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Coverage

United Kingdom

Theme

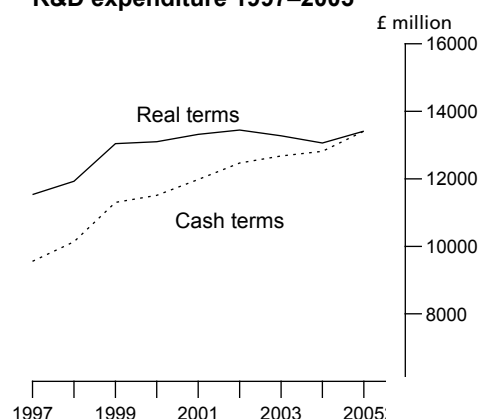
Commerce, Energy and Industry

UK Business Enterprise Research and Development, 2005

In 2005, in cash terms and compared with 2004:

- Total business R&D expenditure increased by 5 per cent to £13.4 billion
- Civil R&D expenditure increased by 4 per cent to £11.2 billion
- Defence R&D expenditure increased by 10 per cent to £2.2 billion

R&D expenditure 1997–2005



In 2005, in real terms (2005 prices) and compared with 2004:

- Total expenditure increased by 3 per cent from £13.1 billion
- Civil expenditure increased by 2 per cent from £11.0 billion
- Defence expenditure increased by 8 per cent from £2.1 billion

Expenditure on R&D performed in UK businesses in cash & real terms, 2001 to 2005

	<i>£ million</i>					<i>Percentage change</i>
	2001r	2002r	2003r	2004r	2005	2004–2005
In cash terms						
Civil	10,333	10,823	10,977	10,778	11,168	+4
Defence	1,645	1,646	1,700	2,039	2,242	+10
Total	11,978	12,469	12,677	12,816	13,410	+5
In real terms (2005 prices)						
Civil	11,486	11,669	11,494	10,982	11,168	+2
Defence	1,828	1,775	1,780	2,078	2,242	+8
Total	13,314	13,444	13,274	13,059	13,410	+3

r denotes revised figures

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Next publication date

To be announced

This annual BERD release is the first produced following the identification of data errors relating to both product and regional classification and businesses' understanding of what is included within the definition of R&D.

Revisions have been made to data back to 2001 and are published at the same time as this 2005 BERD release using the R&D business monitor (MA14) format as it covers all aspects of the R&D data published by ONS.

Because pre-2001 data have been updated previously, the limited potential for companies to provide accurate data six years and more after the event and resource and system limitations, there are no plans to revise data prior to 2001.

UK Business Enterprise R&D 2005

Expenditure on R&D performed in UK businesses: cash and real terms; 1997 to 2005 (Table 1)

In 2005, £13.4 billion was spent on R&D performed within UK businesses – a rise of 5 per cent at current prices compared with the 2004 total. Total R&D expenditure in 2005 represented 1.1 per cent of GDP, in line with recent years.

Expenditure on R&D performed in UK businesses: product groups, 1997 to 2005 (Table 2)

The product group with the largest R&D expenditure was pharmaceuticals with expenditure in 2005 at £ 3.3 billion, 25 per cent of all spending. Other product groups reporting significant R&D expenditure were aerospace, which accounted for £ 2.2 billion (16 per cent) and computer and related activities, which reported £1.1 billion (8 per cent).

Sources of funds for R&D performed in UK businesses: 1997 to 2005 (Table 3 and Table 6)

Funding of R&D from businesses' own funds was £7.3 billion in 2005 (55 per cent of the total). Funding of R&D in UK businesses from abroad was £3.6 billion in 2005 (27 per cent of the total). Funding of R&D in UK businesses by the UK Government was £1.2 billion in 2005, 9 per cent of the total and predominately in defence. The distribution of the sources of funds for business R&D in 2005 is shown in Chart 1. Table 6 shows the sources of funds broken down by civil and defence between 1999 and 2005. The distribution of the source of funds for civil and defence R&D in 2005 is shown in Chart 4.

Employment on R&D performed in UK businesses: 1997 to 2005 (Table 4)

The number of staff employed on R&D decreased by 5,000, or 3 per cent, between 2004 and 2005. Scientists and engineers decreased by around 2,000, and accounted for 65 per cent of all the staff employed on R&D in 2005. The level of technicians remained around the 2004 level of 26,000 while administrative staff decreased by around 2,000, or 7 per cent, between 2004 and 2005. This distribution is shown in Chart 2.

Expenditure on R&D performed in UK businesses: civil and defence, by broad product group, 1999 to 2005 (Table 5)

In real terms, civil R&D increased by 2 per cent and defence R&D by 8 per cent from 2004.

In cash terms, the chemicals and transport equipment broad product groups accounted for 57 per cent of the total civil R&D expenditure. The services broad product group accounted for 25 per cent of total civil R&D expenditure. Defence R&D continued to be dominated by the aerospace broad product group, followed by electrical machinery and mechanical engineering. The distribution of civil and defence R&D expenditure by broad product groups for 2005, is shown in Chart 3.

Expenditure on R&D performed in UK businesses by regional breakdown: 2003 to 2005 (Table 7)

In 2005, 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 24 per cent and the North West accounted for 14 per cent. The regional breakdown for business R&D in 2005 is shown in Chart 5.

BACKGROUND NOTES

The 2005 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 4800 forms were sent out to businesses believed to be performing R&D. These companies were selected using a stratified sample.
3. Around 400 of the largest R&D spenders were included in the sample and accounted for 80 per cent of the 2005 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 4,453 businesses, representing a response rate of 93 per cent.
5. Estimates were made for the R&D activity of unsampled and non-responding businesses.

Revisions to past data

6. This annual BERD release is the first produced following the identification of data errors relating to both product and regional classification and businesses' understanding of what is included within the definition of R&D. Revisions have been made to data back to 2001 and are published at the same time as this 2005 BERD release using the R&D business monitor (MA14) format as it covers all aspects of the R&D data published by ONS.
7. Because pre-2001 data have been updated previously, the limited potential for companies to provide accurate data six years and more after the event and resource and system limitations, there are no plans to revise data prior to 2001.
8. 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 themselves 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 between November 1999 (for 1998) and November 2003 (for 2002).

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

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)	13,410	-217	217

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.

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

More detailed information

- A more detailed analysis of the results of the 2005 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 19 January 2007.

Definitions

Research and Experimental Development (R&D)

- 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

12. 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

13. 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

14. 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

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

General

16. For information on available aggregated data on Research and Development please contact Julie Owens on 01633 812789, (e-mail julie.owens@ons.gov.uk).



17. 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.

18. **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 2006.

1 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES: CASH AND REAL TERMS AND AS A PERCENTAGE OF GDP, 1997 TO 2005

		£million								
		1997	1998	1999	2000	2001	2002	2003	2004	2005
In cash terms	DLBX	9 556	10 133	11 302	11 510	11 978 [†]	12 469	12 677	12 816	13 410
In real terms (2005 prices)		11 536 [†]	11 929	13 042	13 098	13 314	13 444	13 274	13 059	13 410
Current prices GDP	DLHT	824 212 [†]	871 243	921 881	965 494	1 006 906	1 064 183	1 128 191	1 187 551	1 238 474
As a % of GDP		1.2	1.2	1.2	1.2	1.2	1.2	1.1 [†]	1.1	1.1

2005 = 100

Source: National Statistics

	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP deflator used to convert cash terms to real terms	82.8 [†]	84.9	86.7	87.9	90.0	92.7	95.5	98.1	100.0

2 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES: DETAILED PRODUCT GROUPS, 1997 TO 2005

		£million									% of total
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2005
TOTAL	DLBX	9 556	10 133	11 302	11 510	11 978	12 469	12 677	12 816	13 410	100
Agriculture, hunting and forestry; Fishing	DLBY	84	102	115	135	121 [†]	147	136	..	127	0.9
Extractive Industries	DLBZ	44	41	42	46	38 [†]	45	41	36	43	0.3
Food products and beverages; Tobacco products	DLCP	180	242	237	264	285 [†]	269	256	258	266	2.0
Textiles, clothing and leather products	DLCQ	33	33	28	29	17	19	20	21	21	0.2
Pulp, paper and paper products; Printing and publishing; Wood and straw products	DLCT	44	49	45	38	34	44	45	40 [†]	52	0.4
Refined petroleum products and coke oven products; Processing of nuclear fuel	DLCE	225	234	212	182	250	258	269 [†]	245	259	1.9
Chemicals, man-made fibres	DLCC	680	688	718	682	616 [†]	599	618	625	616	4.6
Pharmaceuticals, medical chemicals and botanical products	DLCD	2 151	2 238	2 535	2 846	3 030 [†]	3 159	3 132	3 206	3 308	24.7
Rubber and plastic products	DLCR	60	66	72	54	47 [†]	60	68	63	56	0.4
Other non-metallic mineral products	DLCS	47	56	59	..	41	51 [†]	56	62	44	0.3
Casting of iron and steel	DL CJ	39	47	41	..	28 [†]	29	29	30	34	0.3
Non-ferrous metals	DLCK	15	20	22	21	19	16	6	4	8	0.1
Fabricated metal products	DLCL	88	90	70	73	64	90 [†]	66	80	77	0.6
Machinery and equipment	DLCO	622	640	642	703	718 [†]	760	709	738	725	5.4
Office machinery and computers	DLCN	102	125	111	113	97 [†]	91	70	64	73	0.5
Electrical machinery and apparatus	DLCA	424	423	357	422	354 [†]	372	375	419	412	3.1
Radio, television and communication equipment	DLCB	655	772	867	1 024	1 068 [†]	897	872	765	792	5.9
Precision instruments	DLCM	336	340	473	480	583 [†]	532	487	480	429	3.2
Motor vehicles and parts	DL CG	924	913	1 060	864	894 [†]	915	894	786	741	5.5
Other transport equipment	DL CI	50	72	99	158	..	..	..	23 [†]	27	0.2
Shipbuilding and repairs	DLCH	15	36	76	72	..	..	..	125 [†]	127	0.9
Aerospace	DL CF	893	1 039	1 237	1 091	1 320 [†]	1 370	1 652	2 005	2 197	16.4
Furniture; Other manufactured goods	DL CU	25	20	33	27	31	32 [†]	65	33	34	0.3
Recycling	DL CV	-	-	1	1	..	3	2	1	1	-
Electricity, gas and water supply	DL CW	130	140	137	160	41 [†]	46	36	21	15	0.1
Construction	DL CX	38	39	41	34	30	35	30	..	33	0.2
Wholesale and retail trade	DL DE	..	..	..	..	55	69	53	86 [†]	72	0.5
Transport and storage	DL CY	..	..	..	..	12	..	..	12 [†]	9	0.1
Post and telecommunications	DL CZ	496	449	565	674	738 [†]	726	646	620	901	6.7
Miscellaneous business activities; Technical testing and analysis	DL DC	142	157	196	131	262 [†]	363	314	373	462	3.4
Computer and related activities	DL DB	680	688	713	611	675 [†]	866	1 207	1 099	1 087	8.1
Research and development services	DL DA	313	346	448	428	367 [†]	448	404	296	316	2.4
Public administration	DL DD	6	8	11	12	17 [†]	18	11	31	46	0.3

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: 1997 TO 2005

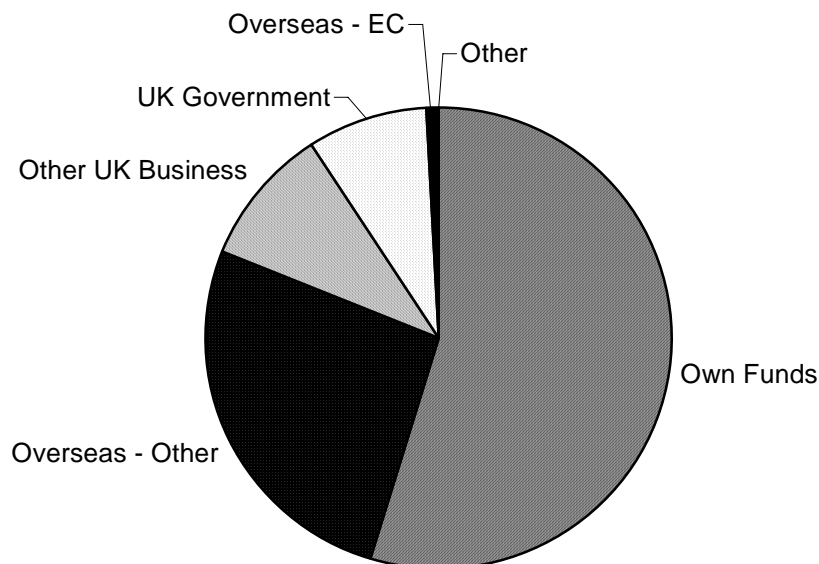
		1997	1998	1999	2000	2001	2002	2003	2004	2005
£ MILLION										
TOTAL	DLBX	9 556	10 133	11 302	11 510	11 978 [†]	12 469	12 677	12 816	13 410
UK Government	DLDO	915	1 094	1 157	1 013	939 [†]	882	1 220	1 335	1 150
Overseas total	DLHK	1 800	2 238	2 570	2 470	3 228 [†]	3 702	3 556	2 993	3 617
of which:										
EC Programmes	DLDQ	108	119	137	101	77 [†]	134	94	63	92
All other funding from abroad	DLDS	1 692	2 119	2 433	2 369	3 150 [†]	3 568	3 463	2 930	3 525
Other UK Business	DLDU	642	659	750	779	727 [†]	851	1 137	1 093	1 300
Own funds	DLDW	6 198	6 141	6 824	7 244	7 080 [†]	7 031	6 760	7 391	7 341
Other	DLDY	1	–	1	3	4	4	3	5	2
PERCENT										
TOTAL		100	100	100	100	100	100	100	100	100
UK Government		10	11	10	9	8 [†]	7	10	10	9
Overseas total		19	22	23	21	27 [†]	30	28	23	27
of which:										
EC Programmes		1	1	1	1	1	1	1	–	1
All other funding from abroad		18	21	22	21	26 [†]	29	27	23	26
Other UK Business		7	7	7	7	6	7	9 [†]	9	10
Own funds		65	61	60	63	59 [†]	56	53	58	55
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, 2005



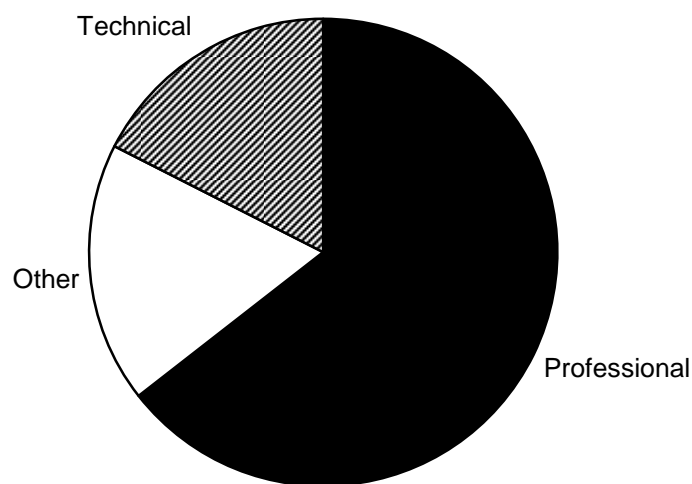
4 EMPLOYMENT ON R&D PERFORMED IN UK BUSINESSES: 1997 TO 2005

Full time equivalent in thousands

		1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL	DLEI	137	148	153	145	154 [†]	158	156	152	147
Scientists and engineers	DLEJ	83	91	92	86	91 [†]	96	99	97	95
Technicians, laboratory assistants and draughtsmen	DLEK	30	32	33	30	30 [†]	31	28	26	26
Administrative, clerical, industrial and other staff	DLEL	24	24	28	30	32 [†]	31	29	29	27
As % of total employment										
Scientists and engineers		61	61	60	59	59 [†]	61	63	64	65
Technicians, laboratory assistants and draughtsmen		22	22	22	21	19 [†]	20	18	17	18
Administrative, clerical, industrial and other staff		18	16	18	21	21 [†]	20	19	19	18

Source: National Statistics

Chart 2 - Employment on R&D performed in UK businesses, 2005



- 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, 1999 TO 2005

£million

		Civil							Defence							
		1999	2000	2001	2002	2003	2004	2005	1999	2000	2001	2002	2003	2004	2005	
In cash terms																
TOTAL	DLBV	9 626	9 838	10 333 [†]	10 823	10 977	10 778	11 168	DLBW	1 675	1 671	1 645 [†]	1 646	1 700	2 039	2 242
Manufacturing	DLEP	7 376	7 582	8 101 [†]	8 176	8 258	8 194	8 213	DLEX	1 619	1 649	1 520 [†]	1 520	1 533	1 878	2 087
Chemicals	DLEQ	3 252	3 527	..	..	..	..	..	DLEY	1	-	..	..	..	..	..
Mechanical engineering	DLER	434	463	502 [†]	548	464	507	520	DLEZ	279	314	280 [†]	302	311	311	282
Electrical machinery	DLES	1 013	1 163	1 226 [†]	1 054	1 059	961	970	DLFA	322	395	292 [†]	305	258	287	308
Transport equipment	DLET	1 159	1 023	..	..	..	..	..	DLFB	77	71	..	..	..	..	..
Aerospace	DLEU	535	457	641 [†]	659	871	943	894	DLFC	701	634	678 [†]	711	781	1 061	1 303
Other manufacturing	DLEV	983	948	1 148 [†]	1 215	1 197	1 128	1 127	DLFD	239	235	187 [†]	97	105	108	78
Services	DLEW	1 915	1 883	2 002 [†]	2 737	DLFE	57	22	124 [†]	154
Other: Total	LDIL	335	374	230 [†]	217	LDJJ	-	-	-	..	..	..	-
Agriculture, hunting & forestry; Fishing	LDIN	115	135	121 [†]	127	LDJL	-	-	-	-	-	-	-
Extractive industries	LDIS	42	46	38 [†]	45	41	36	43	LDKF	-	-	-	-	-	-	-
Electricity, gas & water supply	LDJB	137	160	41 [†]	46	36	21	15	LDKG	-	-	-	-	-	-	-
Construction	LDJG	41	34	30	..	..	..	33	LDKS	-	-	-	..	..	..	-

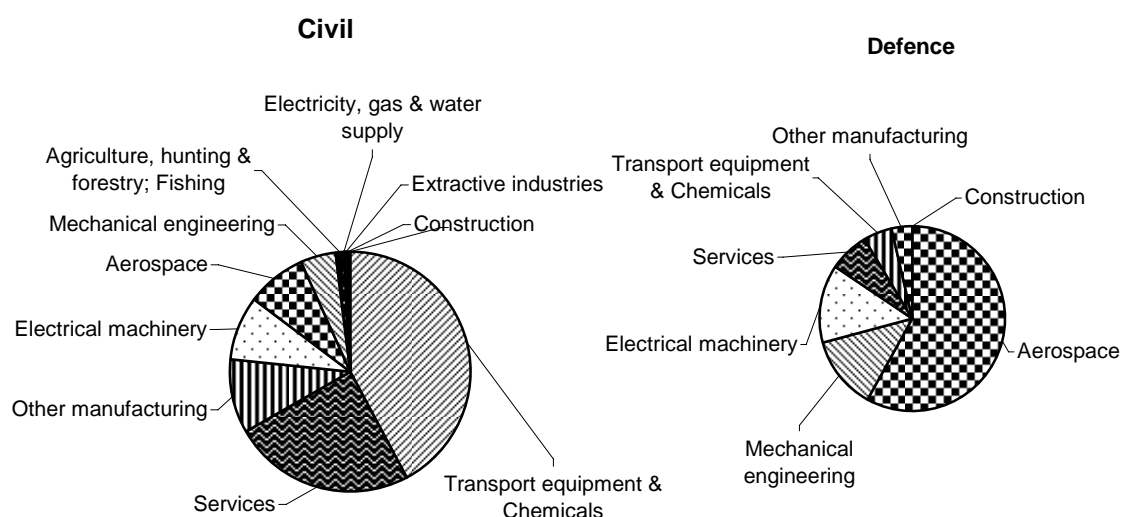
		Civil							Defence							
		1999	2000	2001	2002	2003	2004	2005	1999	2000	2001	2002	2003	2004	2005	
In real terms (2005 prices)																
TOTAL		11 108 [†]	11 195	11 486	11 669	11 494	10 982	11 168		1 933 [†]	1 901	1 828	1 775	1 780	2 078	2 242
Manufacturing		8 511 [†]	8 628	9 005	8 815	8 647	8 349	8 213		1 868 [†]	1 876	1 690	1 639	1 605	1 914	2 087
Chemicals		3 753 [†]	4 013	..	..	..	..	..		1	-	..	..	..	..	..
Mechanical engineering		501 [†]	527	558	591	486	517	520		322 [†]	357	311	326	326	317	282
Electrical machinery		1 169 [†]	1 323	1 363	1 136	1 109	979	970		372 [†]	449	325	329	270	292	308
Transport equipment		1 337 [†]	1 164	..	..	..	..	..		89 [†]	81	..	..	..	..	..
Aerospace		617 [†]	520	712	711	912	961	894		809 [†]	721	754	767	818	1 081	1 303
Other manufacturing		1 134 [†]	1 079	1 276	1 310	1 253	1 149	1 127		276 [†]	267	208	105	110	110	78
Services		2 210 [†]	2 143	2 225	..	..	..	2 737		66 [†]	25	138	..	..	..	154
Other: Total		387 [†]	426	256	..	..	..	217		-	-	-	..	..	..	-
Agriculture, hunting & forestry; Fishing		133 [†]	154	134	..	..	..	127		-	-	-	-	-	-	-
Extractive industries		48 [†]	52	42	49	43	37	43		-	-	-	-	-	-	-
Electricity, gas & water supply		158 [†]	182	46	50	38	21	15		-	-	-	-	-	-	-
Construction		47 [†]	39	33	..	..	..	33		-	-	-	..	..	..	-

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, 2005



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, 1999 TO 2005

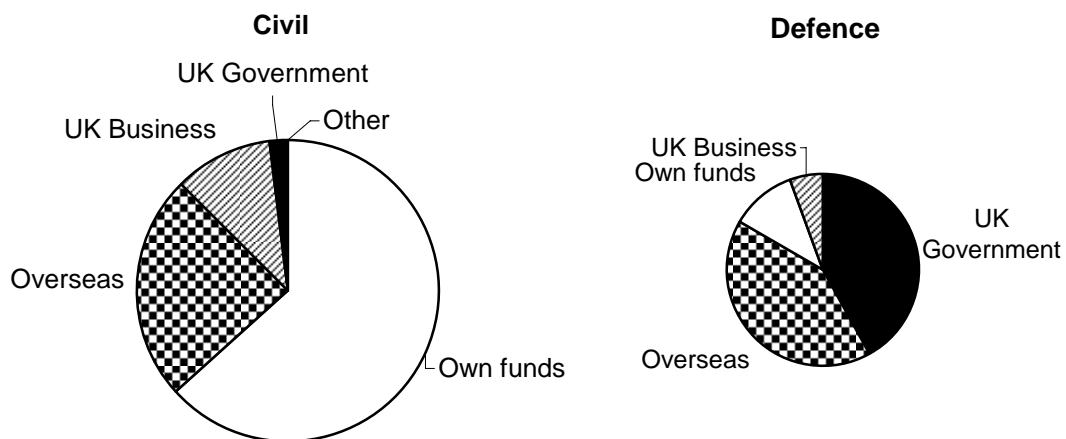
£million

		Civil							Defence							
		1999	2000	2001	2002	2003	2004	2005	1999	2000	2001	2002	2003	2004	2005	
UK Government	DLFG	316	228	152 [†]	188	442	208	210	DLFN	841	785	787 [†]	693	778	1 127	939
Overseas total	DLHS	2 092	2 003	2 794[†]	3 151	2 993	2 475	2 690	DLIF	478	467	434[†]	551	564	518	927
of which:																
EC Programmes	DLFH	137	101	77 [†]	134	94	63	92	DLFO	-	-	-	-	-	-	-
All other funding from abroad	DLFI	1 955	1 902	2 717 [†]	3 017	2 899	2 412	2 598	DLFP	478	467	434 [†]	551	564	518	927
Other UK Business	DLFJ	670	688	630 [†]	..	1 056	1 025	1 178	DLFQ	80	90	96 [†]	..	81	68	122
Own	DLFK	6 548	6 916	6 753 [†]	6 725	6 483	7 065	7 088	DLFR	276	328	328 [†]	306	277	326	253
Other	DLFL	1	3	4	..	3	5	2	DLFS	-	-	-	..	-	-	-
TOTAL	DLBV	9 626	9 838	10 333[†]	10 823	10 977	10 778	11 168	DLBW	1 675	1 671	1 645[†]	1 646	1 700	2 039	2 242

Source: National Statistics

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

Chart 4 - Source of funds for R&D performed in UK businesses, civil and defence, 2005



7 BREAKDOWN OF R&D PERFORMED IN UK BUSINESSES BY GOVERNMENT OFFICE REGION: EXPENDITURE AND EMPLOYMENT, 2003 TO 2005

		Expenditure £million			% of total	Employment FTE in thousands			
		2003	2004	2005	2005	2003	2004	2005	
United Kingdom	DLBX	12 677 [†]	12 816	13 410	100	DLEI	156 [†]	152	147
England	DLKI	11 845 [†]	11 981	12 459	92.9	DLKJ	142 [†]	138	134
North East	DLJO	152 [†]	153	158	1.2	DLJZ	3	3 [†]	3
North West	DLJT	1 545 [†]	1 742	1 887	14.1	DLKE	17	16	16
Yorkshire and the Humber	DLJP	345 [†]	348	350	2.6	DLKA	6	6	6
East Midlands	DLJQ	868 [†]	960	1 019	7.6	DLKB	13 [†]	12	11
West Midlands	DLJN	809 [†]	772	735	5.5	DLJY	14 [†]	13	12
East of England	DLJR	2 936 [†]	2 703	3 316	24.7	DLKC	32 [†]	29	29
London	DLKL	709 [†]	792	630	4.7	DLKM	9	9 [†]	8
South East	DLJS	3 252 [†]	3 214	3 163	23.6	DLKD	36 [†]	38	36
South West	DLJM	1 229 [†]	1 297	1 201	9.0	DLJX	13 [†]	13	13
Wales	DLJU	207 [†]	226	231	1.7	DLKF	4	3 [†]	3
Scotland	DLJV	508 [†]	494	584	4.4	DLKG	7	7 [†]	7
Northern Ireland	DLJW	116	116	136	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, 2005

