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Business Expenditure on Research and Development

2007/2008

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Chapter 1

Overview and Summary

The Business Expenditure on Research and Development (BERD) Survey 2007/2008 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.

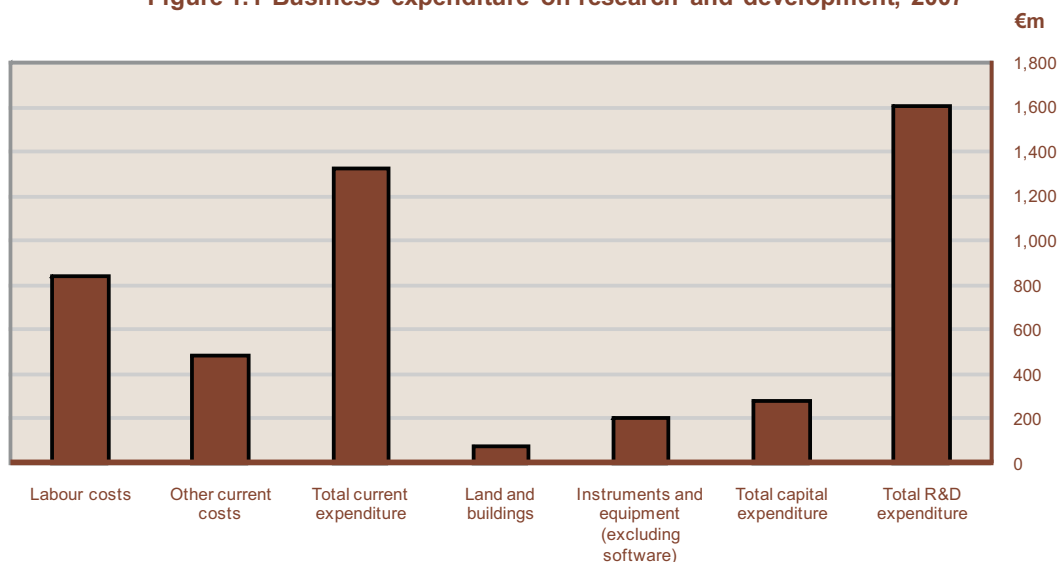
The BERD Survey was previously conducted by Forfás but is now jointly conducted by the CSO and Forfás under Section 11 of the Statistics Act, 1993 to increase efficiency in the collection of statistical data and to reduce the burden on the participating enterprises. Data were collected in accordance 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 March 2009.

Methodological changes were introduced in the BERD 2007/2008 Survey. As a consequence of this, no conclusions should be drawn regarding the direction or scale of any real changes between BERD 2005/2006 and BERD 2007/2008. 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 detailed sectoral level due to sectoral differences in the CSO Business Register (used for the 2007/2008 BERD Survey) when compared with the Forfás Business Register (used for previous editions of the BERD Survey). This CSO Business Register is used as the sampling frame for all CSO business surveys.

Research and development expenditure in 2007

In 2007 more than €1.6bn was spent on research and development activities by enterprises across all business sectors in Ireland. Nearly 83% of all expenditure was on current costs while 17% was spent on capital costs. Enterprises spent €845m on labour costs, €480m on other current costs, €205m on instruments and equipment (excluding software) along with €75m on land and building costs. See Figure 1.1.

Figure 1.1 Business expenditure on research and development, 2007

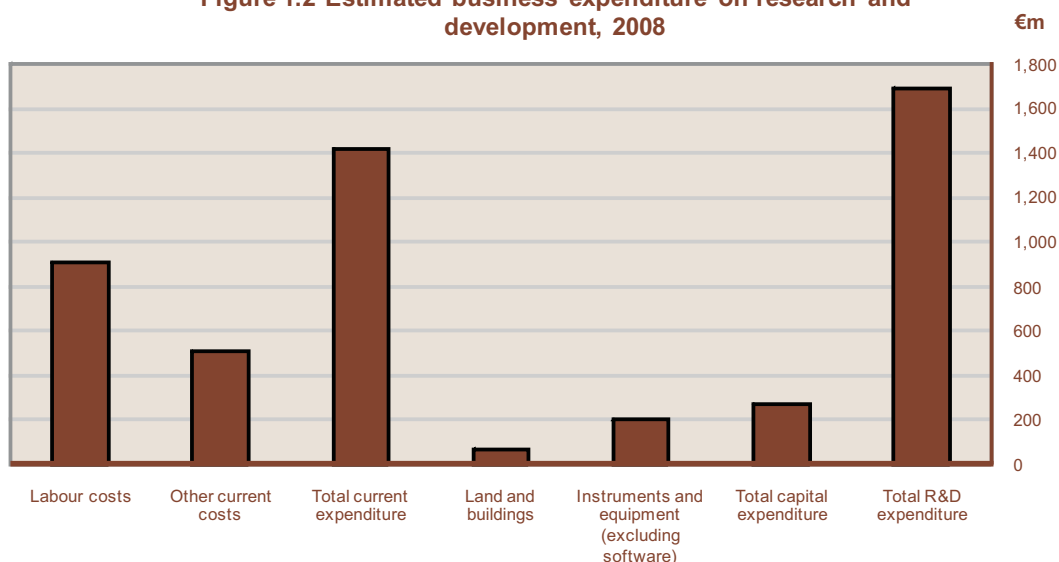


Source: CSO/Forfás - BERD Survey 2007/2008

Estimated research and development expenditure in 2008

Enterprises were asked for their expected research and development expenditure in 2008. As the survey was conducted before many enterprises would have had final expenditure figures for 2008, the figures returned by enterprises should be regarded as an estimate. These estimates indicate that research and development expenditure should have increased to almost €1.7bn in Ireland in 2008. Enterprises indicated that they expected to spend €905m on labour costs, €510m on other current costs, €205m on instruments and equipment (excluding software) and €65m on land and building costs. See Figure 1.2.

Figure 1.2 Estimated business expenditure on research and development, 2008

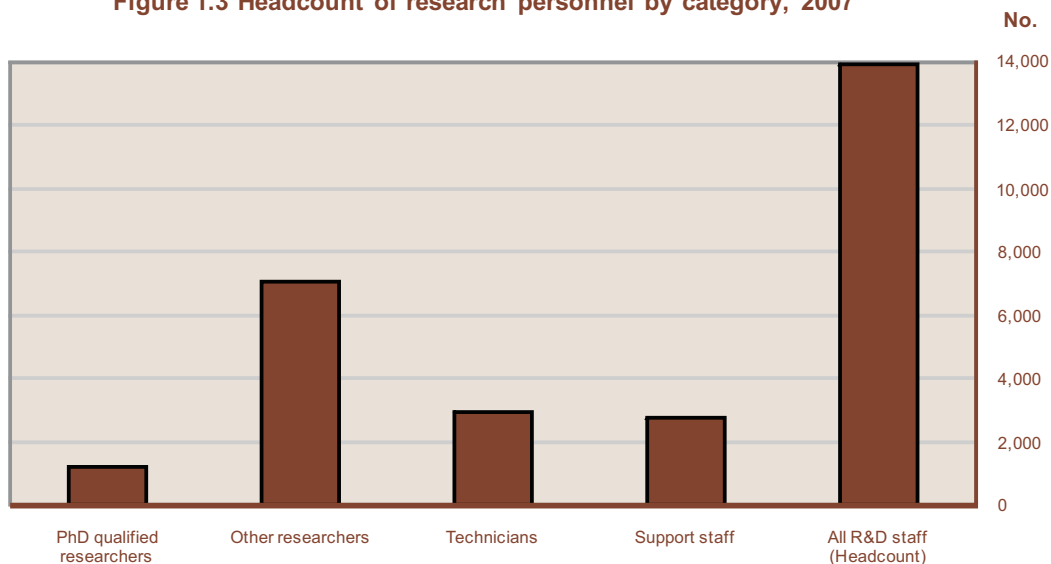


Source: CSO/Forfás - BERD Survey 2007/2008

Research and development – staff headcount

There were 13,950 persons engaged in research and development activities in Ireland in 2007. In total there were 8,250 researchers of which 1,200 were engaged as PhD qualified researchers, 2,950 technicians and 2,750 support staff. See *Figure 1.3*.

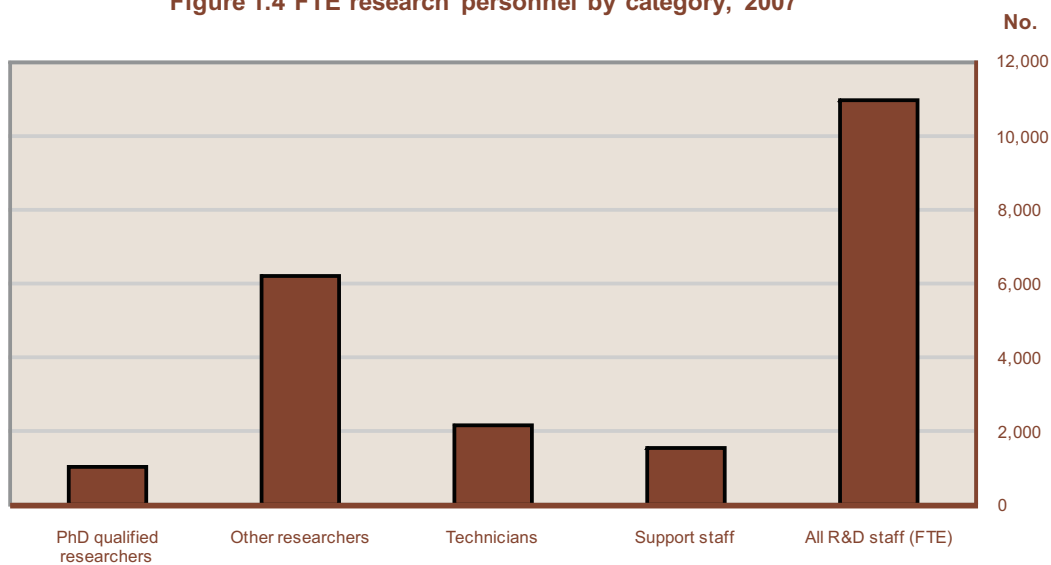
Figure 1.3 Headcount of research personnel by category, 2007



Research and development – Full Time Equivalent (FTE) staff

There were 10,950 Full Time Equivalent (FTE) research staff in Ireland in 2007. Almost 1,050 of these FTEs were PhD qualified researchers while there were more than 6,200 other researcher FTEs. See *Figure 1.4*.

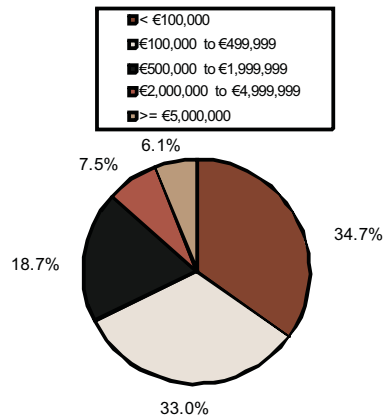
Figure 1.4 FTE research personnel by category, 2007



Number of active enterprises

There were more than 1,200 enterprises engaged in research and development activities in Ireland in 2007. More than two thirds of all enterprises spent less than €500,000 on research and development activities, a fifth spent more than €500,000 and less than €2m while 14% spent €2m or more. See Figure 1.5.

Figure 1.5 Share of enterprises engaged in research and development activities by size of spend, 2007



Source: CSO/Forfás BERD Survey 2007/2008

Chapter 2

Research and Development Expenditure

Introduction

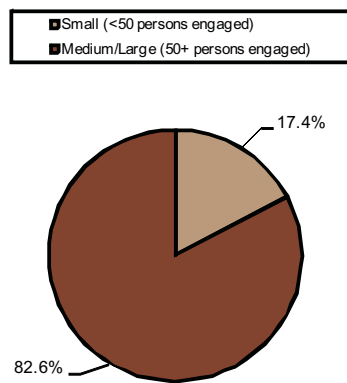
Enterprises were asked to detail their expenditure on research and development for 2007. Details of current expenditure broken into labour costs and other current costs, and capital expenditure broken into land and building costs as well as expenditure on instruments and equipment excluding software were provided. Enterprises were also asked to provide estimates of their expected spend in 2008. In addition enterprises provided 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 2007

In 2007, €1.6bn was spent on research and development activities by enterprises across all business sectors in Ireland with 83% spent on current expenditure and 17% on capital expenditure. This spend by all enterprises was made up of €845m on labour costs, €480m on other current costs, €205m on instruments and equipment (excluding software) along with €75m on land and building costs. See *Table 2.1*.

Small enterprises with less than fifty persons engaged accounted for €280m or 17% of the total spend on research and development in 2007. Medium/large enterprises spent more than €1.3bn, 83% of the total spend in the period. These medium/large enterprises spent €665m on labour costs. See *Figure 2.1 and Table 2.1*.

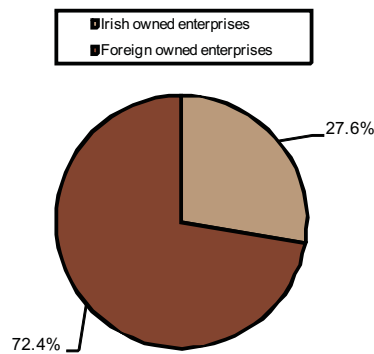
Figure 2.1 Share of total research and development expenditure by size of enterprise, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

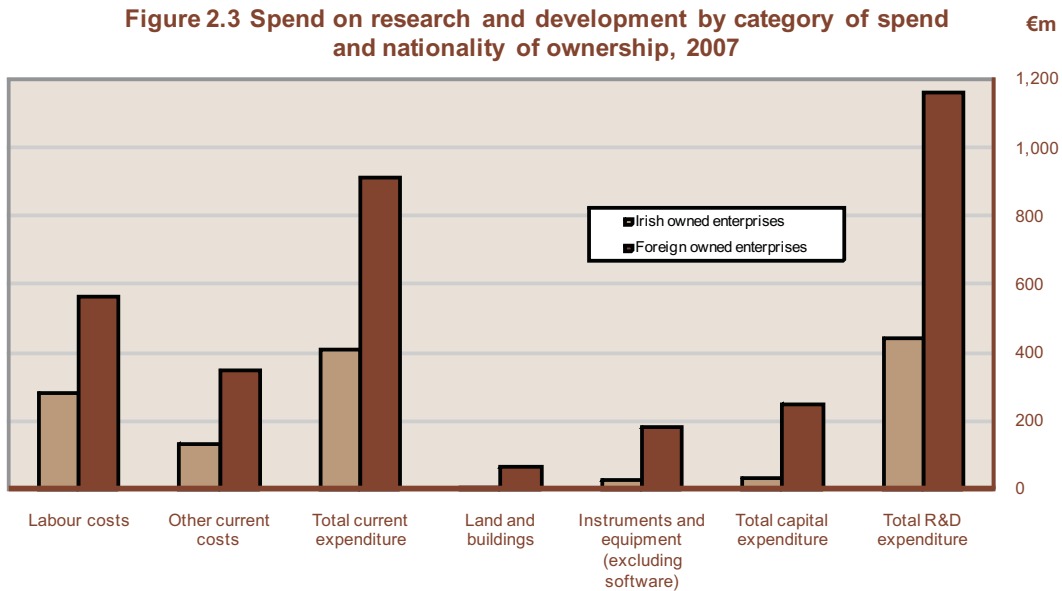
Foreign owned enterprises spent almost €1.2bn on research and development in 2007, (72% of all research and development expenditure) while Irish owned enterprises spent €445m. Almost 79% of all spending by foreign owned enterprises was on current costs compared to 93% for Irish owned enterprises. See Figures 2.2 & 2.3 and Table 2.1.

Figure 2.2 Share of total research and development expenditure by nationality of ownership, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

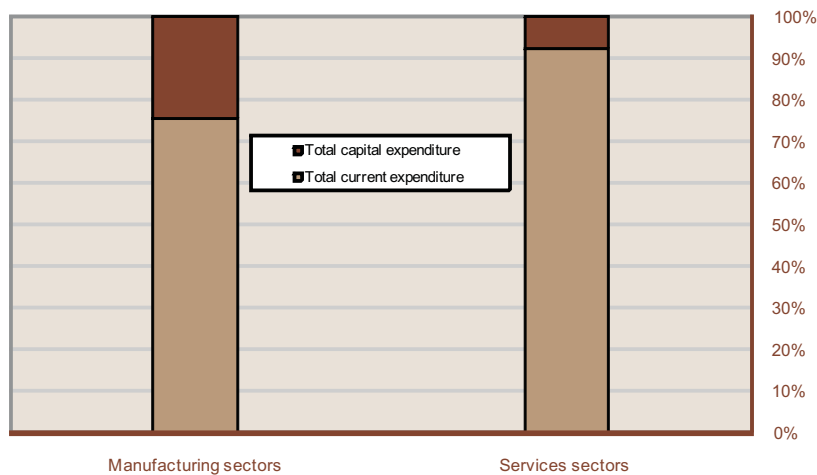
Figure 2.3 Spend on research and development by category of spend and nationality of ownership, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

Research and development spending in 2007 was highest in the manufacturing sector which accounted for 57% of all spending. Spending in this sector was €915m in 2007 while the services sector spent €690m. (It should be noted that spending in the services sector includes the spend from all other non-manufacturing sectors for reasons of confidentiality - the value of this contribution to the services sector total is minimal.) Three quarters of the spend in manufacturing was on current costs compared to services where current costs accounted for 92% of expenditure. See Figure 2.4 and Table 3.1.

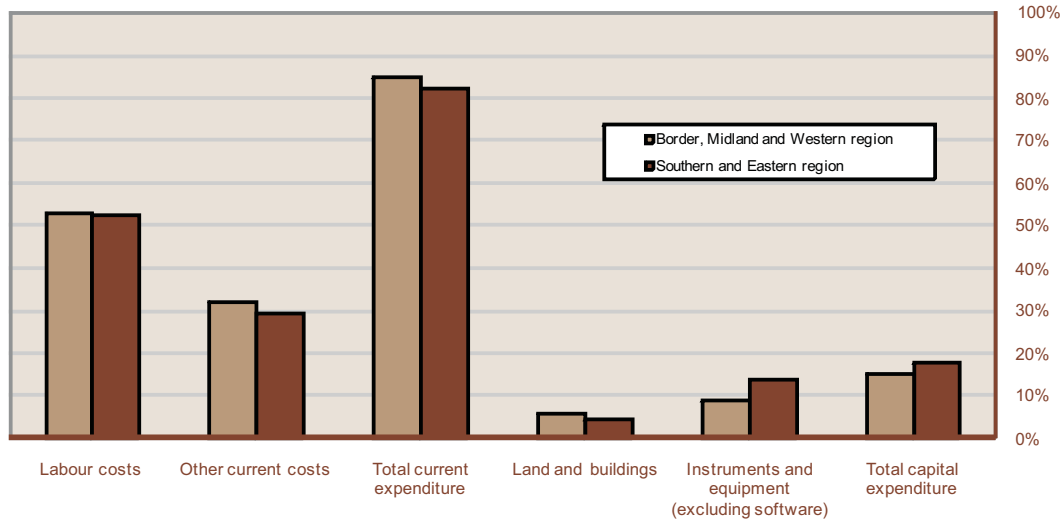
Figure 2.4 Percentage spend on research and development by overall category of spend and sector of activity, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

Total research spending in the Southern and Eastern (SE) region was in excess of €1.3bn in 2007 while €300m was spent in the Border, Midland and Western (BMW) region. In general, the breakdown of expenditure in the various categories in both regions is broadly similar. See *Figure 2.5 and Table 2.1*.

Figure 2.5 Percentage spend on research and development by category of spend and region, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

In excess of 68% of total research and development expenditure was concentrated in five sectors: 'Computer and related activities'; 'Manufacture of chemicals, chemical products and man-made fibres'; 'Manufacture of medical, precision and optical instruments, watches and clocks'; 'Research and development'; 'Manufacture of electrical machinery and apparatus n.e.c.' See *Figure 2.6 and Table 2.2*.

Figure 2.6 Share of research and development expenditures by NACE sector, 2007



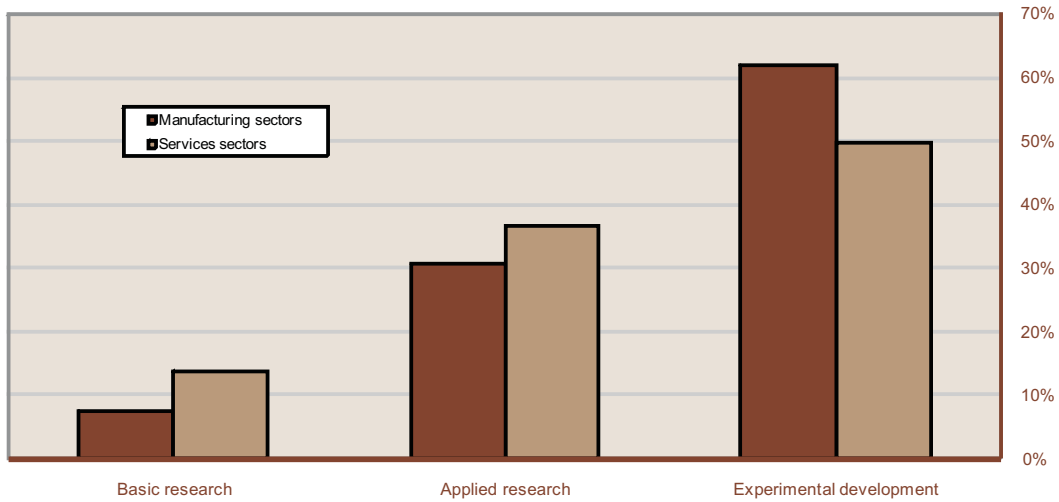
Source: CSO/Forfás - BERD Survey 2007/2008

Type of research and development expenditure in 2007

Research and development expenditure in 2007 was most concentrated in experimental development with 57% of all expenditure spent on this type of research. A third of expenditure was for applied research while 10% of all research and development expenditure was for basic research. Small enterprises were more likely to engage in applied research compared to medium/large enterprises while the opposite was seen with regard to basic research. Irish owned enterprises had a similar pattern when compared to foreign owned enterprises. See Table 2.3.

Almost 62% of the expenditure of manufacturing sector enterprises was for experimental development compared to 50% of expenditure in the services sector. Services sector enterprises were more likely to engage in basic research or applied research. See Figure 2.7 and Table 2.3.

Figure 2.7 Type of business expenditure on research and development by sector of activity, 2007

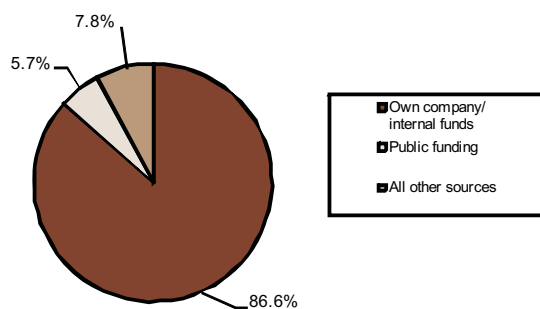


Source: CSO/Forfás - BERD Survey 2007/2008

Source of funds of research and development expenditure in 2007

Almost 87% of all research and development expenditure was funded by enterprises' own company/internal funds, while 6% of expenditure was funded from public funds. See Figure 2.8 and Table 2.4.

Figure 2.8 Source of funds of research and development expenditure in all enterprises, 2007



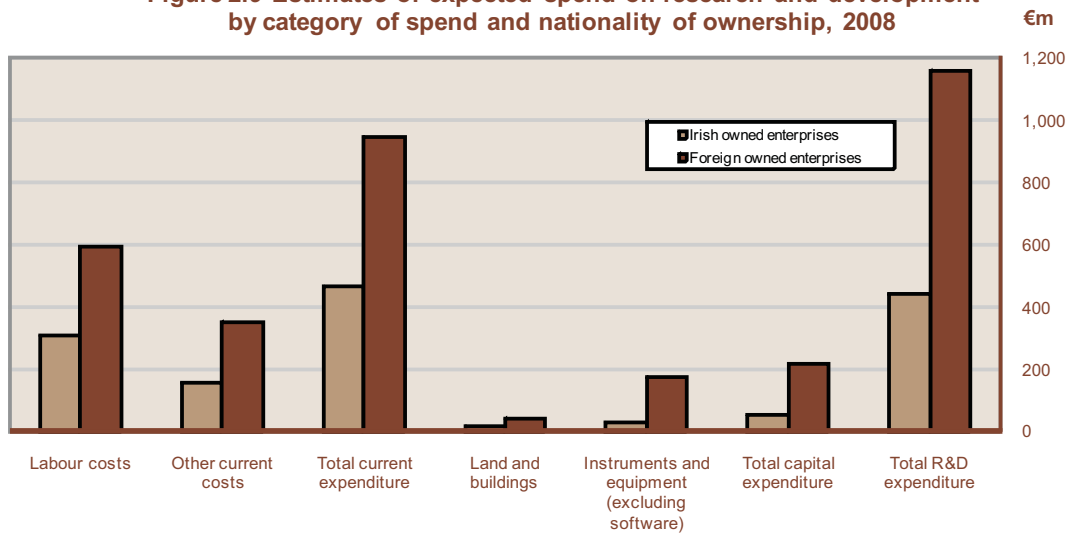
Source: CSO/Forfás - BERD Survey 2007/2008

Estimated research and development expenditure in 2008

Enterprises were asked for their expected research and development expenditure in 2008. As the survey was conducted before many enterprises would have had final expenditure figures for 2008, the figures returned by enterprises should be regarded as an estimate. These estimates indicate that research and development expenditure should have increased to almost €1.7bn in 2008. Small enterprises estimated that they would spend €340m while medium/large enterprises estimated that they would spend more than €1.3bn. See *Table 2.5*.

Foreign owned enterprises indicated that they expected their spend to be almost €1.2bn while Irish owned enterprises indicated that they expected their spend to increase to €520m. See *Figure 2.9 and Table 2.5*.

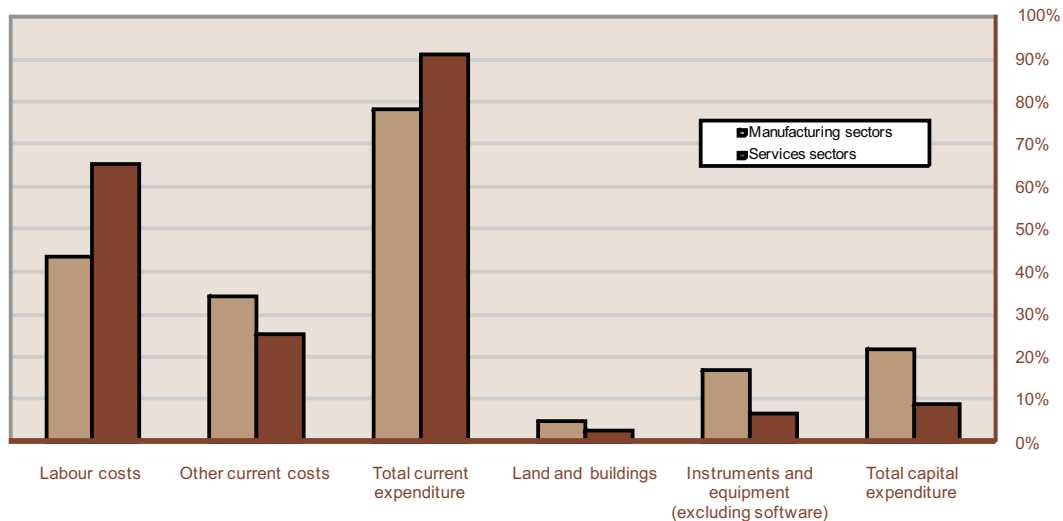
Figure 2.9 Estimates of expected spend on research and development by category of spend and nationality of ownership, 2008



Source: CSO/Forfás - BERD Survey 2007/2008

Estimates of expected spend by sector indicated that total spending on research and development by the manufacturing sector in 2008 should be €915m. The expected spend in the services sector is €770m. Estimates indicate that the services sector expected to spend just under two thirds of expenditure on labour costs while the manufacturing sector will spend 44% of total expenditure on labour costs. The investment in capital expenditure accounts for 22% of the expected spend in the manufacturing sector compared to 9% in the services sector. See Figure 2.10 and Table 2.5.

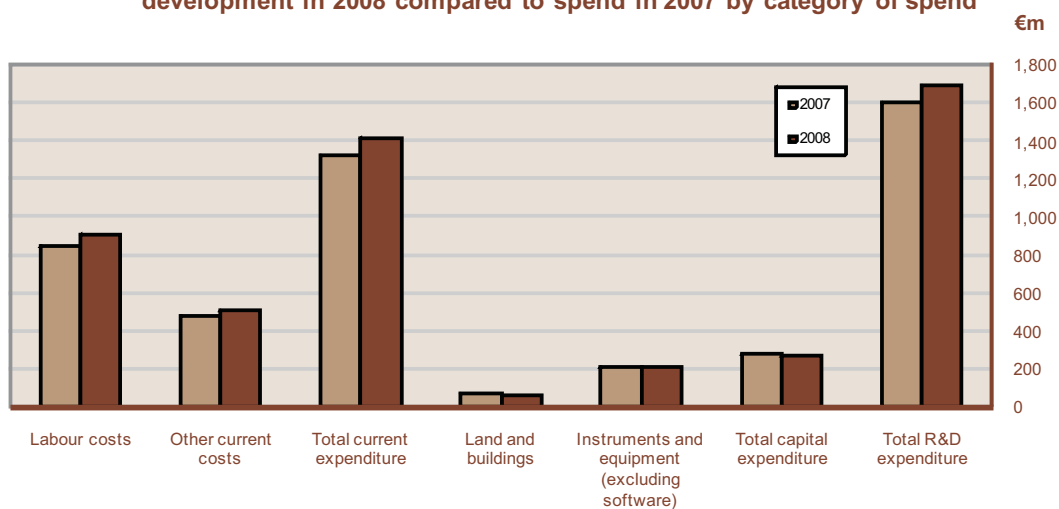
Figure 2.10 Percentage spend on research and development by category of spend and sector of activity, 2008



Source: CSO/Forfás - BERD Survey 2007/2008

Figure 2.11 shows a comparison of the expected research and development spend in 2008 compared to 2007. Figures indicate that overall spending should have increased by 5% while current expenditure should have increased by 7%. See Figure 2.11.

Figure 2.11 Estimates of expected spend on research and development in 2008 compared to spend in 2007 by category of spend



Source: CSO/Forfás - BERD Survey 2007/2008

Table 2.1 Business expenditure on research and development by size of enterprise, nationality of ownership, sector of activity and region, 2007

€'000

	Current Expenditure			Capital Expenditure			Total R&D expenditure
	Labour costs	Other current costs	Total current expenditure	Land and buildings	Instruments and equipment (excluding software)	Total capital expenditure	
Size of enterprise							
Small (<50 persons engaged)	179,488	76,571	256,059	6,266	15,976	22,242	278,301
Medium/Large (50+ persons engaged)	664,359	403,497	1,067,855	67,300	189,728	257,029	1,324,884
Nationality of ownership							
Irish owned enterprises	280,135	130,492	410,627	7,410	24,974	32,384	443,010
Foreign owned enterprises	563,712	349,576	913,287	66,157	180,730	246,887	1,160,174
Sector of activity							
Manufacturing sectors	388,628	300,339	688,967	61,363	163,552	224,915	913,882
Services sectors ¹	455,219	179,728	634,947	12,203	42,153	54,355	689,302
Region							
Border, Midland and Western region	158,160	95,886	254,046	17,729	27,197	44,926	298,972
Southern and Eastern region	685,687	384,181	1,069,868	55,837	178,508	234,345	1,304,213
Total - all enterprises	843,847	480,067	1,323,914	73,566	205,704	279,271	1,603,185

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 Business expenditure on research and development by NACE sector, 2007

		€'000
		Total R&D expenditure
15,16	Manufacture of food, beverages and tobacco.	85,949
17-19	Manufacture of textiles and textile products; Manufacture of leather and leather products.	2,928
20	Manufacture of wood and wood products.	c:
21,22	Manufacture of pulp, paper and paper products; publishing and printing.	c:
24	Manufacture of chemicals, chemical products and man-made fibres.	320,434
25	Manufacture of rubber and plastic products.	16,617
26	Manufacture of other non-metallic mineral products.	2,673
27,28	Manufacture of basic metals and fabricated metal products.	20,341
29	Manufacture of machinery and equipment n.e.c.	43,297
30	Manufacture of office machinery and computers.	33,859
31	Manufacture of electrical machinery and apparatus n.e.c.	112,087
32	Manufacture of radio, television and communication equipment and apparatus.	91,814
33	Manufacture of medical, precision and optical instruments, watches and clocks.	146,982
34,35	Manufacture of transport equipment.	6,637
36,37,23	Manufacturing n.e.c.; Manufacture of coke, refined petroleum products and nuclear fuel.	8,446
Total manufacturing sectors		913,882
50-52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods.	91,758
60-64; 65-67	Transport, storage and communication; Financial intermediation.	37,360
72	Computer and related activities.	392,828
73	Research and development.	119,787
74	Other business activities.	43,310
55,70,71,75-93	All other services.	c:
01,02,05,10-14,40,41,45	All other sectors.	c:
Total services sectors ¹		689,302
Total - all enterprises		1,603,185

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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.

c: Confidential

Table 2.3 Type of business expenditure on research and development by size of enterprise, nationality of ownership and sector of activity, 2007

	Basic research	Applied research	Experimental development	Total	%
Size of enterprise					
Small (<50 persons engaged)	7.9	36.7	55.4	100.0	
Medium/Large (50+ persons engaged)	10.6	32.5	56.9	100.0	
Nationality of ownership					
Irish owned enterprises	7.5	35.4	57.0	100.0	
Foreign owned enterprises	11.1	32.4	56.5	100.0	
Sector of activity					
Manufacturing sectors	7.5	30.6	61.9	100.0	
Services sectors ¹	13.6	36.7	49.7	100.0	
Total - all enterprises	10.1	33.2	56.7	100.0	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 Sources of funds of business expenditure on research and development by size of enterprise, nationality of ownership and sector of activity, 2007

	Own company/ internal funds	Public funding ¹	All other sources ²	Total R&D funding
Size of enterprise				
Small (<50 persons engaged)	200,082	21,610	56,610	278,301
Medium/Large (50+ persons engaged)	1,187,617	69,537	67,730	1,324,884
Nationality of ownership				
Irish owned enterprises	341,472	37,375	64,162	443,010
Foreign owned enterprises	1,046,226	53,771	60,177	1,160,174
Sector of activity				
Manufacturing sectors	855,806	50,384	7,691	913,882
Services sectors ³	531,892	40,762	116,650	689,302
Total - all enterprises	1,387,698	91,146	124,340	1,603,185

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ Public funding includes Government grants and Other public funding.

² 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.

³ 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 2.5 Estimated business expenditure on research and development by size of enterprise, nationality of ownership and sector of activity, 2008

	Current Expenditure			Capital Expenditure			€'000
	Labour costs	Other current costs	Total current expenditure	Land and buildings	Instruments and equipment (excluding software)	Total capital expenditure	Total R&D expenditure
Size of enterprise							
Small (<50 persons engaged)	204,563	90,786	295,349	17,238	29,547	46,785	342,134
Medium/Large (50+ persons engaged)	700,810	419,500	1,120,310	47,066	177,221	224,287	1,344,597
Nationality of ownership							
Irish owned enterprises	308,698	160,376	469,074	19,870	32,505	52,375	521,449
Foreign owned enterprises	596,675	349,910	946,585	44,434	174,263	218,698	1,165,283
Sector of activity							
Manufacturing sectors	400,050	314,190	714,240	45,267	155,945	201,212	915,451
Services sectors ¹	505,324	196,097	701,419	19,037	50,823	69,861	771,280
Total - all enterprises	905,373	510,286	1,415,659	64,304	206,768	271,072	1,686,732

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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

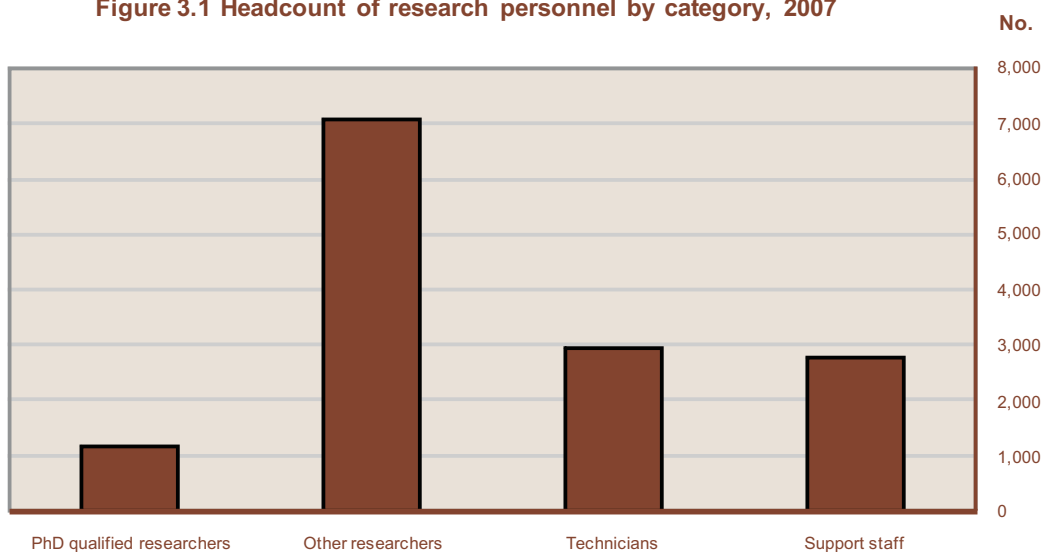
Summary

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

There were 13,950 persons engaged in research and development activities in Ireland in 2007. There were approximately 8,250 researchers of which 1,200 were PhD qualified researchers. In addition, there were 2,950 technicians and 2,750 support staff. See *Figure 3.1 and Table 3.1*.

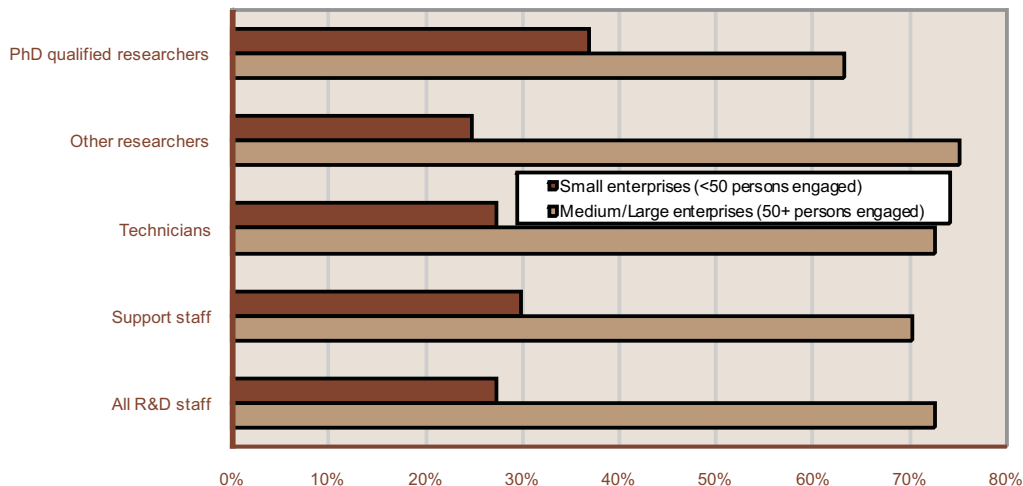
Figure 3.1 Headcount of research personnel by category, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

The number of research personnel engaged in small enterprises in 2007 was more than 3,800, while the number of research personnel in medium/large enterprises was almost 10,150. Almost 37% of all PhD qualified researchers were employed by small enterprises while overall, 27% of all research personnel were employed by such small enterprises. See Figure 3.2 and Table 3.1.

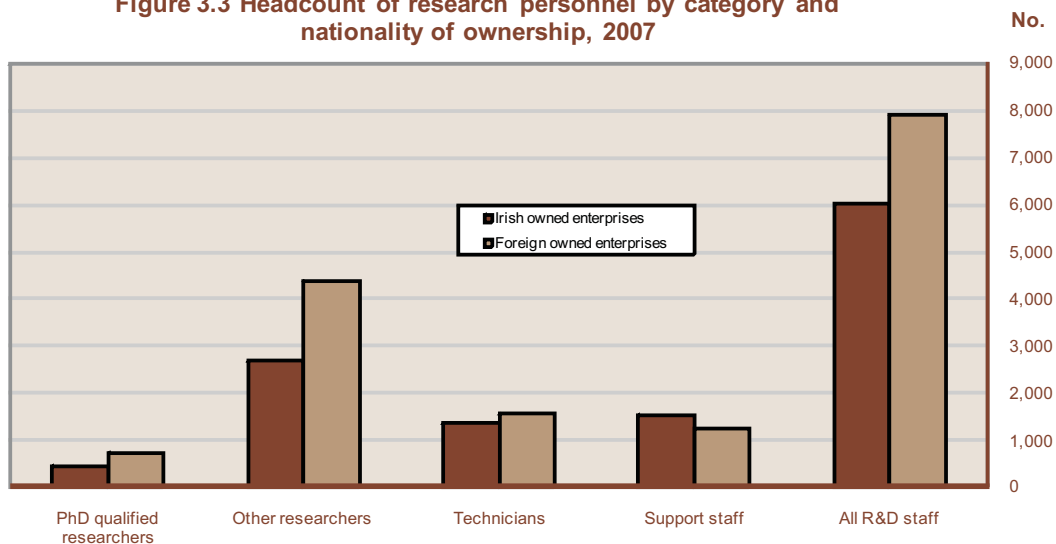
Figure 3.2 Share of research personnel engaged by size of enterprise and category, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

Almost 7,950 research staff were engaged in foreign owned enterprises while 6,000 research staff were engaged in Irish owned enterprises, accounting for 57% and 43% of research staff respectively. See Figure 3.3 and Table 3.1.

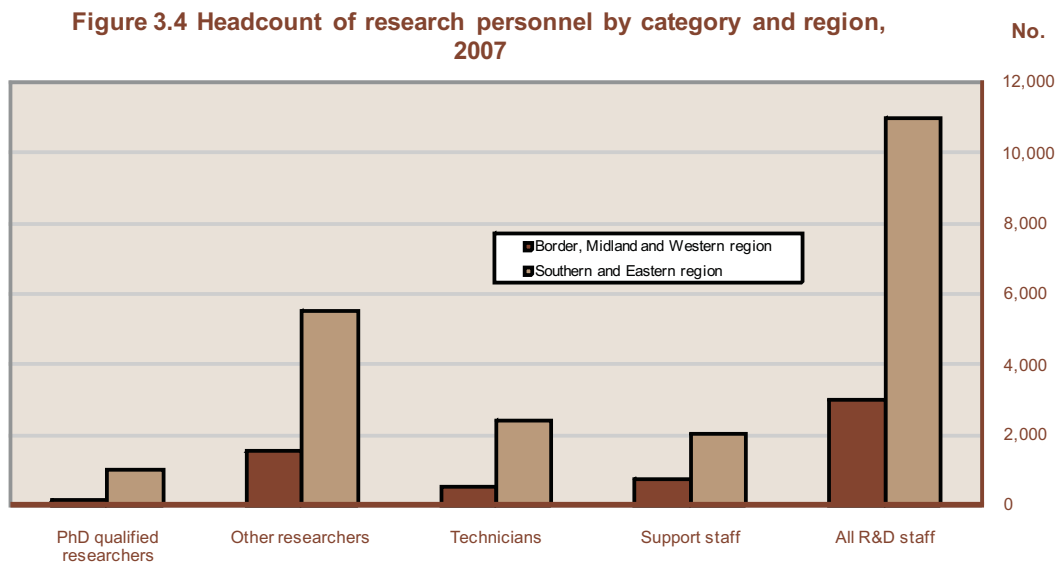
Figure 3.3 Headcount of research personnel by category and nationality of ownership, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

There were more research staff engaged in the services sector (52%) than in the manufacturing sector (48%). Overall there was a higher number of researchers in the services sector compared to the manufacturing sector but there were almost 700 PhD qualified researchers working in the manufacturing sector compared to 500 in the services sector. See Table 3.1.

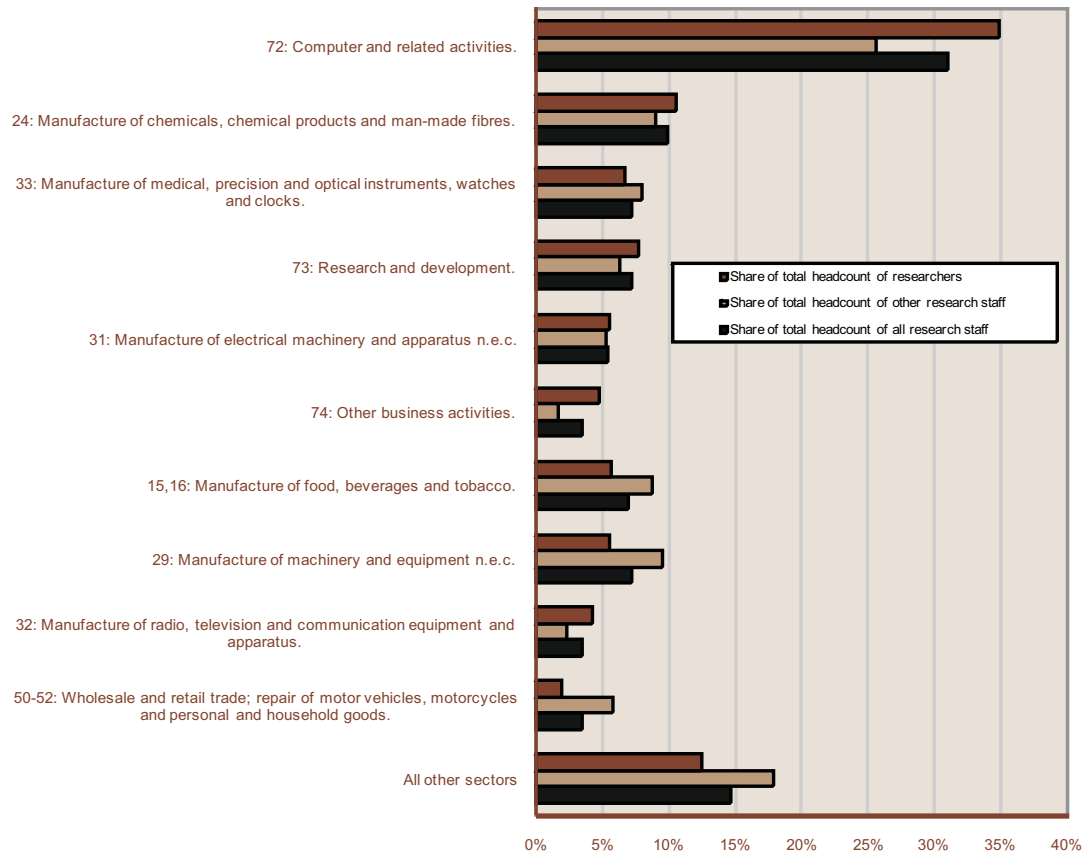
More than 10,950 people were engaged as research staff in the Southern and Eastern (SE) region in 2007 compared to 3,000 in the Border, Midland and Western (BMW) region. The SE region accounted for 79% of all research staff while the BMW region accounted for 21%. See Figure 3.4 and Table 3.1.



Source: CSO/Forfás - BERD Survey 2007/2008

The 'Computer and related activities' sector was the largest employer of research staff in 2007. In excess of 31% of all research staff worked in 'Computer and related activities' in 2007. This sector along with the 'Manufacture of chemicals, chemical products and man-made fibres' and the 'Manufacture of medical, precision and optical instruments, watches and clocks' sectors accounted for almost half of all research staff. See Figure 3.5 and Table 3.2.

Figure 3.5 Share of research and development personnel by NACE sector, 2007

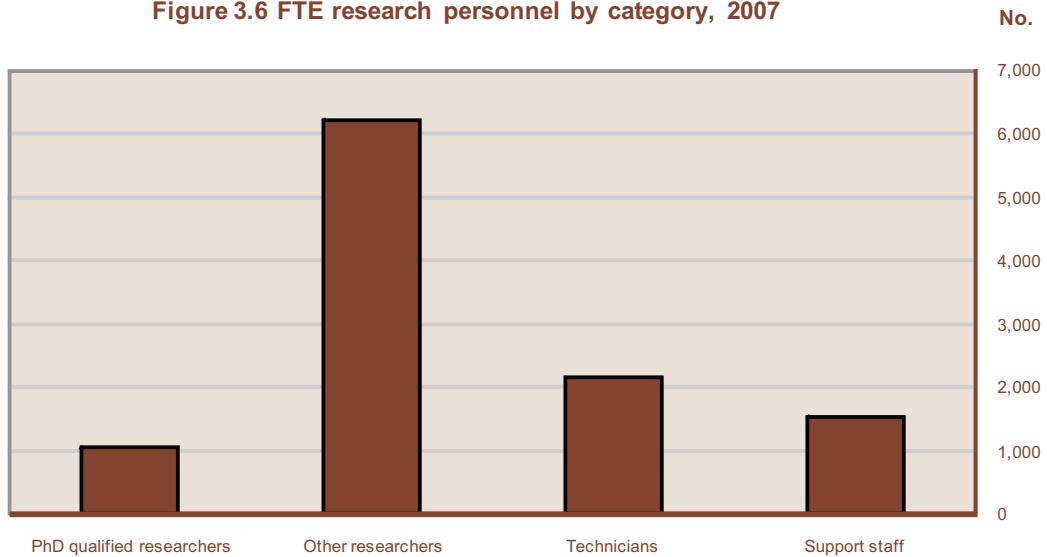


Source: CSO/Forfás - BERD Survey 2007/2008

Research and development – Full Time Equivalent (FTE) staff

There were 10,950 Full Time Equivalent (FTE) research staff in Ireland in 2007. There were approximately 7,250 FTE researchers of which 1,050 were FTE PhD qualified researchers. Just over 39% of all FTE research staff were engaged by Irish owned enterprises compared to 61% of such staff being engaged by foreign owned enterprises. Almost 6,100 FTE research staff worked in the services sectors accounting for 56% of all FTEs while 4,850 worked in the manufacturing sector. On a regional basis, almost 8,650 FTEs worked in the SE region compared to in excess of 2,300 who worked in the BMW region. See *Figure 3.6 and Table 3.3*.

Figure 3.6 FTE research personnel by category, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

A third of all FTE research staff were engaged in the 'Computer and related activities' sector while another tenth worked in the 'Manufacture of chemicals, chemical products and man-made fibres' sector. See *Table 3.4*.

Table 3.1 Total headcount of research personnel by size of enterprise, nationality of ownership and region, 2007

													No.		
	PhD qualified researchers			Other researchers			Technicians			Support staff			All R&D staff		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Size of enterprise															
Small (<50 persons engaged)	328	106	434	1,372	380	1,752	642	164	806	526	297	823	2,868	947	3,815
Medium/Large (50+ persons engaged)	532	213	745	4,080	1,231	5,311	1,626	517	2,143	1,322	615	1,937	7,560	2,575	10,135
Nationality of ownership															
Irish owned enterprises	327	131	459	2,021	660	2,681	1,075	298	1,373	1,043	466	1,510	4,467	1,555	6,022
Foreign owned enterprises	533	187	720	3,431	951	4,382	1,192	383	1,575	805	446	1,250	5,961	1,967	7,928
Sector of activity															
Manufacturing sectors	501	196	696	2,138	737	2,875	1,150	339	1,488	1,057	513	1,571	4,846	1,784	6,631
Services sectors ¹	360	123	483	3,313	874	4,187	1,117	342	1,460	791	398	1,189	5,582	1,738	7,320
Region															
Border, Midland and Western region	120	39	159	1,189	360	1,550	378	141	518	527	223	750	2,214	763	2,976
Southern and Eastern region	741	279	1,020	4,262	1,251	5,513	1,890	540	2,430	1,321	688	2,010	8,214	2,759	10,974
Total - all enterprises	861	318	1,179	5,452	1,611	7,063	2,268	681	2,949	1,848	912	2,760	10,428	3,522	13,950

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 NACE sector, 2007

		No.		
		Total headcount of researchers	Total headcount of other R&D staff	Total headcount of all R&D staff
15,16	Manufacture of food, beverages and tobacco.	470	496	966
17-19	Manufacture of textiles and textile products; Manufacture of leather and leather products.	16	54	70
20	Manufacture of wood and wood products.	c:	c:	c:
21,22	Manufacture of pulp, paper and paper products; publishing and printing.	c:	c:	c:
24	Manufacture of chemicals, chemical products and man-made fibres.	868	511	1,379
25	Manufacture of rubber and plastic products.	60	132	192
26	Manufacture of other non-metallic mineral products.	22	64	86
27,28	Manufacture of basic metals and fabricated metal products.	83	180	263
29	Manufacture of machinery and equipment n.e.c.	159	330	489
30	Manufacture of office machinery and computers.	208	65	273
31	Manufacture of electrical machinery and apparatus n.e.c.	457	302	759
32	Manufacture of radio, television and communication equipment and apparatus.	387	96	483
33	Manufacture of medical, precision and optical instruments, watches and clocks.	554	456	1,010
34,35	Manufacture of transport equipment.	39	108	147
36,37,23	Manufacturing n.e.c.; Manufacture of coke, refined petroleum products and nuclear fuel.	79	150	229
Total manufacturing sectors		3,571	3,059	6,631
50-52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods.	458	543	1,002
60-64; 65-67	Transport, storage and communication; Financial intermediation.	282	99	381
72	Computer and related activities.	2,869	1,464	4,333
73	Research and development.	638	358	996
74	Other business activities.	352	131	483
55,70,71,75-93	All other services.	c:	c:	c:
01,02,05,10-14,40,41,45	All other sectors.	c:	c:	c:
Total services sectors ¹		4,670	2,649	7,320
Total - all enterprises		8,242	5,709	13,950

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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.

c: Confidential

Table 3.3 Total full time equivalent (FTE) research personnel by size of enterprise, nationality of ownership and region, 2007

	PhD qualified researchers	Other researchers	Technicians	Support staff	No. All R&D staff
Size of enterprise					
Small (<50 persons engaged)	370	1,420	548	326	2,663
Medium/Large (50+ persons engaged)	676	4,796	1,608	1,213	8,293
Nationality of ownership					
Irish owned enterprises	398	2,240	966	673	4,278
Foreign owned enterprises	648	3,976	1,189	865	6,678
Sector of activity					
Manufacturing sectors	618	2,407	1,072	770	4,867
Services sectors ¹	428	3,809	1,083	769	6,089
Region					
Border, Midland and Western region	148	1,403	381	392	2,323
Southern and Eastern region	898	4,812	1,775	1,147	8,633
Total - all enterprises	1,046	6,216	2,156	1,539	10,956

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 NACE sector, 2007

		Total FTE researchers	Total other FTE R&D staff	No. Total FTE R&D staff
15,16	Manufacture of food, beverages and tobacco.	418	232	650
17-19	Manufacture of textiles and textile products; Manufacture of leather and leather products.	14	26	41
20	Manufacture of wood and wood products.	c:	c:	c:
21,22	Manufacture of pulp, paper and paper products; publishing and printing.	c:	c:	c:
24	Manufacture of chemicals, chemical products and man-made fibres.	704	397	1,102
25	Manufacture of rubber and plastic products.	46	64	110
26	Manufacture of other non-metallic mineral products.	9	15	24
27,28	Manufacture of basic metals and fabricated metal products.	62	78	140
29	Manufacture of machinery and equipment n.e.c.	133	207	340
30	Manufacture of office machinery and computers.	186	41	227
31	Manufacture of electrical machinery and apparatus n.e.c.	368	251	618
32	Manufacture of radio, television and communication equipment and apparatus.	359	65	423
33	Manufacture of medical, precision and optical instruments, watches and clocks.	490	329	819
34,35	Manufacture of transport equipment.	29	42	71
36,37,23	Manufacturing n.e.c.; Manufacture of coke, refined petroleum products and nuclear fuel.	48	53	101
Total manufacturing sectors		3,025	1,842	4,867
50-52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods.	413	366	779
60-64; 65-67	Transport, storage and communication; Financial intermediation.	266	47	314
72	Computer and related activities.	2,621	1,055	3,677
73	Research and development.	579	298	877
74	Other business activities.	309	77	385
55,70,71,75-93	All other services.	c:	c:	c:
01,02,05,10-14,40,41,45	All other sectors.	c:	c:	c:
Total services sectors ¹		4,237	1,852	6,089
Total - all enterprises		7,262	3,695	10,956

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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.

c: Confidential

Chapter 4

Research and Development Active Enterprises

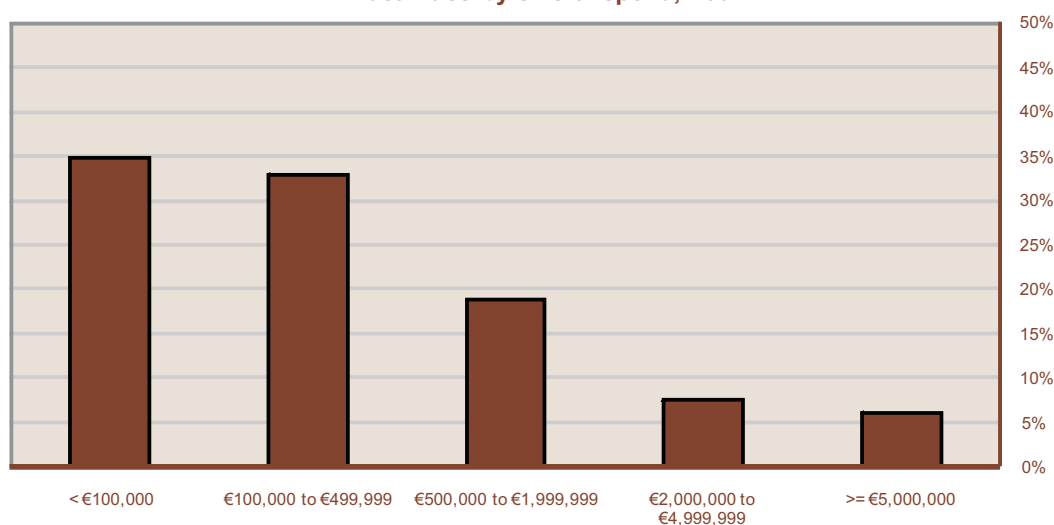
Introduction

Enterprises who had in-house research and development activities in 2007, sub-contracted research and development activities in 2007 or enterprises controlling any branches or plants engaged in research and development activities, are considered to be enterprises engaged in research and development in 2007.

Number of active enterprises

There were more than 1,200 enterprises engaged in research and development activities in Ireland in 2007. More than two thirds of all enterprises spent less than €500,000 on research and development activities. Almost 19% spent between €500,000 and €2m while nearly 14% spent €2m or more on research and development activities in the period. See *Figure 4.1 and Table 4.1*.

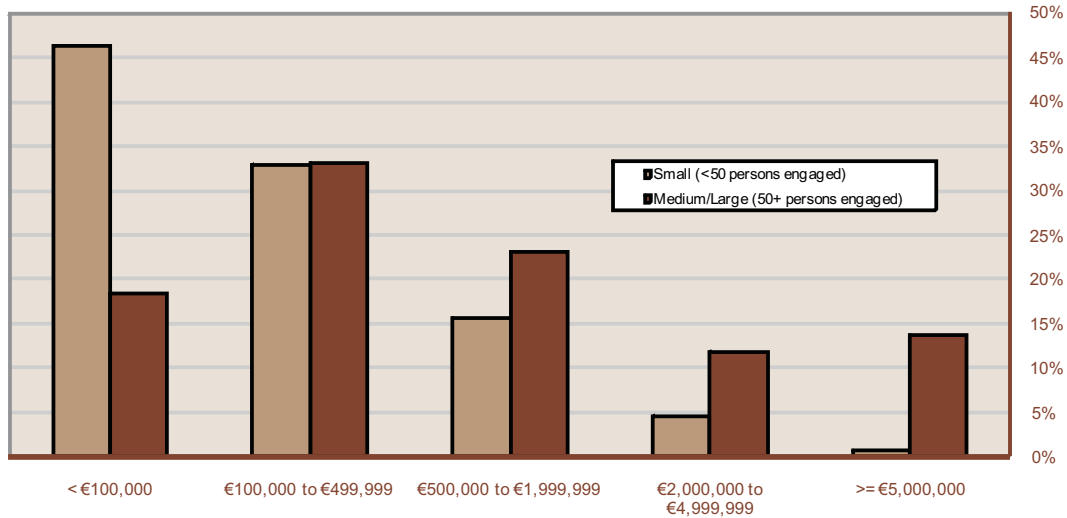
Figure 4.1 Share of enterprises engaged in research and development activities by size of spend, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

In 2007, 700 small enterprises were engaged in research and development activities while 505 medium/large enterprises were engaged in research and development activities. The vast majority (95%) of all small enterprises spent less than €2m on research and development activities in 2007 compared to 75% of medium/large enterprises. A quarter of all medium/large enterprises spent €2m or more. See Figure 4.2 and Table 4.1.

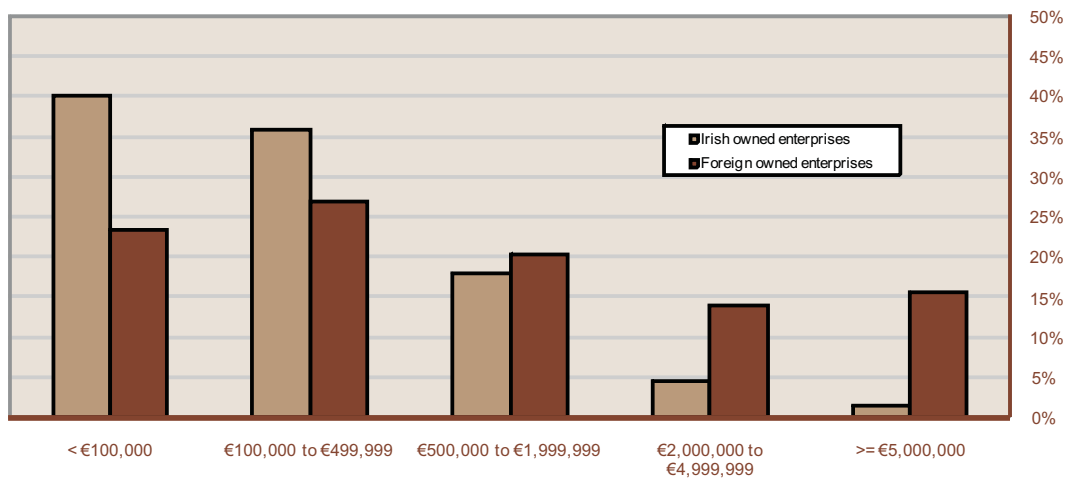
Figure 4.2 Share of enterprises engaged in research and development activities by size of spend and size of enterprise, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

There were more than 815 Irish owned enterprises engaged in research and development activities in 2007 compared to almost 390 foreign owned enterprises. Three quarters of all Irish owned enterprises spent less than €500,000 on research and development compared to half of all foreign owned enterprises. See Figure 4.3 and Table 4.1.

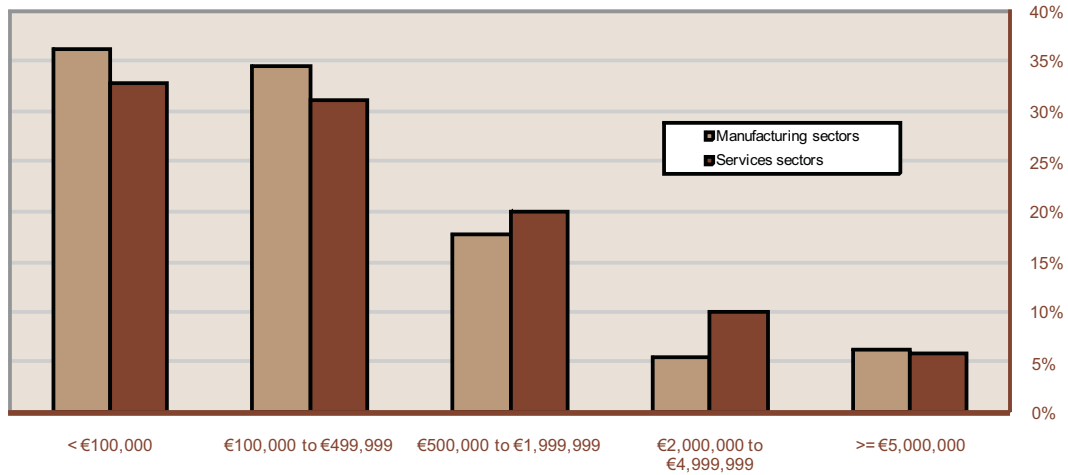
Figure 4.3 Share of enterprises engaged in research and development activities by size of spend and nationality of ownership, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

There were more than 665 enterprises in the manufacturing sector who were actively engaged in research and development in 2007 compared to 540 enterprises in the services sector. Almost 89% of manufacturing sector enterprises spent less than €2m on research and development in 2007 while 84% of services sector enterprises also spent less than €2m. 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, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

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, 2007

	Unit	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.	%	No.	%	No.	%	No.	%
Size of enterprise													
Small (<50 persons engaged)		326	46.4	231	32.9	110	15.7	31	4.4	4	0.6	702	100.0
Medium/Large (50+ persons engaged)		93	18.5	167	33.1	116	23.0	59	11.7	69	13.7	504	100.0
Nationality of ownership													
Irish owned enterprises		328	40.1	293	35.9	147	18.0	37	4.5	12	1.5	817	100.0
Foreign owned enterprises		91	23.4	105	27.0	79	20.3	54	13.9	61	15.7	389	100.0
Sector of activity													
Manufacturing sectors		242	36.3	230	34.5	118	17.7	37	5.5	41	6.1	667	100.0
Services sectors ¹		177	32.8	168	31.2	108	20.0	54	10.0	32	5.9	539	100.0
Total - all enterprises		419	34.7	398	33.0	226	18.7	90	7.5	73	6.1	1,206	100.0

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 PhD Researchers

Introduction

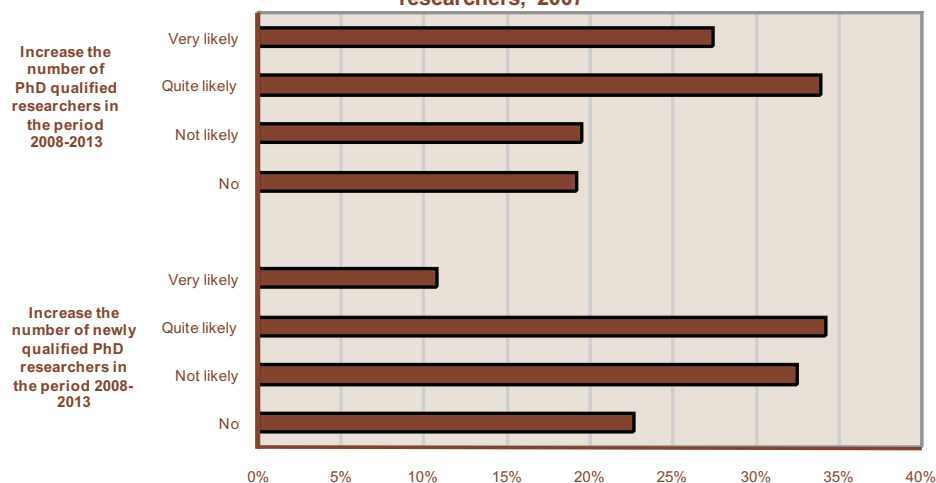
Enterprises were asked a number of questions regarding the recruitment of PhD researchers. They were asked to detail the likelihood of them recruiting PhD researchers and were also asked to rank factors that they considered important in employing PhD researchers, as well as ranking factors that would hamper the employment of such PhD qualified researchers.

Recruitment of PhD qualified researchers

In 2007, 61% 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 2008 to 2013 while 39% of these enterprises indicated that they were not likely or would not increase their numbers.

In addition, 45% of enterprises with PhDs employed indicated that they were very or quite likely to increase the number of newly qualified PhD researchers employed over the period 2008 to 2013, while 55% indicated they were not likely or would not increase such numbers. See Figure 5.1 and Table 5.1.

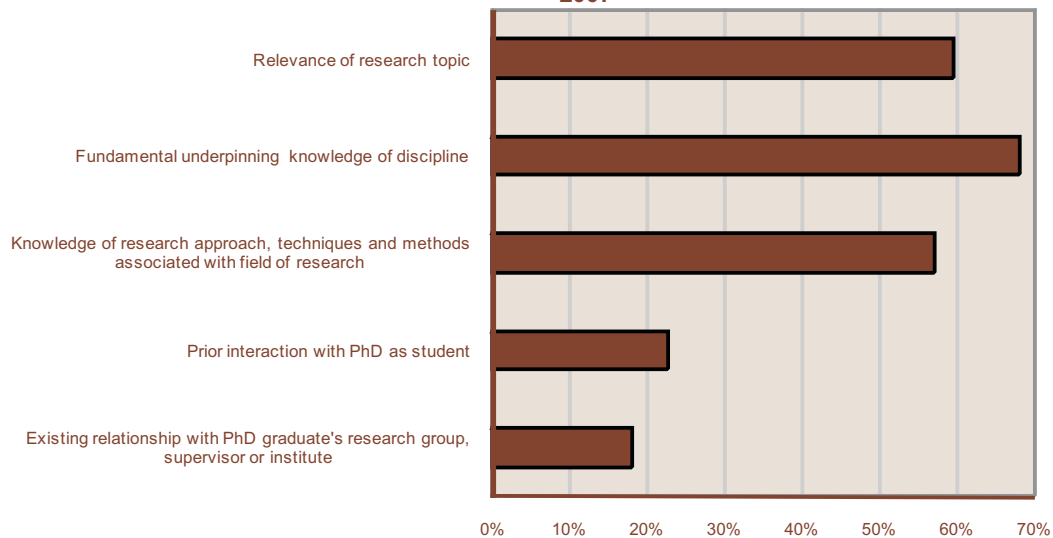
Figure 5.1 Enterprises with PhD researchers currently employed, indicating likelihood of further increasing the number of PhD qualified researchers, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

A highly important factor in employing PhD qualified researchers for 68% of all enterprises with PhD researchers employed was the fundamental underpinning knowledge of the PhD researchers discipline while 60% said the relevance of a PhD's research topic was highly important. See Figure 5.2 and Table 5.2.

Figure 5.2 Highly important factors in employing PhD qualified researchers for enterprises with PhD researchers currently employed, 2007

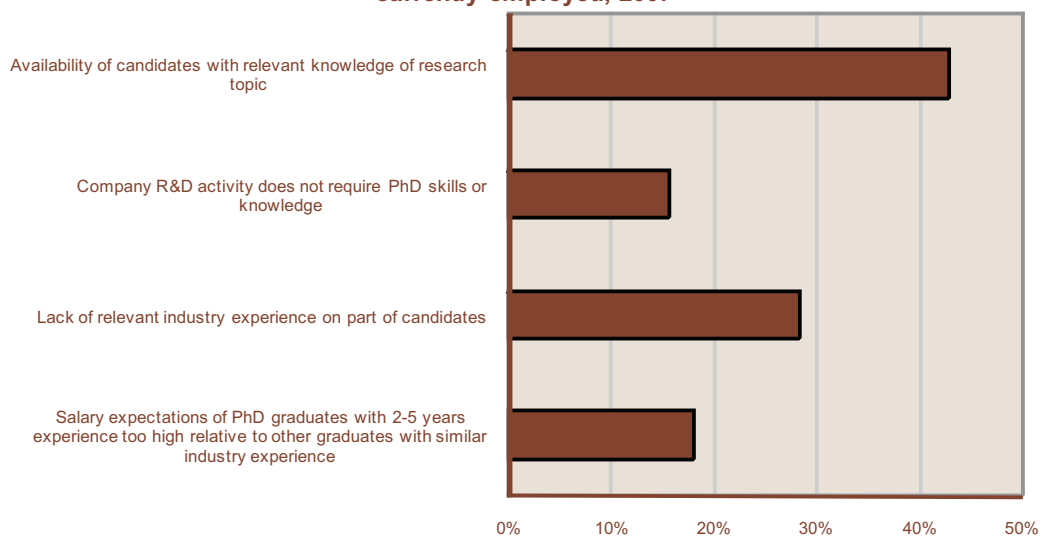


Source: CSO/Forfás - BERD Survey 2007/2008

Hampering factors in recruitment of PhD qualified researchers

Almost 43% of enterprises with PhD researchers employed indicated that the availability of candidates with relevant knowledge of research topics was a highly important factor hampering the recruitment of more PhD qualified researchers. Just over 28% said that the lack of relevant industry experience on the part of candidates was a highly important hampering factor. See Figure 5.3 and Table 5.3.

Figure 5.3 Highly important factors hampering the employment of more PhD qualified researchers for enterprises with PhD researchers currently employed, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

Table 5.1 Enterprises with PhD researchers currently employed, indicating likelihood of further increasing the number of PhD researchers in the period 2008-2013 by number of persons engaged, nationality of ownership and sector of activity, 2007

	Increase the number of PhD researchers in the period 2008-2013				Increase the number of newly qualified PhD researchers in the period 2008-2013				%
	Very likely	Quite likely	Not likely	No	Very likely	Quite likely	Not likely	No	
	Size of enterprise								
Small (<50 persons engaged)	35.1	26.5	16.2	22.2	12.0	40.8	22.3	25.0	
Medium/Large (50+ persons engaged)	18.9	42.0	23.1	16.0	9.5	27.4	43.5	19.6	
Nationality of ownership									
Irish owned enterprises	31.6	25.9	18.1	24.4	11.3	35.1	24.7	28.9	
Foreign owned enterprises	22.4	43.5	21.1	13.0	10.0	33.8	41.3	15.0	
Sector of activity									
Manufacturing sectors	21.7	40.6	19.4	18.3	7.8	35.2	37.4	19.6	
Services sectors ¹	33.1	26.9	19.4	20.6	13.7	33.1	27.4	25.7	
Total - all enterprises	27.4	33.9	19.5	19.2	10.7	34.2	32.5	22.6	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 5.2 Enterprises with PhD researchers currently employed, ranking importance factors in employing PhD qualified researchers, 2007

%

	Relevance of research topic			Fundamental underpinning knowledge of discipline			Knowledge of research approach, techniques and methods associated with field of research			Prior interaction with PhD as student			Existing relationship with PhD graduate's research group, supervisor or institute		
	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant
Size of enterprise															
Small (<50 persons engaged)	64.1	26.1	9.8	66.5	28.6	4.9	53.3	36.4	10.3	26.5	36.2	37.3	19.6	38.0	42.4
Medium/Large (50+ persons engaged)	54.4	32.5	13.0	69.8	30.2	0.0	61.5	33.1	5.3	18.3	50.9	30.8	16.6	49.1	34.3
Nationality of ownership															
Irish owned enterprises	62.2	29.5	8.3	61.9	34.5	3.6	53.6	36.1	10.3	27.5	37.3	35.2	17.0	43.3	39.7
Foreign owned enterprises	56.6	28.9	14.5	75.8	23.0	0.0	60.9	33.5	5.6	16.9	50.0	33.1	19.4	43.1	37.5
Sector of activity															
Manufacturing sectors	52.0	36.3	11.7	74.9	25.1	0.0	66.5	30.7	2.8	25.6	48.3	26.1	19.6	48.0	32.4
Services sectors ¹	66.9	22.3	10.9	61.7	33.1	5.1	47.4	39.4	13.1	19.5	37.9	42.5	16.6	38.9	44.6
Total - all enterprises	59.5	29.2	11.3	68.2	29.3	2.5	57.1	35.0	7.9	22.6	43.2	34.2	18.1	43.2	38.7

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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 5.3 Enterprises with PhD researchers currently employed, ranking importance factors in terms of hampering the employment of more PhD researchers, 2007

	%											
	Availability of candidates with relevant knowledge of research topic			Company R&D activity does not require PhD skills or knowledge			Lack of relevant industry experience on part of candidates			Salary expectations of PhD graduates with 2-5 years experience too high relative to other graduates with similar industry experience		
	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant	High	Medium	Low/ Not relevant
Size of enterprise												
Small (<50 persons engaged)	44.0	32.6	23.4	14.7	38.0	47.3	35.1	40.5	24.3	21.7	46.7	31.5
Medium/Large (50+ persons engaged)	41.1	28.0	31.0	16.6	33.1	50.3	20.7	48.5	30.8	14.2	23.7	62.1
Nationality of ownership												
Irish owned enterprises	41.1	33.9	25.0	17.5	36.6	45.9	31.1	43.5	25.4	22.8	36.8	40.4
Foreign owned enterprises	44.4	26.3	29.4	13.1	34.4	52.5	25.0	45.6	29.4	12.4	34.2	53.4
Sector of activity												
Manufacturing sectors	41.9	33.0	25.1	14.5	32.4	53.1	27.9	44.1	27.9	18.4	33.5	48.0
Services sectors ¹	43.7	27.6	28.7	16.7	39.1	44.3	29.3	44.3	26.4	17.7	37.7	44.6
Total - all enterprises	42.8	30.3	26.9	15.5	35.6	48.9	28.3	44.5	27.2	18.1	35.6	46.3

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

¹ 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

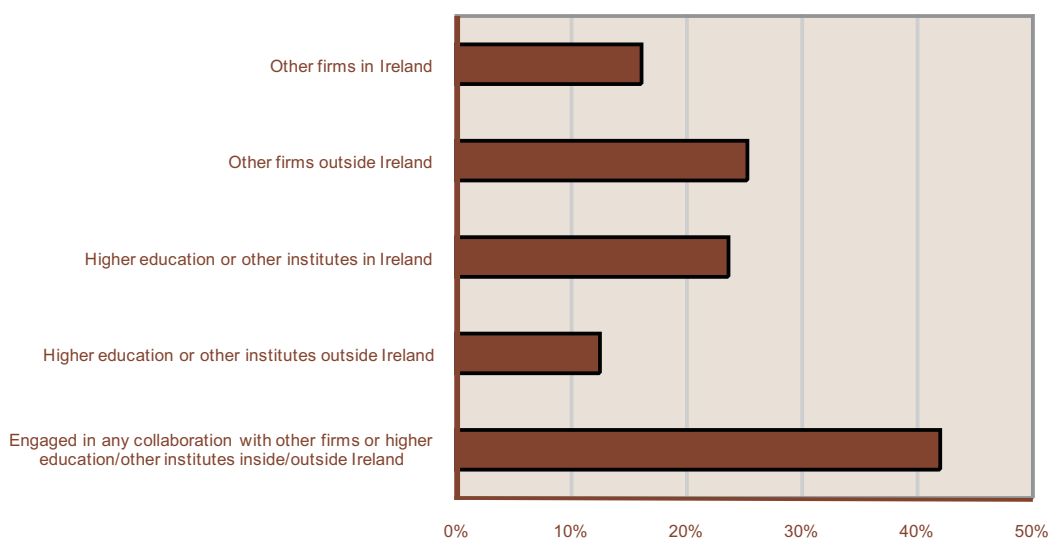
Introduction

Enterprises were asked whether they engaged in joint research projects in 2007 or whether they participated in any industry-academia research and development collaborations in the period.

Joint research projects

In 2007, 42% of all enterprises indicated that they engaged in a joint research project with either other firms or higher education/other institutes. A quarter of all enterprises engaged in a joint research project with other firms outside Ireland while 16% engaged with other firms in Ireland. Almost 24% of enterprises engaged in a joint research project with higher education institutes or other institutes inside Ireland while 13% of enterprises engaged in a joint research project with higher education or other institutes outside Ireland. See *Figure 6.1 and Table 6.1*.

Figure 6.1 Enterprises engaged in joint research projects, 2007

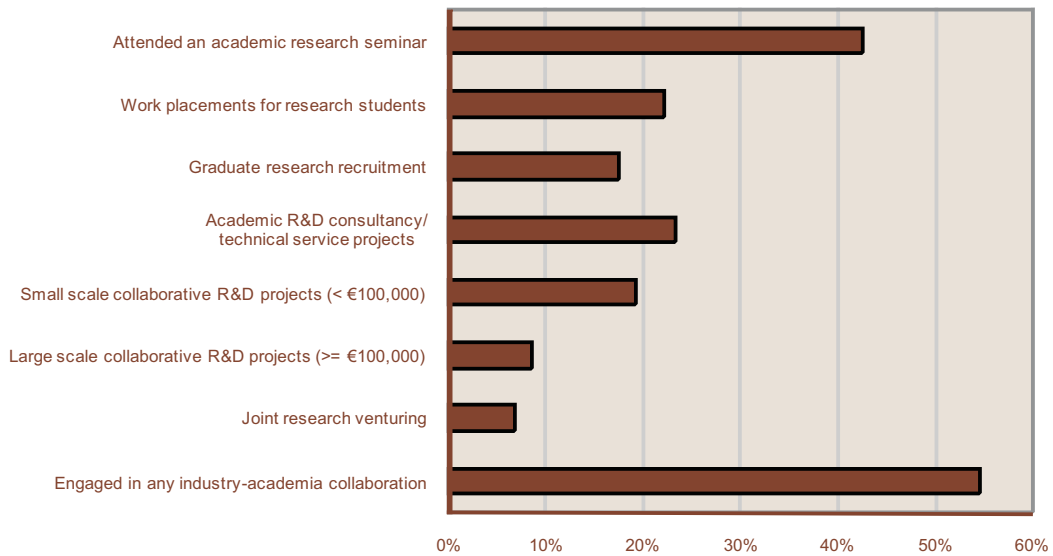


Source: CSO/Forfás - BERD Survey 2007/2008

Participation in industry-academia research and development collaboration

Almost 55% of all enterprises participated in some type of industry-academia research and development collaboration in 2007. The most common type of industry-academia collaboration for enterprises was attending an academic research seminar – 43% of all enterprises attended such a seminar. Over 23% of enterprises engaged in academic research and development consultancy or technical service projects while 22% of enterprises had work placement schemes for research students. See *Figure 6.2 and Table 6.2*.

Figure 6.2 Enterprises participating in industry-academia research and development collaboration, 2007



Source: CSO/Forfás - BERD Survey 2007/2008

Table 6.1 Enterprises engaged in joint research projects by size of enterprise, nationality of ownership and sector of activity, 2007

	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 ¹	%
Size of enterprise						
Small (<50 persons engaged)	15.5	21.7	22.1	11.8	39.6	
Medium/Large (50+ persons engaged)	16.9	30.2	25.8	13.5	45.2	
Nationality of ownership						
Irish owned enterprises	15.9	18.8	21.3	10.9	39.0	
Foreign owned enterprises	16.7	38.6	28.5	15.9	48.1	
Sector of activity						
Manufacturing sectors	16.2	28.0	19.6	12.0	41.4	
Services sectors ²	16.1	21.7	28.6	13.2	42.9	
Total - all enterprises	16.1	25.2	23.6	12.5	42.0	

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

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

² 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 participating in industry-academia research and development collaboration by size of enterprise, nationality of ownership and sector of activity, 2007

	%							
	Attended an academic research seminar	Work placements for research students	Graduate research recruitment	Academic R&D consultancy/ technical service projects	Small scale collaborative R&D projects (< €100,000)	Large scale collaborative R&D projects (>= €100,000)	Joint research venturing	Engaged in any industry-academia collaboration ¹
Size of enterprise								
Small (<50 persons engaged)	39.5	15.4	12.1	21.5	21.2	8.0	7.3	51.0
Medium/Large (50+ persons engaged)	47.0	31.7	24.8	26.0	16.5	9.1	6.2	59.3
Nationality of ownership								
Irish owned enterprises	40.1	18.2	14.9	22.2	19.1	7.8	6.9	52.5
Foreign owned enterprises	47.8	30.6	22.6	26.0	19.8	9.8	6.4	58.4
Sector of activity								
Manufacturing sectors	41.1	24.3	18.6	23.7	18.0	6.4	4.8	54.3
Services sectors ²	44.5	20.4	17.3	23.9	21.0	12.1	9.6	54.2
Total - all enterprises	42.6	22.2	17.4	23.4	19.3	8.5	6.7	54.5

Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

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

² 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 2007/2008 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 was previously conducted by Forfás but is now 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. Data are strictly confidential and are used only for statistical purposes.

Methodological changes were introduced in the BERD 2007/2008 Survey. As a consequence of this, no conclusions should be drawn regarding the direction or scale of any real changes between BERD 2005/2006 and BERD 2007/2008. 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 detailed sectoral level due to sectoral differences in the CSO Business Register (used for the 2007/2008 BERD Survey) when compared with the Forfás Business Register (used for previous editions of the BERD Survey). This 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 2007/08 survey questionnaire is included in Appendix 4 and is also available from the CSO website. Go to www.cso.ie and then go to Business Sectors: Science and Technology.

Appendix 2

Key to NACE Rev 1.1 Classification

Agriculture, hunting and forestry

- 01 Agriculture, hunting and related services activities
- 02 Forestry, logging and related service activities

Fishing

- 05 Fishing, fish farming and related service activities

Mining and quarrying

- 10 Mining of coal and lignite; extraction of peat
- 11 Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying
- 12 Mining of uranium and thorium ores
- 13 Mining of metal ores
- 14 Other mining and quarrying

Manufacturing

- 15 Manufacture of food products and beverages
- 16 Manufacture of tobacco products
- 17 Manufacture of textiles
- 18 Manufacture of wearing apparel; dressing and dyeing of fur
- 19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
- 20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
- 21 Manufacture of pulp, paper and paper products
- 22 Publishing, printing and reproduction of recorded media
- 23 Manufacture of coke, refined petroleum products and nuclear fuel
- 24 Manufacture of chemicals and chemical products
- 25 Manufacture of rubber and plastic products
- 26 Manufacture of other non-metallic mineral products
- 27 Manufacture of basic metals

- 28 Manufacture of fabricated metal products, except machinery and equipment
- 29 Manufacture of machinery and equipment n.e.c.
- 30 Manufacture of office machinery and computers
- 31 Manufacture of electrical machinery and apparatus n.e.c.
- 32 Manufacture of radio, television and communication equipment and apparatus
- 33 Manufacture of medical, precision and optical instruments, watches and clocks
- 34 Manufacture of motor vehicles, trailers and semi-trailers
- 35 Manufacture of other transport equipment
- 36 Manufacture of furniture; manufacturing n.e.c.
- 37 Recycling

Electricity, gas and water supply

- 40 Electricity, gas, steam and hot water supply
- 41 Collection, purification and distribution of water

Construction

- 45 Construction

Services – Divisions 50 to 99

- 50 Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
- 51 Wholesale trade and commission trade, except of motor vehicles and motorcycles
- 52 Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
- 60 Land transport; transport via pipelines
- 61 Water transport
- 62 Air transport
- 63 Supporting and auxiliary transport activities; activities of travel agencies
- 64 Post and telecommunications
- 65 Financial intermediation, except insurance and pension funding
- 66 Insurance and pension funding, except compulsory social security
- 67 Activities auxiliary to financial intermediation
- 70 Real Estate activities
- 71 Renting of machinery and equipment without operator and of personal and household goods
- 72 Computer and related activities
- 73 Research and Development
- 74 Other business activities
- 75 Public administration and defence; compulsory social security
- 80 Education
- 85 Health and social work
- 90 Sewage and refuse disposal, sanitation and similar activities
- 91 Activities of membership organizations n.e.c
- 92 Recreational, cultural and sporting activities
- 93 Other service activities
- 95 Activities of households as employers of domestic staff
- 96 Undifferentiated goods producing activities of private households for own use
- 97 Undifferentiated services producing activities of private households for own use
- 99 Extra-territorial organizations and bodies

Appendix 3

Comparisons to previous data

Introduction

The summary results for previous years that are included in Appendix 3 are included for reference only. Methodological changes were introduced in the BERD 2007/2008 Survey. As a consequence of this, no conclusions should be drawn regarding the direction or scale of any real changes between BERD 2005/2006 and BERD 2007/2008. Comparisons should be treated with caution. In particular, it is not advised to make any comparisons of results at detailed sectoral level due to sectoral differences in the CSO Business Register (used for the 2007/2008 BERD Survey) when compared with the Forfás Business Register (used for previous editions of the BERD Survey). This 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 - 2008

	Unit	2001 ¹	2003 ¹	2005 ¹	2007 ²	2008 ^{2,3}
Research and development expenditure						
Current expenditure	€m	833	952	1,140	1,324	1,416
of which: Labour costs	€m	515	613	748	844	905
Other current costs	€m	318	340	392	480	510
Capital expenditure	€m	67	153	189	279	271
of which: Land and buildings	€m	16	82	56	74	64
Instruments and equipment (excluding software)	€m	51	71	133	206	207
Total research and development expenditure	€m	900	1,105	1,329	1,603	1,687
Human resources - headcount of research staff						
Researchers	No.	6,937	6,611	7,696	8,242	:
of which: PhD qualified researchers	No.	420	466	830	1,179	:
Other researchers	No.	6,517	6,145	6,866	7,063	:
Technicians	No.	2,642	2,799	3,095	2,949	:
Support staff	No.	2,741	2,627	2,830	2,760	:
Total research personnel (headcount)	No.	12,320	12,037	13,621	13,950	:
Human resources - Full Time Equivalent (FTE) research staff						
Researchers	No.	5,971	6,012	6,768	7,262	:
Technicians	No.	1,748	1,909	2,314	2,156	:
Support staff	No.	1,407	1,359	1,256	1,539	:
Total research personnel (FTE)	No.	9,126	9,280	10,338	10,956	:
Distribution of research and development expenditure by size of spend						
< €100,000	No.	:	451	546	419	:
€100,000 to €499,999	No.	:	411	453	398	:
€500,000 to €1,999,999	No.	:	181	253	226	:
€2,000,000 to €4,999,999	No.	:	39	68	90	:
>= €5,000,000	No.	:	42	50	73	:
Total number of enterprises engaged in research and development activities	No.	1,264	1,125	1,370	1,206	:

¹Source: Forfás - Business Expenditure on Research and Development, 2001 - 2005.

²Source: CSO/Forfás - Business Expenditure on Research and Development, 2007-2008.

³Expected expenditure for 2008 - estimated figures were returned by enterprises before final 2008 figures were available.

: Data not available

Appendix 4

BERD 2007/2008 Survey Form

