current Expenditure			
	Labour costs	Other current costs	Total current expenditure	€'000
<b>Size of enterprise</b>				
Small (<50 persons engaged)	191,204	85,517	276,721	
Medium/Large (50+ persons engaged)	774,937	480,523	1,255,460	
<b>Nationality of ownership</b>				
Irish owned enterprises	327,009	163,132	490,141	
Foreign owned enterprises	639,132	402,908	1,042,040	
<b>Sector of activity</b>				
Manufacturing sectors	330,355	255,594	585,949	
Services sectors <sup>1</sup>	635,786	310,446	946,232	
<b>Total - all enterprises</b>	<b>966,140</b>	<b>566,040</b>	<b>1,532,181</b>	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 2.9 Estimated capital expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2010**

	Capital Expenditure						€'000
	Land and buildings	Payments made for licences to use intellectual products	Instruments and equipment (excluding software)	Software purchased wholly for R and D purposes	Software development by company in-house and used in-house	Total capital expenditure	
<b>Size of enterprise</b>							
Small (<50 persons engaged)	23,545	1,893	21,377	2,035	701	49,551	
Medium/Large (50+ persons engaged)	14,536	1,310	206,676	28,108	1,246	251,876	
<b>Nationality of ownership</b>							
Irish owned enterprises	22,334	2,206	40,882	26,188	1,701	93,311	
Foreign owned enterprises	15,747	997	187,171	3,955	246	208,115	
<b>Sector of activity</b>							
Manufacturing sectors	13,351	1,241	104,972	3,877	538	123,980	
Services sectors <sup>1</sup>	24,730	1,962	123,080	26,266	1,409	177,447	
<b>Total - all enterprises</b>	<b>38,081</b>	<b>3,203</b>	<b>228,053</b>	<b>30,143</b>	<b>1,947</b>	<b>301,427</b>	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup> Includes spend from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.



## Chapter 3

### Research and Development Human Resources

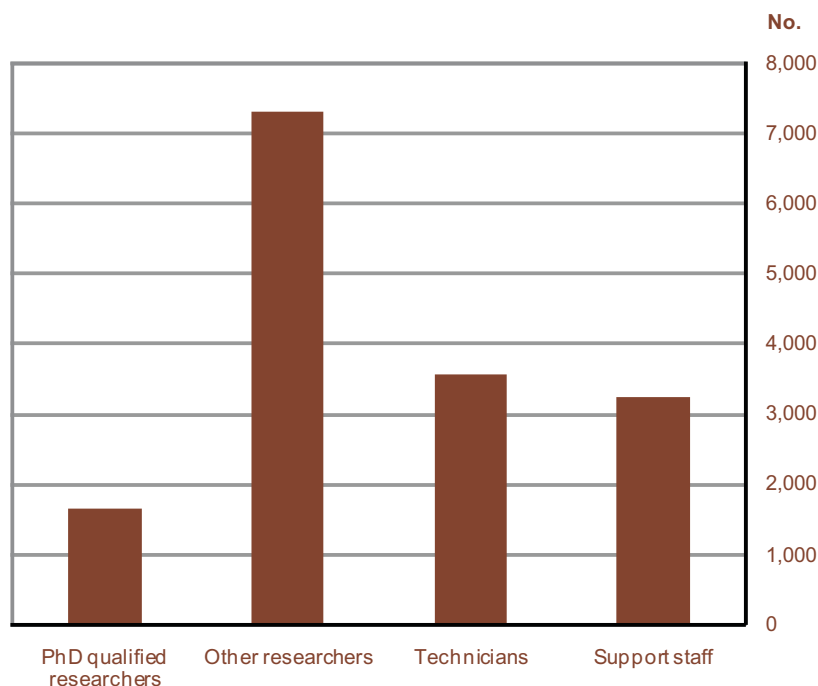
#### Summary

Enterprises were asked to indicate the numbers of both male and female staff they had engaged who devoted any of their time to research and development activities. In addition, they were asked to indicate the average percentage of time these staff members spent on such activities to allow a calculation of Full Time Equivalent (FTE) research staff numbers.

#### Research and development – staff headcount

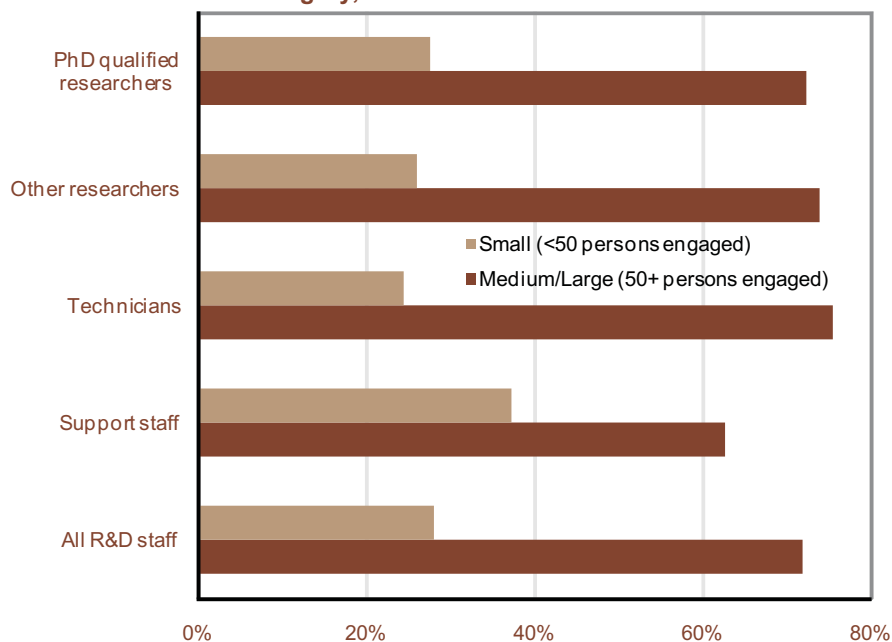
In 2009, 15,773 persons were engaged in research and development activities. There were 8,960 researchers engaged, of which 1,639 held a PhD qualification while there were 3,572 technicians and 3,241 support staff. See *Figure 3.1 and Table 3.1*.

Figure 3.1 Headcount of research personnel by category, 2009



The number of research personnel engaged in small enterprises in 2009 was 4,443, while the equivalent number in medium/large enterprises was 11,330. Small enterprises employed 28% of all research personnel. See Figure 3.2 and Table 3.1.

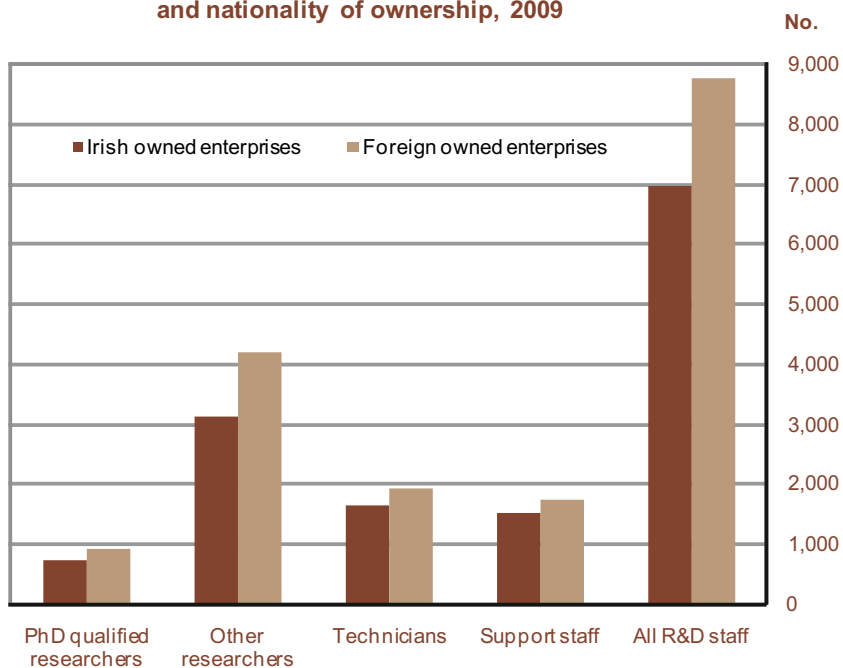
**Figure 3.2** Share of research personnel engaged by size of enterprise and category, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

Almost 8,800 research staff were engaged by foreign owned enterprises, while just under 7,000 research staff were engaged by Irish owned enterprises, accounting for 56% and 44% of the total respectively. See Figure 3.3 and Table 3.1.

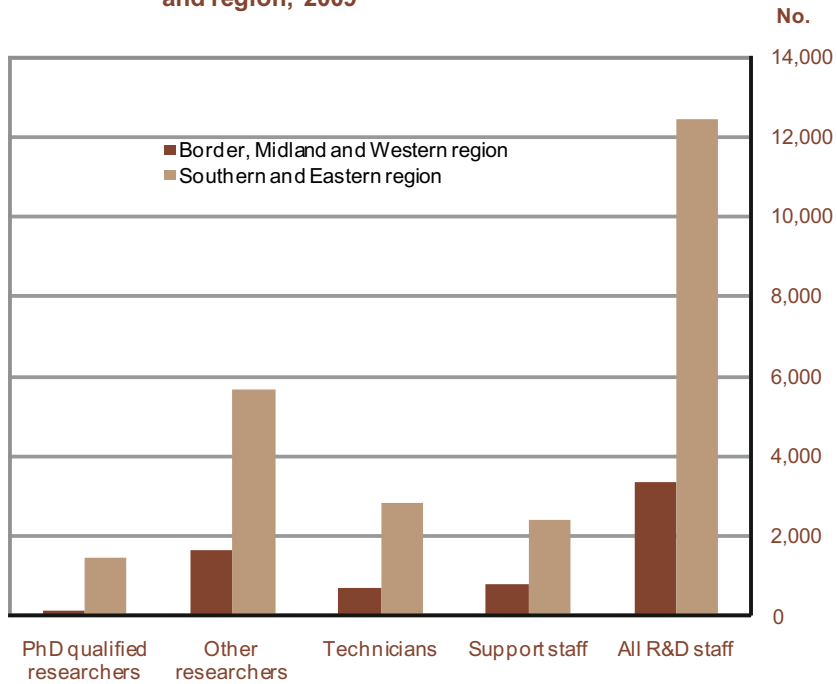
**Figure 3.3** Headcount of research personnel by category and nationality of ownership, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

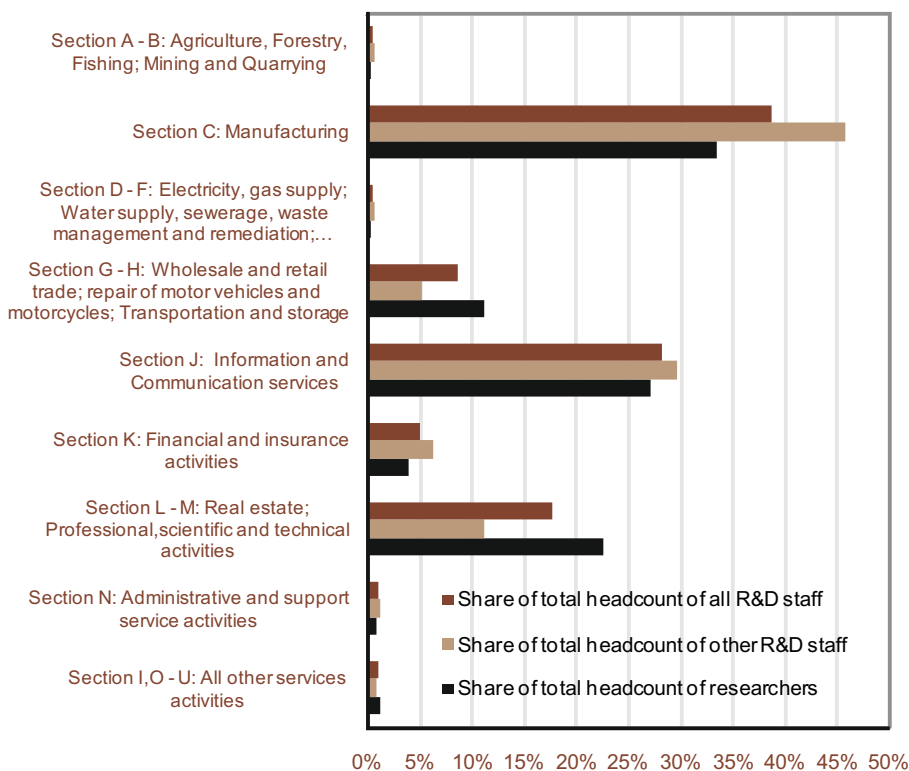
There were more research personnel engaged in the services sector, 61%, than in the manufacturing sector, 39%. There were 559 PhD qualified researchers working in the manufacturing sector compared to 1,080 in the services sector. In the Southern and Eastern (SE) region 12,420 people were engaged as research staff, which is 79% of the total, compared to over 3,350 or 21% in the Border, Midland and Western (BMW) region. See figures 3.4 and 3.5, and Table 3.1.

**Figure 3.4 Headcount of research personnel by category and region, 2009**



Source: CSO/Forfás - BERD Survey 2009/2010

**Figure 3.5 Share of research personnel by sector, 2009**



Source: CSO/Forfás - BERD Survey 2009/2010

The Manufacturing sector employed 6,088 of all R&D staff, this was followed by Information and communication Services with 4,429 staff and Real estate; Professional, scientific and technical activities sector who employed 2,770 staff. See Table 3.2.

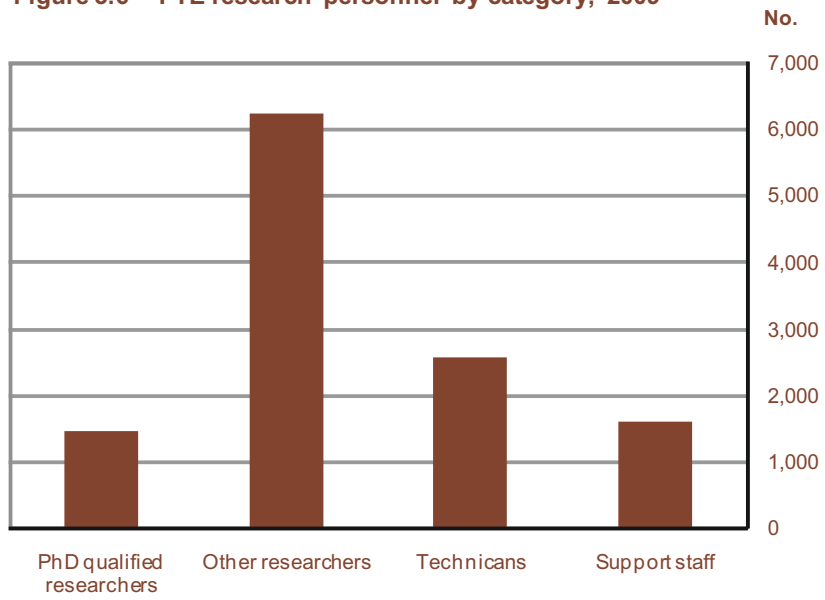
### Research and development – Full Time Equivalent (FTE) staff

There were 11,959 Full Time Equivalent (FTE) research and development staff in Ireland in 2009. There were 1,477 PhD qualified researchers, 6,256 other researchers and 4,227 technical and support staff. Irish owned enterprises employed 41% of all FTE research staff compared to 59% engaged by foreign owned enterprises. On a regional basis, 9,474 FTEs worked in the SE region compared to 2,485 who worked in the BMW region. See Table 3.3.

The Manufacturing sector employed 4,087 FTE's, while the Information and communication services sector employed the equivalent of 3,550 full time staff, and the Real estate; Professional, scientific and technical activities sector a further 2,373 FTE's. See figure 3.6 and Table 3.4.



**Figure 3.6 FTE research personnel by category, 2009**



Source: CSO/Forf-BERD Survey 2009/2010

**Table 3.1 Total headcount of research personnel by size of enterprise, nationality of ownership and sector of activity, 2009**

	PhD qualified researchers		Other researchers		Technicians			Support staff			All R&D staff			No.	
	Male	Female	Male	Female	Male	Female	Total	Male	Female	Total	Male	Female	Total		
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total			
<b>Size of enterprise</b>															
Small (<50 persons engaged)	344	109	454	1,544	360	1,904	715	164	878	809	399	1,207	3,411	1,032	4,443
Medium/Large (50+ persons engaged)	785	400	1,185	3,977	1,440	5,417	1,992	702	2,694	1,436	598	2,034	8,190	3,140	11,330
<b>Nationality of ownership</b>															
Irish owned enterprises	426	285	711	2,226	899	3,125	1,227	411	1,638	1,032	481	1,512	4,911	2,075	6,986
Foreign owned enterprises	704	224	928	3,294	902	4,196	1,479	455	1,934	1,213	516	1,729	6,690	2,097	8,787
<b>Sector of activity</b>															
Manufacturing sector	434	125	559	1,907	516	2,423	1,206	331	1,537	1,114	456	1,570	4,660	1,428	6,088
Services sector <sup>1</sup>	696	384	1,080	3,614	1,285	4,899	1,501	534	2,035	1,131	541	1,672	6,941	2,744	9,685
<b>Region</b>															
Border, Midland and Western region	134	28	162	1,272	385	1,658	544	171	715	593	226	819	2,543	810	3,353
Southern and Eastern region	995	481	1,477	4,248	1,416	5,664	2,162	695	2,857	1,652	771	2,423	9,058	3,362	12,420
<b>Total - all enterprises</b>	<b>1,129</b>	<b>509</b>	<b>1,639</b>	<b>5,521</b>	<b>1,801</b>	<b>7,321</b>	<b>2,706</b>	<b>865</b>	<b>3,572</b>	<b>2,245</b>	<b>997</b>	<b>3,241</b>	<b>11,601</b>	<b>4,172</b>	<b>15,773</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

<sup>1</sup>Includes staff from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal

**Table 3.2 Total headcount of research personnel by sector 2009**

		Total headcount of researchers	Total headcount of other R&D staff	Total headcount of all R&D staff	No.
Section A - B	Agriculture, Forestry, Fishing; Mining and Quarrying	22	34	56	
Section C	Manufacturing	2,981	3,107	6,088	
Section D - F	Electricity, gas supply; Water supply, sewerage, waste management and remediation; Construction	23	38	61	
Section G - H	Wholesale and retail trade; repair of motor vehicles and motorcycles; Transportation and storage	997	340	1,337	
Section J	Information and Communication services	2,419	2,010	4,429	
Section K	Financial and insurance activities	341	420	760	
Section L - M	Real estate; Professional, scientific and technical activities	2,018	752	2,770	
Section N	Administrative and support service activities	66	69	135	
Section I, O - U	All other services activities	93	44	138	
<b>Total - all enterprises</b>		<b>8,960</b>	<b>6,813</b>	<b>15,773</b>	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.

**Table 3.3 Total full time equivalent (FTE) research personnel by size of enterprise, nationality of ownership and sector of activity, 2009**

	No.				
	PhD qualified researchers	Other researchers	Technicians	Support staff	All R&D staff
<b>Size of enterprise</b>					
Small (<50 persons engaged)	349	1,463	546	466	2,823
Medium/Large (50+ persons engaged)	1,128	4,793	2,053	1,163	9,136
<b>Nationality of ownership</b>					
Irish owned enterprises	595	2,528	1,089	648	4,860
Foreign owned enterprises	881	3,728	1,510	980	7,099
<b>Sector of activity</b>					
Manufacturing sector	491	1,964	977	655	4,087
Services sector <sup>1</sup>	985	4,292	1,622	974	7,872
<b>Region</b>					
Border, Midland and Western region	136	1,493	466	391	2,485
Southern and Eastern region	1,341	4,763	2,133	1,238	9,474
<b>Total - all enterprises</b>	<b>1,477</b>	<b>6,256</b>	<b>2,599</b>	<b>1,628</b>	<b>11,959</b>

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010

<sup>1</sup>Includes staff from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal

**Table 3.4 Total full time equivalent (FTE)research personnel by sector, 2009**

		Total FTE researchers	Total other FTE R&D staff	Total FTE R&D staff	No.
Section A - B	Agriculture, Forestry, Fishing; Mining and Quarrying	19	23	41	
Section C	Manufacturing	2,455	1,632	4,087	
Section D - F	Electricity, gas supply; Water supply, sewerage, waste management and remediation; Construction	10	12	22	
Section G - H	Wholesale and retail trade; repair of motor vehicles and motorcycles; Transportation and storage	916	217	1,133	
Section J	Information and Communication services	2,082	1,468	3,550	
Section K	Financial and insurance activities	290	311	600	
Section L - M	Real estate; Professional, scientific and technical activities	1,872	502	2,373	
Section N	Administrative and support service activities	33	46	79	
Section I, O - U	All other services activities	57	16	73	
<b>Total - all enterprises</b>		<b>7,732</b>	<b>4,227</b>	<b>11,959</b>	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010.



## Chapter 4

### Research and Development Active Enterprises

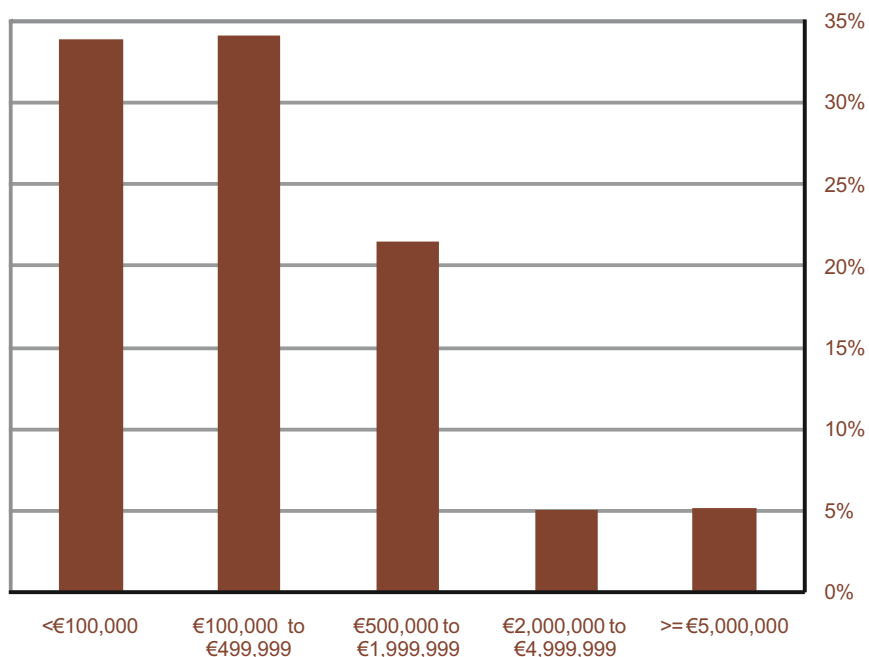
#### Introduction

Enterprises that had in-house research and development activities, sub-contracted research and development activities or enterprises controlling any branches or plants engaged in research and development activities in 2009 were considered to be enterprises engaged in research and development in the period.

#### Number of active enterprises

There were nearly 1,300 enterprises engaged in research and development activities in Ireland in 2009. More than two thirds of all enterprises spent less than €500,000 on research and development activities. Just over one fifth spent between €500,000 and €2m while one in ten enterprises spent €2m or more on research and development activities. *See Figure 4.1 and Table 4.1.*

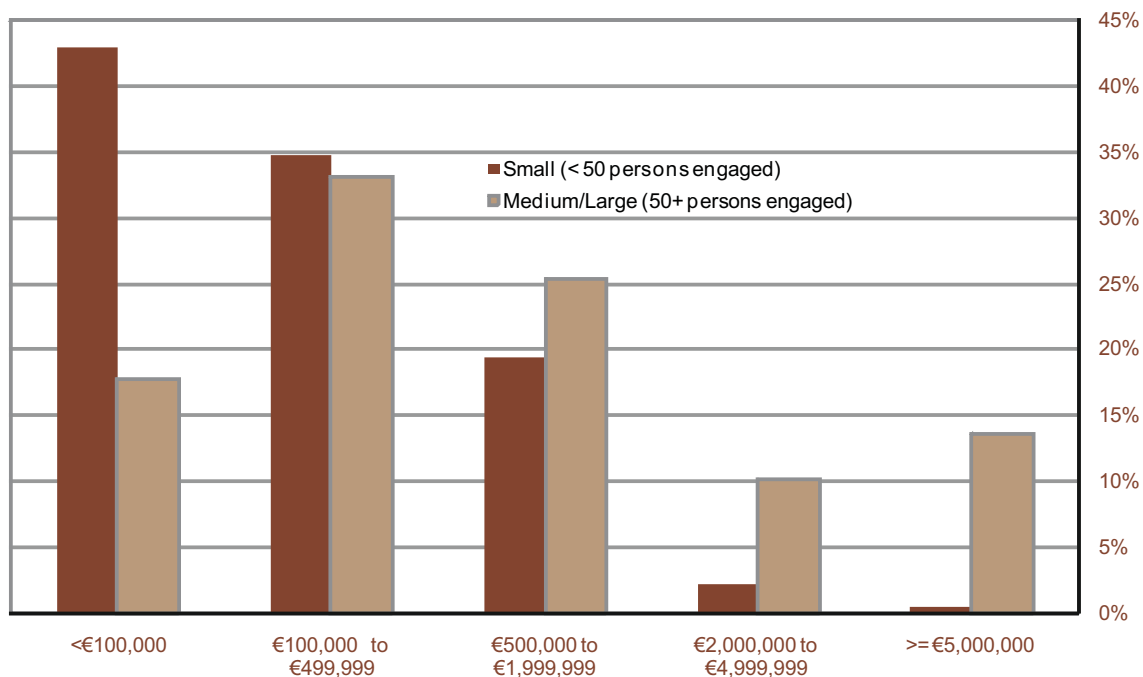
**Figure 4.1** Share of enterprises engaged in research and development activities by size of spend, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

In 2009, 818 small enterprises were engaged in research and development activities compared to 465 medium/large enterprises. The vast majority, 97%, of all small enterprises spent less than €2m on research and development activities compared to 76% of medium/large enterprises. See *Figure 4.2 and Table 4.1*.

**Figure 4.2** Share of enterprises engaged in research and development activities by size of spend and size of enterprise, 2009

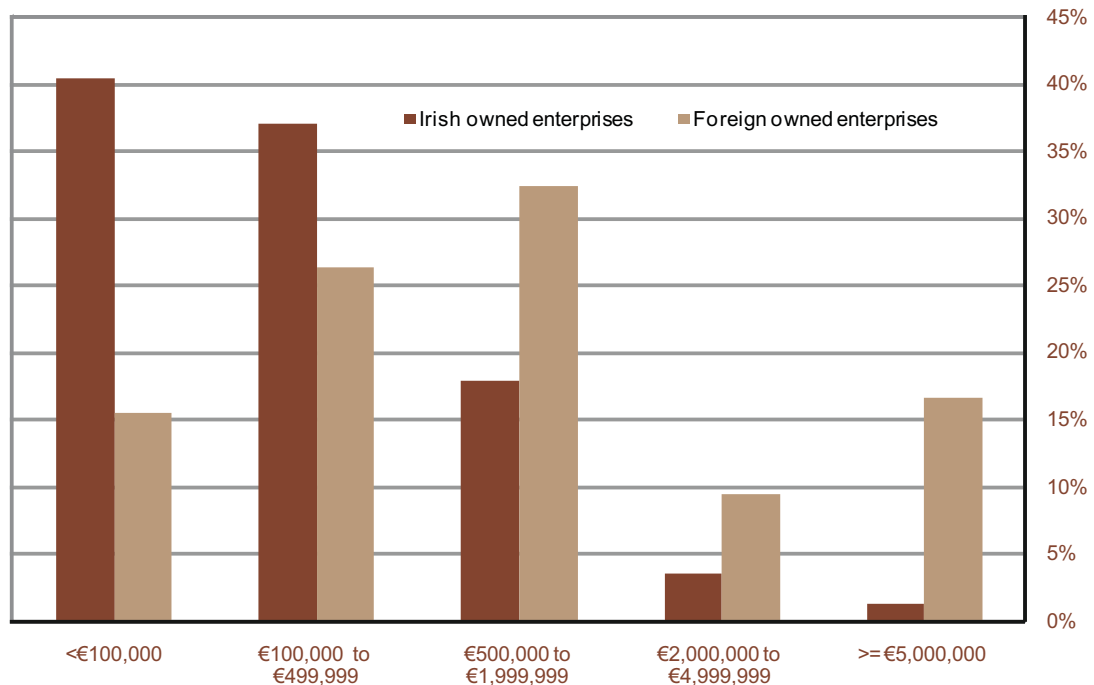


Source: CSO/Forfás - BERD Survey 2009/2010



There were 952 Irish owned enterprises engaged in research and development activities in 2009 compared to 331 foreign owned enterprises. Over 77% of all Irish owned enterprises spent less than €500,000 on research and development compared to 42% of all foreign owned enterprises. See Figure 4.3 and Table 4.1.

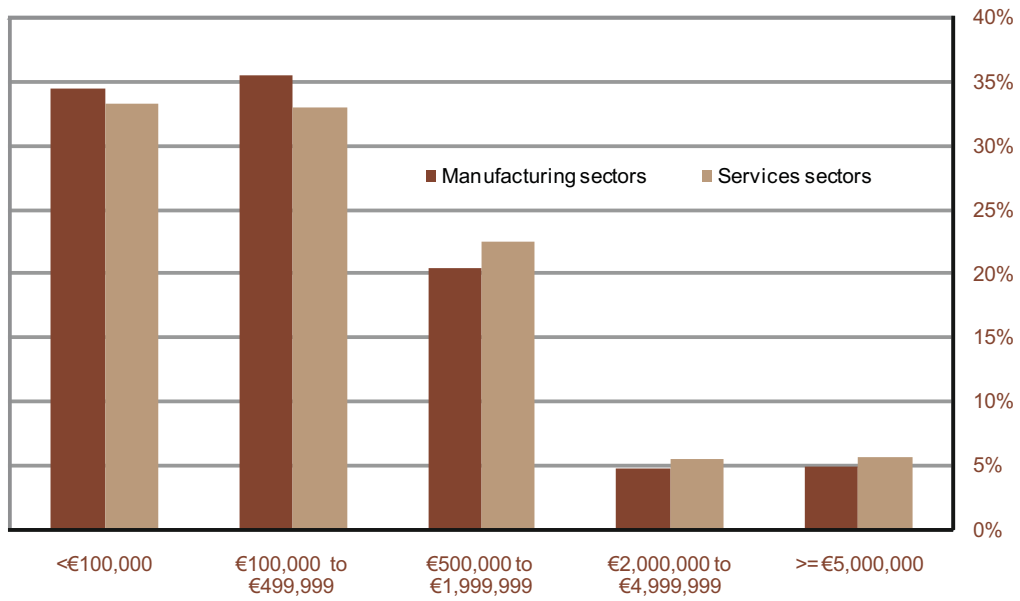
**Figure 4.3** Share of enterprises engaged in research and development activities by size of spend and nationality of ownership, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

The active research and development enterprises were split equally between the manufacturing sector and the services sector. A very high proportion, approximately 90%, of both manufacturing and service sectors enterprises spent less than €2m on research and development in 2009. See Figure 4.4 and Table 4.1.

**Figure 4.4** Share of enterprises engaged in research and development activities by size of spend and sector of activity, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

**Table 4.1 Number of enterprises engaged in research and development activities by size of spend on research and development activities, size of enterprise, nationality of ownership and sector of activity, 2009**

	Size of spend on R&D activities								Total number of enterprises engaged in R&D activities				
	<€100,000	€100,000 to €499,999	€500,000 to €1,999,999	€2,000,000 to €4,999,999	>= €5,000,000	No.	%	No.	%	No.	%		
<b>Size of enterprise</b>													
Small (< 50 persons engaged)	352	285	159	18	4	352	43.0	159	19.4	4	0.5	818	100.0
Medium/Large (50+ persons engaged)	83	154	118	47	63	331	17.8	118	25.4	63	13.5	465	100.0
<b>Nationality of Ownership</b>													
Irish owned enterprises	384	352	170	34	12	952	40.3	170	17.9	12	1.3	952	100.0
Foreign owned enterprises	51	87	107	31	55	331	15.4	107	32.3	55	16.6	331	100.0
<b>Sector of activity</b>													
Manufacturing sectors	221	227	131	30	31	640	34.5	131	20.5	31	4.8	640	100.0
Services sectors <sup>1</sup>	214	212	145	35	36	642	33.3	145	22.6	36	5.6	642	100.0
<b>Total - all enterprises</b>	<b>435</b>	<b>439</b>	<b>277</b>	<b>65</b>	<b>67</b>	<b>1283</b>	<b>33.9</b>	<b>277</b>	<b>21.6</b>	<b>67</b>	<b>5.2</b>	<b>1283</b>	<b>100.0</b>

Source: CSO/Forfás - Business expenditure on Research and Development, 2009-2010

<sup>1</sup>Includes active enterprises from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.



## Chapter 5

### Recruitment of Researchers

#### Introduction

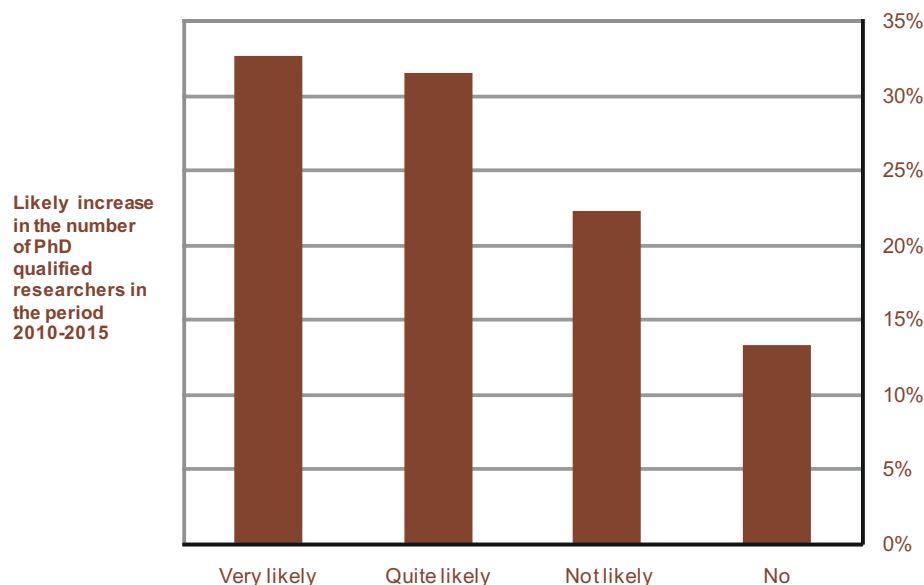
Enterprises were asked to rank the likelihood of recruiting researchers at four different levels of qualification i.e. Diploma, Bachelors Degree, Masters or PhD over the period 2010-2015.

#### Recruitment of qualified researchers

In 2009, 64% of enterprises with PhD researchers employed indicated that they were very likely or quite likely to increase the number of PhD researchers employed over the period 2010 to 2015, while 36% of these enterprises indicated that they were not likely or would not increase their numbers.

Three quarters of enterprises with other researchers employed indicated that they were very likely or quite likely to increase the number of researchers with a Bachelors level degree over the same period, compared to two thirds of enterprises that indicated that they were very likely or quite likely to increase the number of researchers with a Masters degree. *See Figure 5.1 and Table 5.1.*

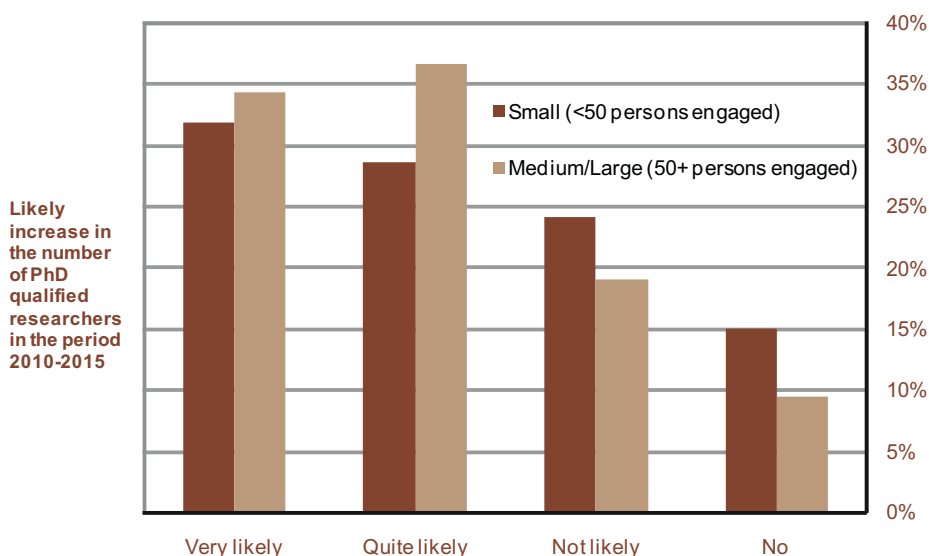
**Figure 5.1** Enterprises with PhD researchers currently employed, indicating likelihood of further increasing the number of PhD qualified researchers, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

The breakdown between small and medium/large active enterprises was roughly the same when comparing the likelihood of increasing researchers with a diploma, bachelor degree or masters level qualification between 2010 and 2015 under the categories very likely and quite likely. In comparison, medium/large active enterprises are 10% more likely than small enterprises to increase PhD researchers. See Figure 5.2 and Table 5.1.

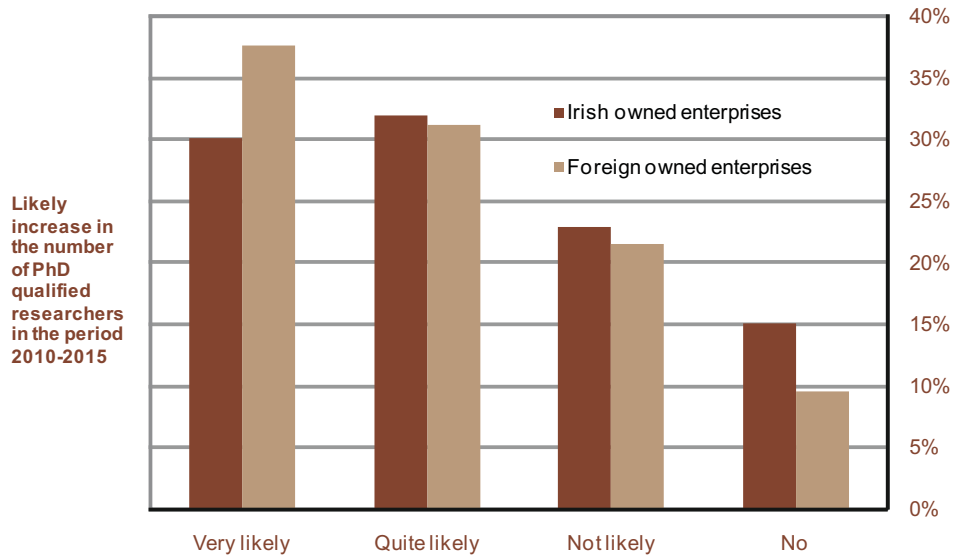
**Figure 5.2** Enterprises with PhD researchers currently employed, indicating likelihood of further increasing the number of PhD qualified researchers, by size of enterprise, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

Almost 70% of foreign owned enterprises indicated that they were very likely or quite likely to increase the number of PhD researchers employed over the period 2010 to 2015 while the equivalent figure for Irish owned enterprises was 62%. See Figure 5.3 and Table 5.1.

**Figure 5.3** Enterprises with PhD researchers currently employed, indicating likelihood of further increasing the number of PhD qualified researchers, by nationality of ownership, 2009



Source: CSO/Forf- BERD Survey 2009/2010

The likelihood of increasing researchers at PhD level is roughly the same in the manufacturing sector and the services sector over the period 2010 to 2015. See Table 5.1.

**Table 5.1: Enterprises with Researchers currently employed, indicating likelihood of further increasing the number of researchers in the period 2010-2015, by number of persons engaged, nationality of ownership and sector of activity, 2009**

	Increase number of researchers												%		
	Diploma level			Bachelors level			Masters Degree level			Phd level					
Size of enterprise	Very likely	Quite likely	Not likely	Very likely	Quite likely	Not likely	Very likely	Quite likely	Not likely	Very likely	Quite likely	Not likely	Very likely	Quite likely	Not likely
Small (<50 persons engaged)	8.7	27.7	28.7	31.9	40.8	14.1	23.6	42.3	16.0	18.1	32.0	28.8	24.2	15.1	
Medium/Large (50+ persons engaged)	11.4	30.2	31.8	34.3	42.5	11.2	28.8	37.0	19.8	14.4	34.4	36.8	19.2	9.6	
<b>Nationality of ownership</b>															
Irish owned enterprises	9.2	30.1	28.2	32.5	41.8	11.9	25.6	38.6	16.5	19.3	30.1	32.0	22.8	15.1	
Foreign owned enterprises	11.5	24.6	34.0	33.0	40.3	16.0	25.3	43.9	20.2	10.6	37.6	31.2	21.6	9.6	
<b>Sector of activity</b>															
Manufacturing sector	10.8	32.6	28.8	29.9	42.0	14.8	21.8	33.5	23.1	21.5	34.0	30.6	22.9	12.5	
Services sector <sup>1</sup>	8.7	24.9	30.9	35.4	40.9	11.5	28.6	46.1	12.7	12.7	32.0	32.0	22.0	14.0	
<b>Total</b>	9.7	28.7	29.9	31.7	32.8	13.0	25.5	40.2	17.6	16.7	32.8	31.6	22.3	13.3	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2009-2010

<sup>1</sup>Includes active enterprises from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal



## Chapter 6

### Research and Development Collaboration

#### Introduction

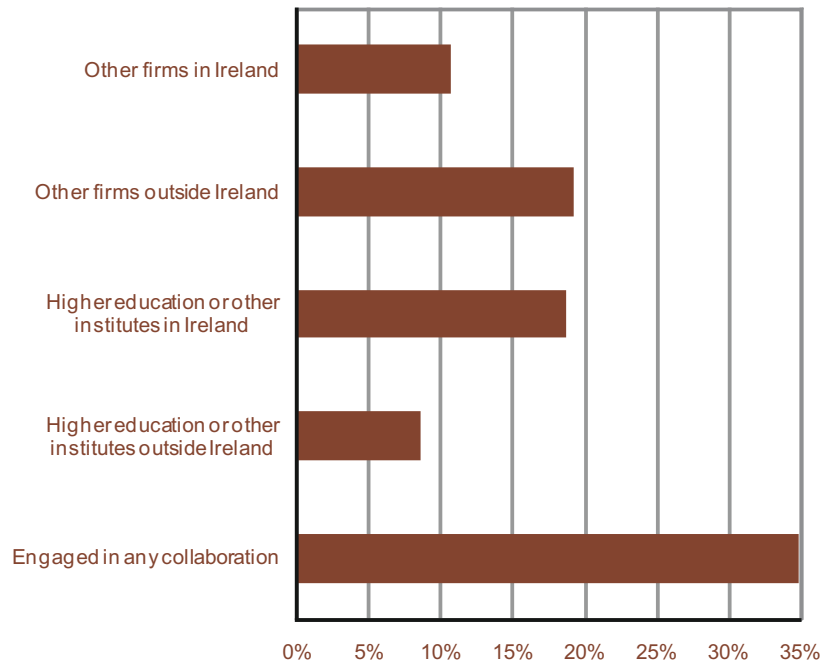
Enterprises were asked whether they engaged in any of four types of joint research projects i.e. with other firms in Ireland; other firms outside Ireland; higher education or other institutes in Ireland; higher education or other institutes outside Ireland.

Those enterprises that engaged in joint research projects with higher education or other institutions in Ireland were further asked to rate (a) the ease of engaging in collaboration and (b) the benefits of such collaboration in terms of importance to their enterprise. A number of reasons that might have curtailed such collaboration were listed in the survey and enterprises that did not engage in joint research projects with higher education or other institutions in Ireland were asked to rank each of the statements as being of high/medium/low importance or not relevant.

#### Joint research projects in 2009

Over one in three research and development active enterprises indicated that they engaged in a joint research project. Just under 20% of all enterprises engaged in a joint research project with other firms outside Ireland while 11% engaged with other firms in Ireland. Almost a fifth of enterprises engaged in a joint research project with higher education institutes or other institutes in Ireland while nearly one in ten enterprises engaged in this type of collaboration outside Ireland. See *Figure 6.1 and Table 6.1*.

**Figure 6.1** Enterprises engaged in joint research projects, 2009

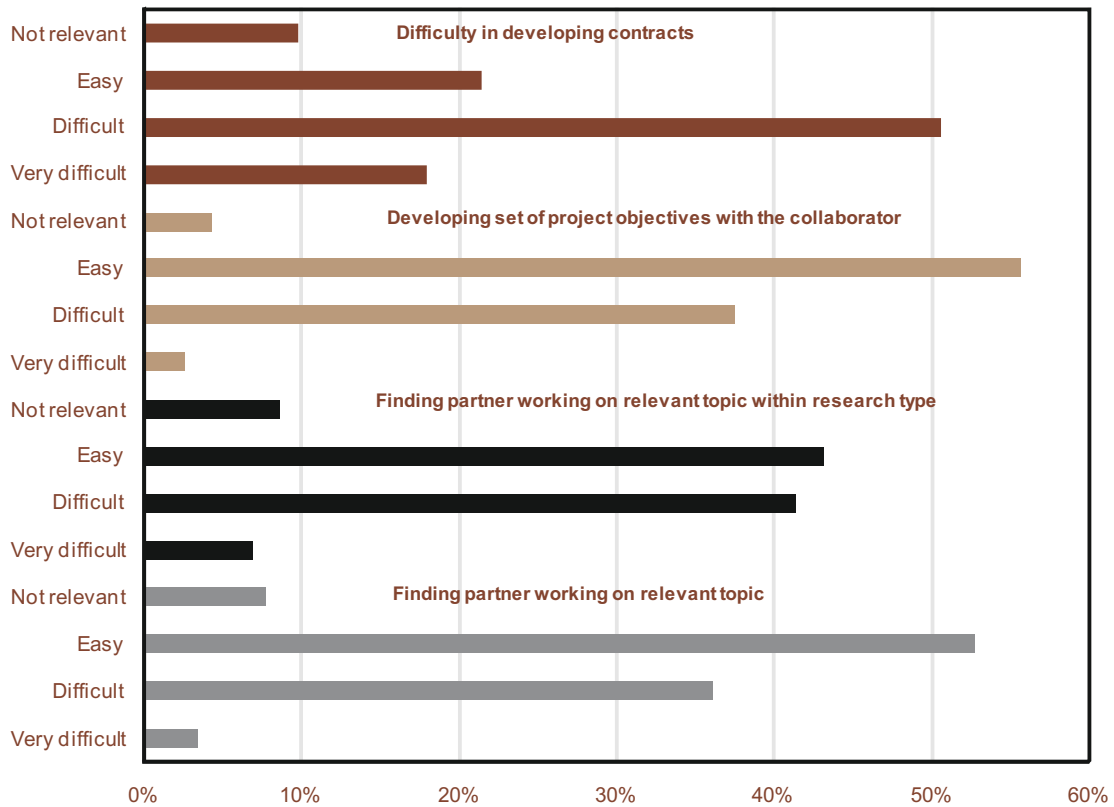


Source: CSO/Forfás - BERD Survey 2009/2010

### Ease of engaging in research and development collaboration projects in Ireland

In 2009, 53% of enterprises rated finding a collaboration partner in a higher education or other institution in Ireland to jointly work on a relevant topic as easy, while 39% indicated that it was either difficult or very difficult. Over 43% of such enterprises indicated that finding a partner to work on a relevant topic within the research type (i.e. applied, basic or experimental) as easy compared to 48% that rated the process as difficult or very difficult. See Figure 6.2 and Table 6.2.

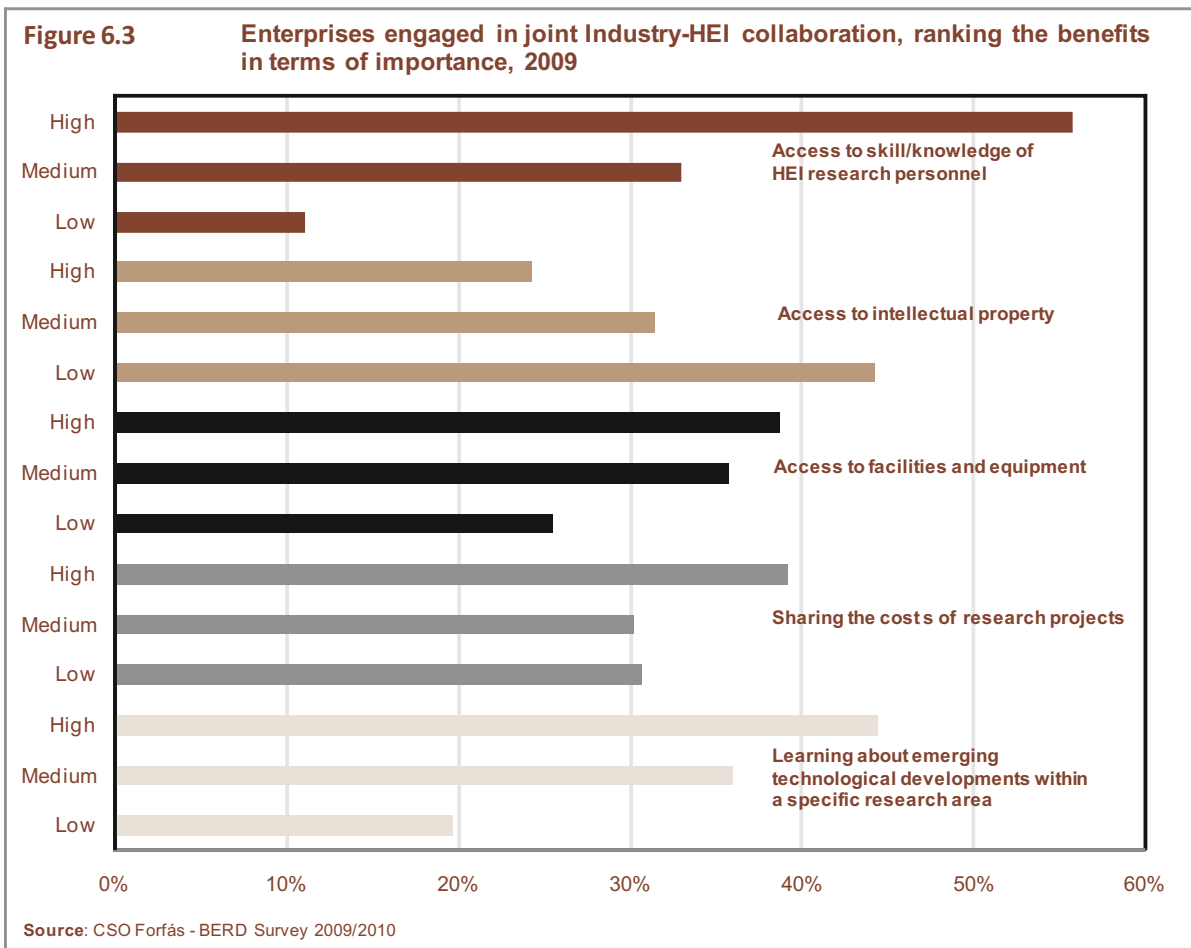
**Figure 6.2** Enterprises engaged in joint research projects with higher education or other institutions in Ireland, ranking the ease of engaging in collaboration, 2009



Source: CSO/Forfás - BERD Survey 2009/2010

### Benefits of industry-academia research and development collaboration in Ireland

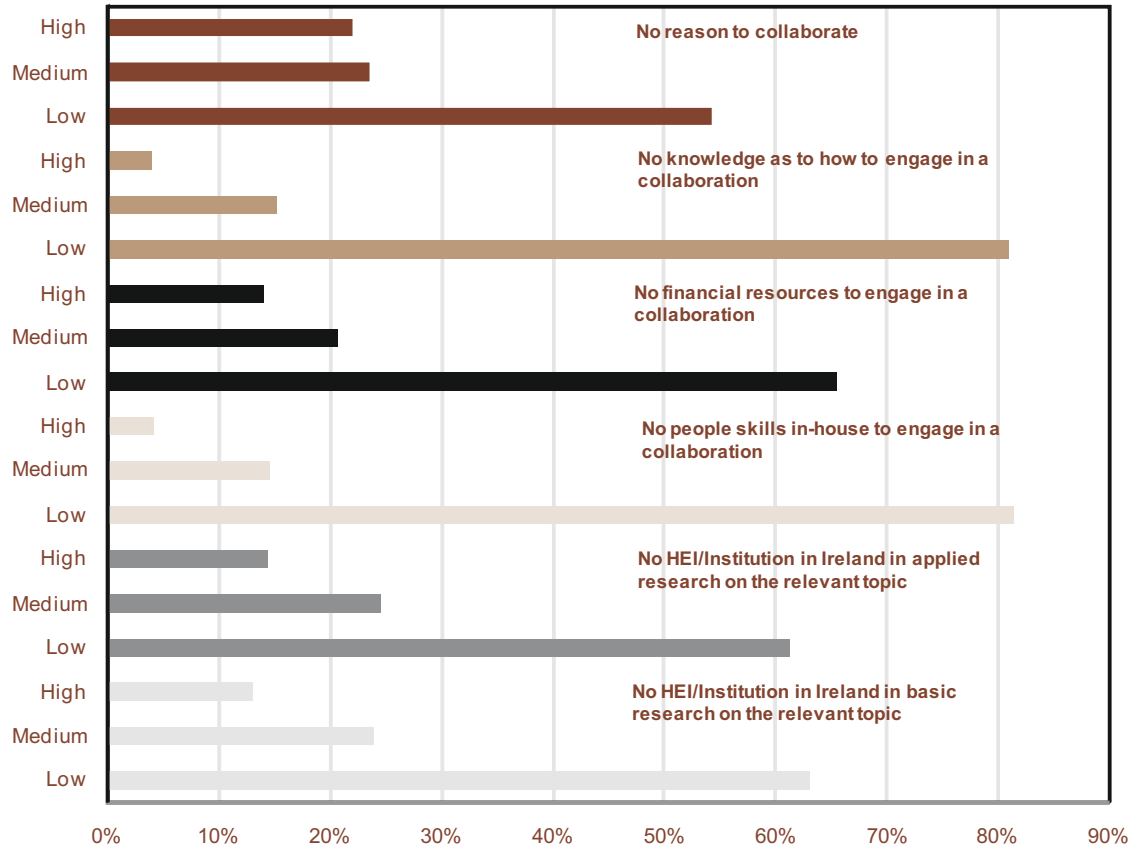
Over half, 56%, of enterprises ranked the access to skill/knowledge of higher education institutes (HEI) research personnel as highly beneficial while over one tenth of enterprises indicated that this was of low or no relevance. In excess of 24% ranked access to intellectual property as high compared to 44% that indicated that this was of low or no relevance. See Figure 6.3 and Table 6.3.



### Reasons not to engage in industry-academia research and development collaboration in Ireland

Over a fifth of enterprises indicated 'No reason to collaborate' as a highly important reason not to engage in industry-academia collaboration in 2009, almost a quarter of enterprises ranked this reason as being of medium importance while over a half indicated this reason as being of low or no relevance. See Figure 6.4 and Table 6.4.

**Figure 6.4** Enterprises not engaged in joint Industry-HEI collaboration, ranking the reasons in terms of importance, not to engage in such collaboration, 2009



Source : CSO/Forfás - BERD Survey 2009/2010

**Table 6.1 Enterprises engaged in joint research projects by size of enterprise, nationality of ownership and sector of activity, 2009**

	Other firms in Ireland	Other firms outside Ireland	Higher education or other institutes in Ireland	Higher education or other institutes outside Ireland	Engaged in any collaboration <sup>1</sup>
<b>Size of enterprise</b>					
Small (<50 persons engaged)	9.4	16.3	17.0	7.3	32.0
Medium/Large (50+ persons engaged)	12.9	24.1	21.7	10.5	39.8
<b>Nationality of ownership</b>					
Irish owned enterprises	10.9	16.8	17.4	8.3	33.1
Foreign owned enterprises	10.0	25.8	22.4	9.4	40.3
<b>Sector of activity</b>					
Manufacturing sector	10.5	19.8	16.8	8.0	33.5
Services sector <sup>2</sup>	10.9	18.5	20.6	9.0	36.1
<b>Total</b>	<b>10.7</b>	<b>19.2</b>	<b>18.7</b>	<b>8.5</b>	<b>34.9</b>

Source: CSO/Forfás - Business Expenditure on Research and Development 2009-2010.

<sup>1</sup>Enterprises could engage in more than one type of research and development collaboration, hence the sum of the categories does not equal the total.

<sup>2</sup>Includes active enterprises from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 6.2 Enterprises engaged in joint research projects with higher education or other institutions in Ireland, ranking the ease of engaging in collaboration, by size of enterprise, nationality of ownership and sector of activity, 2009**

	Finding partner working on relevant topic				Finding partner working on relevant topic within research type				Developing a set of project objectives with the collaborator				Difficulty in developing contracts			
	Very difficult	Difficult	Easy	Not relevant	Very difficult	Difficult	Easy	Not relevant	Very difficult	Difficult	Easy	Not relevant	Very difficult	Difficult	Easy	Not relevant
<b>Size of enterprise</b>																
Small (<50 persons engaged)	5.1	36.0	51.5	7.4	8.1	40.7	45.2	5.9	3.7	35.6	56.3	4.4	19.1	52.9	18.4	9.6
Medium/Large (50+ persons engaged)	1.0	36.1	54.6	8.2	5.2	42.3	39.2	13.4	1.0	40.6	54.2	4.2	16.5	47.4	25.8	10.3
<b>Nationality of ownership</b>																
Irish owned enterprises	3.1	34.4	53.4	9.2	7.5	41.0	41.6	9.9	1.9	37.3	54.7	6.2	16.0	50.9	20.9	12.3
Foreign owned enterprises	4.2	39.4	52.1	4.2	5.7	42.9	45.7	5.7	4.2	38.0	57.7	0.0	22.2	48.6	23.6	5.6
<b>Sector of activity</b>																
Manufacturing sector	3.8	32.7	55.8	7.7	9.7	44.7	37.9	7.8	2.9	41.3	51.0	4.8	17.3	48.1	20.2	14.4
Services sector <sup>1</sup>	3.1	38.8	50.4	7.8	4.7	39.1	46.9	9.4	3.1	33.8	58.5	4.6	18.5	52.3	22.3	6.9
<b>Total</b>	<b>3.4</b>	<b>36.1</b>	<b>52.8</b>	<b>7.7</b>	<b>6.9</b>	<b>41.4</b>	<b>43.1</b>	<b>8.6</b>	<b>2.6</b>	<b>37.5</b>	<b>55.6</b>	<b>4.3</b>	<b>18.0</b>	<b>50.6</b>	<b>21.5</b>	<b>9.9</b>

Source: CSO/Forfás - Business Expenditure on Research and Development 2009-2010.

<sup>1</sup> Includes active enterprises from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.

**Table 6.3 Enterprises engaged in joint Industry-HEI<sup>1</sup> collaboration, ranking the benefits in terms of importance, by size of enterprise, nationality of ownership and sector of activity 2009**

	Access to skill/knowledge of HEI research personnel			Access to Intellectual Property			Access to facilities and equipment			Sharing the costs of research projects			Learning about emerging technological developments within a specific research area		
	High	Medium	Low	High	Medium	Low	High	Medium	Low	High	Medium	Low	High	Medium	Low
<b>Size of enterprise</b>															
Small (<50 persons engaged)	58.1	31.6	10.3	24.6	27.5	47.8	44.2	29.7	26.1	43.5	26.1	30.4	39.7	33.1	27.2
Medium/Large (50+ persons engaged)	52.6	35.1	12.4	24.5	36.7	38.8	30.2	44.8	25.0	33.0	36.1	30.9	51.5	40.2	8.2
<b>Nationality of ownership</b>															
Irish owned enterprises	59.3	27.2	13.6	27.8	27.8	44.4	42.6	32.7	24.7	46.0	26.4	27.6	44.1	33.5	22.4
Foreign owned enterprises	47.9	46.6	5.5	16.7	38.9	44.4	29.2	43.1	27.8	23.3	38.4	38.4	45.2	41.1	13.7
<b>Sector of activity</b>															
Manufacturing sector	56.7	31.7	11.5	23.8	30.5	45.7	36.5	42.3	21.2	36.8	31.1	32.1	49.5	38.3	12.1
Services sector <sup>2</sup>	55.0	34.1	10.9	25.4	31.5	43.1	40.3	31.0	28.7	40.8	29.2	30.0	40.9	33.9	25.2
<b>Total</b>	<b>55.8</b>	<b>33.0</b>	<b>11.2</b>	<b>24.3</b>	<b>31.5</b>	<b>44.3</b>	<b>38.7</b>	<b>35.7</b>	<b>25.5</b>	<b>39.1</b>	<b>30.2</b>	<b>30.6</b>	<b>44.4</b>	<b>35.9</b>	<b>19.7</b>

Source: CSO/Forfás - Business Expenditure on Research and Development 2009-2010.

<sup>1</sup> Higher Education Institute

<sup>2</sup> Includes active enterprises from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal.



**Table 6.4 Enterprises not engaged in joint Industry-HEI<sup>1</sup> collaboration, ranking the reasons in terms of importance, not to engage in such collaboration, by size of enterprise, nationality of ownership and sector of activity, 2009**

Reason not to engage in Industry-HEI collaboration	%					
	No reason to collaborate	No knowledge as to how to engage in a collaboration	No financial resources to engage in a collaboration	No people skill set in-house to engage in a collaboration	No HEI/institution in Ireland in applied research on the relevant topic	No HEI/institution in Ireland in basic research on the relevant topic
	High Medium Low <sup>2</sup>	High Medium Low <sup>2</sup>	High Medium Low <sup>2</sup>	High Medium Low <sup>2</sup>	High Medium Low <sup>2</sup>	High Medium Low <sup>2</sup>
<b>Size of enterprise</b>						
Small (<50 persons engaged)	22.5 27.2 50.3	5.5 17.5 77.0	17.4 24.9 57.7	4.9 17.5 77.5	15.4 25.8 58.8	14.3 24.6 61.0
Medium/Large (50+ persons engaged)	21.2 16.7 62.1	1.0 10.8 88.2	7.2 11.8 81.0	2.6 8.6 88.8	12.2 22.0 65.8	10.6 22.2 67.2
<b>Nationality of ownership</b>						
Irish owned enterprises	22.5 24.8 52.7	4.8 15.9 79.3	15.8 23.5 60.7	4.7 15.8 79.5	13.7 25.7 60.6	13.2 25.1 61.7
Foreign owned enterprises	20.8 19.5 59.7	1.3 13.4 85.3	8.1 11.7 80.3	2.7 10.7 86.7	16.0 20.9 63.1	12.5 19.6 67.9
<b>Sector of activity</b>						
Manufacturing sector	19.9 23.6 56.5	3.7 15.1 81.1	9.0 17.3 73.7	3.1 15.3 81.6	13.1 26.1 60.8	11.6 27.7 60.6
Services sector <sup>3</sup>	24.2 23.6 52.2	4.2 15.4 80.4	19.0 23.8 57.1	5.3 13.8 80.9	15.7 23.0 61.4	14.5 19.7 65.8
<b>Total</b>	22.1 23.6 54.3	4.0 15.3 80.8	14.0 20.6 65.4	4.2 14.6 81.3	14.3 24.5 61.2	13.1 23.8 63.1

Source: CSO/Forfás - Business Expenditure on Research and Development 2009-2010.

<sup>1</sup> Higher Education Institute

<sup>2</sup> Low includes Low & non relevant enterprises.

<sup>3</sup> Includes active enterprises from all other sectors for reasons of confidentiality - it should be noted that the value of this contribution to the services sector total is minimal



# Appendix 1

## Background Notes

### Introduction

The Business Expenditure on Research and Development (BERD) Survey 2009/2010 is a survey of the research and development activities of enterprises in Ireland. The BERD Survey is required for Commission Regulation (EC) No 753/2004 implementing Decision No 1608/2003/EC. The survey collected information about the research and development activities of enterprises across all business sectors of the economy.

The BERD Survey is jointly conducted by the CSO and Forfás under Section 11 of the Statistics Act, 1993 to increase efficiency in the collection of statistical data and to reduce the burden on the participating enterprises. Data were collected in accordance with Section 33 of the Statistics Act, 1993 and with EU law.

Methodological changes were introduced in the BERD 2009/2010 Survey. The business classification used for BERD 2007/2008 was the Statistical Classification of Economic Activities in the European Community NACE Rev.1.1. BERD 2009/2010 uses the NACE Rev.2 classification. Detailed tables that were previously published at 2 digit NACE level, using NACE Rev1.1 classification are now presented at sectoral level using the NACE Rev. 2 classification. The register of likely performers of research and development also changes between surveys. Therefore, conclusions should not be drawn regarding the direction or scale of any changes between BERD 2007/2008 and BERD 2009/2010.

Summary results for previous years are included in Appendix 3 but comparisons should be treated with caution. In particular, it is not advised to make any comparisons of results at a detailed level due to sectoral differences in the CSO Business Register, used for the 2007/2008 BERD and 2009/2010 BERD, when compared with the Forfás Business Register, used for previous editions of the BERD Survey. The CSO Business Register is used as the sampling frame for all CSO business surveys.

## **Survey**

The BERD Survey is a targeted survey that is issued to all enterprises which are believed to be actively engaged in research and development activities across all business sectors of the economy (Appendix 2 contains a detailed list of all NACE sectors). These enterprises were identified from various sources that included previous responses to the survey, existing CSO and Forfás data and other administrative sources. This information is used to create a register of likely research and development performers and this register was supplemented with additional information from the CSO's Business Register such as sectoral classification, number of persons engaged etc. The CSO and Forfás jointly conducted the survey as a postal survey using this register and the survey was carried out under the agreed set of international rules as laid out in the OECD Frascati manual. The returns were grossed using the identified research and development register population to produce overall results. Appreciation is extended to all enterprises that took the time to complete and return survey forms.

## **Questionnaire**

The BERD 2009/2010 survey questionnaire is included in Appendix 4 and is also available from the CSO website:

[http://www.cso.ie/surveysandmethodologies/surveys/industry/Business\\_Expenditure\\_Research\\_Develop.htm](http://www.cso.ie/surveysandmethodologies/surveys/industry/Business_Expenditure_Research_Develop.htm)

## Appendix 2

### Key to NACE Rev. 2 Classification

#### **A Agriculture, Forestry and Fishing (NACE 01-03)**

- 01 Crop and animal production, hunting and related service activities
- 02 Forestry and logging
- 03 Fishing and aquaculture

#### **B Mining and Quarrying (NACE 05-09)**

- 05 Mining of coal and lignite
- 06 Extraction of crude petroleum and natural gas
- 07 Mining of metal ores
- 08 Other mining and quarrying
- 09 Mining support service activities

#### **C Manufacturing (NACE 10-33)**

- 10 Manufacture of food products
- 11 Manufacture of beverages
- 12 Manufacture of tobacco products
- 13 Manufacture of textiles
- 14 Manufacture of wearing apparel
- 15 Manufacture of leather and related products
- 16 Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
- 17 Manufacture of paper and paper products
- 18 Printing of reproduction of recorded media
- 19 Manufacture of coke and refined petroleum products
- 20 Manufacture of chemicals and chemical products
- 21 Manufacture of basic pharmaceutical products and pharmaceutical preparations
- 22 Manufacture of rubber and plastic products
- 23 Manufacture of other non-metallic mineral products
- 24 Manufacture of basic metals
- 25 Manufacture of fabricated metal products, except machinery and equipment
- 26 Manufacture of computer, electronic and optical products

- 27 Manufacture of electrical equipment
- 28 Manufacture of machinery and equipment n.e.c.
- 29 Manufacture of motor vehicles, trailers and semi-trailers
- 30 Manufacture of other transport equipment
- 31 Manufacture of furniture
- 32 Other manufacturing
- 33 Repair and installation of machinery and equipment

#### **D Electricity, gas, steam and air conditioning supply**

- 35 Electricity, gas, steam and air conditioning supply

#### **E Water Supply; Sewerage, Waste Management and Remediation Activities**

- 36 Water collection, treatment and supply
- 37 Sewerage
- 38 Waste collection, treatment and disposal activities; materials recovery
- 39 Remediation activities and other waste management services

#### **F Construction (NACE 41-43)**

- 41 Construction of buildings
- 42 Civil Engineering
- 43 Specialised construction activities

#### **Services (NACE 45-99)**

#### **G Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles**

- 45 Wholesale and retail trade and repair of motor vehicles and motorcycles
- 46 Wholesale trade, except of motor vehicles and motorcycles
- 47 Retail trade, except of motor vehicles and motorcycles

#### **H Transportation and Storage**

- 49 Land transport and transport via pipelines
- 50 Water transport
- 51 Air transport
- 52 Warehousing and support activities for transportation
- 53 Postal and courier activities

#### **I Accommodation and Food Service Activities**

- 55 Accommodation
- 56 Food and beverage service activities

#### **J Information and Communication**

- 58 Publishing activities
- 59 Motion picture, video and television programme production, sound recording and music publishing activities
- 60 Programming and broadcasting activities
- 61 Telecommunications
- 62 Computer programming, consultancy and related activities
- 63 Information service activities

#### **K Financial and Insurance Activities**

- 64 Financial service activities, except insurance and pension funding
- 65 Insurance, reinsurance and pension funding, except compulsory social security
- 66 Activities auxiliary to financial services and insurance activities

**L Real Estate Activities**

68 Real estate activities

**M Professional, Scientific and Technical Activities**

69 Legal and accounting activities

70 Activities of head offices; management consultancy activities

71 Architectural and engineering activities; technical testing and analysis

72 Scientific research and development

73 Advertising and market research

74 Other professional, scientific and technical activities

75 Veterinary activities

**N Administrative and Support Service Activities**

77 Rental and leasing activities

78 Employment activities

79 Travel agency, tour operator and other reservation service and related activities

80 Security and investigation activities

81 Services to buildings and landscape activities

82 Office administrative, office support and other business support activities

**O Public Administration and Defence; Compulsory Social Security**

84 Public administration and defence; compulsory social security

**P Education**

85 Education

**Q Human Health and Social Work Activities**

86 Human health activities

87 Residential care activities

88 Social work activities without accommodation

**R Arts, Entertainment and Recreation**

90 Creative, arts and entertainment activities

91 Libraries, archives, museums and other cultural activities

92 Gambling and betting activities

93 Sports activities and amusement and recreation activities

**S Other Service Activities**

94 Activities of membership organisations

95 Repair of computers and personal and household goods

96 Other personal service activities

**T Activities of Households as Employers; Undifferentiated Goods- and Services- Producing Activities of Households for Own Use**

97 Activities of households as employers of domestic personnel

98 Undifferentiated goods-and services-producing activities of private households for own use.

**U Activities of extraterritorial organisations and bodies**

99 Activities of extraterritorial organisations and bodies





## Appendix 3

### Comparisons to previous data

#### Introduction

The summary results for previous years that are included in this chapter are included for reference only.

Methodological changes were introduced in the BERD 2009/2010 Survey. The business classification used for BERD 2007/2008 was the Statistical Classification of Economic Activities in the European Community NACE Rev.1.1. BERD 2009/2010 uses the NACE Rev.2 classification. Detailed tables that were previously published at 2 digit NACE level, using NACE Rev1.1 classification are now presented at sectoral level using the NACE Rev.2 classification. The register of likely performers of research and development also changes between surveys. Therefore, conclusions should not be drawn regarding the direction or scale of any changes between BERD 2007/2008 and BERD 2009/2010.

Summary results for previous years are included in Appendix 3 but comparisons should be treated with caution. In particular, it is not advised to make any comparisons of results at a detailed level due to sectoral differences in the CSO Business Register, used for the 2007/2008 BERD and 2009/2010 BERD, when compared with the Forfás Business Register, used for previous editions of the BERD Survey. The CSO Business Register is used as the sampling frame for all CSO business surveys.

### Appendix 3 Summary of main variables from Business Expenditure on Research and Development (BERD) Survey, 2001 - 2010

	Unit	2001 <sup>1</sup>	2003 <sup>1</sup>	2005 <sup>1</sup>	2007 <sup>2</sup>	2009 <sup>2</sup>	2010 <sup>2e</sup>
<b>Research and development expenditure</b>							
Current expenditure	€m	833	952	1,140	1,324	1,543	1532
of which:	€m	515	613	748	844	948	966
Labour costs	€m	318	340	392	480	595	566
Other current costs	€m	67	153	189	279	326	301
Capital expenditure	€m	16	82	56	74	50	38
of which:	€m	:	:	:	:	24	3
Payments made for licences to use intellectual products for more than a year	€m	51	71	133	206	222	228
Instruments and equipment (excluding software)	€m	:	:	:	:	28	30
Software purchased	€m	:	:	:	:	3	2
Software developed	€m	900	1,105	1,329	1,603	1,868	1,833
<b>Total research and development expenditure</b>							
<b>Human resources - headcount of research staff</b>							
Researchers	No.	6,937	6,611	7,696	8,242	8,960	:
of which:	No.	420	466	830	1,179	1,639	:
PhD qualified researchers	No.	6,517	6,145	6,866	7,063	7,321	:
Other researchers	No.	2,642	2,799	3,095	2,949	3,572	:
Technicians	No.	2,741	2,627	2,830	2,760	3,241	:
Support staff	No.	12,320	12,037	13,621	13,950	15,773	:
<b>Total research personnel (headcount)</b>							
<b>Human resources - Full Time Equivalent (FTE) research staff</b>							
Researchers	No.	5,971	6,012	6,768	7,262	7,732	:
Technicians	No.	1,748	1,909	2,314	2,156	2,599	:
Support staff	No.	1,407	1,359	1,256	1,539	1,628	:
<b>Total research personnel (FTE)</b>							
		9,126	9,280	10,338	10,956	11,959	:
<b>Distribution of research and development expenditure by size of spend</b>							
< €100,000	No.	:	451	546	419	435	:
€100,000 to €499,999	No.	:	411	453	398	439	:
€500,000 to €1999,999	No.	:	181	253	226	277	:
€2,000,000 to €4,999,999	No.	:	39	68	90	65	:
>= €5,000,000	No.	:	42	50	73	67	:
<b>Total number of enterprises engaged in research and development activities</b>							
	No.	1,264	1,125	1,370	1,206	1,283	:

<sup>1</sup> Source: Forfás - Business Expenditure on Research and Development, 2001 - 2005.

<sup>2</sup> Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008, 2009-2010.

: Data not available

e: Estimated

## **Appendix 4**

### **BERD 2009/2010 Survey Form**