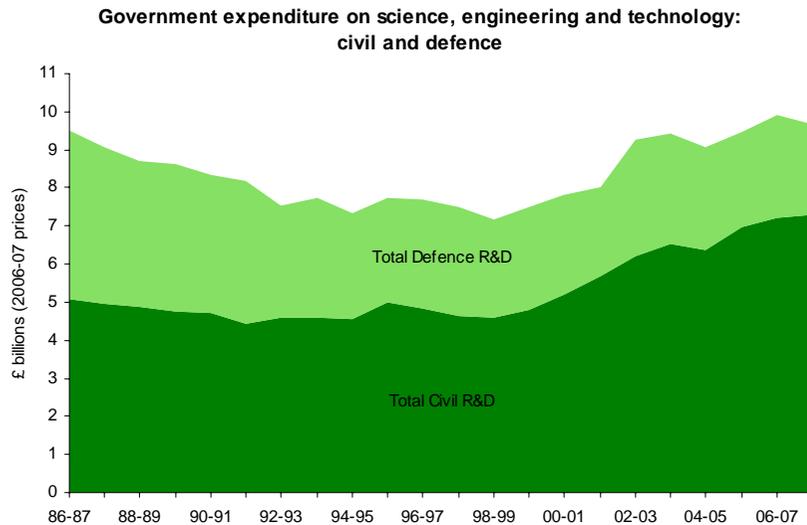


## Research and development in the UK

### Government expenditure

The Government's long-term vision, set out in its ten-year *Science & Innovation Investment Framework*, is to make Britain one of the best places in the world for science, research and innovation.<sup>i</sup> As part of this, the Office of Science and Innovation was established in 2006, within the DTI, with responsibility for UK science policy and for funding basic research allocated via the Research Councils.

Government expenditure on science, engineering and technology (SET) fell in real terms between 1986-87 and 1998-99. It subsequently increased, however, and planned expenditure of £9.7 billion in 2007-08 would represent a real-terms increase of 35 percent from this low point.

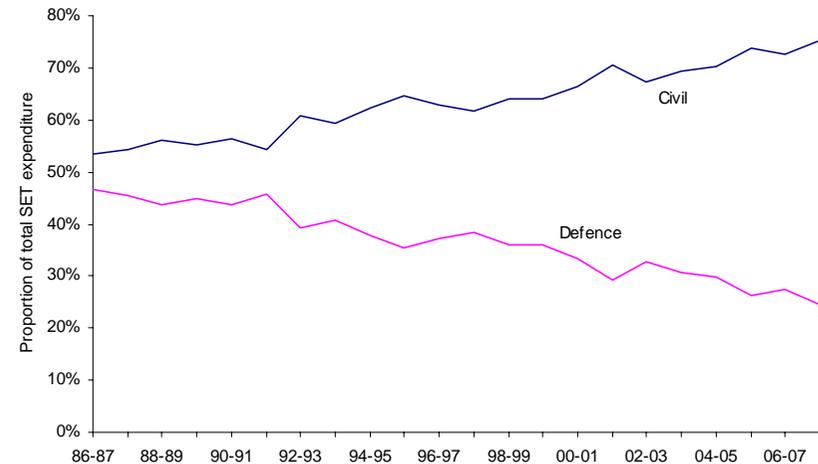


Source: DTI, *SET Statistics*, Table 2.1

Within this overall trend, expenditure on the civil and defence sectors has varied considerably. Planned spending of £7.3 billion on civil SET in 2007-08 would represent a real-terms 44 percent increase from 1986-87 and a 59 percent increase from the low point of 1998-99. By contrast, planned spending of £2.4 billion on defence SET in 2007-08 would be the lowest level of expenditure in real terms over the period considered: representing a 46 percent decrease from 1986-87 and an 8 percent from fall 1998-99.

As a result, the relative shares of government expenditure allocated to civil and defence have altered over the period. In 2007-08, expenditure on civil SET is expected to represent 75 percent of the total, compared with 53 percent in 1986-87.

Split of government expenditure on SET by civil and defence

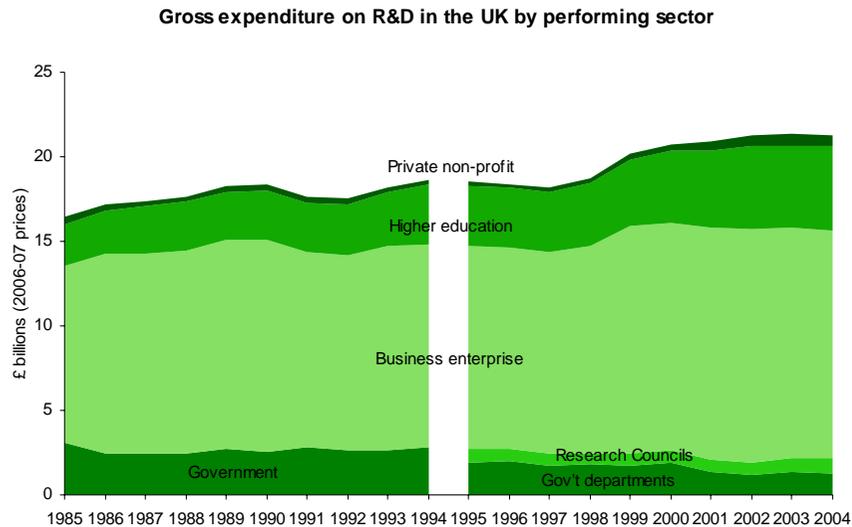


Source: DTI, *SET Statistics*, Table 2.1

**Gross domestic expenditure**

Gross domestic expenditure on R&D (GERD) covers spending in both the private and public sectors. In 2004, GERD amounted to £21.3 billion (expressed in terms of 2006-07 prices). This compares with a total of £16.4 billion in 1985, representing a 30 percent real-terms increase.

Although the UK Government financed 33 percent of GERD in 2004, it accounted for just 10 percent of spending when analysed by performing sector. Expenditure on R&D directly carried out by government departments made up only 6 percent of GERD in 2003, with Research Councils responsible for spending a further 4 percent. The largest performing sector was business enterprise, which accounted for 63 percent of the total. Higher education institutions spent 23 percent of GERD and private non-profit enterprises accounted for the remaining 3 percent.

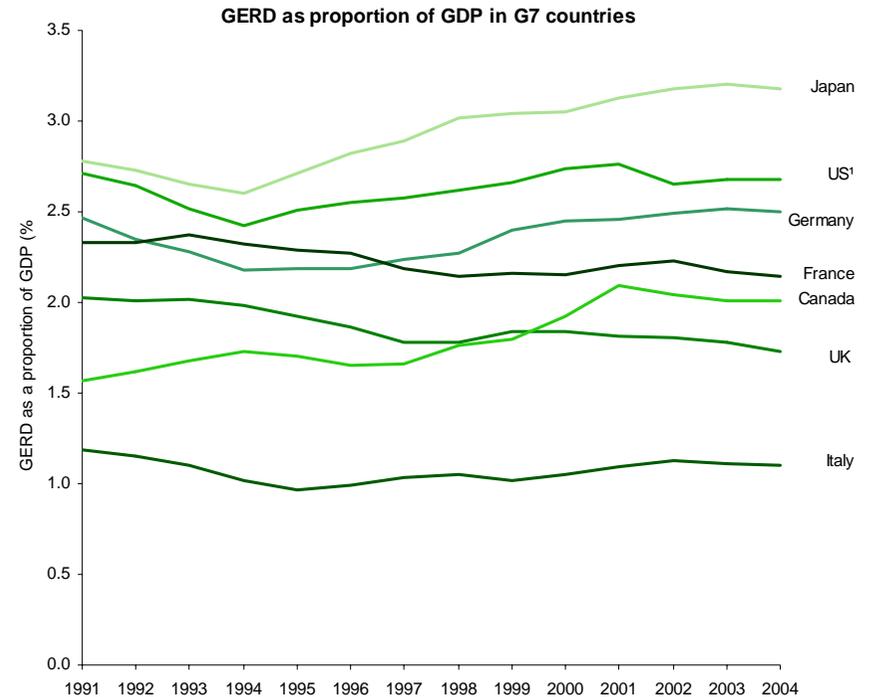


Source: DTI, *SET Statistics*, Table 6.2

**International performance**

The OECD calculates GERD in the UK to have represented 1.7 percent of GDP in 2004. This compares with 3.2 percent in Japan, 2.7 percent in the US, 2.5 percent in Germany, 2.1 percent in France and 2.0 percent in Canada. The UK is ranked sixth within the G7 in terms of GERD as a proportion of GDP. Only Italy has a lower level (1.1 percent in 2004).

This ranking of sixth compares to fifth in 1991. In addition, the UK's distance from the top-ranked Japan has widened significantly over the period. The Government's ten year strategy includes an ambition to increase GERD to 2.5 percent of GDP by 2014.<sup>ii</sup>



Note: <sup>1</sup> Excludes most or all capital expenditure.

Source: DTI, *SET Statistics*, Table 7.1

**Comparison of GERD in G7 countries by sector of performance and source of funding: 2004**

<i>percent</i>	UK	Germany <sup>1e</sup>	France <sup>2</sup>	Italy <sup>3</sup>	Japan <sup>4</sup>	Canada <sup>p</sup>	US <sup>5p</sup>
Percentage by sector of performance							
Government	11	14	17	18	9	9	12
Business enterprise	63	70	63	48	75	56	70
Higher education	25	16	19	33	13	35	14
Private Non-Profit	2	..	1	2	2	0	4
Percentage by source of funds							
Government	33	30	38	51	18	32	31
Business enterprise	44	67	52	43	75	49	64
Abroad	17	2	9	6	0	9	..
Other <sup>6</sup>	6	0	2	..	7	10	5

Notes: <sup>1</sup> Data for 'Private Non-Profit' included elsewhere.

<sup>2</sup> Source of funds data for France are for 2003.

<sup>3</sup> For Italy, sector of performance data are for 2002 & source of funds data are for 1996.

<sup>4</sup> For Japan, sector of performance and source of funds data are for 2003.

<sup>5</sup> For US, data excludes most or all capital expenditure.

<sup>6</sup> "Other" includes higher education and private non profit sectors.

p = provisional

e - estimate

Source: DTI, *SET Statistics*, Table 7.2

The UK Government's provision of 33 percent of GERD in 2004 compared with 51 percent in Italy (1996 data) and 18 percent in Japan (2003 data). The UK had a much higher proportion of funding coming from foreign sources than any other G7 country. Accordingly, the UK had a lower proportion of funding sourced from business enterprise than any country other than Italy.

### Science and engineering personnel

Among the ambitions set out by the Government in its ten-year plan was a determination to ensure a strong supply of scientists, engineers and technologists.<sup>iii</sup>

In 2005, there were 2.7 million people of working age with a science or engineering higher education qualification, representing 7.5 percent of the total working-age population. Among those with such a qualification, 2.5 percent were unemployed, compared with 2.8 percent among all those with a higher education qualification and 5.2 percent among the total working-age population.

Of those with a science or engineering higher education qualification who were employed, 43 percent worked in professional occupations, 23 percent worked in associate professional and technical occupations and 21 percent worked as managers and administrators.<sup>iv</sup>

In 2004-05, there were 191,000 personnel engaged on R&D in the UK, down from 224,000 in 1988-99, but up from 168,000 in 1997-98. Of the

total in 2004-05, 61 percent were researchers, 16 percent were technicians and 22 percent were administration and other staff.<sup>v</sup>

### Research performance

In 2002, the Government commissioned the consultancy firm Evidence Ltd to define a set of indicators and develop a set of PSA target metrics to measure the performance of the UK research base. The latest report from Evidence compared the performance of the UK across more than 30 indicators against a comparator group of 25 countries. It stated that:

The UK continues to sustain a more consistent performance than most countries across fields of research and is strongest overall in the natural sciences. The situation is dynamic: on many indicators it has been second to the USA; on some indicators it has moved into first place over the last two years; at the same time, it has been overtaken in other areas. The UK's strong international excellence has been achieved with lower investment compared to its competitors. On available OECD data, the UK has a relatively sparse density of people with research training. However, this has led to a high level of research productivity. In regard to both research publications and trained people.<sup>vi</sup>

### The future

In October 2007, Lord Sainsbury of Turville published his review of the Government's science and innovation policies, *The Race to the Top*.<sup>vii</sup> The report concluded that:

The two most commonly used measures of innovation performance are the quantity of industrial research and the volume of patenting. The UK's performance is unimpressive on both counts. However, our performance is greatly affected by the structure of industry. UK companies spend similar proportions of their sales on R&D as their competitors within a sector, but have a stronger presence in successful sectors where little, if any, R&D investment as a percentage of sales (e.g. oil and gas, financial services) is reported. This suggests that rather than seeking to raise the amount of research performed by all industries we should focus our efforts on the four major goals developed by the TSB [Technology Strategy Board]:

- to help our leading sectors and businesses to maintain their position in the face of global competition;
- to stimulate those sectors and businesses with the capacity to be among the best in the world to fulfil their potential;
- to ensure that the emerging technologies of today become the growth sectors of tomorrow;
- to combine all these elements in such a way that the UK becomes a centre for investment by world-leading companies.<sup>viii</sup>

The report made eight policy recommendations:

- A new leadership role for the TSB;
- Building on our success in knowledge transfer;
- Using intellectual property rights, standards and metrology to improve knowledge transfer;
- Targeted support for early-stage high-technology companies;
- A major campaign to enhance the teaching of science and technology;
- A key role for government departments;
- Increasing regional focus and resource on science and innovation; and
- Linking up with centres of excellence around the world.<sup>ix</sup>

**Further information:**

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<http://www.dti.gov.uk/files/file38816.xls>

[http://www.hm-treasury.gov.uk/media/5/E/sainsbury\\_review051007.pdf](http://www.hm-treasury.gov.uk/media/5/E/sainsbury_review051007.pdf)

**Updated: 7 December 2007**

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<sup>i</sup> HM Treasury, *Science & innovation framework 2004-2014*, July 2004

<sup>ii</sup> DTI, *The Ten Year Science & Innovation Framework 2004-2014: Annual Report 2006*, para 1.1

<sup>iii</sup> HM Treasury, *Science & innovation framework 2004-2014*, July 2004, Box 1

<sup>iv</sup> DTI, *SET Statistics*, Table 8.1

<sup>v</sup> DTI, *SET Statistics*, Table 8.3

<sup>vi</sup> DTI, *PSA target metrics for the UK research base*, March 2007, p4

<sup>vii</sup> Lord Sainsbury of Turville, *The Race to the Top: A Review of Government's Science and Innovation Policies*, October 2007

<sup>viii</sup> *ibid.* p4

<sup>ix</sup> *ibid.* pp5-7