

Questions from BEIS consultation on UK R&D roadmap – July 2020

Raising our research ambitions

Researchers are driven by curiosity – by a desire to ask fundamental questions about how the world works and why – and by a drive to solve problems at the intersection of knowledge and societal need. By supporting research, we advance the frontiers of knowledge, increasing our understanding of the world and of each other. We form global collaborations and alliances. We invent the highly disruptive new technologies which can transform the world around us, improving living standards and health outcomes. And we use these insights to tackle the greatest challenges facing the world – those that cross boundaries and impact on our whole society.

The unprecedented increase in public investment announced at the Budget signals a step change in our overall ambitions for UK research, and will enable us to push harder at the frontiers of knowledge, unlocking brilliant new technological breakthroughs and enabling applied research to create transformative benefits for government, businesses and communities right across the UK.

Question 1. How can we best increase knowledge and understanding through research, including by achieving bigger breakthroughs?

The application of new knowledge

Research is critically important in helping to address significant issues, such as healthy ageing, achieving net zero carbon emissions, and addressing climate change. Applied research plays a vital role in ensuring that resilience, efficiency and effectiveness of public services is improved, that healthcare outcomes are advanced, and that evidence is deployed to solve real world problems and address threats to our security.

This requires having a healthy and vibrant ecosystem of institutions in which researchers are free to follow their curiosity, to test radical new ideas, to tackle complex societal problems, and to form new connections, collaborations and networks. It requires a broad span of approaches, from people developing new theories and insights into natural phenomena and the application of research in technological and industrial settings, through to systems research to improve patient care or tackle the barriers to inclusivity in society.

Question 2. How can we maximise the economic, environmental and societal impact of research through effective application of new knowledge?

Driving up innovation

Innovation is the process by which ideas are turned into economic growth – where discoveries are translated into new products, services and jobs, creating positive change in businesses, public services, government and wider society. The UK is ranked 5th in the Global Innovation Index 2019 and in the top 10 best countries worldwide to start, locate and scale a business. We already attract significant venture capital – at a level that exceeds that of Germany, France and Sweden combined. We are home to 77 unicorns (start-ups valued over US \$1bn), more than a third of the total across Europe and Israel. And yet, we underperform in innovation compared to research.

We need to do more to make the most of our world-class research base and to increase the productivity of UK businesses all over the UK. We need to ensure our excellence in discovery research, design, engineering, data science, and creative arts translates into commercial applications – increasing the productivity of our existing industries and creating new growth opportunities for the

UK. The UK has lower levels of R&D activity by businesses compared to our competitor nations, and that investment is focussed on large investors in a few sectors.

Question 3. How can we encourage innovation and ensure it is used to greatest effect, not just in our cutting-edge industries, but right across the economy and throughout our public services?

Inspiring and enabling talented people and teams

To achieve our ambitions for UK science, research and innovation, we must be world-leading in the way that we inspire and enable talented people. This means being the best place in the world for attracting, training and retaining diverse, talented people and teams across the whole spectrum – from excellent scientists, researchers, engineers and technicians, through to entrepreneurs, business leaders and investors.

Question 4. How can we attract, retain and develop talented and diverse people to R&D roles? How can we make R&D for everyone?

Levelling up R&D across the UK

The UK's research and innovation system has remarkable strengths right across the UK. From precision medicine in Glasgow to marine innovation in the Western Gateway, from compound semiconductors in South Wales, to future food processing in the Midlands and eco-Innovation in the North West Coastal Arc, the UK has centres of excellence in research and innovation across the country. At a local level R&D investment can transform areas by acting as a driving force for social innovation, local growth and improved productivity.

To unlock these benefits in more areas of the UK, we should do more to build on a wider range of R&D strengths. We should also do more to enable places all over the UK to thrive and to fulfil their potential in R&D.

Question 5. How should we ensure that R&D plays its fullest role in levelling up all over the UK?

Developing world-leading infrastructure and institutions

Our future success in R&D will rely on a diverse network of infrastructure: internationally competitive, high-quality and accessible facilities, resources, data and services.

The UK is home to over 500 nationally and internationally significant research and innovation infrastructures, providing us with a breadth of expertise across sectors.

We need to take a flexible approach to supporting research infrastructure to deliver better value for money and keep assets continuously maintained and cutting-edge. Higher quality infrastructure will help attract and retain the best staff and create a more vibrant research environment.

Question 6. How should we strengthen our research infrastructure and institutions in support of our vision?

Being at the forefront of global collaboration

Research and innovation are inherently global, and international collaboration and mobility of talent are associated with more impactful research. The UK's leading researchers and innovators want to collaborate with the best talent in the world, in the best facilities in the world, regardless of borders. These international collaborations lead to new advances and discoveries, pushing the frontiers of

knowledge faster and further. They underpin the UK's position as a world-leading knowledge economy and support trade, investment, diplomacy, defence and security.

Question 7. How should we most effectively and safely collaborate with partners and networks around the globe?

Harnessing excitement about our vision

Our mission is to inspire and enable people from all backgrounds and experiences to engage and contribute to research and innovation and show that science is for everyone. We will nurture the whole system of innovation that will improve lives, services and businesses right around the UK and beyond – creating a fairer, healthier, more prosperous and more resilient society. And we will celebrate our successes far and wide, showcasing our strengths, and promoting the UK as a destination for talent and investment, and a partner of choice.

Question 8. How can we harness excitement about this vision, listen to a wider range of voices to ensure R&D is delivering for society, and inspire a whole new generation of scientists, researchers, technicians, engineers, and innovators?