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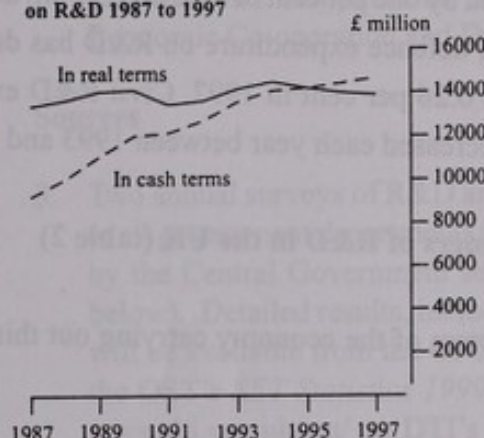
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Gross domestic expenditure on research and development 1997

In 1997 the UK's gross domestic expenditure on research and development (R&D) was £14.6 billion. This represented an increase, in cash terms, of two per cent from the level in 1996.

Gross domestic expenditure
on R&D 1987 to 1997



In real terms Gross Domestic Expenditure on R&D decreased by one per cent between 1996 and 1997.

In 1997, expenditure on R&D was 1.80 per cent of gross domestic product. This proportion has fallen in the last four years, as expenditure on R&D has been outstripped by growth in GDP.

Gross expenditure on R&D in the UK (£million)

	In cash terms	In real terms	Cash terms % of GDP
1986	8,623	13,175	2.22
1987	9,221	13,375	2.15
1988	10,035	13,632	2.09
1989	11,069	14,033	2.12
1990	11,991	14,097	2.13
1991	12,131	13,429	2.06
1992	12,689	13,597	2.07
1993	13,541	14,135	2.09
1994	14,046	14,455	2.05
1995	14,172	14,172	1.96
1996	14,401	13,971	1.88
1997	14,647	13,863	1.80

Note: Real terms is calculated at 1995 prices using GDP deflator.

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Prepared by the Government Statistical Service

Gross domestic expenditure on research and development in the UK (tables 1, 2 and 3)

The estimate of the UK's gross domestic expenditure on R&D in 1997 was £14.6 billion compared to £14.4 billion in 1996. R&D expenditure for civil purposes at £12.5 billion in 1997 was two per cent higher in cash terms than for 1996. R&D expenditure for defence purposes, at £2.1 billion, increased by one per cent in cash terms from the 1996 level. As a percentage of GDP, defence expenditure on R&D has declined from 0.34 per cent in 1992 to 0.26 per cent in 1997. Civil R&D expenditure as a proportion of GDP decreased each year between 1993 and 1997.

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

The sectors of the economy carrying out this R&D in 1997 were (in cash terms):

Business enterprises: £9.6 billion, two per cent higher than in 1996.

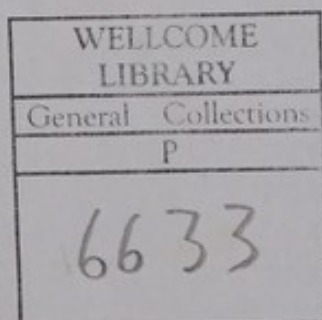
Government: £2.0 billion, three per cent lower than 1996.
 (Including research councils)

Higher education: £2.9 billion compared with £2.8 billion in 1996.

Private non-profit: £0.2 billion, similar to 1996.

Funding of R&D in the UK (tables 4 and 5)

In 1997 Government funded 31 per cent of all R&D performed in the UK (25 per cent of civil R&D and 62 per cent of defence R&D).



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BACKGROUND NOTES

1. This First Release presents estimates of gross domestic expenditure on research and development in the UK (GERD) in 1997.
2. More detailed figures will be published later in the year by the DTI's Office of Science and Technology (OST) in the *Science, Engineering and Technology Statistics 1999 (SET Statistics 1999)*¹, and in ONS's *Economic Trends*². Detailed tabulations for Business Enterprise R&D were published in January 1999 in *Business Monitor MA14*³. International comparisons are published by the Organisation of Economic Co-operation and Development (OECD)⁴.

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 OST's *SET Statistics 1999*. They will also be available at <http://www.dti.gov.uk/ost/> on DTI's website. 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 performing R&D. The 1997 survey results were first published in an ONS First Release on 20 November 1998⁵.
5. The government funding totals in table 4 and 5 differ from tables showing departmental breakdowns of net expenditure in OST's *SET Statistics 1998*. Tables 4 and 5 use information on government funded R&D from the survey of Business Enterprise R&D. The *SET Statistics 1998* use the survey of government funded R&D. The differences are due chiefly to the way each survey records the R&D content of Ministry of Defence contracts.

Definition of R&D

6. The definitions used here are based on those internationally agreed by OECD; they are set out in the *Frascati Manual*⁶.
7. The guiding line to distinguish R&D activity is the presence of an appreciable element of innovation. 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 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. So, 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 intramural 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 Office on the basis of the Culyer directive which since 1995 confirmed the extent of R&D spending in the NHS. For years 1991 to 1995 inclusive, estimates for NHS R&D are based on simple proportions of the total NHS budget; no estimate is included for 1990 and earlier years.
 - 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. **Private non-profit R&D** is estimated on the basis of ONS's 1996 Private Non Profit Survey (PNP).

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 business enterprise 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 business enterprises may be considered more robust than the other GERD components, since they are based on well established surveys.

Real terms

14. Figures given in "real terms" are calculated using the GDP deflator at market prices; 1995=100.

Revisions

15. GDP and GDP deflators used have been revised in line with the new European System of Accounts (ESA95) definitions. (See ONS National Accounts First Release dated 24 September 1998)7.

16. There have been some revisions to the 1996 Business Survey results. These were necessary to take into account misclassification and updated population information.

Rounding of figures

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

General

18. For information on available aggregated data on Gross Domestic Expenditure on Research and Development and ONS' Data Analysis

Service, please contact Jane Morgan on 01633 813109; (e-mail jane.morgan@ons.gov.uk).

19. Details of the policy governing the release of new data, including a description of the release categories featured on the front page of ONS releases, are available from the press office.
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21. The Office for National Statistics works in partnership with others in the Government Statistical Service to provide Parliament, government and the wider community with the statistical information, analysis and advice needed to improve decision-making, stimulate research and inform debate. It also registers key life events. It aims to provide an authoritative and impartial picture of society and a window on the work and performance of government, allowing the impact of government policies and actions to be assessed.

References

1. 1996-97 outturn government R&D expenditure figures were in OST's SET Statistics 1998, HMSO, London; 1997-98 figures will be published in SET Statistics 1999 in May 1999.
2. 1996 UK R&D figures were in Economic Trends, August 1998. 1997 figures will be published in Economic Trends, later in 1999.
3. 1997 Business Enterprise R&D was published in Business Monitor MA14 in January 1999. Available from ONS Direct, Tel: 01633 812078. ISSN 1463 6115.
4. Main Science and Technology Indicators 1998, OECD, Paris. ISSN 1011-792X.
5. First Release Business Enterprise Research and Development 1997, ONS (98) 390.
6. Proposed Standard Practice for Surveys of Research and Experimental Development, 'Frascati Manual', OECD, Paris. ISBN 92-64-14202-9
7. Office for National Statistics' (ONS) National Accounts First Release of the 24th September 1998 Quarterly national accounts - 2nd quarter 1998 (No. 309).

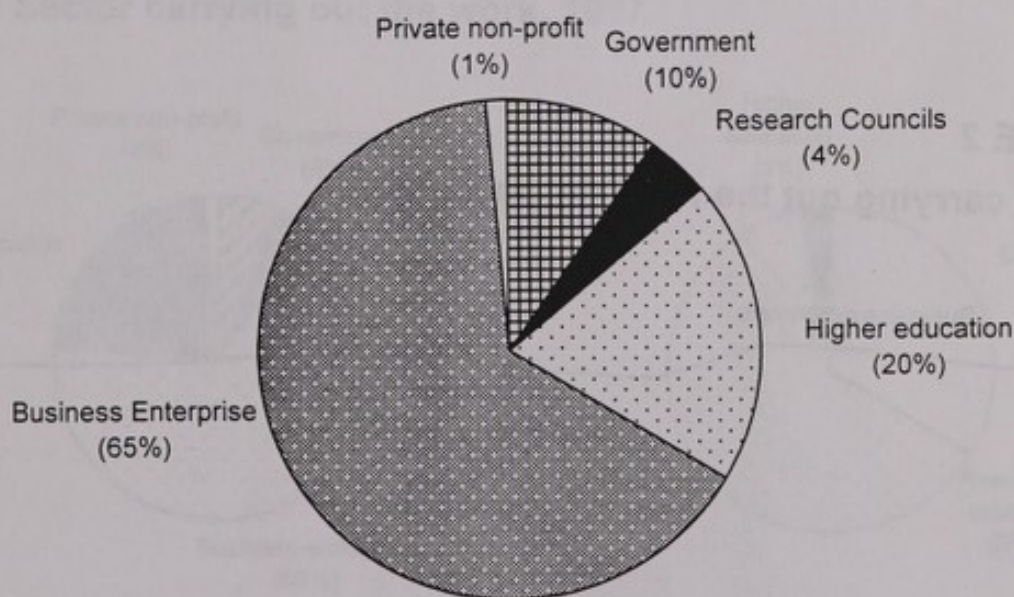
1 R&D PERFORMED IN THE UK IN EACH SECTOR ACCORDING TO SOURCE OF FINANCE, 1997

	Sector carrying out the work						£million
	Government	Research Councils	Higher education	Business enterprise	Private non-profit	Total	Abroad
Sector providing the funds							
Government	1 165	78	156	919	18	2 337	236
Research Councils	21	405	691	8	10	1 135	119
Higher Education Funding Councils	—	—	1 033	—	—	1 033	—
Higher education	—	3	117	—	1	122	—
Business enterprise	202	37	207	6 770	35	7 250	—
Private non-profit	6	28	438	1	107	579	—
Abroad	30	38	248	1 856	19	2 191	—
TOTAL	1 424	590	2 891	9 553	190	14 647	—
of which:							
Civil	718	583	2 829	8 209	190	12 529	—
Defence	706	7	62	1 343	—	2 118	—

Source: Office for National Statistics

FIGURE 1

Sector carrying out the work 1997



2 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN THE UK BY SECTOR OF PERFORMANCE: 1987 TO 1997

£million

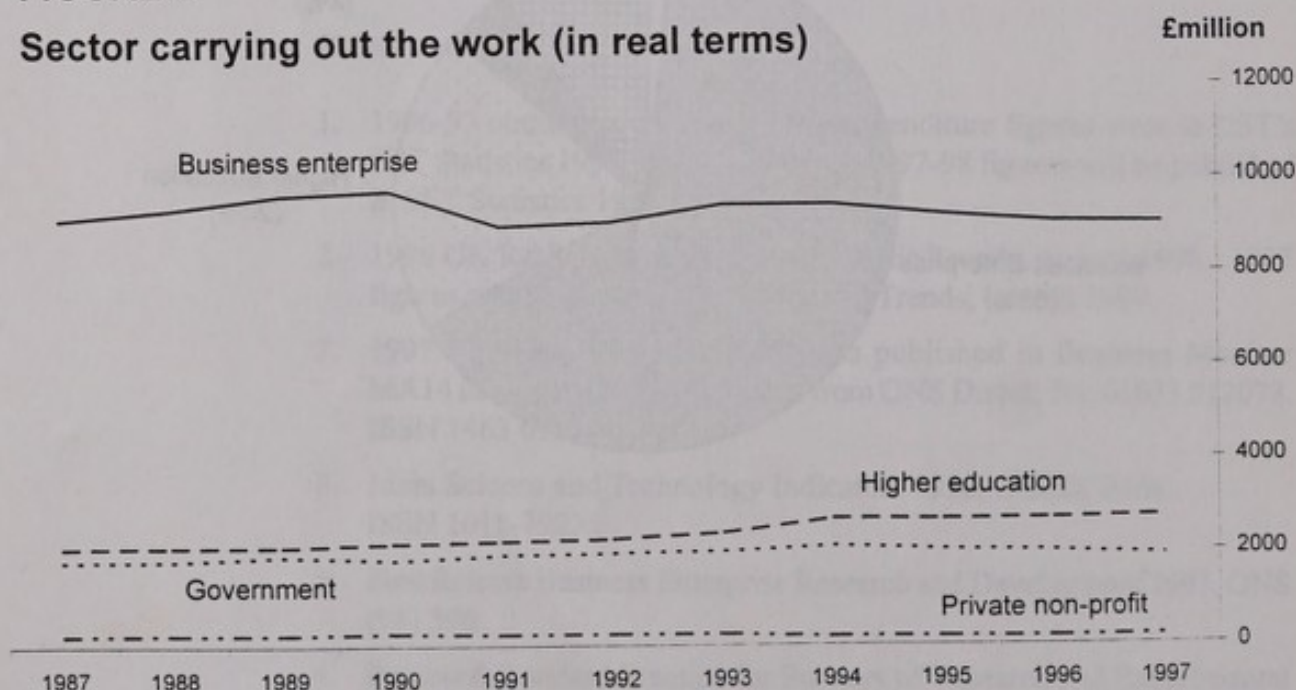
		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Sector carrying out the work												
In cash terms												
TOTAL	GLBA	9 221	10 035	11 068	11 991	12 131	12 689	13 541	14 046	14 172	14 401	14 647
Government	GLBK	1 264	1 360	1 534	1 566	1 757	1 846	1 928	2 051	1 462	1 495	1 424
Research Councils	DMRS	—	—	—	—	—	—	—	—	581	575	590
Business enterprise	GLBL	6 335	6 922	7 650	8 318	8 135	8 489	9 069	9 204	9 254	9 362	9 553
Higher education	GLBM	1 460	1 575	1 689	1 873	2 020	2 129	2 312	2 623	2 696	2 792	2 891
Private non-profit	GLBN	162	179	196	234	219	224	232	168	177	177	190
As % of GDP	GLBH	2.15	2.09	2.12	2.13	2.06	2.07	2.09	2.05	1.96	1.88	1.80

		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Sector carrying out the work												
In real terms (1995 prices)												
TOTAL	GLBD	13 375	13 632	14 031	14 097	13 429	13 597	14 134	14 455	14 172	13 971	13 863
Government	GLBW	1 833	1 848	1 945	1 841	1 945	1 978	2 013	2 111	1 462	1 450	1 348
Research Councils	DMSU	—	—	—	—	—	—	—	—	581	558	558
Business Enterprise	GLBX	9 189	9 403	9 698	9 779	9 005	9 096	9 466	9 472	9 254	9 082	9 041
Higher Education	GLBY	2 118	2 140	2 141	2 202	2 236	2 281	2 413	2 699	2 696	2 709	2 736
Private non-profit	GLBZ	235	243	248	275	242	240	242	173	177	172	180

Source: Office for National Statistics

FIGURE 2

Sector carrying out the work (in real terms)



3 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN THE UK BY SECTOR OF PERFORMANCE: 1992 TO 1997

IN CASH TERMS

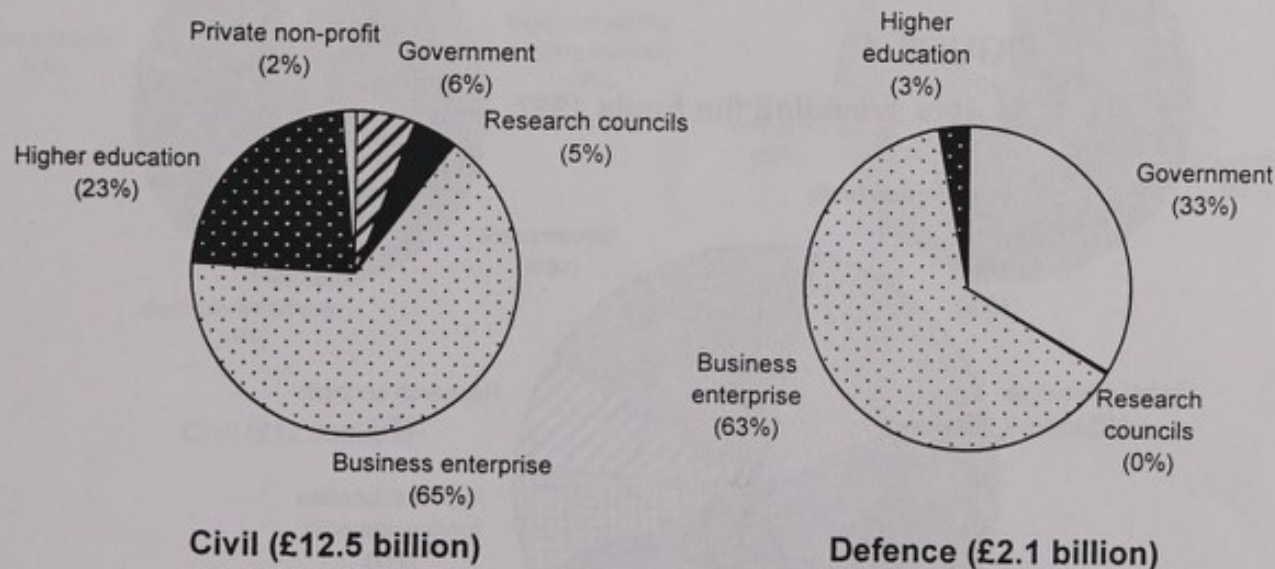
£million

		Civil						Defence						
		1992	1993	1994	1995	1996	1997		1992	1993	1994	1995	1996	1997
Sector carrying out the work														
TOTAL	GLBB	10 606	11 442	11 906	12 039	12 312	12 529	GLBC	2 083	2 099	2 140	2 133	2 089	2 118
Government	GLBO	1 214	1 251	1 403	789	768	718	GLBS	632	677	648	673	727	706
Research Councils	DMSC	—	—	—	574	570	583	DMSM	—	—	—	8	5	7
Business enterprise	GLBP	7 092	7 710	7 771	7 863	8 065	8 209	GLBT	1 397	1 359	1 433	1 391	1 297	1 343
Higher education	GLBQ	2 084	2 259	2 573	2 635	2 732	2 829	GLBU	45	53	50	61	60	62
Private non-profit	GLBR	216	221	159	177	177	190	GLBV	8	11	9	—	—	—
As % of GDP	GLBI	1.73	1.77	1.74	1.67	1.61	1.54	GLBJ	0.34	0.32	0.31	0.30	0.27	0.26

Source: Office for National Statistics

FIGURE 3

Sector carrying out the work, 1997



4 EXPENDITURE ON RESEARCH AND DEVELOPMENT IN THE UK BY SECTOR OF FUNDING: 1987 TO 1997

£million

		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Sector funding R&D in the UK												
<i>In cash terms</i>												
TOTAL	GLBA	9 221	10 035	11 068	11 991	12 131	12 689	13 541	14 046	14 172	14 401	14 647
Government	GLCA	3 535	3 553	3 913	4 123	4 131	4 239	4 400	4 657	2 611	2 458	2 337
Research Councils	DMSR	—	—	—	—	—	—	—	—	1 078	1 092	1 135
Higher Education Funding Councils	DMS	—	—	—	—	—	—	—	—	1 018	1 028	1 033
Business enterprise	GLCB	4 526	5 193	5 631	5 986	6 054	6 461	6 974	7 025	6 796	6 796	7 250
Higher education	GLCC	66	78	82	86	92	99	103	116	119	120	122
Abroad	GLCE	848	944	1 139	1 433	1 458	1 455	1 613	1 753	2 039	2 361	2 191
Private non-profit	GLCD	246	267	303	365	397	435	451	495	511	546	579

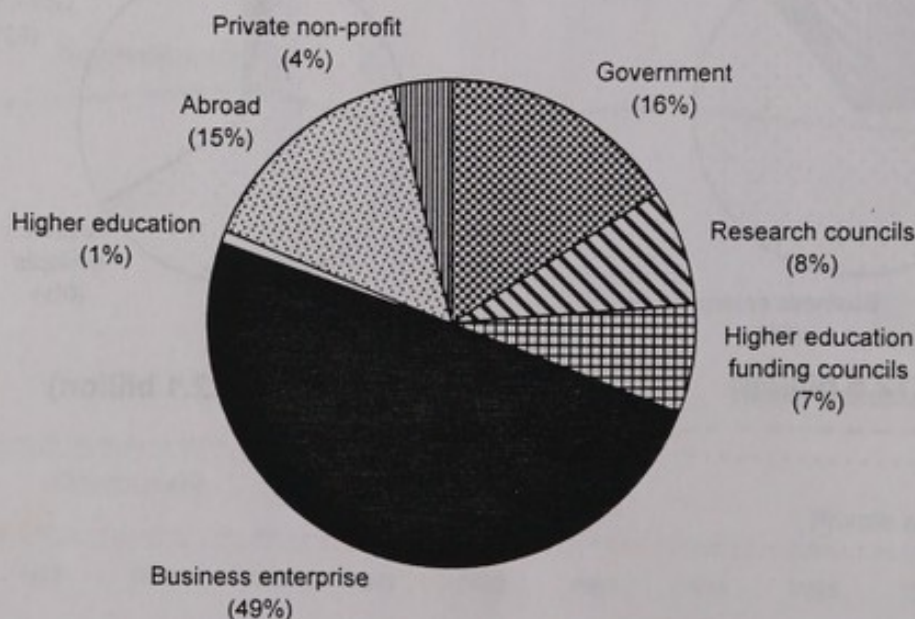
Sector funding R&D in the UK

In real terms (1995 prices)

		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
TOTAL	GLBD	13 375	13 632	14 031	14 097	13 429	13 597	14 134	14 455	14 172	13 971	13 863
Government	GLCP	5 128	4 827	4 961	4 847	4 573	4 542	4 593	4 793	2 611	2 385	2 212
Research Councils	DMSV	—	—	—	—	—	—	—	—	1 078	1 059	1 074
Higher Education Funding Councils	DMSW	—	—	—	—	—	—	—	—	1 018	997	978
Business enterprise	GLCQ	6 565	7 054	7 139	7 037	6 702	6 923	7 280	7 230	6 796	6 593	6 862
Higher education	GLCR	96	106	104	101	102	106	108	119	119	116	115
Abroad	GLCT	1 230	1 282	1 444	1 685	1 614	1 559	1 684	1 804	2 039	2 290	2 074
Private non-profit	GLCS	357	363	384	429	439	466	471	509	511	530	548

Source: Office for National Statistics

FIGURE 4
Sectors providing the funds 1997



5 EXPENDITURE ON CIVIL AND DEFENCE R&D PERFORMED IN THE UK BY SECTOR OF FUNDING: 1992 to 1997

IN CASH TERMS

£million

		Civil						Defence						
		1992	1993	1994	1995	1996	1997		1992	1993	1994	1995	1996	1997
Sector funding R&D in the UK														
TOTAL	GLBB	10 606	11 442	11 906	12 039	12 312	12 529	GLBC	2 083	2 099	2 140	2 133	2 089	2 118
Government	GLCF	2 979	3 046	3 347	1 225	1 113	1 025	GLCK	1 260	1 354	1 310	1 386	1 346	1 311
Research Councils	DMSX	—	—	—	1 078	1 092	1 134	GLCM	—	—	—	—	—	—
Higher Education Funding Councils	DMSY	—	—	—	1 018	1 027	1 033	DMSZ	—	—	—	—	—	—
Business enterprise	GLCG	5 959	6 549	6 554	6 405	6 365	6 779	GLCL	502	425	471	391	430	472
Higher education	GLCH	99	103	116	119	120	122	GLCN	—	—	—	—	—	—
Abroad	GLCJ	1 152	1 300	1 396	1 683	2 048	1 857	GLCO	303	314	358	356	313	335
Private non-profit	GLCI	416	445	493	511	545	579	GLCN	19	6	2	—	—	—

Source: Office for National Statistics

FIGURE 5

Sector funding R&D in the UK 1997

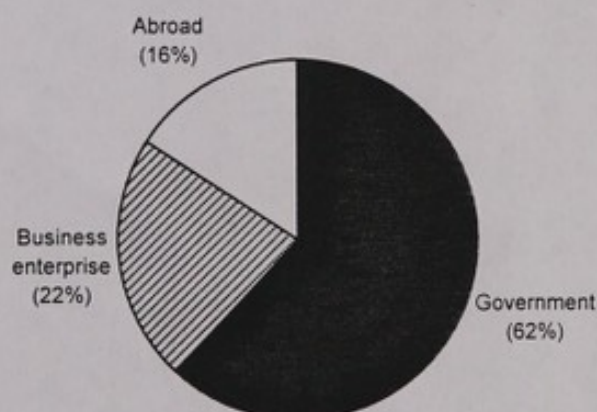
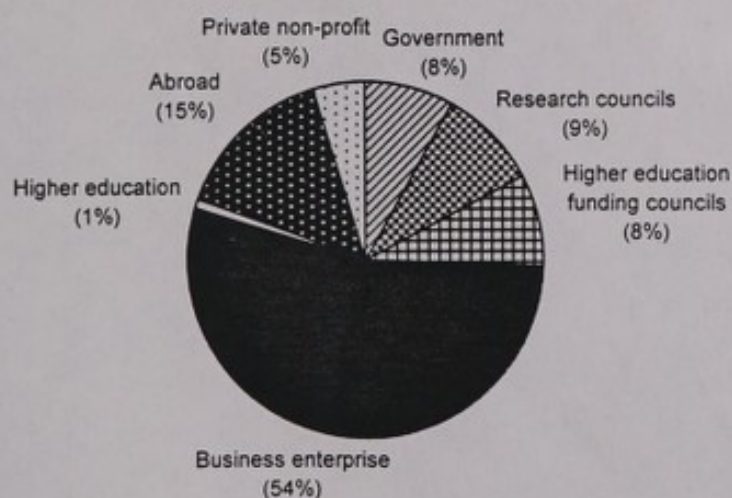


Table 1: Funding for Research and Development (R&D) in the UK, 1987-1997

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total	10,000	11,000	12,000	13,000	14,000	15,000	16,000	17,000	18,000	19,000	20,000
Government	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500	9,000
Industry	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
Academia	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
Charity	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
Other	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000

Source: Department of Trade and Industry, UK R&D Statistics

Notes: Figures are in millions of pounds sterling. The total R&D funding in the UK has increased steadily over the period, with government funding becoming a more significant proportion of the total.

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Government	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500	9,000
Industry	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
Academia	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
Charity	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
Other	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000

FIGURE 1

Government funding R&D in the UK 1987

