

Ideas – how to maximise impact

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 16 October 2018, Sir John Kingman co-chaired a workshop with Professor Brian Foster OBE, then Vice President of the Royal Society, which gathered experts from across research, business and thought leadership, to explore a series of questions on how to maximise impact of investment in R&D. Annex A contains a full delegate list. The discussion covered a wide-ranging series of topics, including incentives to maximise impact, delivering impact and the supply of capital.

Background

Investment in R&D, both public and private, achieves significant overall returns and leads to impacts on knowledge, economy and society. The UK is a world-leader in research and innovation, ranking first amongst comparable nations for research quality and in the top four of the Global Innovation Index. R&D performed in UK-based businesses directly supported 210,000 jobs in 2016 and 13 of Europe's 34 unicorns (startups valued over \$1bn) are located here. Moreover, as well as economic returns, investment in R&D delivers significant societal benefits through new products, services and avoided costs.

Summary of discussion

Efforts to maximise impact and the wider landscape

The challenge of maximising impact of investment in research is not just one for UKRI but requires a cross-government effort. Delegates emphasised the importance of thinking about how mechanisms operate as an ecosystem and pursuing multiple pathways to achieve the target. It was noted that a balance between bottom-up, responsive investments and more directed, strategic programmes was required; impact can arise from all types of research. The world is changing, and attendees suggested it would be important to consider what emerging technologies, such as AI or big data, would mean for R&D and how to support their successful adoption in R&D-intensive sectors such as the life sciences. In particular, the scale of investment in other countries is considerably greater than in the UK. Further, given the economic balance of the UK, it was felt that any R&D enhancement strategy should have some focus on the future of the service sector and what R&D-driven changes may occur to support sector growth.

It was suggested that UKRI should not be afraid to experiment with mechanisms, taking managed risks. Improved data is also required to understand what works; it was felt that currently schemes are often initiated or closed without this evidence. Delegates noted that how something is implemented often has a greater impact than the 'what', but that the evidence base needed further development. The responsibility of UKRI to foster knowledge in terms of what works for research and innovation policy was acknowledged.

Delegates discussed the strength of the UK's charity landscape, distinct in its large contribution to R&D compared to internationally. Whilst charities can find it challenging to navigate partnerships in

R&D and relationships between business and charities could be improved, they represent extraordinary assets and a key partner in the plan to achieve 2.4%.

Foreign Direct Investment (FDI)

The strong track record of the UK in attracting overseas investment in R&D was noted, and recognised as a key part of the policy mix in achieving the 2.4% target. However, delegates questioned whether we know exactly what international HQs want when deciding R&D investments, and if the UK can provide this. The importance of signalling in terms of 'one front door' was highlighted, along with the need for responsiveness both ways.

It was agreed that a strong research base, and in particular its people, as the main asset for R&D, was very attractive for FDI.

Levers for maximising impact

Delegates felt that progress was being made in industry-academia collaborations, but that this could be accelerated, for example through bringing industry on board to co-design programmes at an early stage. Academic career pathways were also highlighted; a 'revolving door' of individuals between academia and industry (as seen more frequently in the US) is desirable.

There is good evidence that a number of low cost brokerage initiatives work well, especially between SMEs and academia, with Knowledge Transfer Networks, innovation vouchers, and ICURe being specifically highlighted. Account management was identified as effective, but more expensive, though support could be sustained through cost-sharing between Higher Education Institutions (HEIs). In addition, if organisations can share a talent pool then individuals can cycle in and out, de-risking operations for individual startups.

The role of procurement in driving innovation in the public sector was discussed. It was identified that take up of innovation in the NHS proved challenging for a multitude of reasons. One individual viewpoint was that delivery of innovation was especially difficult to get right in a service that is free at the point of access.

Delegates discussed how the regulatory environment could be optimised to maximise investment in R&D, agreeing that there were exemplar case studies but less understanding of why these work and whether principles can be applied across the regulatory landscape.

Supply of capital

Delegates agreed that the landscape supplying capital at the early startup stages is vibrant, vigorous and heterogenous and a strength of the UK. However, they acknowledged that the gap in later stage venture capital is significant, with the £2.5bn British Business Bank patient capital programme just a catalyst in this space. The gap is currently filled by US venture capital funds and sovereign wealth funds (especially from Singapore, China and the Middle East) and wealth creation does not benefit UK institutions.

Delegates also noted a gap at the other end of the development spectrum, around very early R&D intensive groups or ventures emerging from universities at the 'proof of concept' stage. This stage was felt to need further support, currently having patchy coverage from only some universities.

Delegates discussed how pension and insurance funds could be attracted to investing in fast growing businesses. The need for meaningful exits that deliver for the UK is crucial, and there is currently a scale mismatch between the size of UK funds and the scale that insurance or pension

firms would be interested in. Large funds take time to grow and it was agreed the current landscape is limited.

Delegates further recognised that investment discussions tend to focus on where the commercialisation activity happens. It was noted that considerable innovation is in the application and customer-facing aspects of a venture, which then migrate leaving behind only a small portion of the value chain. As such, delegates felt that a long-term, sustainable R&D strategy should recognise the need to build ecosystems throughout the value chain, not just around the early phases of R&D activity.

Co-location was promoted as a good method for attracting investors, representing a single roof with multiple opportunities. It was agreed that there has been a culture shift in startups, with numerous all-graduate teams. These invigorate the health of the system, but also highlight the need for mentorship – delegates noted they would often want to back promising teams once they had learnt from experience.

How do we maximise impact?

For the UK to achieve maximum benefits from an R&D intensive economy we must maximise the impact of investments. Delegates proposed a number of ideas that could contribute to meeting the 2.4% target:

- experiment with mechanisms, taking managed risks;
- build data and understanding of what works and use this to understand which schemes to initiate, continue or stop;
- explore how to support the adoption of AI in key UK R&D-intensive sectors, such as life sciences;
- consider the role of government in market creation, such as through procurement and the opening up of data;
- explore 'one front door' – to signal opportunities for FDI investment in R&D and ensure national offers are aligned with local or regional offers for investment;
- consider building further on the ISCF and initiating more co-creation between industry and research councils/Innovate UK at an early stage;
- understand whether a small proportion of UKRI's budget could be set aside for research on innovation;
- consider if HEIF funds could be hypothecated to direct them towards activities which are known to work, such as sharing account managers between multiple universities;
- emphasise the importance of a balanced portfolio across the research landscape, recognising that impact can arise from all types of research;
- increase understanding of the potential of optimising procurement systems and regulatory environments to boost investment in R&D;
- explore how the later stage venture capital gap can be addressed, beyond the £2.5bn British Business Bank patient capital fund;
- consider how to build the overall ecosystem through the value chain beyond R&D;
- investigate if lack of physical space hinders business creation and growth;
- understand how to increase mobility between academia and industry; and
- explore how to reach businesses who would benefit from R&D but aren't currently investing.

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

Name	Organisation
John Kingman (Co-chair)	UK Research and Innovation
Brian Foster (Co-chair)	Royal Society
Kirsten Bound	Nesta
Felicity Burch	CBI
Gerard Cielen	University of Leuven
Claire Craig	Royal Society
Rebecca Endean	UK Research and Innovation
Kieron Flanagan	Manchester Institute of Innovation Research
Anne Glover	Amadeus Capital
Jonathan Grant	King's College London
Alice Hu-Wagner	British Business Bank
Sarah Main	Campaign for Science and Engineering
Joe Marshall	National Centre for Universities and Business
Sam Myers	AstraZeneca
Miles Padgett	University of Glasgow
Graeme Reid	University College London
Stephen Roper	University of Warwick
Nick Shuttleworth	British Business Bank
Rebecca Todd	Longwall Ventures