

## **2.4% target – historical lessons learned and international comparisons**

### Introduction

Central to the UK Government's Industrial Strategy White Paper, published in 2017, is the target to increase the UK's spend on research and development (R&D) to 2.4% of GDP by 2027. UK Research and Innovation (UKRI) has organised a series of workshops with our stakeholders, to explore the biggest questions for UKRI and the UK research and innovation landscape more broadly over the coming years. Workshop outputs are being used to develop our evidence base and inform our policy and analysis work.

On 28 November 2018, Sir John Kingman chaired a workshop, co-hosted by the Campaign for Science and Engineering, which gathered experts from across the research landscape to explore a series of questions around the UK's previous target to increase its R&D intensity and the lessons we can learn from international comparisons. Annex A contains the delegate list.

### Background

In 2004, the UK Government published its *Science and Innovation Investment Framework* (SIIF), setting out the ambition to increase R&D intensity to 2.5% of GDP by 2014, which was not met. As the UK aims towards a similar target understanding its previous experience will be crucial to develop the right policy frameworks. We know that the 2.4% target is challenging but achievable. Over the past decade 14 other countries have increased their R&D intensity as a proportion of GDP to a similar scale and in the time period as the UK now requires to achieve its current target. There is considerable diversity in the strategic approach and mix of policy levers used across these countries, but all offer the opportunity for consideration of what may work when targeting increased investment in R&D, both public and private.

### Summary of discussion

#### **Lessons learned from the 2004 Science and Innovation Investment Framework**

Delegates highlighted that the 2004 SIIF did not result in a substantial change in the UK's R&D intensity as a proportion of GDP. It was noted that the SIIF focused on public support for R&D (including research council funding and R&D tax credits) with the intention to reverse the downward trend of public investment. Delegates emphasised that in order to reach the 2.4% target there would need to be significant public investment, alongside policy mechanisms to leverage further private R&D investment. The key variables to crowd in private R&D investment were cited as: public funding for business R&D; the mix of sectors across the economy; and the capacity of businesses to engage in innovation.

New mechanisms for supporting R&D introduced since 2004 were highlighted, such as the Industrial Strategy Challenge Fund (ISCF) and the UK Research Partnership Investment Fund (UKRPIF), both designed to leverage industry investment and encourage collaboration. R&D activity in the UK occurs in a small number of businesses, with a few key sectors dominating.

Delegates discussed a shift in funding away from research and innovation directly commissioned and funded by central government departments to funding by research councils (including for business led investment via Innovate UK). Attendees observed that to achieve the 2.4% target all government departments will need to directly engage with R&D in relation to policy design and procurement. To illustrate this, delegates gave examples including suggesting that the Department for Education could engage further with research on social mobility and the Department for Business, Energy and Industrial Strategy could support more innovations in the energy sector.

Commitment of this kind could act to leverage further private investment. Articulating the impact of R&D investments to policy makers, both on the economy and the UK's ability to address major societal challenges, will be imperative to drive culture change across government departments. In addition, delegates highlighted the need to incentivise academic engagement with research of this kind, via the REF and dual support system.

Delegates highlighted the need to address skill shortages within the STEAM (science, technology, engineering, arts and mathematics) pipeline and the provision of education at all levels, to meet the requirement for highly skilled staff across the R&D environment, including technical staff. Delegates noted that there were currently no incentives, such as a further education (FE) version of the Higher Education Innovation Fund (HEIF), for FE institutions to become involved in R&D and provide skilled personnel. An example illustrative of these challenges is the Large Hadron Collider, which has a large number of British particle physicists currently participating (a huge success story for UK science), but very few UK technicians involved in the construction and maintenance of the project.

## **International comparisons**

The UK is a part of large cohort of countries that have set a target to raise R&D intensity. Delegates agreed that if the UK is to achieve its 2.4% R&D target then a strategy that is both long term and agile, and reflects the UK's industrial structure, will be required. This strategy should also consider the broader background of the UK's exit from the European Union. In this context, delegates drew upon the diffusion capacity of other leading R&D nations, including the United States, Sweden, South Korea, China and Japan, and noted this is something the UK could look to develop.

In comparison to other countries with R&D investment targets the UK is heavily reliant on Foreign Direct Investment (FDI). To maintain and increase this investment, delegates emphasised the need to showcase the R&D capabilities of the UK and adopt a proactive approach to forming mutually beneficial bilateral international partnerships.

It was highlighted that Germany has successfully developed a network of internationally facing Fraunhofer translational research institutions that aim to connect basic research with businesses and provide shared capabilities. Delegates felt that the UK's catapult network, established in 2011 as a series of translational organisations that aims to mimic the Fraunhofer model, could play a key role in the endeavour to increase research capacity within businesses, particularly for SMEs without the capital to engage in R&D.

Delegates noted that in the US the Defence Advanced Research Projects Agency (DARPA) is a large procurer of research and innovation; it regularly provides capital and invests in cutting edge technology within the private sector, which acts to crowd in R&D activity. It was highlighted that procurement of this type is something the UK could explore in the context of its 2.4% strategy.

## **What can the UK learn from the 2004 SIIIF and international comparisons?**

The UK has a wealth of information to draw upon in developing the policy and strategy that will be required to raise R&D intensity to 2.4% by 2027. Delegates proposed a number of ideas:

- explore building upon the ISCF and developing further mechanisms that leverage and maximise business investment into R&D;
- increase the appetite for research and innovation within central government departments;
- better understand potential mechanisms to incentivise academic engagement with government commissioned research;
- develop the breadth and depth of the STEAM skill pathway so that the UK can produce highly technically qualified people;

- incentivise FE involvement in R&D projects and build links between universities and businesses, and FE skills;
- develop a sustained strategy for raising R&D intensity, learning from past experience;
- engage further with international investors and showcase the UK's capability abroad to attract R&D FDI;
- encourage R&D diffusion across the public and private sectors;
- build on strengths in university-based R&D; and
- look at what can be learned from existing catapults to understand how to further develop the catapult network to improve the translational capacity of the UK.

In summary, Sir John Kingman emphasised that the workshop conversation was just a starting point. UKRI has a responsibility to rise to the opportunity, and challenge, of the target to increase the UK's investment in R&D to 2.4% of GDP by 2027, and 3% in the longer term, improving productivity and economic growth across the UK.

**Annex A – Delegate List**

<b>Name</b>	<b>Organisation</b>
Sir John Kingman (Chair)	UK Research and Innovation
Professor Graeme Reid	UCL
Professor Alan Hughes	University of Cambridge
Lord David Willetts	Resolution Foundation
James Tooze	CaSE
Professor Joanna Chataway	University of Sussex
Dr Joe Marshall	NCUB
Dr Gallagher	Oxentia
Professor Luke Georghiou	University of Manchester
Naomi Weir	CaSE
Dr Sarah Main	CaSE
Tera Allas	McKinsey Centre for Government
Professor Paul Nightingale	University of Sussex (then, now UK Research and Innovation)
Rebecca Endean	UK Research and Innovation