

The Magic Number? Reaching 2.5% of GDP on R&D

The Science and Innovation Investment Framework (SIIF) 2004-2014 set the ambition of raising UK spending on research and development (R&D) to 2.5% of Gross Domestic Product (GDP) by 2014. The Department of Business, Innovation and Skills (BIS) 2009 Annual Report on SIIF retains the 2.5% goal as a key challenge.

Why have a GDP target?

The UK target was adapted from the Lisbon treaty target of 3% GDP to be spent by the European Union (EU) on R&D by 2010. The Lisbon target was set in 2000 and retained in 2005 (when many other aspects of the treaty were lost) because a higher rate of R&D was seen as essential for Europe to build a thriving and competitive knowledge economy. Nine EU countries adopted a target of 3% or more by 2010-2012. The UK government adopted a lower target of 2.5% over a longer time frame, for 2014. Table 1 compares the current goals and recent spending of the UK with some competitor countries and regions.

Table 1. Country targets for %GDP spent on R&D and spending in 2007

Country/region	Target	Target date	Actual
China	2.0	2010	1.5
EU	3.0	2010	1.8
Finland	4.0	2011	3.5
France	3.0	2012	2.1
Germany	3.0	2010	2.5
Japan*	1.0	2010	3.4
Russia	2.0	2010	1.1
UK	2.5	2014	1.8
US	>3.0	--	2.7

*Japan target for public spending only.

Given that many other countries are investing heavily in research, could the UK not just rely on what they produce? The answer is no. The UK will only be able to benefit fully from other countries R&D, if UK researchers have developed their own skills and knowledge by conducting comparable research themselves. Evidence shows that countries with higher R&D intensity gain more from foreign performed R&D.

Current UK situation

The UK spent £25 billion (1.81% GDP) on R&D in 2007 up from £20 billion (1.69% GDP) in 2004. The UK ranks 15th in the world on %GDP spent on R&D.

Since GDP targets are a ratio, to make progress R&D expenditure has to increase faster or shrink slower than the rate of growth for the overall economy.

The 2.5% target could be reached:

- If GDP were to remain constant and an additional £10 billion was spent on R&D.
- If R&D spending were to remain constant and GDP falls by 28%.

Increasing R&D intensity

In 2007, the government invested 30% of the UK's total R&D spend, the private sector funded 47%, 17% from foreign-owned firms and 6% from the non-profit sector. We consider each of these streams in turn.

Public Spending

UK government investment in R&D has increased in real terms from 2004 to 2007 but not at the same rate as in the private sector, so its share of total investment has dropped from 33 to 30%. In fact, the public spending may have triggered increased private investment by demonstrating government commitment to science and innovation and producing research knowledge and skills. Evidence shows that public R&D helps generate private R&D, and vice versa, and that both have an independent effect on growth. Ensuring that there are plenty of skilled workers helps to make sure that public and private money are not competing for limited resources.

As a percentage of GDP, UK government spending on R&D fluctuated from 0.52 to 0.59% over the last decade, and was 0.55% in 2007. Comparing across G7 countries for 2006, UK public spending was only greater than Italy, with Germany at 0.71%, France at 0.81% and USA at 0.77%. Many countries have invested at much higher rates than the UK in science and innovation as an economic stimulus in response to the recession, so the UK's standing is likely to fall.

Public funding for UK R&D comes through a variety of streams, as illustrated in Table 2, that serve different purposes. They should continue to do so otherwise their differentiation is pointless. In addition, the UK made a net contribution of £357 million to the EU R&D budget in 2007-08.

Table 2. Public support for UK R&D, shown by net spend in 2007, %change in real terms from 2004, & objectives

Funding stream	Millions	%change	Knowledge	Policy	Society	Wealth	Defence
Science Budget	£3,520	+42	***	**	**	**	**
Funding Councils	£2,230	+14	***	*	*	*	*
Civil Departments	£1,290	-28	*	***	**	*	-
Ministry of Defence	£2,140	-23	*	*	*	*	***
TSB	£230	-	*	-	**	***	*
RDAs	£440	-	*	-	**	***	-
R&D Tax Credit	£670	-	*	-	*	***	*

Notes: Tax credit data from BIS website for 2006-07. Regional Development Agencies (RDAs) and Technology Strategy Board (TSB) spending, taken from their websites, is for science and innovation and will not all be R&D. More * indicate importance of objective.

- Public funding of R&D needs to reach more internationally competitive levels especially in the light of stimulus investments by other countries.
- Increased public investment should trigger more funding from other sources.

Private sector

In 1997, business funded 50% of UK R&D, this dropped to a low of 42% but has risen again in recent years to an estimated 47% in 2007. Between 2004 and 2007, private financing of R&D increased from 0.75% GDP to 0.85%, driven by increases in the defence sector.

In setting the 2.5% target, the UK government argued that it would be too difficult to achieve 3% because of the profile of the UK economy. More than four fifths of UK industry sales occur in sectors that are low of very low investors in R&D, like oil and gas, and 75% of GDP comes from the service sector. One of the goals of SIIF is to create new R&D intensive sectors.

- Government interventions should continue to work to build new sectors with high R&D intensity.
- Public support for industrial R&D through tax credits and direct investment must be retained (see page 11).

Abroad

In international comparisons, the UK receives the highest proportion of R&D funds from foreign owned firms. The attractiveness of the UK derives from its strong research base and framework conditions such as macro-economic stability, light-touch regulation, and a favourable tax regime. At the same time, UK firms are outsourcing more R&D overseas; extra-mural R&D performed abroad has nearly trebled from 1996 to 2005 reaching £1,750 million.

- The strength of the research base is essential to attract foreign investment.
- Levels of outward R&D investment must be closely monitored.

Research Charities

Charitable funding of UK R&D has been rising in real terms since 2004 and reached around £950 million in 2008-09. Most research charities do not consider the funding of university infrastructure their responsibility, although many contribute to it. Funding councils top-up charity research funding so that it is competitive to universities and research institutes. If charities have difficulty funding high-quality research they may spend their money elsewhere, like on patient support, or even funding work overseas.

- There should be an ongoing commitment to support charitable investment in research.

Conclusions

- There should be a government target for at least 2.5% GDP to be invested in R&D.
- If levels of R&D do not rise, the UK risks becoming increasingly internationally uncompetitive for funding and skills.
- More research should be funded into the science of science policy, and a Treasury Chief Scientific Adviser should be appointed, to determine the best approach to the portfolio of public support for UK R&D.

Hilary Leivers & Nick Dusic

Main sources:

OECD Science, Technology and Industry Outlook, 2008.
SET Statistics, BIS, November, 2009.
UNESCO Institute for Statistics, December 2009.
Business Innovation Investment in the UK, Bulli, S., DIUS, 2008
See Impacts of Investment, CaSE Policy Report, September 2009, for additional references.