



## **Gross domestic expenditure on research and development (R&D) in the UK (tables 1, 2 and 3)**

The estimate of the UK's gross domestic expenditure on R&D (GERD) in 2006 was £23.2 billion compared to £21.7 billion in 2005. Expenditure on civil R&D projects was £20.9 billion in 2006, 10 per cent higher in cash terms than for 2005. R&D expenditure for defence purposes, at £2.4 billion, was 11 per cent lower than 2005. Over the period of this report, expenditure on civil R&D projects as a proportion of GDP has ranged between 1.49 and 1.61 per cent and on defence projects it has been between 0.18 and 0.21 per cent.

### **Performers of R&D in the UK (table 2)**

The sectors of the economy carrying out R&D (in cash terms) in 2006 were:

- Business Enterprise: £14.3 billion, up 7 per cent on 2005.
- Higher Education: £6.1 billion, up 9 per cent on 2005.
- Government: £1.3 billion, up 2 per cent on 2005.
- Research Councils: £1.1 billion. Unchanged on 2005.
- Private Non-Profit (PNP): £0.5 billion, up 3 per cent on 2005.

### **Funding of R&D (in cash terms) in the UK (tables 4 and 5)**

- In 2006, government (including Higher Education Funding Councils and Research Councils) funded 32 per cent of all R&D performed in the UK (29 per cent of civil R&D and 53 per cent of defence R&D).
- Businesses funded 45 per cent of all R&D, a 3 per cent increase on the previous year.

### **Revisions**

Revisions have been made to the Business Enterprise estimates for 2004 and 2005 and also to the 2005 Government estimates. This is due to some misreporting and the late receipt of data.

## BACKGROUND NOTES

1. This First Release presents estimates of gross domestic expenditure on research and development in the UK (GERD) in 2006.
2. More detailed figures will be published later in the year by the Department for Innovation, Universities & Skills (DIUS) in the *Science, Engineering and Technology Statistics 2008 (SET Statistics 2008* -see background note 21). Detailed tabulations for Business Enterprise R&D were published in January 2008 in *Business Monitor MA14* – see background note 22. International comparisons are published by the Organisation for Economic Co-operation and Development (OECD – see background note 23).

## Sources

3. Two annual surveys of R&D are conducted by ONS. One is addressed to all government departments and covers R&D performed in, or funded by the Central Government sector (see the classification of sectors below). Detailed results, including figures for individual departments, will be available from the ONS on request after they have appeared in the DIUS's *SET Statistics 2008*, which will be available on BERR's website at <http://www.berr.gov.uk/dius/science/science-funding/set-stats/index.html>. This publication has detailed analyses of the net expenditure of government departments (i.e. which includes government expenditure on R&D performed outside central government, less any receipts for work performed within central government).
4. The other annual survey is addressed to businesses. The 2006 survey results were first published in an ONS First Release on 26 November 2007 – see background note 24.
5. The government funding totals in tables 4 and 5 differ from the tables showing departmental breakdowns of net expenditure in DIUS's *SET Statistics*. Tables 4 and 5 use information on government funded R&D from the survey of Business Enterprise R&D. The *SET Statistics 2008* use the survey of government funded R&D. The differences are due chiefly to the way the respondents to each survey record the R&D content of Ministry of Defence contracts.

## Definition of R&D

6. The definitions used here are based on those internationally agreed through the OECD; and are set out in the *Frascati Manual* – see background note 25.

7. R&D activity is distinguished by the presence of an appreciable element of novelty. If the activity follows an established pattern it is excluded; if it departs from routine and breaks new ground it is included. For example: activities such as routine testing, market research, patent applications, trial production runs, and artistic design work are excluded. Overheads of R&D projects are included. VAT is excluded.

#### **Defence R&D**

8. Defence includes all R&D programmes undertaken primarily for defence reasons regardless of their content or whether they have secondary civil applications. It includes nuclear and space R&D undertaken for defence purposes. It does not include civil R&D financed by the Ministry of Defence, for instance on meteorology or telecommunications. It includes defence R&D commissioned by overseas clients.

#### **Classification of sectors**

9. The OECD terminology is used. "Government" corresponds to the "General Government" sector of the UK National Accounts and includes local as well as central Government. "Business enterprise" corresponds to the "Corporate" sector and includes public corporations and research associations as well as commercial and industrial companies. "Private Non-Profit" corresponds to the "Personal" sector of the National Accounts, except that higher education institutions are excluded and put into a separate OECD sector ("Higher Education"). "Abroad" corresponds to the "Overseas" sector.

#### **Gross domestic expenditure on research and development (GERD)**

10. GERD is the measure most commonly used for international comparisons. It covers all R&D performed in the country concerned irrespective of who pays for it. Therefore, UK GERD covers all R&D in the UK including that funded from abroad; but it excludes R&D performed abroad even if funded from the UK. The four components of GERD relate to R&D performed in the four sectors of the economy:
  - a. **Government R&D** is based on the returns of in house R&D in the government survey with the addition of ONS estimates for two other components: R&D performed by local authorities and some R&D within central government R&D not available from the survey. From 1996 UK NHS figures have been obtained from the Department of Health and the Scottish Executive on the basis of the Culyer Directive which since 1995 confirmed the extent of R&D spending in the NHS. From 1991 to 1995, estimates for NHS R&D are based on proportions of the total NHS budget.

- b. **Business enterprise R&D** is derived from the results of the ONS's business R&D survey.
  - c. **Higher Education R&D** is estimated by the Higher Education Funding Councils for England, Scotland, Wales and the Department for Education in Northern Ireland.
  - d. **PNP** is estimated from a number of sources including the total reported as "other" extramural R&D spend by government, including Research Councils.
11. In addition to being analysed by sector of performance, GERD may be analysed by sector of funding. The R&D performed by any one sector of the economy can be funded by any of the other sectors or by the performing sector itself.
  12. For the purposes of estimating GERD the standard internationally recommended practice of the OECD is to use information from those performing R&D when this is available. These estimates are considered more reliable than those from surveys of R&D funders. This is why, in the UK GERD table, the estimate of businesses' R&D funded by government is from the business enterprise survey rather than the government R&D survey.
  13. The figures for R&D performed by government and businesses may be considered more robust than the other GERD components, since they are based on well-established surveys.
  14. On 1 July 2001, the Government research agency, the Defence Evaluation and Research Agency (DERA) was disestablished and two new organisations were created. Around a quarter of DERA remained within the Ministry of Defence (MOD) as a government agency while the remaining three-quarters became a private limited company (PLC). As a PLC its R&D activities are now classified and included within the Business sector.
  15. The sample for the R&D business survey was doubled in 1999 to four thousand businesses.
  16. Due to a review of the methodology used for the compilation of the R&D spend by the PNP sector, estimates are currently based on a number of sources. These include the total reported as the GovERD 'other' spend by government, including Research Councils. The findings of the methodological review will be fed in to the next PNP survey, which is planned for 2008.

#### Real terms

17. Figures given in “real terms” are calculated using the GDP deflator at market prices; 2006=100.

**Revisions**

18. One indication of the reliability of the key indicators in this release can be obtained by monitoring the size of revisions. The table below records the size and pattern of revisions that have occurred over the last five years. Please note that these indicators only report summary measures for revisions. (The revised data may itself be subject to sampling or other sources of error.)

The table covers estimates of the UK’s gross domestic expenditure on R&D first published from March 2000 (for 1998) to March 2004 (for 2002). A spreadsheet giving these estimates and the calculations behind the averages in the table is available on the National Statistics website at: <http://www.statistics.gov.uk/statbase/Product.asp?vlnk=418>

	Value in latest period	Revisions between first publication and estimates three years later	
		Average over the last 5 years (mean revision)	Average over the last 5 years without regard to sign (average absolute revision)
<i>£ million</i>			
Gross expenditure on R&D in the UK (GLBA)	23,204	-34	214

A statistical test has been applied to the average revision to find out if there is bias in the estimates. No statistically significant bias was identified.

More information about the revisions material in this Release can be found on the National Statistics website: <http://www.statistics.gov.uk/cci/article.asp?ID=793>

19. Figures marked † indicate revised data where the period marked is the earliest in the table to have been revised.

**Rounding of figures**

20. There may be discrepancies between totals and the sum of their independently rounded components.

**References**

21. Government R&D expenditure figures for 2005-06 are available in DIUS's *SET Statistics 2007*, available on BERR's website at <http://www.berr.gov.uk/dius/science/science-funding/set-stats/index.html>; 2006-07 figures will be published in *SET Statistics 2008*, publication date to be announced.
22. 2006 Business Enterprise R&D was published in *Business Monitor MA14* in January 2008. Available on the web at: <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=165>
23. *Main Science and Technology Indicators 2006/7*, OECD, Paris. ISSN 1011-792X. Available on the web at [www.SourceOECD.org](http://www.SourceOECD.org).
24. First Release *Business Enterprise Research and Development 2006*, National Statistics. Available on the web at: <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=8206>
25. Proposed Standard Practice for Surveys of Research and Experimental Development, '*Frascati Manual*', OECD, Paris. ISBN 92-64-19903-9

#### General

26. For information on available aggregated data on Gross Domestic Expenditure on Research and Development and ONS's Data Analysis Service, please contact Julie Owens on 01633 456765 (e-mail [julie.owens@ons.gsi.gov.uk](mailto:julie.owens@ons.gsi.gov.uk)).
27. Details of the National Statistics policy governing the release of new data are available from the Press Office. Also available is a list of the names of those given pre-publication access to the contents of this release.
28. **National Statistics** are produced to high professional standards set out in the National Statistics Code of Practice. They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference. © **Crown copyright 2008**.

# 1 R&D PERFORMED IN THE UK IN EACH SECTOR ACCORDING TO SOURCE OF FUNDING, 2006

IN CASH TERMS

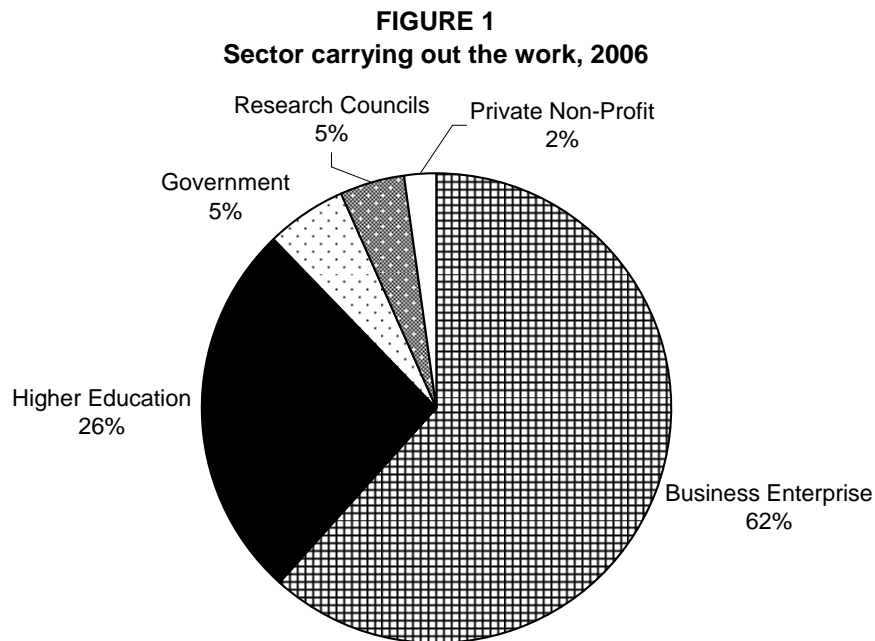
Sector carrying out the work

£million

	Government	Research Councils	Higher Education	Business Enterprise	Private Non-Profit	Total	Abroad
<b>Sector providing the funds</b>							
Government	1 045	105	279	1 074	79	2 582	311
Research Councils	2	778	1 818	7	123	2 727	222
Higher Education Funding Councils	–	–	2 085	–	–	2 085	–
Higher Education	1	21	261	–	8	292	–
Business Enterprise	180	28	290	9 933	57	10 487	1 808
Private Non-Profit	5	59	826	2	184	1 076	–
Abroad	32	63	503	3 289	67	3 954	–
<b>TOTAL</b>	<b>1 264</b>	<b>1 054</b>	<b>6 062</b>	<b>14 306</b>	<b>518</b>	<b>23 204</b>	<b>–</b>
of which:							
Civil	904	1 053	6 016	12 364	517	20 854	–
Defence	360	1	46	1 942	–	2 350	–

1 - denotes nil, figures unavailable or too small to display.

Source: National Statistics



## 2 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN THE UK BY SECTOR OF PERFORMANCE: 1996 TO 2006

£million

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Sector carrying out the work</b>												
In cash terms												
<b>TOTAL</b>	<b>GLBA</b>	14 447	14 687	15 503	16 978	17 736	18 286	19 228	19 898	20 248 <sup>†</sup>	21 681	23 204
Government	<b>GLBK</b>	1 553	1 403	1 471	1 464	1 593	1 160	1 053	1 243	1 240	1 238 <sup>†</sup>	1 264
Research Councils	<b>DMRS</b>	575	590	591	622	647	674	713	825	930	1 051	1 054
Business Enterprise	<b>GLBL</b>	9 297	9 556	10 133	11 302	11 510	11 978	12 469	12 677	12 668 <sup>†</sup>	13 310	14 306
Higher Education	<b>GLBM</b>	2 792	2 893	3 040	3 324	3 691	4 149	4 618	4 785	5 004	5 580 <sup>†</sup>	6 062
Private Non-Profit	<b>GLBN</b>	230	245	268	266	296	325	374	369	406	502 <sup>†</sup>	518
As % of GDP		1.86	1.77	1.77	1.83	1.83	1.80	1.79	1.75	1.69 <sup>†</sup>	1.74	1.75
<hr/>												
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Sector carrying out the work</b>												
In real terms (2006 prices)												
<b>TOTAL</b>		18 502 <sup>†</sup>	18 275	18 814	20 197	20 802	20 946	21 357	21 478	21 269	22 303	23 204
Government		1 989 <sup>†</sup>	1 746	1 785	1 742	1 868	1 329	1 170	1 342	1 303	1 274	1 264
Research Councils		736	734 <sup>†</sup>	717	740	759	772	792	891	977	1 081	1 054
Business Enterprise		11 907 <sup>†</sup>	11 891	12 297	13 445	13 500	13 720	13 849	13 684	13 307	13 692	14 306
Higher Education		3 576 <sup>†</sup>	3 600	3 689	3 954	4 329	4 753	5 129	5 165	5 256	5 740	6 062
Private Non-Profit		295 <sup>†</sup>	305	325	316	347	372	415	398	426	516	518

1 - denotes nil, figures unavailable or too small to display.

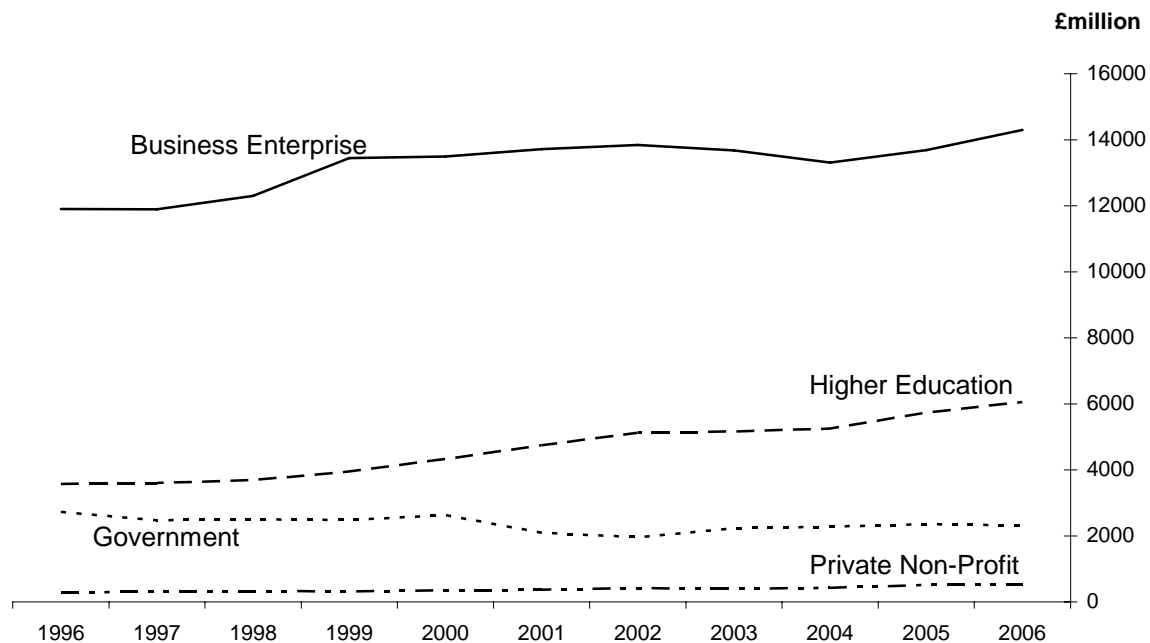
2 <sup>†</sup> denotes revised figures.

3 See background note 18 on revisions.

4 On 1 July 2001, the Government research agency, the Defence Evaluation and Research Agency (DERA) was disestablished and two new organisations were created. Around a quarter of DERA remained within the Ministry of Defence (MOD) as a government agency whilst the remaining three-quarters became a Private limited company (PLC). As a PLC its R&D activities are now classified and included within the Business sector.

Source: National Statistics

**FIGURE 2**  
**Sector carrying out the work (in real terms) 1996 - 2006**



# 3 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN THE UK BY SECTOR OF PERFORMANCE: 2001 TO 2006

IN CASH TERMS

£million

		Civil						Defence						
		2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006	
<b>Sector carrying out the work</b>														
<b>TOTAL</b>	<b>GLBB</b>	16 177	17 256	17 780	17 808 <sup>†</sup>	19 028	20 854	<b>GLBC</b>	2 108	1 972	2 118	2 440	2 653 <sup>†</sup>	2 350
Government	GLBO	746	771	869	889	878 <sup>†</sup>	904	GLBS	414	283	374	351	360	360
Research Councils	DMSC	669	708	819	923	1 046	1 053	DMSM	5	6	6	7	4	1
Business Enterprise	GLBP	10 333	10 823	10 977	10 629 <sup>†</sup>	11 055	12 364	GLBT	1 645	1 646	1 700	2 039	2 254 <sup>†</sup>	1 942
Higher Education	GLBQ	4 104	4 581	4 746	4 960	5 546 <sup>†</sup>	6 016	GLBU	45	37	38	44	34	46
Private Non-Profit	GLBR	325	374	369	406	502 <sup>†</sup>	517	GLBV	-	-	-	-	-	-
As % of GDP		1.60	1.61	1.56	1.49 <sup>†</sup>	1.52	1.57		0.21	0.18	0.19	0.20	0.21	0.18

1 - denotes nil, figures unavailable or too small to display.

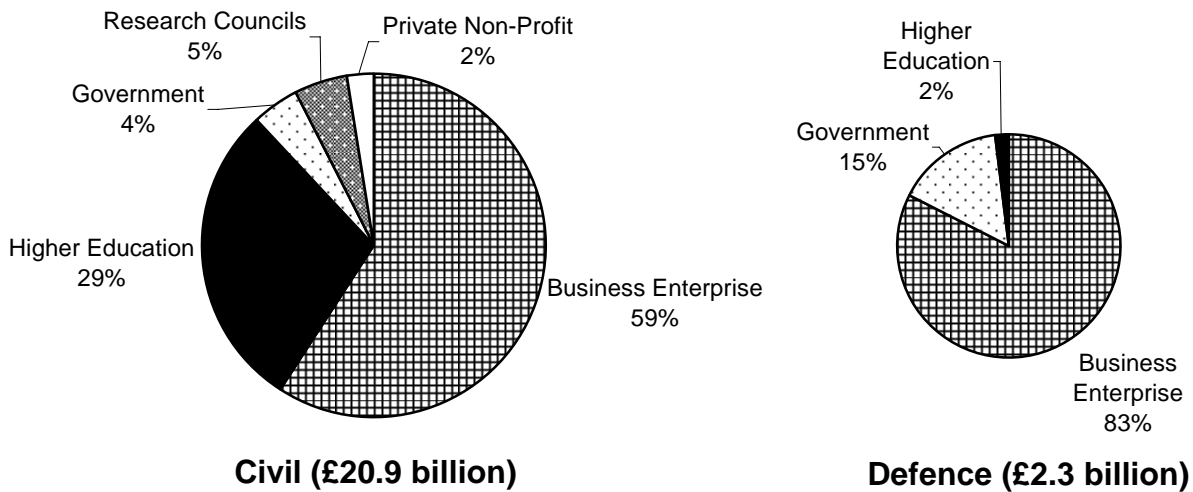
2 <sup>†</sup> denotes revised figures.

3 See background note 18 on revisions.

4 On 1 July 2001, the Government research agency, the Defence Evaluation and Research Agency (DERA) was disestablished and two new organisations were created. Around a quarter of DERA remained within the Ministry of Defence (MOD) as a government agency whilst the remaining three-quarters became a Private limited company (PLC). As a PLC its R&D activities are now classified and included within the Business sector.

Source: National Statistics

**FIGURE 3**  
**Sector carrying out the work, 2006**



# 4 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN THE UK BY SECTOR OF FUNDING: 1996 TO 2006

£million

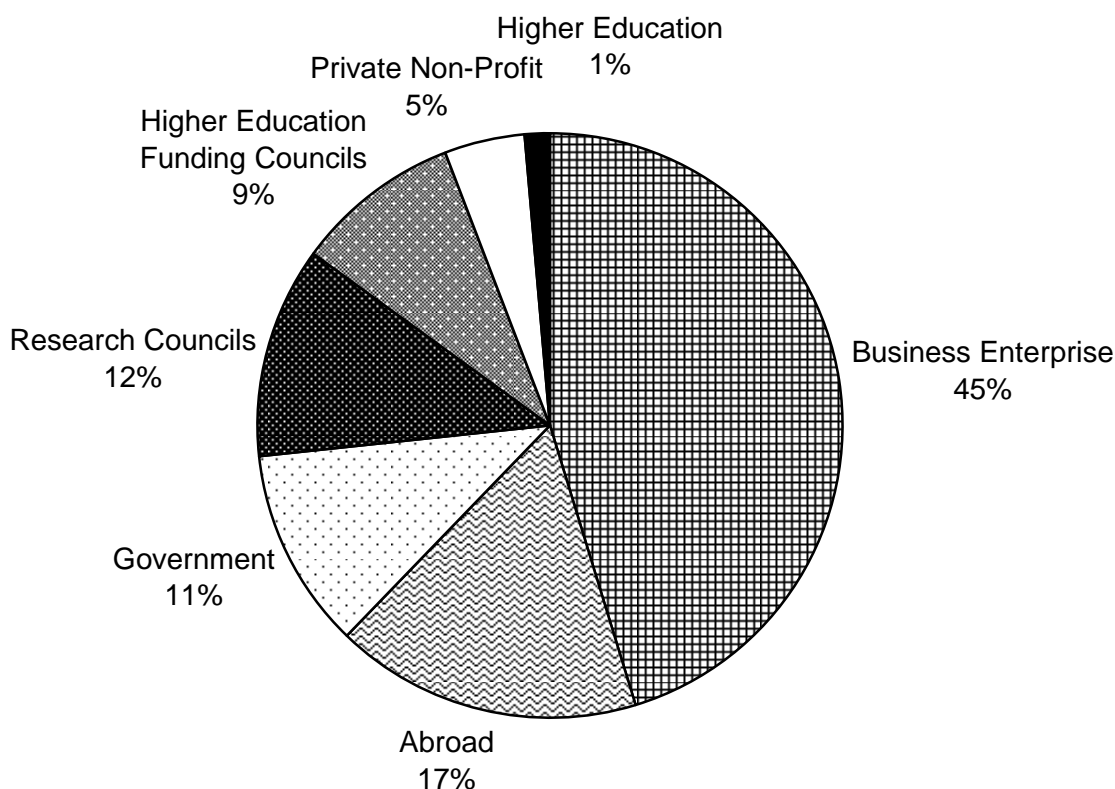
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Sector funding R&amp;D in the UK</b>												
In cash terms												
<b>TOTAL</b>	<b>GLBA</b>	14 447	14 687	15 503	16 978	17 736	18 286	19 228	19 898	20 248 <sup>†</sup>	21 681	23 204
Government	GLCA	2 542	2 403	2 606	2 722	2 779	2 292	2 215	2 705	2 777 <sup>†</sup>	2 594	2 582
Research Councils	DMSR	1 112	1 156	1 139	1 211	1 317	1 512	1 713	1 947	2 084	2 574	2 727
Higher Education Funding Councils	DMSS	1 027	1 033	1 085	1 157	1 276	1 474	1 626	1 665	1 804	1 928	2 085
Business Enterprise	GLCB	6 784	7 275	7 331	8 137	8 559	8 329	8 366	8 394	8 922 <sup>†</sup>	9 119	10 487
Higher Education	GLCC	121	123	130	143	160	184	208	218	229	266 <sup>†</sup>	292
Abroad	GLCE	2 316	2 119	2 590	2 908	2 830	3 607	4 138	4 038	3 472 <sup>†</sup>	4 178	3 954
Private Non-Profit	GLCD	545	578	621	701	815	888	962	931	960	1 022	1 076

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Sector funding R&amp;D in the UK</b>												
In real terms (2006 prices)												
<b>TOTAL</b>		18 502 <sup>†</sup>	18 275	18 814	20 197	20 802	20 946	21 357	21 478	21 269	22 303	23 204
Government		3 256 <sup>†</sup>	2 990	3 163	3 238	3 259	2 625	2 460	2 920	2 917	2 668	2 582
Research Councils		1 424 <sup>†</sup>	1 438	1 382	1 441	1 545	1 732	1 903	2 102	2 189	2 648	2 727
Higher Education Funding Councils		1 315 <sup>†</sup>	1 285	1 317	1 376	1 497	1 688	1 806	1 797	1 895	1 983	2 085
Business Enterprise		8 688 <sup>†</sup>	9 052	8 897	9 680	10 039	9 541	9 292	9 061	9 372	9 381	10 487
Higher Education		155	153	158	170	188 <sup>†</sup>	211	231	235	241	274	292
Abroad		2 966 <sup>†</sup>	2 637	3 143	3 459	3 319	4 132	4 596	4 359	3 647	4 298	3 954
Private Non-Profit		698 <sup>†</sup>	719	754	834	956	1 017	1 068	1 005	1 008	1 051	1 076

1 - denotes nil, figures unavailable or too small to display.  
 2 <sup>†</sup> denotes revised figures.  
 3 See background note 18 on revisions.

Source: National Statistics

**FIGURE 4**  
**Sector providing the funds, 2006**



# 5 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN THE UK BY SECTOR OF FUNDING: 2001 TO 2006

IN CASH TERMS

£million

		Civil						Defence						
		2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006	
<b>Sector funding R&amp;D in the UK</b>														
<b>TOTAL</b>	<b>GLBB</b>	16 177	17 256	17 780	17 808 <sup>†</sup>	19 028	20 854	<b>GLBC</b>	2 108	1 972	2 118	2 440	2 653 <sup>†</sup>	2 350
Government	GLCF	1 088	1 258	1 563	1 300 <sup>†</sup>	1 304	1 333	GLCK	1 204	956	1 142	1 477 <sup>†</sup>	1 290	1 249
Research Councils	DMSX	1 512	1 713	1 947	2 084	2 574	2 727	GLCM	-	-	-	-	-	-
Higher Education Funding Councils	DMSY	1 474	1 626	1 665	1 804	1 928	2 085	DMSZ	-	-	-	-	-	-
Business Enterprise	GLCG	7 864	7 907	7 988	8 483 <sup>†</sup>	8 689	9 983	GLCL	464	459	406	439 <sup>†</sup>	430	504
Higher Education	GLCH	184	208	218	229	266 <sup>†</sup>	292	GLCM	-	-	-	-	-	-
Abroad	GLCJ	3 167	3 581	3 468	2 948 <sup>†</sup>	3 245	3 358	GLCO	440	556	569	524	933 <sup>†</sup>	596
Private Non-Profit	GLCI	888	962	931	960	1 022	1 076	GLCN	-	-	-	-	-	-

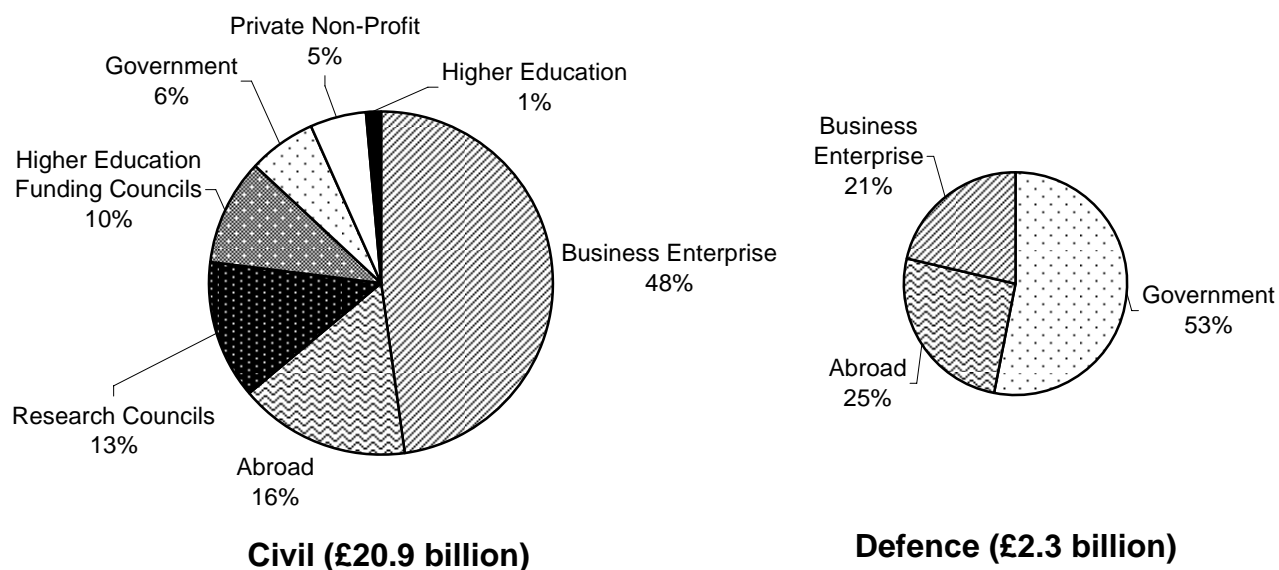
1 - denotes nil, figures unavailable or too small to display.

2 <sup>†</sup> denotes revised figures.

3 See background note 18 on revisions.

Source: National Statistics

**FIGURE 5**  
**Sector funding R&D in the UK, 2006**



# R1 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN UK: REVISIONS TO SERIES PREVIOUSLY PUBLISHED IN CASH TERMS

£million

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>TOTAL</b>	<b>GLBA</b>	-	-	-	-	-	-	-	-	-148	-83
<b>Sector carrying out the work</b>											
Government	GLBK	-	-	-	-	-	-	-	-	-	-9
Research Councils	DMRS	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLBL	-	-	-	-	-	-	-	-	-148	-100
Higher Education	GLBM	-	-	-	-	-	-	-	-	-	11
Private Non-Profit	GLBN	-	-	-	-	-	-	-	-	-	15
<b>Sector funding R&amp;D in the UK</b>											
Government	GLCA	-	-	-	-	-	-	-	-	-45	-34
Research Councils	DMSR	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils	DMSS	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLCB	-	-	-	-	-	-	-	-	-69	-43
Higher Education	GLCC	-	-	-	-	-	-	-	-	-	1
Abroad	GLCE	-	-	-	-	-	-	-	-	-35	-7
Private Non-Profit	GLCD	-	-	-	-	-	-	-	-	-	-
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>CIVIL</b>	<b>GLBB</b>	-	-	-	-	-	-	-	-	-148	-96
<b>Sector carrying out the work</b>											
Government	GLBO	-	-	-	-	-	-	-	-	-	-9
Research Councils	DMSC	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLBP	-	-	-	-	-	-	-	-	-149	-113
Higher Education	GLBQ	-	-	-	-	-	-	-	-	-	11
Private Non-Profit	GLBR	-	-	-	-	-	-	-	-	-	15
<b>Sector funding R&amp;D in the UK</b>											
Government	GLCF	-	-	-	-	-	-	-	-	-46	-30
Research Councils	DMSX	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils	DMSY	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLCG	-	-	-	-	-	-	-	-	-68	-48
Higher Education	GLCH	-	-	-	-	-	-	-	-	-	1
Abroad	GLCJ	-	-	-	-	-	-	-	-	-34	-8
Private Non-Profit	GLCI	-	-	-	-	-	-	-	-	-	-
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>DEFENCE</b>	<b>GLBC</b>	-	-	-	-	-	-	-	-	-	12
<b>Sector carrying out the work</b>											
Government	GLBS	-	-	-	-	-	-	-	-	-	-
Research Councils	DMSM	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLBT	-	-	-	-	-	-	-	-	-	12
Higher Education	GLBU	-	-	-	-	-	-	-	-	-	-
Private Non-Profit	GLBV	-	-	-	-	-	-	-	-	-	-
<b>Sector funding R&amp;D in the UK</b>											
Government	GLCK	-	-	-	-	-	-	-	-	1	6
Research Councils	GLCM	-	-	-	-	-	-	-	-	-	-
Higher Education Funding Councils	DMSZ	-	-	-	-	-	-	-	-	-	-
Business Enterprise	GLCL	-	-	-	-	-	-	-	-	-1	5
Higher Education	GLCM	-	-	-	-	-	-	-	-	-	-
Abroad	GLCO	-	-	-	-	-	-	-	-	-	2
Private Non-Profit	GLCN	-	-	-	-	-	-	-	-	-	-

1 - denotes nil, figures unavailable or too small to display.

Source: National Statistics