
Economic Analysis of R&D

January 2024

Invitation to tender

The British Academy is the UK's national body for the humanities and social sciences (referred to as SHAPE – Social Sciences, Humanities and Arts for People and the Economy). Their purpose is to deepen understanding of people, societies, and cultures, enabling everyone to learn, progress and prosper.

The Campaign for Science and Engineering (CaSE) is the UK's leading independent advocate for science and engineering. They represent over 110 scientific organisations including businesses, universities, professional bodies, research charities as well as individual scientists and engineers.

Both organisations have substantial existing research and policy work on the role of Research & Development (R&D) in UK economy and society. [The Economic Significance of the UK Science Base](#) is a widely cited piece of research on the economic benefits of R&D investment, commissioned by CaSE and produced by Alan Hughes, and Jonathan Haskel in 2014. [Understanding SHAPE in R&D](#) draws together long-term research conducted by the British Academy on the value and representation of SHAPE R&D across the economy.

CaSE and the British Academy wish to build on these bodies of evidence, bringing them together to enable a broader programme of economic analysis which can be used to underpin policy arguments for how and why the UK research base, across all disciplines, offers economic benefits to the UK. To enable this analysis, we wish to commission work as set out in this tender that analyses and engages with the tangible and intangible value and returns of the UK research base. We hope to use this analysis to deepen our understanding of the links between research, innovation and productivity growth across sectors and covering all disciplines.

The work we wish to commission may take the form of a single piece of analysis, for example updating previous analyses with new data and literature, or a related suite of analyses addressing a set of interrelated issues as set out below. It will be up to the tenderer to respond accordingly with what will add most value given our two organisations' mutual interests and complementary areas of focus.

The most critical element is that we are left with a robust set of quantitative and qualitative evidence which can be used to make the case for investment in the UK science and research base. Successful tenders will provide us with fresh and innovative thinking about the value of this investment in traditional and nontraditional R&D sectors, across the whole of the UK science and research base, including the social sciences, humanities, and the arts.

Below we set out the full rationale and several areas of relevant background thinking, before setting out a series of initial questions for consideration.

Rationale

The role of business R&D investment

R&D is a significant driver of innovation, leading to the development of new products, services and process. These innovations can spur economic growth by creating new markets and improving productivity; increasing competitive advantage in a global market; creating skilled jobs across the UK; and having spillover effects across sectors. To capture these benefits, historic commitments to public investment in UK R&D – with long-term targets and a strategy to achieve status as a world-leader – have been made by the UK government.

Much existing literature already tells us that there is a strong economic case for investment in research and innovation which supports the government's decision. In particular, work from Haskel and Hughes (2014) and Frontier Economics (2014) have examined the rates of return on research and innovation,¹ while the series of *What's it worth?* studies have looked at the specific applications of these calculations to fields of medical research.² All of these have been major and important contributions to the field and underpin major markers in terms of how we think about rates of return and so-called 'R&D multipliers'.

However, to maximise the returns on public R&D investments, it is important to consider how business investment can be leveraged. In the UK, businesses are the main funders and performers of R&D; the amount of R&D performed by UK businesses was £46.9bn in 2021, an increase of £2.9bn since 2020 and £5.9bn since 2018. This follows a correction to R&D accounting, which saw a substantial increase in the level of R&D activity carried out by small and medium sized enterprises (SMEs). Despite this, the UK still lags behind other R&D nations on business investment. Comparatively few firms headquartered in the UK are global leaders in R&D investment.

Importantly, there is also a growing body of literature looking at how much private investment is 'crowded in' by public investment. This paints a positive picture about research and innovation overall, but these calculations are much easier to do for the sciences and more traditional R&D intensive industries, with pharmaceutical industries co-locating next to university centres of chemistry and biomedical expertise being the classic example. However, much of the UK's economy is based in the services sector and while there is a huge amount of R&D that occurs in across these sectors of the economy, it is much harder to capture and more nuanced. Nesta's reports on the concept of 'hidden innovation' estimate that up to 75% of the country's innovation comes from these non-traditional areas that are not well-captured by GDP.³ Haskel and Stian Westlake make similar points in their work on *Capitalism without Capital* (2017), looking in depth at the concept of 'intangible assets' and how we can incorporate these into models of economic growth.⁴

¹ Haskel and Hughes (2014), [The Economic Significance of the UK Science Base](#) and Frontier Economics (2014), [Rates of return on investment in science and innovation](#).

² See, for example, Wellcome Trust et al (2017), [Medical Research: What's it worth](#) and The Academy for Medical Sciences et al (2014), [Medical Research: What's it worth](#).

³ Nesta (2009), [The Innovation Index: Measuring the UK's investment in innovation and its effects](#).

⁴ Haskel, J., and Westlake, S. (2017) *Capitalism without Capital: The rise of the intangible economy* (Princeton University Press).

Further work undertaken by the Academy and others provides evidence to suggest that some forms of R&D in the UK are undercounted.⁵ The OECD ‘Frascati Manual’ definition of R&D recognises the importance of arts, humanities, and social sciences research, yet these are excluded from some UK R&D definitions, leading to different understandings amongst businesses, policymakers and the research community as to what ‘counts’ as R&D. This may mean that, to capture and understand the full breadth and depth of R&D taking place in the economy, we need to look more closely at the evidence base for the UK R&D and innovation system, including how we measure and use evidence to determine returns on investment.

Policy levers to support business R&D and innovation

It is therefore important to better understand how to encourage further business investment in R&D across the economy to support productivity, wages, and GDP growth in the UK, and how to measure the returns from this investment to show its value. With the service industries accounting for 81% of total UK economic output and a growing influence of fundamental drivers like AI, Net Zero, and sustainability on our economy, understanding, encouraging, and recognising R&D in all disciplines and sectors may have vital significance for reaching R&D targets. We need the strongest evidence base possible for the development of policies and new ways of thinking that can promote innovation and make the case for the value of investing in R&D for economic growth.

A long-standing argument has been that low levels of innovation (and hence productivity) in the UK economy are the result of relatively low levels of public and private investment in R&D compared to other countries. However, in November 2022, the Office for National Statistics (ONS) made significant changes to the methodology used to estimate R&D. As a result, it was found that there is substantially more business R&D in the UK economy than previously captured by official statistics. The revisions to Business Enterprise Research and Development (BERD) statistics suggest that public R&D is even more effective than we thought in generating private sector R&D, i.e. the leverage effect is strong. However, despite the UK having higher levels of research intensity than previously thought, the level of productivity growth has stayed the same.

If innovation and productivity in the UK are not being held back by the quantity of R&D, this suggests the issue could be due to other factors.

One explanation could be due to the **composition of R&D spending** – that different types of R&D and other intangible investments in different types of organisations, both large and small, lead to different degrees of wider spillover effects. It could be that the types of R&D that have been revealed with the revised methodology (which are mostly driven by smaller businesses) have smaller spillovers than other types, or perhaps smaller firms are less able to capture the spillovers from R&D. This would have interesting implications for the types of policy levers that would be needed to improve spillovers.

Another issue could be one of **translation, i.e. the efficiency of R&D expenditure** and of those working in R&D in the UK. One implication of this would be that a more efficient innovation ecosystem could help to boost innovation levels in the UK and in turn the productivity of the UK economy.

In addition to R&D investment, other important aspects of the UK’s innovation ecosystem include infrastructure, market, regulation for innovation and procurement, developing skills and focusing on regional strengths, amongst others. Questions around **absorptive capacity, adoption and diffusion, scale-up capabilities, and systems thinking** must all sit together to unpack the various hypotheses and what policy levers are needed to address them.

⁵ The British Academy (2023), [Understanding SHAPE in R&D: Bridging the Evidence Gap](#).

Programme of work

The issues set out above are of broad interest to CaSE and the Academy, and we would like to better understand what could be done to make the innovation system more efficient to improve productivity gains. The following commission is an important tool in tackling and addressing these broad questions.

We wish to commission an up-to-date and robust economic analysis/analyses of the returns of the UK research base (public and private), including where possible ideas about how to use this analysis to deepen our understanding of the links between research, innovation and productivity growth. This will allow us to update existing figures and analyses which may be out of date, and to use this analysis to develop a more credible set of multipliers for R&D across all sectors of the economy.

As stated in the opening of this invitation, we encourage tender respondents to think creatively about how they would approach such a brief. Respondents may propose a single piece of analysis, such as significantly updating existing analysis using new or novel data analyses, or respondents may feel that presenting a smaller series of analyses rather than one significant one would be appropriate, for example covering a range of intersecting topics, such as spillovers, R&D multipliers and hidden innovation. Justifying what topics will be covered will be as important as signalling what will not be covered and/or is appropriately covered elsewhere.

Regardless of the proposed outputs, successful tenderers must explore the full breadth of R&D across all sectors and disciplines and should engage to the greatest extent possible with literature around concepts like ‘hidden innovation’ and ‘intangible assets’. We would therefore like to invite proposals to explore:

- The role of public investment in research and its relationship with private investment, including multiplier effects, to understand overall funding patterns.
- The composition of business R&D spending in the UK, and an assessment of the extent to which different types of R&D (and intangible investments) in different types of organisations (e.g. large and small) and sectors lead to different degrees of wider spillovers.
- If and how to better measure the causes/mechanisms of return on different R&D activities, including the precise causal mechanisms through which R&D generates social and economic value for the UK.
- If there are things which should be, but which are not currently, measured which would increase our understanding of what factors cause or increase return on R&D investment.
- The efficiency of R&D expenditure, the barriers to this – including to translation, adoption and absorption – and the conditions needed to reduce barriers and improve productivity gains.

We expect the successful bidder to help us explore the precise questions that it would be most helpful to seek answers to, and to understand what is possible on the basis of existing research. Possible other questions include:

- What is the link between business R&D spending and degree of wider spillovers in the economy? How does this differ by type of R&D, sector, size of business, and region?
- What are the implications of R&D composition on translation efficiency?
- What are new and innovative ways of thinking about the rates of return and net present value of investments in R&D, and how can we think creatively about making this case to HM Government?

These questions are suggestions, and not exhaustive or prioritised. We understand that proposals may not be able to address all our research questions, but we encourage tenderers to indicate the trade-offs in exploring some questions over others. In addition, we welcome different methodological approaches but stress we are most interested in detailed analysis of R&D investment and activity (qualitative and quantitative) which will build on the existing work already done in this space. We encourage bids to incorporate ways to test assumptions in the data analysis and refine any analytical approaches. All innovative approaches to providing a well-rounded picture of the data and evidence we currently have, gaps, and an assessment of policy opportunities are welcome. As we anticipate that data analysis will be crucial as part of this commission, we welcome proposals which include creative methods to ensure that the analysis is supported by appropriate evidence from multiple sources.

Outputs, timeline and budget

We expect outcomes from this project to include as a minimum a written report(s), including data visualisations as appropriate and suitable for publication on the websites of both the Academy and CaSE. Both organisations will require peer review as part of this process.

We anticipate that the commissioned team will consult key stakeholders, work closely with staff at the Academy and CaSE throughout the project, and provide at least one draft report for feedback, as well as regular oral updates.

Invitations to tender close on **8th March 2024** and we expect to meet with shortlisted organisations/researchers before awarded the tender by the end of March 2024. Work should commence as soon as possible thereafter and an initial kick-off meeting to agree the approach should be held in April 2024, using a technical briefing provided by the successful tenderer setting out a detailed project plan, including questions and methodology. An interim project meeting with a brief report update should be delivered by July 2024, and a final draft report should be submitted by September 2024.

Depending on the methods proposed and questions addressed, we expect to receive bids across a range of values, but no single bid should exceed £80,000, excluding VAT. We encourage submissions at any level if they demonstrate value for money and meet the proposal assessment criteria. If a bidding organisation feels that there are activities which would provide useful evidence against the research questions, but would not be feasible within the budget, we welcome proposals which detail this.

The terms of payment will be 75% payable on commission and 25% on completion of the final report.

Proposal assessment criteria

- The strength of the proposed approach and methodology to answering the research question(s)
- The expertise of the researcher / research team in the subject area
- The experience of the researcher / research team in conducting studies using similar research methodologies
- The anticipated breadth of coverage of sectors, R&D types, and organisations
- The demonstrated value for money.

Response to this brief

Please submit your response to this brief by **12.00pm GMT on 8th March 2024** to e.hopkins@thebritishacademy.ac.uk. Your response should be no more than 8 pages (excluding CVs of the researcher / research team), and include:

- Your approach to undertaking this work, including justification of methodology and question(s) addressed;
- Details of the communities and networks which you propose to access;
- Any risks or difficulties that you foresee with this project, and any steps that might be taken to mitigate them;
- Relevant experience that you have to undertake this work;
- Your proposed timescales to undertake this work, including proposed number of days allocated;
- Break-down of estimated costs;
- CVs of all individuals making a significant contribution to the commission.

For further information or queries, please email Dr Eleanor Hopkins, Senior Policy Adviser, at the British Academy on e.hopkins@thebritishacademy.ac.uk.