UK's Negotiating Objectives for Withdrawal from the EU

A response from the Royal Society of Chemistry to the House of Commons Exiting the European Union Committee.

Summary

For UK science to contribute to UK prosperity, a robust environment that actively sustains our already world-class science and innovation base is needed. Making science and innovation a priority in the UK's negotiating objectives will be vital to realise the government's vision to make research and development (R&D) a key driver for growth in our post-Brexit economy. Keeping the UK at the forefront of global science and innovation requires us to:

- Maintain access to EU research and development funding programmes and infrastructure.
- Enable easy movement of the best scientists and innovators to and from the UK.
- Develop a regulatory system that achieves a balance between nurturing innovation, protecting the environment and human health and enables the UK to trade internationally.

Introduction

Science and innovation contribute to economic growth, enabling development of new goods and services, attracting inward investment and creating jobs. Every £1 of public investment in R&D, resulted in an average £1.36 investment in R&D by the private sector.[1] Recent announcements by the Prime Minister[2] and Chancellor[3] committing an additional £4.7 billion of funding for science and innovation by 2020 recognise their role as an engine in achieving the Prime Minister's goal of *'better productivity…….more economic growth not just in the south-east of England but across the whole country'*.[4] Maintaining an environment that provides sustained backing for science and innovation is vital for UK productivity. Science is inherently international and will be affected deeply by the outcome of the UK's negotiations to exit the EU.

We outline the three key negotiating priorities from the perspective of the scientific community. We recognise that these are part of the broader negotiation priorities being considered by the government, but addressing science and innovation coherently through a sector perspective will be crucial to ensure that our science base retains its world-leading position. It should also be noted that the priorities outlined below have been identified and agreed across our sector. This was captured in the recent House of Commons Science and Technology Committee report, *Leaving the EU: implications and opportunities for science and research*, which advocated that all of these areas must be addressed together *'…as a coherent whole rather than a list of separate considerations'*.[5]

Priority 1: Access to EU R&D Funding Programmes and Infrastructure

Maintain access to EU research and development funding programmes and infrastructure.

During the last multiannual framework programme for science (Framework Programme 7), the UK received £8.8B, compared with a contribution of £5.4B.[6] As an example, UK university chemistry departments received £48 million or 22.6% of their funding from EU government bodies[7] in 2014/2015, up from 16.8% in 2011/12. The proportion of funding that they received from UK research councils decreased from 55.4% to 48.3% in the same period.[8]

A crucial point is that the value of these programmes is not solely their financial contribution, but also the fact that many EU programmes are specifically set up to foster collaboration across nations, disciplines and sectors. These enable UK universities, SMEs and large companies to partner as part of larger initiatives, delivering more impact than is possible alone and leading to R&D relationships and links that outlast the initial funding period. These links are key to our long-term global competitiveness.

Examples of EU programmes include:

- **Public-Private Partnerships** such as the *Innovative Medicines Initiative (IMI)*. IMI consists of a number of different projects to accelerate the development of better and safer medicines for patients.[9] The UK-based Chem21[10] consortium is part of the IMI and has leveraged funds of over €26m from both public and private sources to develop the manufacture of sustainable pharmaceuticals. The project brings together 6 pharmaceutical companies (2 UK based), 13 universities (4 UK based) and 4 SMEs (2 UK based) from across Europe. The other participating nations are Germany, Belgium, Finland, France, the Netherlands, Austria and Denmark.
- **Marie Skłodowska Curie Actions** which support leading researchers to work in other nations or disciplines for fixed periods of time. The UK can host and maintain links with the top researchers of the future from around the world, whilst UK researchers have opportunities to work in leading laboratories elsewhere in Europe.
- **Shared international facilities supported by EU programmes**. An example is the European Synchrotron Radiation Facility (ESRF) in Grenoble.[11] The ESRF generates X-rays which scientists can use to map molecules in detail, helping to uncover the causes of heart disease, develop the next generation of solar cells and understand how viruses spread. Whilst the facility itself is funded by the participating nations both within and outside the EU, access to EU programmes allows UK scientists to apply for funding to visit these facilities and carry out work there. The UK needs to maintain access to shared international facilities like this, as it is not possible for a single nation to host and maintain the full range of specialist large equipment that scientific research requires.
- **The European Research Council (ERC)** provides large, long-term research grants (up to €2.5 million over 5 years). As ERC grants are awarded on the basis of excellence alone, there is no requirement for even distribution across member states or associated countries. In 2014 the UK received nearly 24% of the European Research Council (ERC) grants[12] and in 2015, five of the top twenty European institutions hosting ERC grantees were in the UK (France and Germany had three institutions each in the top twenty; Switzerland had two).[13]

The government has recently shown its commitment to science and innovation by pledging an additional £4.7 billion of funding by 2020, recognising the role of the sector in the UK's future prosperity. EU R&D programmes bring additional benefits that will increase the return on this investment and benefits flowing to the UK economy. They provide something complementary; an existing framework for multilateral collaborations that enable universities and companies across several nations to work together to accelerate research, discovery and innovation. Preserving access to this framework is key to the advancement of science and its contribution to growth (see below).

Priority 2: Mobility

Enable easy movement of the best scientists and innovators to and from the UK.

Mobility of scientists is integral to the advancement of research and innovation. The Prime Minister recently outlined her goal to make Britain *'the global go-to place for scientists'*.[14] In order to do the best science, researchers travel to and from the UK to collaborate with leaders in their field, to access cutting-edge research facilities and to present their work to audiences globally. To remain globally competitive, universities and businesses must hire the best people to deliver world-class research, innovation and teaching.

International Collaboration: A study by Elsevier comparing collaboration between EU countries and the states of the USA found that in both regions, the field-weighted citation impact of research that involved inter-country or inter-state collaboration was greater than that of research that involved intra-country or intra-state collaboration. Collaborations involving partners outside the region had an even higher field-weighted citation impact.[15]

Whilst collaboration with scientists around the world is important, there is strong collaboration between the UK and Europe. There is the relative geographical proximity and ease of travel combined with EU programmes that enable collaboration discussed above. The same study by Elsevier found that the proportion of inter-country collaborations in Europe rose between 2003 and 2011, whilst inter-state collaborations in the USA fell over the same period.

This evidence is reinforced by a study published in November 2016 by *Nature Index* which examined international collaboration by calculating an average collaboration score, based upon the author affiliations of research papers published in a specific selection of high-quality science journals. The study showed that in the period between 2012 and 2015 the collaboration score between the UK and Europe increased from 120 to 150. By comparison, the collaboration score between UK institutions and those in the rest of the world remained between 40 and 50 over the same period.[16]

International Researchers working in the UK: The research community across the UK is already international in make-up. The most recent data from the Higher Education Statistics Authority indicates that in UK chemistry departments over a third of staff come from outside the UK:

- 22% of staff are non-UK EU nationals;
- 13% are non-EU nationals.[17]

In the current context, this means uncertainty for a large number of researchers over their future status in the UK. As outlined by the House of Commons Science & Technology Select committee chair, Stephen Metcalfe MP, *'Telling EU scientists and researchers already working in the UK that they are allowed to stay is one way the Government could reduce that uncertainty right away.'*[18]

A key staff group in universities is those who carry out post-doctoral research. These are typically 1-3 year fixed-term contract posts; Marie Skłodowska Curie Fellows represent some of the brightest and best of such researchers. Post-doctoral researchers carry out significant amounts of research that contributes to the UK's overall research outputs. At the end of their contract they may transition into roles across academia, industry and other sectors or move to another country, but often maintain their links with UK institutions.

Short-term mobility (days to months): Easy movement of both researchers and students to undertake short projects or use specific pieces of equipment and to share or present their work with collaborators is also vital for the constant exchange of ideas required to advance research. High barriers to this will likely discourage scientists from outside the UK from undertaking collaborative research here and may also impact the ability of UK-based researchers and students to visit EU countries.

Mobility to advance science and innovation runs across sectors; from our universities through to skilled workers and technicians in our businesses. A skilled workforce along the whole science and innovation chain will be needed to realise the government's vision *'…that Britain continues to be a beacon of competitiveness, now and in the future'*.[19]

Priority 3: Regulation

Develop a regulatory system that achieves a balance between nurturing innovation, protecting environment and human health and enables the UK to trade internationally.

Our analysis shows that there are at least 300 regulations and directives relevant to UK chemicals and product manufacturing industries and the UK chemical sciences community, broken down into:

- Over 100 regulations and directives that govern the manufacture, use and distribution of chemicals, where the main EU regulation for chemicals is Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Regulation (EC) No 1907/2006).This is implemented together with many other chemical product specific regulations to protect EU citizens from chemical exposures (e.g. regulations for consumer goods, cosmetics, electronics, paints, medicines and agrochemicals etc).

- Regulations that require chemical sciences expertise in their development and enforcement e.g. directives and regulations relating to chemicals in food, water, environment, energy and broader research practices. Specific examples are the EU Water Framework Directive and the EU Ambient Air Quality Directive, for regulating chemical pollutants in the environment.

A key issue is ensuring that regulatory frameworks support UK business both large and small, and enable safe and sustainable product innovation. Regulations relating to chemicals can be technically complex and their development and implementation is reliant on scientific input from members of the chemical sciences community. Regulation should be informed by scientific evidence that can help to ensure that there is an appropriate balance between risk and precaution. It is important to enable innovation and at the same time to provide appropriate safeguards for human health and the environment that are expected by society.

Whilst the Great Repeal Act provides some level of certainty for the day the UK exits the EU, uncertainty remains over our longer-term regulatory framework after such an Act. Such uncertainty will not help business and possible future sector-specific regulatory scenarios should be considered now. Regulatory change will impact several different UK economic sectors, potentially in very different ways. Given that regulations relating to chemicals involve a significant amount of technical and scientific detail, government will need to call upon scientific expertise from across sectors to understand the challenges and opportunities for the future.

We will also need to understand how changes to our relationship with the EU will affect the UK's ability to be involved in providing evidence that influences the future regulations. The EU will remain an export market for many sectors, meaning that the UK will still need to understand and respond to changes in EU regulation to continue trading there. Exploring the options for this now by engaging with regulators, scientists, businesses and other specialists will send a strong signal to businesses that securing long-term regulatory clarity is a priority for government in achieving the goal of boosting productivity and growth.

For innovative chemicals and products, there are areas that represent scientific and regulatory knowledge gaps which could present possible future world-leading opportunities for the UK. One example is nanotechnology; this is a topic where international regulatory consensus has been difficult to achieve yet innovation is progressing rapidly. Combining the UK's strength in research and the application of science to regulation could provide an opportunity to bring together countries in the EU and beyond and demonstrate leadership in this area.

Contact

The Royal Society of Chemistry would be happy to discuss any of the issues raised in our response in more detail. Any questions should be directed to Dr Mindy Dulai, dulaim@rsc.org, 01223 432674.

About us

With over 50,000 members and a knowledge business that spans the globe, the Royal Society of Chemistry is the UK's professional body for chemical scientists, supporting and representing our members and bringing together chemical scientists from all over the world.

Our members include those working in large multinational companies and small to medium enterprises, researchers and students in universities, teachers and regulators.

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[1] -*What is the relationship between public and private investment in science, research and innovation?*, Department of Business, Innovation & Skills, 2015
[2] - *CBI annual conference 2016: Prime Minister's speech*, Speech by the Prime Minister at the CBI Annual Conference in London, November 2016
[3] - *Autumn Statement 2016*, HM Treasury, November 2016
[4] - *Britain, The Great Meritocracy*, Speech by the Prime Minister at the British Academy, London, 9 September, 2016
[5] - *Leaving the EU: implications and opportunities for science and research*, House of Commons Science & Technology Select Committee, November 2016
[6] - *UK Research and the European Union: The role of the EU in funding UK research*, The Royal Society, 2016

[7] - Funding from EU Government bodies defined by HESA as 'all research grants and contracts income from all government bodies operating in the EU, which includes the European Commission but excludes bodies in the UK', https://www.hesa.ac.uk/component/content/article?id=1317
[8] - Source data: HESA finance records (http://www.hesa.ac.uk)
[9] - http://www.imi.europa.eu/
[10] - https://www.chem21.eu/
[11] - http://www.esrf.eu/about
[12] - *European Research Council Grants: projects and results, 2007-2015*
[13] - *Annual Report on the ERC activities and achievements in 2015*, European Research Council, March 2016
[14] - *CBI annual conference 2016: Prime Minister's speech*, November 2016
[15] - *Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility*, Science Europe and Elsevier's SciVal Analytics, September 2013
[16] - *Nature Index shows significant increase in UK and EU collaboration*, SpringerNature press release, November 2016
[17] - Source data: HESA student and staff records (http://www.hesa.ac.uk)
[18] - *Government should reduce Brexit uncertainty for science sector*, House of Commons Science & Technology Select Committee, November 2016
[19] - *A place for innovation*, Speech by Secretary of State for Business, Energy and Industrial Strategy at Innovate 2016, November 2016.

All links active on 6 December 2016

