

Science Council response to House of Lords Call for Evidence - Delivering a UK science and technology strategy

24 March 2022

Introduction

The Science Council welcomes this evidence call by the House of Lords Science and Technology Committee, which presents a useful opportunity to better consider what success looks like for UK science and technology, and how it can be best achieved.

The Science Council's charitable purpose is "to promote the advancement and dissemination of knowledge of and education in science, pure and applied, for the public benefit." The Science Council advances professionalism in science through the professional registration of scientists and technicians who meet a high professional standard and competence and follow an established code of conduct.

The Science Council also serves as an umbrella organisation, providing a forum to connect its 36 member bodies for discussion and information exchange. The Science Council provides member bodies with a forum to raise standards through sharing practice and knowledge, to hold each other to account through a peer-review approach, and further their own commitment to advance science for the public's benefit.

Summary

The Science Council believes that for the UK to be a science superpower there are a number of prerequisites which include:

- A level of R&D funding competitive with other leading scientific nations to enable science and innovation to play a leading role in driving economic growth.
- Ensuring a balanced portfolio of research across the full range of scientific disciplines, encompassing both basic and applied research, through baseline R&D funding.
- Ensuring the highest professional standards are upheld for UK science with scientists valued as trusted professionals.
- Scientists embedded in public policy making across Government, valued for their expertise as economists and social scientists are.
- An education and skills ecosystem to both ensure a strong skills pipeline and build public trust in science.
- A diverse and inclusive scientific workforce that reflects wider society and makes best possible use of all available talent.
- Maintaining close international scientific and clinical partnerships, including through association with Horizon Europe and ODA funded initiatives.

Funding and economy

The Science Council and its member organisations are proud of the impactful research that takes place in the UK, the importance of which has never been more apparent than in the response to the COVID-19 pandemic. Ensuring the UK retains its position as a world leader in science, particularly in this era of climate and biodiversity crisis, requires an ongoing commitment by both Government and the scientific community.

We share the Government's stated ambition for the UK's R&D sector to reach 2.4% of GDP by 2027, which was the OECD average at the time this target was set. However, the OECD average has continued to rise with many of the UK's competitors exceeding this figure including the United States, China, Japan, and Germany. The UK cannot claim a science superpower status while the UK lags in share of its GDP spent on science compared to other developed economies.

Government spending on research and development (R&D) is a major catalyst for further private investment, with findings of private sector R&D output rising by 20p per year in perpetuity for every pound spent by Government. Government spending commitments can particularly provide research initiatives with stability and can give industry confidence in making additional investments.

The Government is currently committed to increasing the public research budget to £22bn by 2024/25 as part of its trajectory towards the 2.4% target. Ahead of the 2021 Spending Review, the Science Council and its member organisations called on the Government to commit to sustained and steady increases, rather than leaving the bulk of the increase until the end of the investment period. However this did not materialise in the final Spending Review, instead there was a further delay, which risks the UK falling further behind.

Predictable and signalled year on year rises will give industry more confidence to invest in the UK and give time for the scientific infrastructure and workforce to grow alongside the increases in funding, so that, together, the UK can reach the GDP target successfully. If the UK instead puts off investment or otherwise fails to progress on its long term science spending commitments, businesses are likely to take their R&D investments elsewhere in the world.

Balanced research portfolio

In recent years, Government investment in science has increasingly been focused on addressing specific challenges, particularly those relating to medicine and energy. These are valuable initiatives that have played a valuable role in driving innovation. The Science Council would even welcome further targeted initiatives and key challenges such as how the UK can best meet its targets for net-zero carbon emissions.

However, it is important to complement these valuable targeted initiatives with growth in core science funding which should always form the bulk of public investment in research. Insights from undirected and discovery research often present some of the greatest opportunities. The World Wide Web was invented by Tim Berners-Lee while he was working at CERN, and has transformed our lives in ways unimagined by CERN's funders. In a science

superpower, there would be an environment which best fosters this kind of undirected breakthroughs.

Ensuring a balanced portfolio of research across the full range of scientific disciplines is key to science superpower status, creating the best possible environment for world leading research to flourish. This can also support the Government's levelling up aspiration, with more diverse funding options giving opportunities to institutions across the country, rather than concentration on established destinations.

Trusted professionals

Upholding the high standards that define UK Science, is a key priority for the Science Council as a peer regulator for scientists and technicians.

Professional registration is our most valuable tool for maintaining these standards for science, whether in academia, industry or the public sector. Professional registration can be useful in demonstrating a common standard of capability between academia, the public sector and industry, to enable recognition of an individual's excellence when moving between these sectors.

The Science Council holds the registers for Chartered Scientist (CSci) and Registered Scientist (RSci), these registrations can be particularly appealing for scientists who work across a range of disciplines as they are not confined to a single specialism. We also hold the register for Registered Science Technician (RSciTech), which is essential for recognising the whole team that contributes to successful research and innovation.

By encouraging professional registration for scientists and science technicians, the Government would be supporting high standards of professional practice, easing the transferability of skilled individuals between academia and industry and further reinforcing confidence in the UK research and innovation ecosystem.

Science in government

The essential role played by scientists, technologists, technicians, and researchers in Government has never been more obvious than during the COVID-19 pandemic. Ensuring that the Government has access to the best possible scientific and technical advice is crucial to addressing the biggest challenges facing the UK; from combating climate change to harnessing emerging technologies.

It is necessary to better embed and network science advice mechanisms across Government, enhancing the career paths and recognition of science professionals in Government and building a professional function with coherence and influence analogous to economists. There has been demonstrable progress, such as with the impressive number of scientists engaged in providing advice directly to the Government on COVID-19.

However, no matter how talented and well-resourced the science and engineering profession within Government becomes, links with the wider scientific community are essential. The Government's Science and Engineering Profession (GSEP) strategy published in 2021 recognises this, placing an appropriate emphasis on increasing connections and

interchange. There remains enormous potential from better mobilising the whole science and technology ecosystem.

The Science Council has been working with GSEP, considering how we can best enable science professionals working in Government to attain professional registration, and finding ways to ensure they are better valued for their expertise as they progress in their careers.

Education

For a strong science ecosystem, simply spending on R&D will not be sufficient; these efforts will also require a skilled and growing workforce of researchers, technicians and support staff.

Investments in science and technical education are necessary to secure the future of UK science, providing the skills base needed for excellence and the future innovators that shape our world. In addressing skills shortages, member organisations of the Science Council can play a valuable role in promoting and supporting continuous professional development (CPD) and assessing areas for development in curricula and training.

Successful science is based on the combined efforts of the whole team of researchers, technicians and supporting staff, rather than just a small number of leading academics. For this reason, the Science Council has been working to increase awareness of technical pathways into science through apprenticeships, T-levels, and higher technical qualifications (HTQs).

It is important that our education system produces scientifically literate citizens who can make informed choices both politically and in their own lives as scientific questions increasingly shape our future. There are significant challenges for our education system including unequal access to high quality teaching, high teacher attrition rates, and recruitment shortages in the sciences.

Being taught consistently by subject-specific teachers increases the likelihood of students progressing to post-16 science qualifications, so Science Council members have been calling on the Government to allocate additional resource to improve the subject-specific CPD available to science teachers.

Workforce and diversity

A strong scientific workforce is necessary for sustaining economic growth and making the most of R&D investments, but it also plays an important part in our national resilience and ability to react to emerging challenges. The COVID-19 pandemic has demonstrated the vital role the science community plays in rising to public health challenges, with healthcare scientists, clinical engineers and technologists contributing to tackling the pandemic and maintaining other essential services.

UK universities naturally played a leading role in developing responses, prophylaxis and therapies, but our national response to the pandemic also benefited from the large pool of trained researchers across the whole country who could be drawn on for testing and vaccination efforts.

We cannot reliably predict what future kinds of challenges the UK will face, but we do know that having a strong diverse multidisciplinary scientific workforce will bring huge dividends in tackling them.

By promoting equality, diversity and inclusion (EDI) we can better enable science to serve society by attracting the widest possible talent to the science workforce and fostering a greater diversity of scientific ideas, research and technology. It is essential to be proactive in seeking out participation from under-represented groups, in order to build and develop a world in which studying and working in science are open to all. This requires leadership at every level, promoting and communicating this vision to educators, employers, policy makers, opinion formers and the public.

The Science Council in collaboration with the Royal Academy of Engineering has created an EDI framework tool for professional bodies, which enables them to assess and monitor their progress on diversity and inclusion, as they seek to embed inclusive practices into their strategies, planning and organisational cultures.

International collaboration

The importance of international collaboration in scientific research to realise these ambitions cannot be overstated. Close scientific and clinical partnerships, across Europe and beyond, are key to monitoring, contingency planning for, and alleviation of high priority national and global challenges, including climate change, COVID-19, and food and energy security.

The UK has a long history of close and trusted collaboration and shared success with many countries, enabled through the European Framework Programmes. The strength of those partnerships has provided enormous benefits including excellent research, resulting in countless collaborations to tackle those global challenges, and boost competitiveness and growth.

Association to Horizon Europe is a vital enabler for our continued growth as a research and innovation world leader, promoting our openness to international collaboration and attracting the best global talent. Further delay, or worse still a UK decision not to associate, will reduce the opportunity for innovation and impact the ambition to realise the UK's status as a true scientific superpower.

Another major component of the UK's success in science has been its partnerships linked to UK aid spending. The Government's decision to cut Official Development Assistance funding to 0.5% of GNI, compounded by reduction in GNI caused by the pandemic, has had profound and immediate consequences for UK Science.

UKRI was hit by a £120m shortfall affecting more than 800 research programmes, including some which supported the global fight against COVID-19, and other diseases with pandemic potential. This cut affected thousands of UK based researchers, but also directly undermined the kind of international collaboration needed for excellent science.

Revisiting the cuts to these programmes is a priority for the UK scientific community, but we would be concerned if doing so impacted on other important aid programmes. We therefore would call on the Government to explore ways of addressing this funding gap from outside

the current ODA budget and other existing science funding, given that these programmes play an important part of the Government's ambition for a Global Britain.

The Science Council and its members would be keen to work with the Committee and others in exploring a long term solution including development of a stronger, more sustainable system to support the UK's international R&D efforts.

Annex – List of Science Council member organisations

Association for Clinical Biochemistry and Laboratory Medicine (ACB)
Association for Science Education (ASE)
Association for Simulated Practice in Healthcare (ASPiH)
Association of Anatomical Pathology Technology (AAPT)
Association of Neurophysiological Scientists (ANS)
Biochemical Society
British Association of Sport and Exercise Sciences (BASES)
British Society of Soil Science
British Psychological Society
Chartered Institution of Water and Environmental Management (CIWEM)
College of Podiatry
Geological Society of London
Institute of Animal Technology
Institute of Biomedical Science (IBMS)
Institute of Corrosion (ICorr)
Institute of Food Science & Technology (IFST)
Institute of Marine Engineering, Science and Technology (IMarEST)
Institute of Materials, Minerals and Mining (IOM3)
Institute of Mathematics and its Applications
Institute of Physics (IOP)
Institute of Physics and Engineering in Medicine (IPEM)
Institute of Science and Technology
Institute of Water
Institution of Chemical Engineers (IChemE)
Institution of Environmental Sciences
The Nuclear Institute
Oil and Colour Chemists' Association (OCCA)
The Organisation for Professionals in Regulatory Affairs (TOPRA)
Operational Research Society
Royal Astronomical Society
Royal Meteorological Society (RMetS)
Royal Society of Biology
Royal Society of Chemistry
Society for Cosmetic Scientists (SCS)
Society for Natural Sciences (SNS)
Society of Dyers and Colourists (SDC)