

The Rt Hon Alok Sharma MP
Secretary of State for Business, Energy and Industrial Strategy
1 Victoria Street
London
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From the President Venki Ramakrishnan

12 August 2020

Dear Secretary of State,

The effects of COVID-19 on our economy, health and social wellbeing have been profound. The crisis has created new challenges, exposed and exacerbated existing vulnerabilities. As we respond to the crisis, we need to consider both our immediate recovery and a long-term shared vision for the country. Maintaining the UK's position as a global leader in science is crucial to our long-term economic strength. Underpinning this status is a diverse and internationally competitive workforce able to generate new knowledge and new applications of that knowledge.

The publication of the UK Research and Development (R&D) Roadmap is a positive statement of intent. We have welcomed 'the vision for UK science that is forward and outward looking. With its focus on investment, talent – whoever they are and wherever they are from – and international collaboration it can provide a basis for confidence in the future.' The Roadmap contains a useful analysis of the current research and innovation landscape and provides a coherent framing for Government research and innovation policy. As it acknowledges, it is 'the start of the conversation.' Further work is required to identify the solutions to the challenges that the Roadmap describes. Specifically, it is important to note that private sector spending makes up the majority investment in R&D in the UK and so greater consideration of how best to support businesses, including those headquartered outside the UK, is necessary.

We note the plans set out in the Roadmap to engage with a wide range of stakeholders. We look forward to participating in focussed discussion on the specific areas highlighted in the Roadmap.

Alongside the Roadmap, a survey was issued inviting responses on a set of high-level questions related to the content and ambitions of the roadmap. Please find some initial reflections on the themes of the high-level questions in the survey drawn from our existing policy work enclosed at Annex A. We look forward to further engagement to contribute toward the development of the comprehensive R&D plan.

Yours sincerely



Venki Ramakrishnan PRS

Cc. Amanda Solloway MP



President Sir Venki Ramakrishnan
Executive Director Dr Julie Maxton

Founded in 1660, the Royal Society is the independent scientific academy of the UK, dedicated to promoting excellence in science.

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Annex A – Response to the R&D Survey

The Royal Society is the national academy of science for the UK. It is a self-governing Fellowship of many of the world's most distinguished scientists working across a broad range of disciplines in academia, industry, charities and the public sector. The Society draws on the expertise of the Fellowship to provide independent and authoritative scientific advice to UK, European and international decision makers.

The Royal Society's purpose is to recognise, promote and support excellence in science and encourage the development and use of science for the benefit of humanity. Through our activity as a publisher and funder of research and innovation, as well as our advocacy we seek to promote positive change in the research and innovation landscape.

The publication of the UK Research and Development Roadmap in July 2020 was important as a recognition that maintaining the UK's position as a global leader in science is crucial to our immediate recovery and our long-term economic strength. Developing a plan that can best deliver this requires engagement with stakeholders across the research and innovation landscape. We welcome the call for input. The content contained below draws from our existing work. The themes identified below are intended to align with the high-level questions contained in the online survey. This is intended to serve as an initial input. We look forward to developing on this in discussion.

Supporting discovery research

Discovery-oriented research can deliver unforeseen but transformative benefits. Long-term timeframes are required to make new scientific discoveries and realise the full potential of these, whether that is bringing a new drug to market or developing technologies to meet challenges such as energy or climate change. Both research funding and support for commercialization must recognise these timeframes and help create the necessary freedom within the system to pursue promising ideas.

Research and innovation are interrelated, complementary though often distinct endeavours that take place within a shared ecosystem. Support for both will be critical to our immediate recovery.

Maximising the economic, environmental and societal impact of research

To fully realise the economic and social benefits of research and innovation, there must be support for the full spectrum of inquiry. Applied investigation needs a constant stream of ideas from discovery-oriented work. It is vital that researchers are supported when they seek to explore the potential economic, environmental and societal impacts of their research. In academia, commercialization of research should be accepted as a normal activity and its outputs (such as patents) held in the same regard, particularly in recruitment, retention and promotion of staff, as publication records currently are. Researchers need to be given the time and opportunity to explore the translation of their research, and training and development and support to enable them to do so successfully.

Supporting innovation across the economy

The National Academies have recognised the need to better understand the range of benefits that research and innovation (R&I) bring to the UK, the distribution of those benefits across the country and its population, how those benefits are achieved and how best to measure them. As part of this activity, we commissioned an evidence synthesis to examine these issues¹. It identified the following barriers to translating research and driving innovation:

“Challenges to the translation and innovation process are very context dependent; however, lack of clarity about user needs and stable access to capital throughout the innovation process were commonly identified.

Continuity of funding is important for research translation and innovation and, conversely, the absence of stable funding can be a barrier to translation and innovation. Access to funding, in particular for small and medium-sized enterprises (SMEs), can be a barrier to innovation across sectors. Absorptive capacity is also potentially impacted when there are structural barriers to SMEs being able to access the market, which is notably the case in heavily regulated sectors, such as financial services or the life sciences.”²

¹ <https://royalsociety.org/topics-policy/publications/2018/a-fresh-case-for-investment-in-uk-research-and-innovation/>

² <https://royalsociety.org/-/media/policy/Publications/2018/fresh-case/fresh-case-summary.pdf>

Public R&D funding has an important role to play in incentivising private investment. In the UK context, industrial policy like the Industrial Strategy and related initiatives such as the Industrial Strategy Challenge Fund have a signalling role than can encourage private investment in R&D.

Creating a world-leading inclusive research and innovation workforce

People with the right skills are essential for all parts of the research and innovation ecosystem including established industries, start-ups, scale ups and academia. The UK benefits from a highly international research workforce – its reputation for excellence attracts people from around the world and allows it to compete with other scientifically excellent nations for international talent. However, it also has significant skills gaps. To remain a world leading destination for science, research and business, the UK needs to invest in its own workforce, including ensuring that all young people have a broad and balanced education that includes science, arts and humanities education up to age 18 - while continuing to attract the best international talent. Funding should be open to all – it is ideas that matter, not nationality or career stage.

The Global Talent visa route is an important step to increasing the attractiveness of the UK. Work to simplify and expand the scheme and lower barriers to research mobility such as visa costs would further improve our competitiveness as a destination.

Finally, it is vital that we invest in increasing the diversity of our research workforce. A lack of diversity within science, technology, engineering and mathematics careers represents a waste of talent that the UK should be accessing to reach its full potential. The Royal Society commissioned detailed data analysis of the proportion of black and ethnic minority students and staff in STEM, in order to understand where underrepresentation is occurring and what action the Society could take - as a national academy and in conjunction with partners in the scientific community – to address that under-representation. Similar data analysis was commissioned to look at outcomes and progression of students and staff with disabilities.

The Society looks forward to contributing to the forthcoming R&D People and Culture Strategy.

The role of research and innovation in supporting regional economic development

There is significant divergence in economic, health and social outcomes across the UK. Locally informed place-based investment in research and development (R&D) has a role to play in improving productivity across the UK alongside complementary investments in infrastructure, skills and amenities.

Improving economic performance comes from increased employment and higher productivity. While pre-COVID-19 employment levels in the UK were high, overall productivity growth in the UK has been flat since the 2008 financial crisis, though this varies massively within and between regions.

Investment in R&D is one means to achieve productivity growth: “The creation and application of new ideas is critical for long-run productivity growth. There is clear and robust evidence of a link between R&D spending and national productivity”³.

The Government’s commitment to increase funding in R&D and ensure that the benefits of this investment are more widely felt is welcome. Care is needed to ensure that this increase is delivered judiciously. Further work to better understand the role of R&D in supporting regional economic development may be beneficial. Specifically, to understand the relative importance of public R&D investment alongside other factors such as investment in skills and infrastructure.

The Society will continue to engage with the development of the R&D Place Strategy.

Improving our research infrastructure

Research infrastructures may be less visible than universities or other large laboratories, but they are strategically valuable assets for the UK. They both underpin cutting-edge research and make a key contribution to economic activity.

UK research infrastructures are a hub for international collaboration. Many require resource that is beyond that available to any one nation and realising the most value from investment in them often means making them available to the widest possible pool of excellent researchers, wherever they are based.

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/443897/Productivity_Plan_int.pdf

UKRI has completed work to review the current infrastructure landscape and identify future needs. It is vital that UKRI and Government continue to engage the research and innovation landscape in ongoing processes to identify need and prioritise investment in extant and new research infrastructure.

Facilitating successful international collaboration

Science is a global endeavour. It is at the heart of modern life throughout the world and is inherently and increasingly international and collaborative. The Society's Research and Innovation Maps illustrate the fundamental importance of international collaboration⁴. 91% of National Academy Fellows and grant holders report that mobility was very important to their careers⁵. 72% of active UK researchers have trained or worked as researchers abroad⁶.

The UK can refresh its international research and innovation strategy with a focus on creating ambitious new deals with leading and established science nations across Europe and further afield as well as emerging science nations. There is scope for broadening the range of available instruments for international collaboration and to think strategically about how to deploy them alongside existing multilateral, bilateral and national/regional mechanisms. The optimal platform on which to build these new arrangements will be securing full UK access to the next EU Framework Programme, Horizon Europe, through an association agreement. The UK also plays a lead role in convening a number of multilateral networks and opportunities exist in the coming year to use science as a soft power asset (COP and G7 to give a couple of examples).

Engaging the public in research and innovation

Science should be a source of pride and inspiration for the whole nation. Science must be part of wider conversation; this exchange of thinking and dialogue can valuably shape approaches to deliver the target, helping to maximise its relevance, accessibility and impact.

The COVID-19 pandemic has put science and scientists front and centre of public discourse. While this is an unprecedented opportunity to show the importance and value of science in everyday life, there is also a downside. As the crisis has deepened, worrying trends are emerging on the long-term impact of trust in science. A recent blog⁷ by Royal Society President, Venki Ramakrishnan PRS, illustrates some of the risks. It is vital that politicians, policymakers and scientists work together constructively to engage the public.

The Royal Society is committed to improving public engagement in science. To achieve this, we deliver a range of public engagement schemes⁸. Our annual Summer Science exhibition enables the public to engage with cutting-edge research and researchers. In response to the pandemic, we moved the 2020 Summer Science Exhibition online. The YouTube playlists for the week have already been viewed over 50,000 times. Our Pairing Scheme gives policymakers and research scientists an opportunity to experience each other's worlds⁹. The Royal Society also promotes excellence in the teaching of the sciences, mathematics and computing and supports teachers to be part of the scientific community. We have collated a dedicated set of resources for teachers and parents to use during the pandemic¹⁰. Finally, we are considering further public engagement activities specifically focused on improving understanding around the scientific process as it relates to the pandemic.

⁴ <https://royalsociety.org/topics-policy/projects/uk-research-and-innovation/research-innovation-mapping/#story=2&chapter=1>

⁵ <https://royalsociety.org/topics-policy/projects/international-researcher-mobility/role-of-international-collaboration-mobility-in-research/>

⁶ <https://royalsociety.org/topics-policy/projects/international-researcher-mobility/international-mobility-researchers-review-literature/>

⁷ <https://royalsociety.org/blog/2020/05/following-the-science/>

⁸ <https://royalsociety.org/grants-schemes-awards/meet-the-scientists/>

⁹ <https://royalsociety.org/grants-schemes-awards/pairing-scheme/>

¹⁰ <https://royalsociety.org/topics-policy/education-skills/teacher-resources-and-opportunities/resources-for-teachers/science-at-home/>