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**Coverage**

United Kingdom

**Theme**

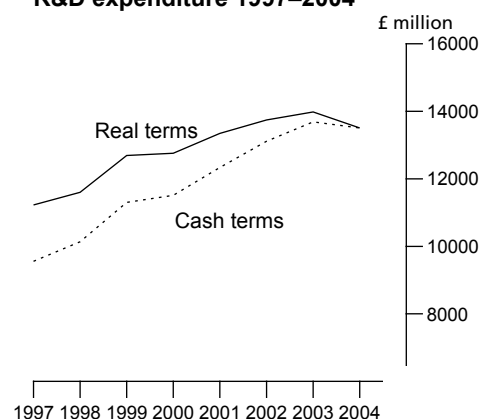
Commerce, Energy and Industry

## UK Business Enterprise Research and Development, 2004

In 2004, in cash terms and compared with 2003:

- Total expenditure decreased by 1 per cent to £13.5 billion
- Civil expenditure decreased by 4 per cent to £11.2 billion
- Defence expenditure increased by 16 per cent with £2.3 billion

**R&D expenditure 1997–2004**



In 2004, in real terms (2004 prices) and compared with 2003:

- Total expenditure decreased by 3 per cent to £13.5 billion
- Civil expenditure decreased by 6 per cent to £11.2 billion
- Defence expenditure increased by 13 per cent to £2.3 billion

Despite the small fall in R&D expenditure in 2004, due to the decrease in civil R&D expenditure, there has been an upward trend in R&D expenditure in real terms since 1997. In cash terms, there has been an upward trend since 1992.

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### Expenditure on R&D performed in UK businesses in cash & real terms, 2000 to 2004

	£ million					Percentage change 2003–2004
	2000	2001	2002	2003	2004	
<b>In cash terms</b>						
Civil	9,838	10,513	11,461	11,739	11,248	-4
Defence	1,671	1,824	1,649	1,948	2,256	16
Total	11,510	12,336	13,110	13,687	13,504	-1
<b>In real terms (2004 prices)</b>						
Civil	10,904	11,371	12,015	11,988	11,248	-6
Defence	1,852	1,973	1,729	1,989	2,256	13
Total	12,757	13,343	13,743	13,978	13,504	-3

## **UK Business Enterprise R&D 2004**

### **Expenditure on R&D performed in UK businesses: cash and real terms; 1997 to 2004 (Table 1)**

In 2004, £13.5 billion was spent on R&D performed within UK businesses – a fall of 1 per cent at current prices compared with the 2003 total. Total R&D Expenditure in 2004 represented approximately 1.1 per cent of GDP, a small decrease on recent years.

### **Expenditure on R&D performed in UK businesses: product groups, 1997 to 2004 (Table 2)**

The product group with the largest R&D expenditure was pharmaceuticals with expenditure in 2004 at £3.2 billion, 24 per cent of all spending. Other major product groups were aerospace which accounted for £2.0 billion (15 per cent) and computer and related activities £1.1 billion (8 per cent).

### **Sources of funds for R&D performed in UK businesses: 1997 to 2004 (Table 3 and Table 6)**

Funding of R&D from businesses' own funds was £7.4 billion in 2004 (55 per cent of the total). Funding of R&D in UK businesses from abroad was £3.3 billion in 2004 (25 per cent of the total). Funding of R&D in UK businesses by the UK Government was £1.6 billion in 2004, 12 per cent of the total and predominately in defence. The distribution of the sources of funds for business R&D in 2004 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 2004 is shown in Chart 4.

### **Employment on R&D performed in UK businesses: 1997 to 2004 (Table 4)**

The number of staff employed on R&D remained broadly the same between 2003 and 2004 with scientists and engineers accounting for 63 per cent of the staff employed on R&D in 2004. The level of technicians decreased by 7 per cent on 2003 figures and administrative staff increased 3 per cent between 2003 and 2004. This distribution is shown in Chart 2.

### **Expenditure on R&D performed in UK businesses: civil and defence, by broad product group, 1999 to 2004 (Table 5)**

In real terms, civil R&D decreased by 6 per cent in 2004 and defence R&D increased by 13 per cent from 2003.

In 2004, in cash terms, chemical products and other manufacturing accounted for 44 per cent of the total civil R&D expenditure. The second largest civil R&D broad product group was services, accounting for 24 per cent of total civil R&D expenditure. Defence R&D continued to be dominated by the aerospace product group, followed by mechanical engineering and electrical machinery. The distribution of civil and defence R&D expenditure by broad product groups for 2004, is shown in Chart 3.

### **Expenditure on R&D performed in UK businesses by regional breakdown: 2002 to 2004 (Table 7)**

In 2004, 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 again the South East which accounted for 24 per cent of the total expenditure and East of England which accounted for 22 per cent, followed by the North West which accounted for 13 per cent. The regional breakdown for business R&D in 2004 is shown in Chart 5.

## **BACKGROUND NOTES**

### **The 2004 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 4500 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 are included in the sample and accounted for 81 per cent of the 2004 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 4,354 businesses, representing a response rate of 96 per cent.
5. Estimates were made for the R&D activity of unsampled and non-responding businesses.

#### **Revisions to past data**

6. There are no revisions to past data.

#### **More detailed information**

7. A more detailed analysis of the results of this 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](http://www.statistics.gov.uk) on 20 January 2006.

## Definitions

### Research and Experimental Development (R&D)

8. 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

9. 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

10. 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

11. 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

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

### General

13. For information on available aggregated data on Research and Development please contact Julie Owens on **01633 812789**, (e-mail [julie.owens@ons.gov.uk](mailto:julie.owens@ons.gov.uk)).
14. 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.
15. **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 2005

# 1 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES: CASH AND REAL TERMS AND AS A PERCENTAGE OF GDP, 1997 TO 2004

		£million							
		1997	1998	1999	2000	2001	2002	2003	2004
In cash terms	<b>DLBX</b>	9 556	10 133	11 302	11 510	12 336	13 110	13 687	13 504
In real terms (2004 prices)		11 225	11 602	12 690	12 757	13 343	13 743	13 978	13 504
Current prices GDP	<b>DLHT</b>	824 044	870 464	921 762	965 041	1 006 523	1 062 954	1 121 029	1 175 666
As a % of GDP		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1

2004 = 100

Source: National Statistics

	1997	1998	1999	2000	2001	2002	2003	2004
GDP deflator used to convert cash terms to real terms	85.1	87.3	89.1	90.2	92.5	95.4	97.9	100.0

## 2 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES: DETAILED PRODUCT GROUPS, 1997 TO 2004

		£million								% of total
		1997	1998	1999	2000	2001	2002	2003	2004	2004
<b>TOTAL</b>	<b>DLBX</b>	9 556	10 133	11 302	11 510	12 336	13 110	13 687	13 504	100
Agriculture, hunting and forestry; Fishing	DLBY	84	102	115	135	96	122	121	107	0.8
Extractive Industries	DLBZ	44	41	42	46	43	52	56	108	0.8
Food products and beverages; Tobacco products	DLCF	180	242	237	264	314	299	306	258	1.9
Textiles, clothing and leather products	DLCQ	33	33	28	29	17	19	20	21	0.2
Pulp, paper and paper products; Printing and publishing; Wood and straw products	DLCT	44	49	45	38	34	44	45	46	0.3
Refined petroleum products and coke oven products; Processing of nuclear fuel	DLCE	225	234	212	182	250	258	277	245	1.8
Chemicals, man-made fibres	DLCB	680	688	718	682	522	583	552	566	4.2
Pharmaceuticals, medical chemicals and botanical products	DLCD	2 151	2 238	2 535	2 846	3 040	3 304	3 241	3 244	24.0
Rubber and plastic products	DLCR	60	66	72	54	45	64	64	72	0.5
Other non-metallic mineral products	DLCG	47	56	59	..	41	46	48	61	0.5
Casting of iron and steel	DLCJ	39	47	41	..	31	32	29	30	0.2
Non-ferrous metals	DLCK	15	20	22	21	19	16	6	4	-
Fabricated metal products	DLCL	88	90	70	73	64	59	60	77	0.6
Machinery and equipment	DLCO	622	640	642	703	843	767	973	1 034	7.7
Office machinery and computers	DLCN	102	125	111	113	105	146	58	51	0.4
Electrical machinery and apparatus	DLCA	424	423	357	422	451	462	443	421	3.1
Radio, television and communication equipment	DLCB	655	772	867	1 024	1 044	957	948	811	6.0
Precision instruments	DLCM	336	340	473	480	488	442	400	368	2.7
Motor vehicles and parts	DLCG	924	913	1 060	864	898	929	1 173	878	6.5
Other transport equipment	DLCI	50	72	99	158	208	..	..	22	0.2
Shipbuilding and repairs	DLCH	15	36	76	72	83	..	..	94	0.7
Aerospace	DLCF	893	1 039	1 237	1 091	1 260	1 347	1 652	2 000	14.8
Furniture; Other manufactured goods	DLCU	25	20	33	27	31	48	68	47	0.3
Recycling	DLCV	-	-	1	1	1	3	2	1	-
Electricity, gas and water supply	DLCW	130	140	137	160	99	116	69	43	0.3
Construction	DLCX	38	39	41	34	30	35	30	40	0.3
Wholesale and retail trade	DLDE	..	..	..	..	55	69	..	118	0.9
Transport and storage	DLCY	..	..	..	..	12	10	..	13	0.1
Post and telecommunications	DLCZ	496	449	565	674	733	742	660	620	4.6
Miscellaneous business activities; Technical testing and analysis	DLDC	142	157	196	131	242	360	288	327	2.4
Computer and related activities	DLDB	680	688	713	611	725	888	1 323	1 111	8.2
Research and development services	DLDA	313	346	448	428	495	558	465	623	4.6
Public administration	DLDD	6	8	11	12	18	18	24	42	0.3

Source: National Statistics

1 .. denotes disclosive figures.

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

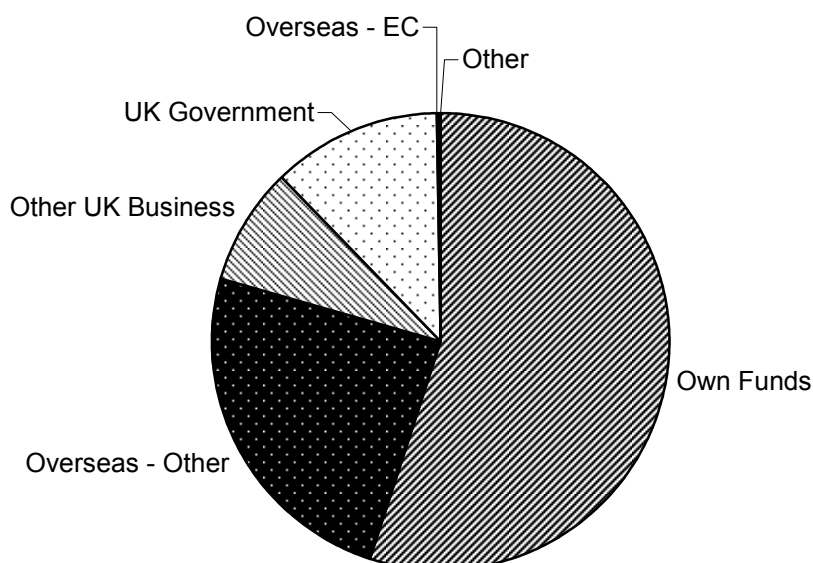
### 3 SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES: 1997 TO 2004

		1997	1998	1999	2000	2001	2002	2003	2004
<b>£ MILLION</b>									
<b>TOTAL</b>	<b>DLBX</b>	9 556	10 133	11 302	11 510	12 336	13 110	13 687	13 504
UK Government	<b>DLDO</b>	915	1 094	1 157	1 013	1 101	884	1 487	1 602
<b>Overseas total</b>	<b>DLHK</b>	1 800	2 238	2 570	2 470	3 012	3 567	3 554	3 336
of which:									
EC Programmes	<b>DLDQ</b>	108	119	137	101	109	177	95	47
All other funding from abroad	<b>DLDS</b>	1 692	2 119	2 433	2 369	2 903	3 391	3 459	3 289
Other UK Business	<b>DLDU</b>	642	659	750	779	764	942	1 146	1 117
Own funds	<b>DLDW</b>	6 198	6 141	6 824	7 244	7 455	7 712	7 496	7 443
Other	<b>DLDY</b>	1	–	1	3	4	4	3	5
<b>PERCENT</b>									
<b>TOTAL</b>		100	100	100	100	100	100	100	100
UK Government		10	11	10	9	9	7	11	12
<b>Overseas total</b>		19	22	23	21	24	27	26	25
of which:									
EC Programmes		1	1	1	1	1	1	1	–
All other funding from abroad		18	21	22	21	24	26	25	24
Other UK Business		7	7	7	7	6	7	8	8
Own funds		65	61	60	63	60	59	55	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, 2004**



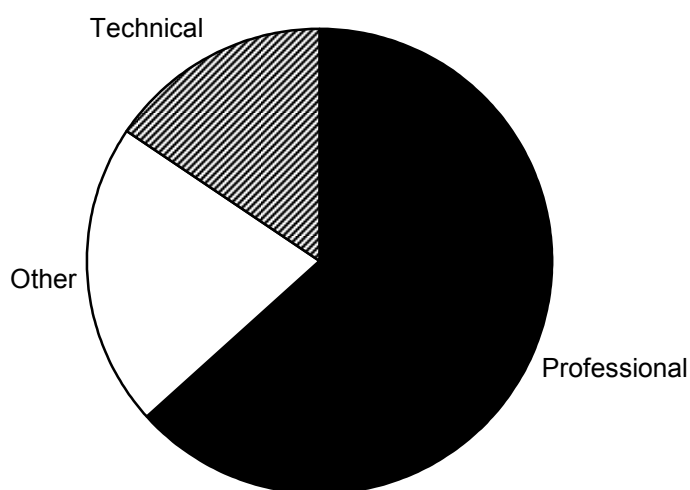
# 4 EMPLOYMENT ON R&D PERFORMED IN UK BUSINESSES: 1997 TO 2004

Full time equivalent in thousands

		1997	1998	1999	2000	2001	2002	2003	2004
<b>TOTAL</b>	<b>DLEI</b>	137	148	153	145	152	167	163	163
Scientists and engineers	<b>DLEJ</b>	83	91	92	86	93	105	103	103
Technicians, laboratory assistants and draughtsmen	<b>DLEK</b>	30	32	33	30	28	30	27	25
Administrative, clerical, industrial and other staff	<b>DLEL</b>	24	24	28	30	31	32	33	34
<b>As % of total employment</b>									
Scientists and engineers		61	61	60	59	61	63	63	63
Technicians, laboratory assistants and draughtsmen		22	22	22	21	18	18	17	15
Administrative, clerical, industrial and other staff		18	16	18	21	20	19	20	21

Source: National Statistics

**Chart 2 - Employment on R&D performed in UK businesses, 2004**



- 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 2004

£million

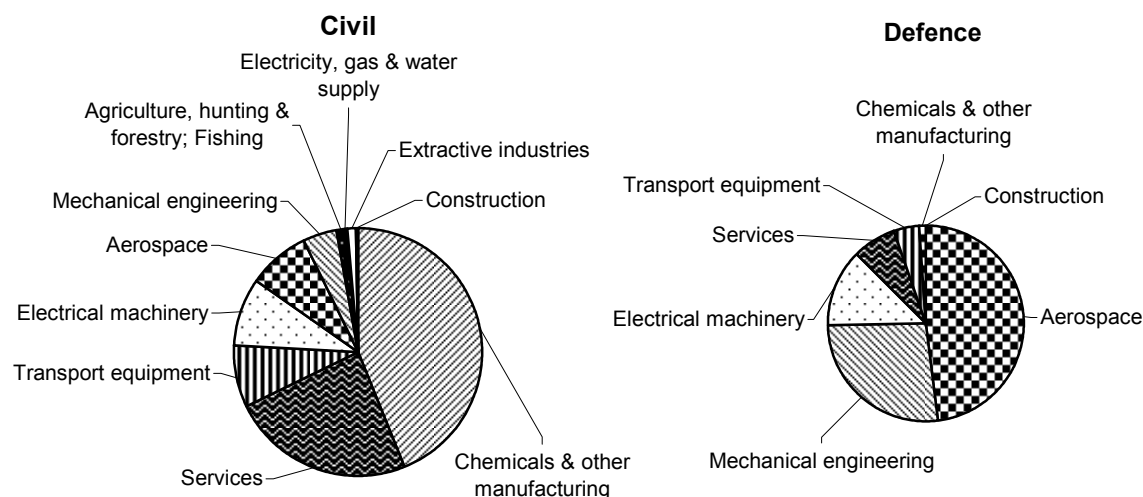
		Civil						Defence						
		1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004	
In cash terms														
<b>TOTAL</b>	<b>DLEV</b>	9 626	9 838	10 513	11 461	11 739	11 248	<b>DLBW</b>	1 675	1 671	1 824	1 649	1 948	2 256
<b>Manufacturing</b>	<b>DLEP</b>	7 376	7 582	8 089	8 626	8 754	8 257	<b>DLEX</b>	1 619	1 649	1 699	1 514	1 781	2 094
Chemicals	DLEQ	3 252	3 527	3 562	3 885	3 793	..	DLEY	1	-	-	2	-	..
Mechanical engineering	DLER	434	463	470	524	466	505	DLEZ	279	314	437	302	566	606
Electrical machinery	DLES	1 013	1 163	1 200	1 204	1 131	996	DLFA	322	395	399	361	318	287
Transport equipment	DLET	1 159	1 023	1 106	..	..	898	DLFB	77	71	82	..	..	96
Aerospace	DLEU	535	457	621	645	859	917	DLFC	701	634	639	702	792	1 082
Other manufacturing	DLEV	983	948	1 130	..	..	..	DLFD	239	235	141	..	..	..
<b>Services</b>	<b>DLEW</b>	1 915	1 883	2 155	2 511	2 709	2 694	<b>DLFE</b>	57	22	125	135	167	161
<b>Other: Total</b>	<b>LDIL</b>	335	374	268	324	276	297	<b>LDJJ</b>	-	-	-	-	-	1
Agriculture, hunting & forestry; Fishing	LDIN	115	135	96	122	121	107	LDJL	-	-	-	-	-	-
Extractive industries	LDIS	42	46	43	52	56	108	LDKF	-	-	-	-	-	-
Electricity, gas & water supply	LDJB	137	160	99	116	69	43	LDKG	-	-	-	-	-	-
Construction	LDJG	41	34	30	35	30	39	LDKS	-	-	-	-	-	1

		Civil						Defence						
		1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004	
In real terms (2004 prices)														
<b>TOTAL</b>		10 809	10 904	11 371	12 015	11 988	11 248		1 881	1 852	1 973	1 729	1 989	2 256
<b>Manufacturing</b>		8 282	8 403	8 749	9 043	8 940	8 257		1 818	1 828	1 838	1 587	1 819	2 094
Chemicals		3 652	3 909	3 853	4 073	3 874	..		1	-	-	2	-	..
Mechanical engineering		487	513	508	549	476	505		313	348	473	317	578	606
Electrical machinery		1 137	1 289	1 298	1 262	1 155	996		362	438	432	378	325	287
Transport equipment		1 301	1 134	1 196	..	..	898		86	79	89	..	..	96
Aerospace		601	507	672	676	877	917		787	703	691	736	809	1 082
Other manufacturing		1 104	1 051	1 222	..	..	..		268	260	153	..	..	..
<b>Services</b>		2 150	2 087	2 331	2 632	2 767	2 694		64	24	135	142	171	161
<b>Other: Total</b>		376	415	290	340	282	297		-	-	-	-	-	1
Agriculture, hunting & forestry; Fishing		129	150	104	128	124	107		-	-	-	-	-	-
Extractive industries		47	51	47	55	57	108		-	-	-	-	-	-
Electricity, gas & water supply		154	177	107	122	70	43		-	-	-	-	-	-
Construction		46	38	32	37	31	39		-	-	-	-	-	1

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, 2004**



Note - Chemicals & other manufacturing have been combined to prevent disclosive data.

# 6 SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES: CIVIL AND DEFENCE, 1999 TO 2004

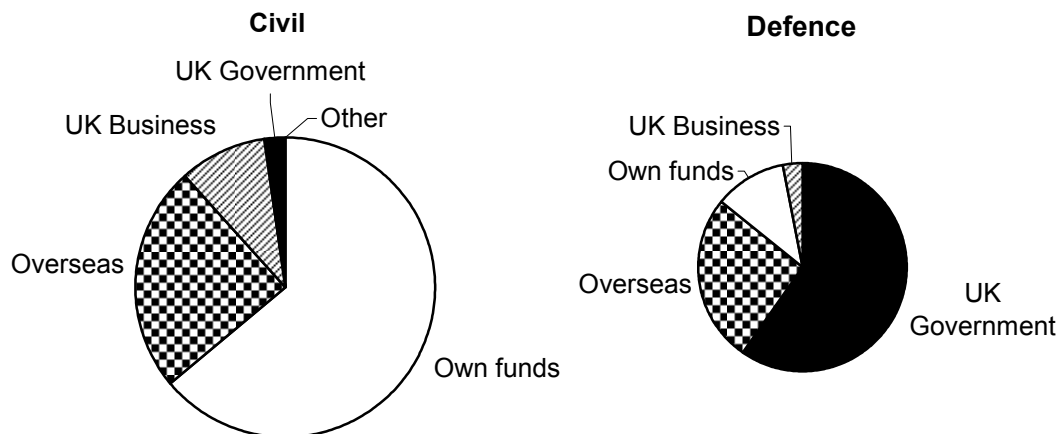
£million

		Civil						Defence						
		1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004	
UK Government	DLFG	316	228	191	193	447	257	DLFN	841	785	911	691	1 040	1 346
<b>Overseas total</b>	<b>DLHS</b>	<b>2 092</b>	<b>2 003</b>	<b>2 585</b>	<b>3 026</b>	<b>3 008</b>	<b>2 748</b>	<b>DLIF</b>	<b>478</b>	<b>467</b>	<b>427</b>	<b>541</b>	<b>546</b>	<b>588</b>
of which:														
EC Programmes	DLFH	137	101	109	177	95	47	DLFO	—	—	—	—	—	—
All other funding from abroad	DLFI	1 955	1 902	2 476	2 849	2 913	2 701	DLFP	478	467	427	541	546	588
Other UK Business	DLFJ	670	688	666	848	1 066	1 046	DLFQ	80	90	98	94	80	71
Own	DLFK	6 548	6 916	7 068	7 390	7 214	7 192	DLFR	276	328	387	322	282	252
Other	DLFL	1	3	4	4	3	5	DLFS	—	—	—	—	—	—
<b>TOTAL</b>	<b>DLBV</b>	<b>9 626</b>	<b>9 838</b>	<b>10 513</b>	<b>11 461</b>	<b>11 739</b>	<b>11 248</b>	<b>DLEW</b>	<b>1 675</b>	<b>1 671</b>	<b>1 824</b>	<b>1 649</b>	<b>1 948</b>	<b>2 256</b>

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, 2004**



# 7 BREAKDOWN OF R&D PERFORMED IN UK BUSINESSES BY GOVERNMENT OFFICE REGION: EXPENDITURE AND EMPLOYMENT, 2002 TO 2004

		Expenditure £million			% of total	Employment FTE in thousands			
		2002	2003	2004	2004	2002	2003	2004	
<b>United Kingdom</b>	<b>DLBX</b>	13 110	13 687	13 504	100	<b>DLEI</b>	167	163	163
<b>England</b>	<b>DLKI</b>	12 138	12 786	12 546	92.9	<b>DLKJ</b>	151	149	148
North East	DLJO	128	281	269	2.0	DLJZ	3	3	4
North West	DLJT	1 661	1 559	1 691	12.5	DLKE	18	17	16
Yorkshire and the Humber	DLJP	357	382	372	2.8	DLKA	7	6	6
East Midlands	DLJQ	1 063	929	978	7.2	DLKB	15	14	14
West Midlands	DLJN	695	587	800	5.9	DLJY	13	9	14
East of England	DLJR	2 741	3 453	2 969	22.0	DLKC	32	37	31
London	DLKL	950	771	842	6.2	DLKM	10	9	12
South East	DLJS	3 268	3 464	3 265	24.2	DLKD	39	40	38
South West	DLJM	1 274	1 359	1 361	10.1	DLJX	14	14	13
<b>Wales</b>	<b>DLJU</b>	182	264	228	1.7	<b>DLKF</b>	3	4	4
<b>Scotland</b>	<b>DLJV</b>	640	521	614	4.5	<b>DLKG</b>	11	7	9
<b>Northern Ireland</b>	<b>DLJW</b>	149	116	116	0.9	<b>DLKH</b>	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, 2004**

