
ROYAL SOCIETY

Pro-science budget is not enough for a Brexit world

Clarity in UK and EU policy must come soon, so science funds can be spent well, says **Venki Ramakrishnan**.

We live in uncertain times. This is all too true in the United Kingdom, which is negotiating its exit from the European Union. On the basis of the government's latest budget, and as a natural optimist, I am hopeful about the future of British science.

On 22 November, UK Chancellor of the Exchequer Philip Hammond signalled continued support for science in his speech to the House of Commons. Research and innovation featured prominently, paving the way for an industrial strategy to drive a technological revolution. Hammond announced more money for science, including an extra £75 million (US$100 million) to support companies using artificial intelligence, and new PhDs in the area. There was also £100 million to boost computing in schools by training more teachers, and investment in getting more young people to study mathematics to create the digitally literate workforce of the future.

This budget builds on previous commitments to increase UK research funding — both public and private — to 2.4% of gross domestic product (GDP) by 2027, with a longer-term goal of 3%. (Currently, the United Kingdom lags behind the United States, Sweden, Switzerland, Germany and Japan.) The challenge for the British Treasury is to increase public science expenditure from around 0.34% of GDP to at least 0.65%, the average for members of the Organisation for Economic Co-operation and Development, while also creating an environment in which private industry invests in long-term research and development.

As president of the Royal Society, the world's oldest national scientific society, I advocate for research in Britain and beyond. Money is essential to science, but it must be used optimally. That means a long-term commitment to basic research and to scientific collaboration between the United Kingdom and the EU after Brexit.

Diversity is a strength of British science. UK researchers have many sources of funding, from direct government support for universities to grants from research councils, national academies and charities. They can work in a variety of institutions, including universities that train students and foster research, and bodies that focus on long-term problems, such as the MRC Laboratory of Molecular Biology in Cambridge. The research itself is also diverse. Funding policy follows the Haldane principle, in which the government sets overall priorities and scientists decide how to allocate resources.

It is important that these priorities are not focused too narrowly and investments have a broad, long-term perspective. Applied research directed towards immediate social benefit is essential. So is basic research. It increases our wealth of knowledge — an end in its own right — and generates transformational technologies. Basic science yields fantastic returns on investment, but we cannot predict which investment will pay off, or when. It took almost a century to apply the theory of relativity to correct the time signals from satellites, thus enabling the global positioning functions on smartphones.

Too many big companies have become too focused on short-term returns — possibly at the expense of productivity. Governments must not make the same mistake.

My biggest concern is making sure the United Kingdom remains open to talent, traditionally one of its strengths. Science depends on a rapid exchange of ideas, facilitated by the movement of people. Three of the past five presidents of the Royal Society were immigrants to the United Kingdom. I came here from the United States because I knew the MRC Laboratory was the best place to ask big and important questions, and I would be given the freedom and funding to pursue my goals.

The perception of Britain as open and welcoming is now under threat as a result of Brexit. But there are reasons for scientists to be optimistic.

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The UK government has declared science one of its 12 Brexit priorities — on a par with protecting workers and cooperating for free trade and against terrorism. It clearly aspires to maintain strong scientific links with the EU after Brexit. Our EU counterparts, from academy presidents to heads of funding programmes, agree. We will all be better off if the United Kingdom remains active in EU research programmes. A report released in July by an EU committee seeking to maximize the impact of such programmes, chaired by French economist Pascal Lamy, emphasized this point.

There are also reasons for concern. Despite broad agreement, progress on urgent issues has been agonizingly slow. Uncertainty will erode UK strengths. EU citizens working here must be assured that they and their families can remain. They must know what processes to follow and what restrictions they may face. We need them to continue to be welcome, appreciated contributors to our country's research without needless psychological stress. We must also ensure that the United Kingdom is not seen as hostile to foreign talent, and we need an immigration system that makes it as easy as possible for highly skilled people to come here.

We must ensure, too, that Britain participates fully in the EU's next research funding programme, Framework 9. Moreover, UK input is valuable well before application invitations are issued. We are involved in much cutting-edge research that can inform funding priorities.

There is no room for complacency. The factors that have kept the United Kingdom at the forefront of global science could disappear if we do not maintain them. If we become isolationist or too focused on short-term returns on investment, even my natural optimism will vanish. ■

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