

Why the UK needs a comprehensive international science strategy

Being a global player in science is critical for the UK's long-term prosperity. Having secured association to Horizon Europe, the UK now needs a comprehensive international strategy which builds on that association and brings long-term benefits to us all.



“Getting the most from UK science means thinking globally. First, we need to maximise the UK's association to Horizon Europe and future EU Framework Programmes to drive the growth and global influence of our research and innovation. Secondly and in step, we need a complementary joined-up strategy for global scientific collaboration that delivers economic and societal benefit.”

Sir Adrian Smith, President of the Royal Society.

Why this matters

International collaboration extends the impact and reach of scientific discoveries and innovations. That in turn translates into advances in economic performance, the health and security of people and the planet, and our resilience to national and global-scale shocks.

In 2022, more than half of the UK's research output (61.5%) was the result of international collaboration¹, compared with 26% in 1998². Science is increasingly global, and harnessing the benefits requires us to maintain this global outlook.

Where does the UK stand currently?

UK science is a valuable economic, cultural and soft power asset with enormous potential to drive the future economy and improve people's lives and opportunities. We start from a position of strength.

Currently, the UK is second only to the USA in the number of Nobel prize-winning scientists. We ranked first on field-weighted citation impact in the G7 every year since 2007³, are fourth in the Global Innovation Index⁴, and have five out of the seven European universities in the Times Higher global top 30⁵.

Our science, engineering and technology base is a strong pull for research-intensive companies such as Arm at Cambridge, Boeing at Sheffield and Strathclyde, Jaguar Land Rover in Coventry, and Siemens in Lincoln. It is also the source of transformational innovations across the life sciences sector, with multinationals like AstraZeneca and GSK choosing to site their R&D operations here.

The risk now facing the UK comes from rapidly increasing global competition. With countries like China, the USA and Germany ramping up their expenditure on science and technology, the UK is under growing pressure to keep pace in attracting globally mobile talent and investment and retain a competitive edge.

Losing this edge means falling behind further.

Why is a comprehensive international science strategy needed?

To maximise the opportunities from international scientific collaboration, the UK needs a comprehensive strategy that is backed by long-term, cross-government support. This will bring three critical benefits to the UK that a more fragmented or ‘hands off’ approach will fail to deliver.

First, by actively facilitating the global diffusion of people and ideas, it will ensure that the UK stays at the cutting edge of scientific fields, and adapts as new ones emerge.

Second, it will instil confidence in the UK as a stable and predictable environment for foreign direct investment in science-based industry, linking policy agendas across Whitehall.

Third, it will allow us to demonstrate global leadership in science in support of wider foreign policy objectives.

What does Horizon Europe offer the UK?

Maintaining a close partnership with the EU – the UK’s largest scientific collaborator in terms of co-authorship – provides the baseline for scientific collaborations globally and must be core to this future strategy.

Now that the UK is associated to Horizon Europe, the EU’s ninth Framework Programme for research and innovation, and the Copernicus Earth observation programme, we need to make the most of the opportunity to boost UK applications and rebuild our links with international partners. We also need to prepare for the long-term as an active and reliable participant in European research.

Association was hard won, but worth the fight.

BOX 1

Benefits of Horizon Europe association

Pooling our expertise with other European nations has led to advances in medicine and public health, cleaner energy, environment and transport innovations, and jobs across the UK. We get to build on this success as an associated country under Horizon Europe.

Association provides access to people and networks that foster new frontiers of knowledge and innovation. It means the UK can attract and retain scientific talent through prestigious schemes like the European Research Council grants and gives us a strong platform for seeking further collaborations across the world. Other non-EU countries such as Israel, Norway and New Zealand are also associated.

BOX 2

Benefits of wider global collaboration

World-leading UK science is not produced in isolation but builds on the body of knowledge developed through the work of researchers across the world, progressing it further and in new directions. That often means collaborating with scientists, and using facilities, outside the UK. Large-scale infrastructure, such as the European Organization for Nuclear Research (CERN) or the Square Kilometre Array Observatory (SKAO), enables an international pool of researchers to access shared equipment and facilities at scale that would otherwise be unavailable to them.

International collaborative projects also allow teams of scientists to push the boundaries of knowledge faster and more effectively. The Human Genome Project, for example, was a huge collaborative and interdisciplinary endeavour involving a consortium of researchers in the UK, USA, France, Germany, Japan and China. In generating the first sequence of the human genome, it not only accelerated the study of human biology but fast-tracked advances in medicine and a range of other applications from forensics to biofuels.

BOX 3

Who are the UK’s major research collaborators outside Europe?

Though Europe remains the UK’s biggest academic collaborator, accounting for 12 of our top 20 country partners for co-authorship, we also have strong links with the USA – the country we collaborate with the most – as well as with China, Australia and Canada, and increasingly with emerging science nations in the Global South. Co-authored publications with India and South Africa from 2019 to 2022, for example, increased by 64% and 31% respectively, compared with a growth rate of 16% with the USA over the same period⁶. We also have strong connections to other innovative economies such as Japan and South Korea with a high concentration of research-intensive companies that invest in the UK.

What are the strategic priorities?

The UK's international science strategy must contain five essential ingredients:

1. GLOBAL LEADERSHIP

UK scientific expertise is recognised globally, which puts us in a strong position to catalyse action on climate change, food and water security and biodiversity loss, and in global approaches to artificial intelligence (AI)⁷ and other rapidly developing technologies with transformative economic and societal potential. Having previously led the way on difficult and controversial regulatory issues, the UK also has an opportunity to develop safe and ambitious regulations in AI and in areas such as genetic technologies which set the global standard⁸.

2. AN OPEN AND WELCOMING APPROACH TO GLOBAL TALENT

The ability of researchers and innovators to move in and out of the UK with minimal barriers is essential for increasing the volume and quality of science undertaken in the UK and the economic and societal benefits that derive from it. Currently the UK charges up to ten times more for work and study visas than the average of leading science nations⁹. This undermines our ability to attract global talent to work in academia and industry. We also have a bureaucratic and unwieldy system for short-term mobility for conferences and other research-related visits¹⁰, and make it difficult for researchers and innovators to bring family members to the UK. These barriers need to be removed. As visa arrangements tend to be reciprocated internationally, improving the attractiveness of the UK's offer should have the added benefit of facilitating outward mobility for UK-based researchers to develop their careers and build international networks.

3. ENGAGEMENT WITH FUTURE EU FRAMEWORK PROGRAMMES

An effective international science strategy must commit the UK to active participation in Horizon Europe and its successors. After securing association to Horizon and Copernicus, the UK is well placed to shape and inform discussions on Framework Programme 10, which is scheduled to launch in 2028. We should also maintain a partnership with the EU on fusion science having opted out of Euratom Research and Training and ITER for the current programme period.

4. A CLEAR FRAMEWORK FOR COLLABORATION

The UK needs a coherent approach to collaborating with established and emerging science nations, both bilaterally and multilaterally, in areas of scientific excellence, innovation strengths, global challenges, high cost infrastructure, and strategic partnerships. A clear framework is needed when it comes to prioritising partner countries and different modes of bottom-up and top-down collaboration. It must be underpinned by a robust and nuanced perspective on national security. Things to avoid in this context include overly restrictive geographical and thematic priorities and a lack of stability in ministerial aspirations. The strategy must be for the long-term and command cross-government support.

5. SUPPORT FOR SCIENCE IN INTERNATIONAL DEVELOPMENT

Finally, the UK has a long and effective history of supporting science in international development including the UN's sustainable development goals. We must now recommit to this work by reversing cuts to research funded by Official Development Assistance (ODA) which had hugely negative consequences for our scientific partnerships across the Global South¹¹. Building research capacity in low and middle-income countries through long-term, equitable partnerships brings mutual benefit, as illustrated by the role of the Network for Genomic Surveillance in South Africa identifying novel COVID-19 variants and alerting other countries¹².

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“Policy separation of science from energy, business and trade and other Whitehall departments should not mean a fragmented international science strategy. The creation of the Department and Secretary of State for Science, Innovation and Technology creates the opportunity for Cabinet level leadership, which then needs to be backed by a cross-government delivery plan.”

Sir Adrian Smith, President of the Royal Society.

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