

26 November 2007

Coverage

United Kingdom

Theme

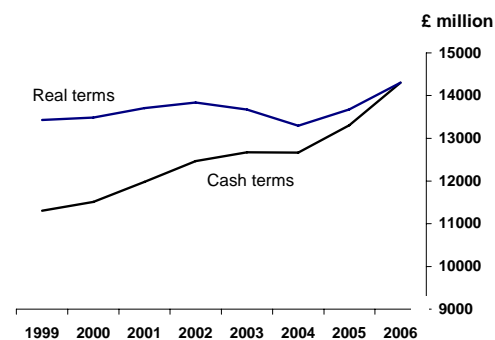
Commerce, Energy and Industry

UK Business Enterprise Research and Development 2006

In 2006, in cash terms and compared with 2005:

- Total R&D expenditure increased by 7 per cent to £14.3 billion
- Civil R&D expenditure increased by 12 per cent to £12.4 billion
- Defence R&D expenditure decreased by 14 per cent to £1.9 billion

R&D expenditure 1999- 2006



In 2006, in real terms (2006 prices) and compared with 2005:

- Total expenditure increased by 5 per cent from £13.7 billion
- Civil expenditure increased by 9 per cent from £11.4 billion
- Defence expenditure decreased by 16 per cent from £ 2.3 billion

Expenditure on R&D performed in UK businesses in cash and real terms, 2002 to 2006

	<i>£ million</i>					<i>percentage change</i>
	2002	2003	2004r	2005r	2006	2005-2006
In cash terms						
Civil	10,823	10,977	10,629	11,055	12,364	+12
Defence	1,646	1,700	2,039	2,254	1,942	-14
Total	12,469	12,677	12,668	13,310	14,306	+7
In real terms (2006 prices)						
Civil	12,010	11,838	11,154	11,363	12,364	+9
Defence	1,826	1,833	2,140	2,317	1,942	-16
Total	13,836	13,671	13,294	13,681	14,306	+5

r denotes revised figures

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Next publication date
To be announced

UK Business Enterprise R&D 2006

Expenditure on R&D performed in UK businesses: cash and real terms; 1999 to 2006 (Table 1)

In 2006, £14.3 billion was spent on R&D performed within UK businesses – a rise of 7 per cent at current prices compared with the 2005 total. Total R&D expenditure in 2006 represented 1.1 per cent of GDP, in line with recent years.

Expenditure on R&D performed in UK businesses: product groups, 1999 to 2006 (Table 2)

The product group with the largest R&D expenditure was pharmaceuticals with expenditure in 2006 at £ 3.9 billion, 28 per cent of all spending. Other product groups reporting significant R&D expenditure were aerospace, which accounted for £ 1.8 billion (13 per cent) and computer and related activities, which reported £1.4 billion (10 per cent).

Sources of funds for R&D performed in UK businesses: 1999 to 2006 (Table 3 and Table 6)

Funding of R&D from businesses' own funds was £8.7 billion in 2006 (61 per cent of the total). Funding of R&D in UK businesses from abroad was £3.3 billion in 2006 (23 per cent of the total). Funding of R&D in UK businesses by the UK Government was £1.1 billion in 2006, 8 per cent of the total and predominately in defence. The distribution of the sources of funds for business R&D in 2006 is shown in Chart 1. Table 6 shows the sources of funds broken down by civil and defence. The distribution of the source of funds for civil and defence R&D in 2006 is shown in Chart 4.

Employment on R&D performed in UK businesses: 1999 to 2006 (Table 4)

The number of staff employed on R&D increased by 4,000, or 3 per cent, between 2005 and 2006. Scientists and engineers remained constant at 94,000, and accounted for 63 per cent of all the staff employed on R&D in 2006. The level of technicians increased by 3,000 while administrative staff increased by 2,000, between 2005 and 2006. This distribution is shown in Chart 2.

Expenditure on R&D performed in UK businesses: civil and defence, by broad product group, 2001 to 2006 (Table 5)

In real terms, civil R&D increased by 9 per cent while defence R&D decreased by 16 per cent from 2005.

In cash terms, the manufacturing broad product group accounted for 73 per cent of total civil R & D expenditure and the services broad product group for 25 per cent. Defence R&D continued to be dominated by the aerospace product group, followed by electrical machinery and mechanical engineering. The distribution of civil and defence R&D expenditure by broad product groups for 2006, is shown in Chart 3.

Expenditure on R&D performed in UK businesses by regional breakdown: 2004 to 2006 (Table 7)

In 2006, 93 per cent of business R&D expenditure was carried out in England, a similar level to previous years. The regions with the largest R&D expenditure were all in England: the East of England accounted for 25 per cent of the total expenditure; South East accounted for 23 per cent and the North West accounted for 11 per cent. The regional breakdown for business R&D in 2006 is shown in Chart 5.

BACKGROUND NOTES

The 2006 Survey

Sample design

1. The R&D survey is an annual sample survey based on a continually updated register of R&D performers.
2. Approximately 4600 forms were sent out to businesses believed to be performing R&D. These companies were selected using a stratified sample.
3. Around 450 of the largest R&D spenders are included in the sample and accounted for 83 per cent of the 2006 total R&D expenditure figure. Smaller R&D performers and others believed to be performing R&D were selected using various sampling fractions. Industry group and company employment were the stratification variables.
4. Completed forms were returned by 4,142 businesses, representing a response rate of 90 per cent.
5. Estimates were made for the R&D activity of unsampled and non-responding businesses.

Revisions to past data

6. The 2004 and 2005 data have been revised where necessary to take account of company misreporting.
7. 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 seven 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 revisions table covers estimates of the UK's business enterprise expenditure on R&D first published from November 2000 (for 1999) to November 2004 (for 2003).

		Revisions between first publication and estimates three years later	
	Value in latest period	Average over the last 5 years (mean revision)	Average over the last 5 years without regard to sign (average absolute revision)
<i>£ million</i>			
Expenditure on R&D performed by UK (businesses)	14306	-399	399

A spreadsheet giving these estimates and the calculations behind the averages in the table is available on the National Statistics website at:

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.

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

More detailed information

9. A more detailed analysis of the results of the 2006 survey, and description of methods used, will be published in Business Monitor MA14, which will be available on the internet at www.statistics.gov.uk on 18 January 2008.

Definitions

Research and Experimental Development (R&D)

10. R&D and related concepts follow internationally agreed standards defined by the Organisation for Economic Co-operation and Development (OECD) and published in the Frascati manual. R&D is defined as “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of the stock of knowledge to devise new applications”.

R&D performed in UK businesses

11. This refers to R&D performed in the UK within business enterprises. It excludes R&D funded by UK businesses that is performed overseas or in other sectors of the UK economy (such as higher education; government departments, agencies, and non-departmental public bodies; local authorities; and private non-profit organisations). Public corporations are counted as business enterprises.

Product groups

12. The broad product groups consist of aggregations of the detailed product groups. 'Services' includes R&D consultancy and other services in support of manufacturing industry.

Employment

13. Employment is calculated by respondents on the basis of 'full-time equivalent' staff averaged over the year. The categories of employment used are:
 - **Scientists and Engineers:** professionals engaged in the conception or creation of new knowledge, products, methods and systems.
 - **Technicians:** qualified personnel who participate in R&D projects by performing scientific and technical tasks, normally under the supervision of professional scientists and engineers. They will usually have a scientific or engineering qualification.
 - **Administrative and Other:** other supporting staff, including skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with such projects.

Rounding of figures

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

General

15. For information on available aggregated data on Research and Development please contact Julie Owens on 01633 812789, (e-mail julie.owens@ons.gov.uk).
16. Details of the National Statistics policy governing the release of new data are available from the ONS press office. Also available is a list of the names of those given pre-publication access to the contents of this release.
17. **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 2007.

1 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES: CASH AND REAL TERMS AND AS A PERCENTAGE OF GDP, 1999 TO 2006

		£million							
		1999	2000	2001	2002	2003	2004	2005	2006
In cash terms	DLBX	11 302	11 510	11 978	12 469	12 677	12 668 [†]	13 310	14 306
In real terms (2006 prices)		13 432 [†]	13 487	13 707	13 836	13 671	13 294	13 681	14 306
Current prices GDP	DLHT	927 330 [†]	971 322	1 013 368	1 071 469	1 136 193	1 195 518	1 249 276	1 322 579
As a % of GDP		1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1

2006 = 100

Source: National Statistics

	1999	2000	2001	2002	2003	2004	2005	2006
GDP deflator used to convert cash terms to real terms	84.1 [†]	85.3	87.4	90.1	92.7	95.3	97.3	100.0

2 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES: DETAILED PRODUCT GROUPS, 1999 TO 2006

		£million								% of total
		1999	2000	2001	2002	2003	2004	2005	2006	2006
TOTAL	DLBX	11 302	11 510	11 978	12 469	12 677	12 668 [†]	13 310	14 306	100
Agriculture, hunting and forestry; Fishing	DLBY	115	135	121	147	136	..	..	88	0.6
Extractive Industries	DLBZ	42	46	38	45	41	36	43	43	0.3
Food products and beverages; Tobacco products	DLCP	237	264	285	269	256	258	276 [†]	314	2.2
Textiles, clothing and leather products	DLCQ	28	29	17	19	20	21	18 [†]	17	0.1
Pulp, paper and paper products; Printing and publishing; Wood and straw products	DLC T	45	38	34	44	45	40	52	55	0.4
Refined petroleum products and coke oven products; Processing of nuclear fuel	DLCE	212	182	250	258	269	245	259	298	2.1
Chemicals, man-made fibres	DLCC	718	682	616	599	618	625	628 [†]	675	4.7
Pharmaceuticals, medical chemicals and botanical products	DLCD	2 535	2 846	3 030	3 159	3 132	3 239 [†]	3 379	3 949	27.6
Rubber and plastic products	DLCR	72	54	47	60	68	63	55 [†]	90	0.6
Other non-metallic mineral products	DLCS	59	..	41	51	56	62	44	47	0.3
Casting of iron and steel	DLCJ	41	..	28	29	29	30	34	38	0.3
Non-ferrous metals	DLCK	22	21	19	16	6	4	8	6	-
Fabricated metal products	DLCL	70	73	64	90	66	77 [†]	74	68	0.5
Machinery and equipment	DLC O	642	703	718	760	709	761 [†]	747	806	5.6
Office machinery and computers	DLCN	111	113	97	91	70	53 [†]	60	30	0.2
Electrical machinery and apparatus	DLCA	357	422	354	372	375	406 [†]	399	431	3.0
Radio, television and communication equipment	DLCB	867	1 024	1 068	897	872	763 [†]	814	755	5.3
Precision instruments	DLCM	473	480	583	532	487	486 [†]	446	444	3.1
Motor vehicles and parts	DLCG	1 060	864	894	915	894	789 [†]	744	754	5.3
Other transport equipment	DLCI	99	158	..	..	..	23	21 [†]	25	0.2
Shipbuilding and repairs	DLCH	76	72	..	..	..	125	127	134	0.9
Aerospace	DLCF	1 237	1 091	1 320	1 370	1 652	1 960 [†]	2 157	1 836	12.8
Furniture; Other manufactured goods	DLCU	33	27	31	32	65	33	26 [†]	24	0.2
Recycling	DLCV	1	1	..	3	2	2	1	1	-
Electricity, gas and water supply	DLCW	137	160	41	46	36	21	15	21	0.1
Construction	DLCX	41	34	30	35	30	..	..	36	0.3
Wholesale and retail trade	DLDE	..	..	55	69	53	76 [†]	60	55	0.4
Transport and storage	DLCY	..	..	12	..	..	12	9	16	0.1
Post and telecommunications	DLCZ	565	674	738	726	646	639 [†]	919	1 175	8.2
Miscellaneous business activities; Technical testing and analysis	DLDC	196	131	262	363	314	349 [†]	438	520	3.6
Computer and related activities	DLDB	713	611	675	866	1 207	1 060 [†]	1 070	1 360	9.5
Research and development services	DLDA	448	428	367	448	404	211 [†]	200	140	1.0
Public administration	DLDD	11	12	17	18	11	31	33 [†]	56	0.4

Source: National Statistics

1 .. denotes disclosive figures.

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

3 SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES: 1999 TO 2006

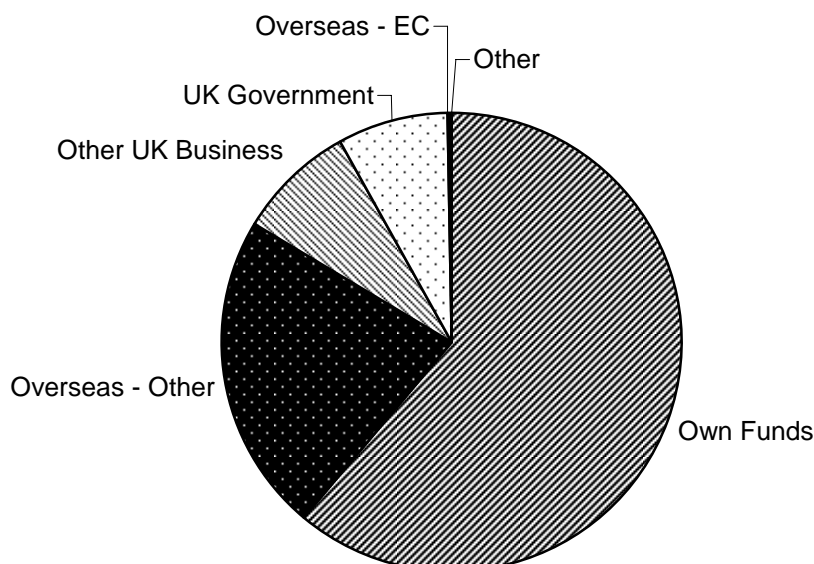
		1999	2000	2001	2002	2003	2004	2005	2006
£ MILLION									
TOTAL	DLBX	11 302	11 510	11 978	12 469	12 677	12 668 [†]	13 310	14 306
UK Government	DLDO	1 157	1 013	939	882	1 220	1 290 [†]	1 110	1 082
Overseas total	DLHK	2 570	2 470	3 228	3 702	3 556	2 958 [†]	3 611	3 289
of which:									
EC Programmes	DLDQ	137	101	77	134	94	42 [†]	72	52
All other funding from abroad	DLDS	2 433	2 369	3 150	3 568	3 463	2 917 [†]	3 539	3 238
Other UK Business	DLDU	750	779	727	851	1 137	1 067 [†]	1 274	1 200
Own funds	DLDW	6 824	7 244	7 080	7 031	6 760	7 348 [†]	7 312	8 732
Other	DLDY	1	3	4	4	3	5	2	2
PERCENT									
TOTAL		100	100	100	100	100	100	100	100
UK Government		10	9	8	7	10	10	8 [†]	8
Overseas total		23	21	27	30	28	23	27	23
of which:									
EC Programmes		1	1	1	1	1	–	1 [†]	–
All other funding from abroad		22	21	26	29	27	23	27 [†]	23
Other UK Business		7	7	6	7	9	8 [†]	10	8
Own funds		60	63	59	56	53	58	55	61
Other		–	–	–	–	–	–	–	–

Source: National Statistics

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

2 'Other' includes funds from Private Non-Profit organisations and Higher Education establishments

Chart 1 - Sources of funds for R&D performed in UK businesses, 2006



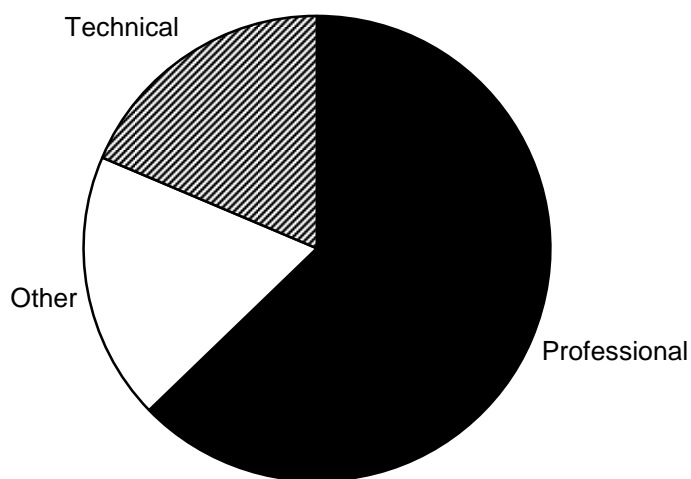
4 EMPLOYMENT ON R&D PERFORMED IN UK BUSINESSES: 1999 TO 2006

Full time equivalent in thousands

		1999	2000	2001	2002	2003	2004	2005	2006
TOTAL	DLEI	153	145	154	158	156	150 [†]	145	149
Scientists and engineers	DLEJ	92	86	91	96	99	94 [†]	94	94
Technicians, laboratory assistants and draughtsmen	DLEK	33	30	30	31	28	27 [†]	25	28
Administrative, clerical, industrial and other staff	DLEL	28	30	32	31	29	29	26 [†]	28
As % of total employment									
Scientists and engineers		60	59	59	61	63	63 [†]	65	63
Technicians, laboratory assistants and draughtsmen		22	21	19	20	18	18 [†]	17	19
Administrative, clerical, industrial and other staff		18	21	21	20	19	19	18	19

Source: National Statistics

Chart 2 - Employment on R&D performed in UK businesses, 2006



- Professional = Scientists and engineers
- Other = Admin, clerical, industrial and other staff
- ▨ Technical = Technicians, lab assistants and draughtsmen

5 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN UK BUSINESSES: BROAD PRODUCT GROUPS, 2001 TO 2006

£million

		Civil						Defence						
		2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006	
In cash terms														
TOTAL	DLBV	10 333	10 823	10 977	10 629 [†]	11 055	12 364	DLBW	1 645	1 646	1 700	2 039	2 254 [†]	1 942
Manufacturing	DLEP	8 101	8 176	8 258	8 186 [†]	8 274	9 035	DLEX	1 520	1 520	1 533	1 878	2 097 [†]	1 762
Chemicals	DLEQ	..	..	..	..	..	..	DLEY	..	..	..	..	..	..
Mechanical engineering	DLER	502	548	464	492 [†]	501	564	DLEZ	280	302	311	346 [†]	320	310
Electrical machinery	DLES	1 226	1 054	1 059	935 [†]	969	880	DLFA	292	305	258	287	305 [†]	336
Transport equipment	DLET	..	..	..	..	..	..	DLFB	..	..	..	..	..	..
Aerospace	DLEU	641	659	871	934 [†]	890	912	DLFC	678	711	781	1 026 [†]	1 267	924
Other manufacturing	DLEV	1 148	1 215	1 197	1 134 [†]	1 131	1 262	DLFD	187	97	105	108	90 [†]	71
Services	DLEW	2 002	..	..	..	2 573 [†]	3 142	DLFE	124	..	..	..	157 [†]	180
Other: Total	LDIL	230	..	..	..	208 [†]	187	LDJJ	-	..	..	..	-	-
Agriculture, hunting & forestry; Fishing	LDIN	121	..	..	..	..	88	LDJL	-	..	..	..	..	-
Extractive industries	LDIS	38	45	41	36	43	43	LDKF	-	-	-	-	-	-
Electricity, gas & water supply	LDJB	41	46	36	21	15	21	LDKG	-	-	-	-	-	-
Construction	LDJG	30	..	..	..	..	36	LDKS	-	..	..	..	..	-

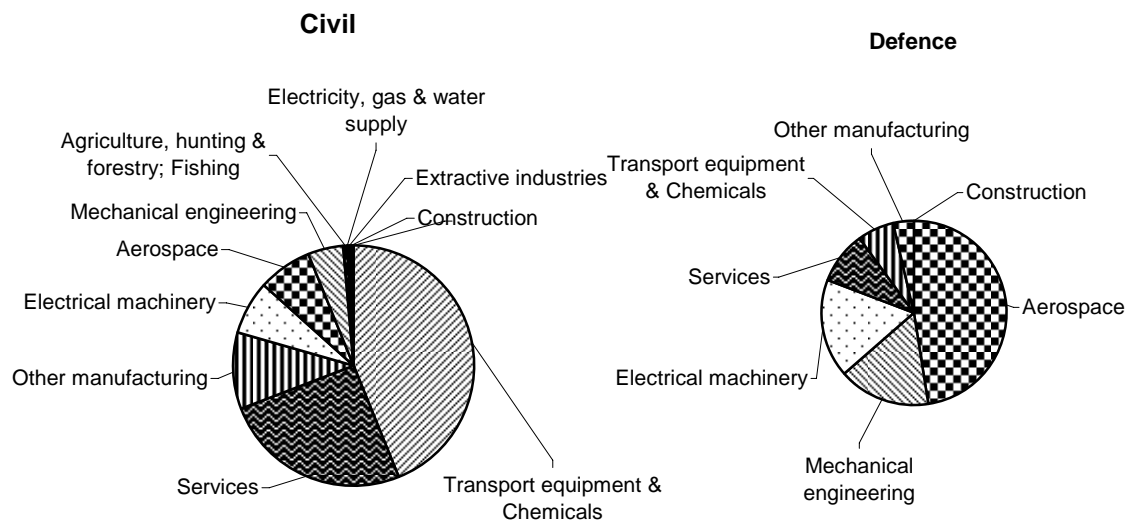
		Civil						Defence						
		2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006	
In real terms (2006 prices)														
TOTAL		11 825 [†]	12 010	11 838	11 154	11 363	12 364		1 882 [†]	1 826	1 833	2 140	2 317	1 942
Manufacturing		9 271 [†]	9 073	8 906	8 591	8 504	9 035		1 739 [†]	1 687	1 653	1 971	2 155	1 762
Chemicals	
Mechanical engineering		574 [†]	608	500	516	515	564		320 [†]	335	335	363	329	310
Electrical machinery		1 403 [†]	1 170	1 142	981	996	880		334 [†]	338	278	301	313	336
Transport equipment	
Aerospace		734 [†]	731	939	980	915	912		776 [†]	789	842	1 077	1 302	924
Other manufacturing		1 314 [†]	1 348	1 291	1 190	1 162	1 262		214 [†]	108	113	113	93	71
Services		2 291 [†]	2 645	3 142		142 [†]	161	180
Other: Total		263 [†]	214	187		-	..	..	..	-	-
Agriculture, hunting & forestry; Fishing		138 [†]	88		-	-	-	..	..	-
Extractive industries		43 [†]	50	44	38	44	43		-	-	-	-	-	-
Electricity, gas & water supply		47 [†]	51	39	22	15	21		-	-	-	-	-	-
Construction		34 [†]	36		-	..	..	..	..	-

Source: National Statistics

1 .. denotes disclosive figures.

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

Chart 3 - Expenditure on civil and defence R&D performed in UK businesses, by broad product groups, 2006



Note - Transport equipment & Chemicals have been combined to prevent disclosive data.

6 SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES: CIVIL AND DEFENCE, 2001 TO 2006

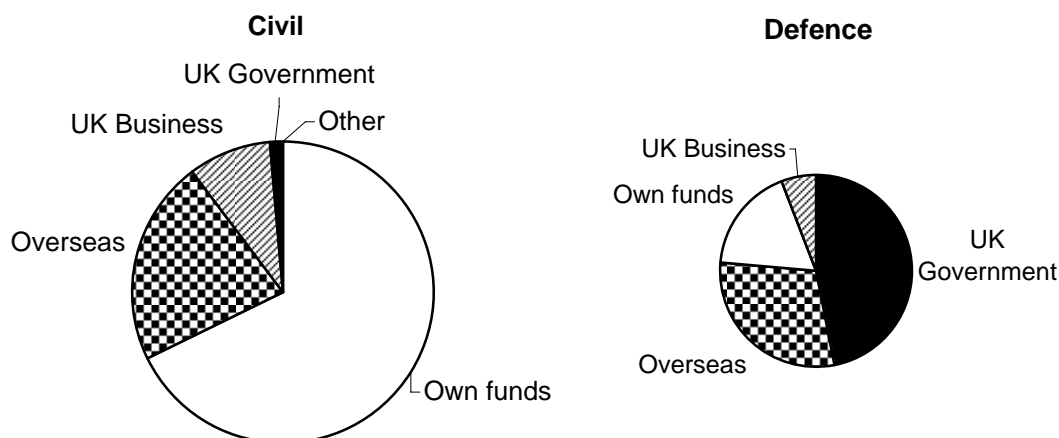
£million

		Civil						Defence						
		2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006	
UK Government	DLFG	152	188	442	162 [†]	165	172	DLFN	787	693	778	1 128 [†]	945	909
Overseas total	DLHS	2 794	3 151	2 993	2 440[†]	2 683	2 714	DLIF	434	551	564	518	928[†]	575
of which:														
EC Programmes	DLFH	77	134	94	42 [†]	72	51	DLFO	-	-	-	-	-	-
All other funding from abroad	DLFI	2 717	3 017	2 899	2 398 [†]	2 610	2 663	DLFP	434	551	564	518	928 [†]	575
Other UK Business	DLFJ	630	..	1 056	999 [†]	1 149	1 089	DLFQ	96	..	81	68	125 [†]	112
Own	DLFK	6 753	6 725	6 483	7 023 [†]	7 056	8 386	DLFR	328	306	277	325 [†]	256	346
Other	DLFL	4	..	3	5	2	2	DLFS	-	..	-	-	-	-
TOTAL	DLBV	10 333	10 823	10 977	10 629[†]	11 055	12 364	DLEW	1 645	1 646	1 700	2 039	2 254[†]	1 942

Source: National Statistics

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

**Chart 4 - Source of funds for R&D performed
in UK businesses, civil and defence, 2006**



7 BREAKDOWN OF R&D PERFORMED IN UK BUSINESSES BY GOVERNMENT OFFICE REGION: EXPENDITURE AND EMPLOYMENT, 2004 TO 2006

		Expenditure £million			% of total	Employment FTE in thousands			
		2004	2005	2006	2006	2004	2005	2006	
United Kingdom	DLBX	12 668 [†]	13 310	14 306	100	DLEI	150 [†]	145	149
England	DLKI	11 834 [†]	12 355	13 361	93.4	DLKJ	136 [†]	132	136
North East	DLJO	257 [†]	289	293	2.0	DLJZ	3	3	3
North West	DLJT	1 739 [†]	1 892	1 627	11.4	DLKE	16	15 [†]	15
Yorkshire and the Humber	DLJP	343 [†]	344	386	2.7	DLKA	6	6	6
East Midlands	DLJQ	936 [†]	1 001	977	6.8	DLKB	11 [†]	11	11
West Midlands	DLJN	758 [†]	719	933	6.5	DLJY	13	12	13
East of England	DLJR	2 672 [†]	3 287	3 570	25.0	DLKC	28 [†]	29	27
London	DLKL	744 [†]	538	980	6.9	DLKM	9	7 [†]	10
South East	DLJS	3 089 [†]	3 035	3 279	22.9	DLKD	37 [†]	35	36
South West	DLJM	1 296 [†]	1 249	1 316	9.2	DLJX	13	14 [†]	14
Wales	DLJU	226	233 [†]	222	1.6	DLKF	3	3	3
Scotland	DLJV	493 [†]	586	579	4.0	DLKG	7	7	7
Northern Ireland	DLJW	116	136	145	1.0	DLKH	3	3	3

Source: National Statistics

1 FTE - Full Time Equivalents

Chart 5 - Breakdown of R&D performed in UK businesses by Government Office region, 2006

