



UK Science and Innovation after the UK Exits the EU

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The government has set out its ambition for a more prosperous UK, where economic growth is achieved by increasing productivity across the country. Science and innovation will underpin this growth. They enable the development of new goods and services, attract inward investment and create jobs.

To achieve this ambition, we need an environment that sustains and builds on our already world-class science and innovation base. For the UK to stay at the forefront of global science and innovation there are three key objectives:

1. Maintain access to international research and development funding programmes and research facilities, along with the collaboration opportunities these bring.
2. Enable easy movement of skilled and talented scientists and students to and from the UK.
3. Develop a future regulatory system that achieves a balance between nurturing innovation, protecting the environment and human health and enabling the UK to trade internationally.

As exit negotiations start between the UK and the EU, achieving these three objectives will be essential so that science will continue to contribute to UK growth and prosperity.

1. Funding and facilities

EU funding schemes provide access to a wider range of research grants and facilities that complement domestic funding schemes. The commitment, in the November 2016 Autumn statement, of an additional £4.7 billion for research and development (R&D) in the UK by 2020 is recognition of the role of science in driving growth and productivity. Sustained national funding for UK science is essential to achieve improved growth and productivity across the UK. EU funding provides a complement that allows access to a richer range of funding that is an important element of overall research funding and often fulfils a different purpose. Chemistry in UK universities receives 22.6% of its funding (£55 million) from the EU:

- **The European Research Council (ERC)** gives research grants of up to €2.5 million over 5 years to individual researchers, based solely on the criterion of excellence. Interim figures from the current EU Funding Framework, which runs from 2014 – 2019 show that UK researchers have received 22.4% of ERC grants to date under Horizon 2020, the current framework for EU R&D funding. UK success in winning these prestigious grants reflects the excellence of the research being done in the UK.

Access to EU R&D funding programmes for universities and businesses enhances our global competitiveness by supporting UK scientists to forge links and collaborations across nations, disciplines and sectors. The collaborative links, societal and economic impacts often long outlast the period of initial investment and collaboration. The range of mechanisms to support collaboration is large, varying from schemes to support individual researchers to undertake collaborative visits through to large scale public-private partnerships that bring together large companies, SMEs, universities and the public sector in consortia.

- **The Innovative Medicines Initiative (IMI)** is the world's largest public-private partnership in the life sciences, with a total second phase budget of €3.3 billion. It aims to speed up the discovery and delivery of new medicines to patients across the world. One of the IMI's first phase projects is Chem21, led by the University of Manchester and GlaxoSmithKline. The project 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. Work to date by the group includes the development of cheaper, more environmentally friendly methods for the production of drugs.

Cutting edge scientific research requires access to a range of state-of-the-art, instruments and research facilities. The UK has strong capability in some universities and has centres of excellence such as the Diamond Light Source, but it is not possible for any nation to establish and maintain centres of excellence in all areas. So for many fields of scientific research access to international facilities is essential, be that to the *European Synchrotron Radiation Facility* in Grenoble or to *European Southern Observatory* observation sites in Chile. Where there are state-of-the-art centres in Europe it is more practical for UK researchers to use these rather than travelling to work at facilities in North America or Asia. From 2007-2013, EU funding supported 3,539 UK-based researchers to access 1,055 European research facilities

- **The European Synchrotron Radiation Facility (ESRF)** in Grenoble 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.

2. Mobility and Collaboration

The UK needs immigration arrangements that attract and accommodate highly skilled and mobile workers and that forge international links. Last November, Theresa May outlined her goal to make Britain ‘the global go-to place for scientists’. Europe’s geographic proximity coupled with EU funding that enables collaboration, means that it must continue to form part of our overall approach to international scientific collaboration, as we continue to forge strong scientific partnerships across the world.

For the UK to remain globally competitive in science and innovation we must attract skilled and talented people to work in our companies and universities. These people bring ideas and know-how at the frontiers of discovery and application, enable the UK to establish new capability, and train the next generation of researchers and innovators. Amongst chemistry staff in UK universities:

- 22% of staff are non-UK EU nationals
- 13% of staff are non-EU nationals
- 74.1% of staff on open-ended or permanent contracts are UK staff
- 51.7% of staff on fixed-term contracts are international staff.

Post-doctoral researchers are a highly-skilled, dynamic, mobile group of researchers that contribute significantly to the UK’s overall research outputs and are a vital part of the academic UK scientific workforce. Post-doctoral research positions are generally 1-3 year fixed-term contract posts. Researchers build research skills, networks and outputs, usually at a different institution to where they completed their doctoral degree and/or in a different country. At the end of their contract they may transition into roles across academia, industry and other sectors in the UK or move to another country, but often maintain their links with UK institutions, laying the foundations for future international collaborations.

- Marie Skłodowska Curie Actions are an EU funding scheme that support leading researchers to work in other nations or disciplines for fixed periods of time. Between 2007 and 2014, Marie Skłodowska Curie Actions provided funding for 8120 researchers to work in the UK. The second most successful nation in this stream of funding, Germany, received funding for 4605 researchers to work there over the same period of time.

Movement of both researchers and students to and from the UK to undertake short projects or use specific pieces of equipment and to share or present their work with collaborators is also essential for the constant exchange of ideas required to advance research. About 50% of the UK’s published research articles are co-authored with at least one international partner. These internationally collaborative papers are linked to greater impact for partners in both countries. 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.

- 4 out of the top 5 collaborative partner countries for UK researchers, based on co-authorship of papers are in the EU.

3. Regulation

The UK needs a clear, simple and enforceable regulatory framework relating to chemicals that balances the needs of research, innovation and trade with protecting citizens, wildlife and the environment. Exploring the options for our future regulatory regime 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.

Regulation must also enable industry to innovate and develop new products, using existing and new chemicals as raw materials, all of which can be traded internationally. There are at least 300 EU regulations and directives relevant to UK chemicals and product manufacturing industries and the UK chemical sciences community.

Development of Regulation: Regulation related to chemicals and the environment aims to ensure continued environmental protection from hazardous chemicals that can have harmful effects. The following elements are key to developing a regulatory framework:

- Regulations relating to chemicals and the environment involve a significant amount of technical and scientific detail, including specific data that must be generated to high standards.
- The government will need to call upon scientific expertise from across sectors to understand the challenges and opportunities for the UK's future regulatory framework.
- Regulation should be informed by scientific evidence that can help to ensure that there is an appropriate balance between risk and precaution.

Regulation, innovation and trade: It is important to enable innovation and international trade and at the same time to provide appropriate safeguards for human health and the environment that are expected by society.

- The EU will remain an export market for many sectors after the UK leaves, meaning that the UK businesses will still need to understand and respond to changes in EU regulation to continue trading there.
- We will also need to determine what regulatory frameworks will apply to any new future trade agreements with countries outside the EU and the effects that these frameworks will have on both small and large businesses.

Contact and further information

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