



Leaving the EU: implications and opportunities for science and research

Written evidence submitted to the House of Commons Science & Technology Committee
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Executive Summary

Brexit presents two main challenges to the UK in terms of scientific research.

1. It threatens to limit access to EU funding, a source from which the UK has benefitted greatly.
2. It threatens both short- and long-term collaboration and mobility of UK-based researchers.

At the same time, this provides various opportunities to rethink how scientific research is conducted in the UK. Namely, it will allow for:

1. Funding and administrative streamlining to allow for easier and quicker project appraisal, submission and auditing;
2. Tailoring of the research agenda to UK needs, particularly in further involving business and the private sector in research;
3. Development of new venues for overseas collaboration, particularly in emerging markets such as China; and
4. Developing a clearer connection between science and society and how research can inform public policy and everyday life.

Based on these challenges and opportunities, the researchers propose five main recommendations:

1. The UK should attempt to maintain Associate Country status in Horizon 2020 and subsequent EU funding initiatives;
2. In the immediate term, the government should provide funding guarantees and other funding support to ensure that UK researchers remain competitive in current EU funding bids;
3. A stakeholder engagement strategy should be crafted that allows for continuous, meaningful discussion and collaboration between scientists and the government in Brexit negotiations;
4. Coordination between UK research bodies should be continued and strengthened; and
5. Alternative sources of UK funding should be established to replace unique EU funding schemes, such as Erasmus Plus and ERC 'frontier' research grants.

Introduction

[P1] We are a group of researchers from Swansea University from disparate disciplines – engineering, medicine and politics. We have developed the Initiative for Managing Policymaker-Academic Cooperation and Knowledge Transfer (IMPACT) as a way of connecting scientists and policymakers in an ongoing, iterative dialogue about how science can benefit policy and vice versa. We have decided to submit evidence to this inquiry as concerned researchers who have benefitted from EU membership, both in terms of funding and staff mobility. We feel that our broad, interdisciplinary approach to research that encompasses both scientific and policy concerns leaves us well placed to comment on the risks and opportunities facing UK scientific research post-Brexit.

[P2] The vote for Brexit represents a significant danger to British science and research, as the EU has played a key role in promoting funding and collaboration in a wide variety of research. At the same time, it presents several opportunities for overhauling the ways in which science is funded, staffed and conducted. Scientific research is an important contributor to both the UK's economy and its reputation as a world leader in knowledge, employing around 100,000 people in the public sector and another 150,000 in the private sector (Hutton, 2016). 16% of academic staff is made up of non-UK EU nationals (Skogstad, 2016). EU funding forms an important part of this research excellence and the UK is increasingly outward looking with 64% of its research built on international collaborations (Hutton, 2016). In order to remain competitive, these sources of funding and collaboration must be maintained.

[P3] A *Nature* poll indicated that over 83% of UK researchers felt that the UK should remain part of the EU, and nearly 80% felt that a UK exit from the EU would be harmful or very harmful to British science. This concern operated both ways, as over 60% also felt that a UK exit would be harmful to EU science (Cressey, 2016). In the wake of the vote for Brexit, British scientists are reporting an increasing number of cases where they are having difficulty in joining EU-based consortiums for funding, as reported by Scientists for EU (Hutton, 2016). RCUK has released a statement highlighting the importance of maintaining international collaboration (RCUK, 2106), but this must also be translated into concrete actions. While significant care must be taken to avoid losing Britain's eminent place in the research world post-Brexit, it also offers an opportunity to rethink how research is funded and conducted in the UK and to rebuild a research infrastructure that will retain the UK's place as a world leader in scientific research.

[P4] This short response aims to highlight the main issues facing British scientific research in an uncertain environment after the Brexit vote, and provide some suggestions on how the problems associated with Brexit can be mitigated and new opportunities developed to enhance UK science.

Risks

While British scientific research will undoubtedly change in many ways if the UK leaves the EU, there are two main issues that will immediately face researchers:

1. [P5] **Funding:** The single biggest threat to UK science post-Brexit is funding, as the UK is one of the largest recipients of EU research money (Royal Society, 2015, pg. 3). The UK Office of National Statistics estimated that the UK contributed €5.4 billion to research but received €8.8 billion over the period of 2007-2013 (Royal Society, 2015, pg. 12). Approximately 10%

of science funding comes from the EU, and this percentage has been rising (Galsworthy & Davidson, 2015). Larger universities get an even higher percentage of their funding from the EU (Rahman, 2016). These facts create a challenging environment for funding research after a British exit from the EU. Even if current funding levels are maintained, the UK could still see a potential research funding shortfall of 500 million Euros each year. This will also likely increase the pressure on UK funding bodies, with an increasing number of applications (and subsequent fall in success rates) for domestic grants.

2. **[P6] Collaboration and mobility:** Science is a highly mobile field of employment and the free movement principle enshrined in the EU has significantly reduced the difficulties in short-, medium- and long-term labour mobility. The UK has a highly mobile research community, with almost 70% of publishing academic staff having affiliations with non-UK institutions from 1996-2011 (Royal Society, 2016, pg. 9). 28% of UK academic staff are non-UK nationals (16% EU and 12% non-EU) and half of all PhD students come from outside the United Kingdom (Royal Society, 2016, pg. 8). Free movement is likely to be limited in the wake of Brexit (Masood, 2016), and any change to the current state of mobility is a concern, as there is likely to be a significant increase in the administrative burden of ensuring easy and worthwhile staff mobility and collaboration. While reciprocal agreements are likely to be worked out that ensure some labour market access for permanent relocation, Brexit could severely curtail shorter-term visits and exchanges. Access to programmes that facilitate these limited duration stays, such as the Erasmus Plus staff exchange opportunities, are likely to be adversely affected. In terms of collaborative research and grants, the EU removes red tape in that large projects and programmes can be developed and coordinated centrally, which will become more difficult post-Brexit. For instance, there may be a need to coordinate separately with different governments or funding bodies for all collaborating institutions, as guidelines will not necessary be harmonised across all partner countries.

Opportunities

The sea change likely to be brought about by the UK's vote to leave the EU also presents opportunities to renegotiate and revitalise scientific research, its funding and its relationship to wider society in the UK. There are four main opportunities that will present themselves during the Brexit negotiation.

1. **[P7] Funding streamlining:** Rules and regulations around EU funding applications and grants are designed to fit a wide variety of funding calls over multiple programmes and research areas. As such, the known issue of overextended time-to-grant and intrinsic complexity of European funding create a high threshold of administrative knowledge and resources necessary to navigate these funds. While Horizon 2020 has simplified application procedures and shortened the time-to-grant to 8 months (European Commission, 2015, pg. 2), that can still be a significant period of time especially for SME projects (European Commission, 2015, pg. 16), and bureaucratic red tape can remain a problem in EU funding with a significant percentage (over 6%) of recipients finding the process unwieldy (European Commission, 2015, pg. 5). By returning the key sources of funding to the nation state level, Brexit may offer an opportunity to streamline research guidelines, thus reducing the resource burden of both applying for and undertaking large research grants. Some researchers indicate that many UK funding bodies, including RCUK bodies, Innovate UK and the Wellcome Trust, are

all already simpler and more user-friendly than EU funding (European Commission, 2015, pg. 26). In particular, project implementation is seen as simpler, and lighter reporting and submission requirements freed up scientists' time from administration to research. These successes can be built upon, and the pre-existing funding council model employed in the UK allows for development of criteria and processes that are more responsive to particular disciplines. Initiatives such as the RCUK international funding and activities opportunities (see <http://www.rcuk.ac.uk/international/>) ensure that cross-cutting and transnational research can still be developed. While there is an opportunity to streamline funding application processes, care must still be taken to ensure that cooperation and parity with EU funding sources remains, given the close ties between British and EU research.

2. **[P8] Development of the UK as a research leader:** Brexit also offers the opportunity for the UK to more closely tailor the research agenda in a way that supports British science, both in terms of research focus and priorities. Funding can more accurately reflect the state of British research and the direction it should take. For instance, 64% of research in the UK is conducted by business and other private organisations, but these groups only received 18% of research funding (Royal Society, 2015, pg. 18). Changes in funding guidelines could ensure that non-university stakeholders are included more centrally in the research process and bolster external research, and conversely, that universities are able to more actively engage with business funding opportunities. In addition, a greater emphasis could be placed on interdisciplinary, inter-institutional and international research. UK-centric funding streams would also allow for the creation of UK-specific key areas and challenges for research to address, creating a stronger link between science and societal issues.
3. **[P9] Overseas Collaboration:** While connections to the EU need to be maintained – 60% of academic collaborations are with EU partners (Royal Society, 2016, pg. 4) – a change in approach to funding and collaboration also represents an opportunity to grow research in other regions of the world. The United States remains a key source of collaboration for UK researchers, and new and emerging research-heavy regions such as China present a chance for UK researchers to draw on even more expertise and funding and research opportunities.
4. **[P10] Connections between science and society:** Even if a senior politician's remarks that "the people of this country have had enough of experts" (Michael Gove, 2016) do not represent everybody's views, this is also indicative of a fundamental disconnection between scientific research and society. Brexit provides an opportunity for government, scientists, other relevant stakeholders and the public at large to rethink how scientific research should inform public policy and day-to-day life. While the exact nature of this relationship will need to be determined, the referendum result provides the opportunity to open up a dialogue with the public on what science can, and does, provide to British society.

Recommendations

Given the challenges and opportunities facing UK science and research in a post-Brexit environment, there are five key recommendations that draw on expertise from both social and natural sciences.

1. **[P11] The UK should strive to maintain Associated Country status in Horizon 2020 and beyond** in order to maintain the UK's access to EU funding streams. While this might prove to be politically difficult given the likely requirement of free movement inherent in participation in Horizon 2020, this represents the best possible outcome for British scientific

research. The UK has built up significant administrative and research capacity in engaging with and securing EU-level funding, which is clearly demonstrated by the country's excellent track record for EU-funded research. The Swiss case provides a negative example of what can happen to a country when it is shut out from EU funding streams, where uncertainty and renegotiations of funding streams has led to a significant drop in research funding to the country for Horizon 2020 as compared to FP7 (Galsworthy & Davidson, 2015). It is vital that UK research is not dealt a similar blow.

2. **[P12] In the immediate term, two new and temporary sources of research funding should be developed.** First, a new source of seed-corn funding should be established to reassure EU consortium partners about the UK's continuing central role in EU funding opportunities. At the moment, the UK remains a full member of the EU, but legitimate concerns about the UK's continued access and ability to secure EU funding have made it more likely that other EU partners may be favoured over British researchers and institutions (Sample, 2016). At least some of this worry is due to funding concerns, and this is true across the natural and social sciences. The UK should provide some funding, with a low administrative hurdle, to researchers with proven and pre-existing European networks who are already or about to start developing collaborative bids. This would dissuade other EU partners from dropping UK universities from projects and provide a strong signal that UK research will continue to be outward looking. In addition, the government should guarantee that project funding commitments are fully and legally honoured to make up any potential funding shortfalls should the UK be forced to exit the Horizon 2020 programme. This would help to assuage any concerns from other EU universities about the continued viability of their research and funding.
3. **[P13] In the immediate term, the UK should also establish a stakeholder engagement strategy and platform** to engage with scientists, other research partners and the wider public on what the priorities for UK scientific research should be and how it should relate to British society as a whole. The government should be encouraged to look beyond evidentiary and passive forms of information gathering and instead focus on co-creation ideas that actively involve stakeholders in developing a strategy that will better connect scientists to the wider policy debate. **In the immediate term, a dedicated liaison should be created linking research, higher education and the Brexit team.** This is doubly important now that responsibilities for universities and research are split over two departments – Education and Business, Energy & Industrial Strategy. A strong voice for scientific research should be included in any and all Brexit negotiations.
4. **[P14] In the medium (2-3 year) term, coordinating bodies for research should be further developed.** The EU now plays a significant role in coordinating research and research infrastructure through bodies such as the European Strategic Forum on Research Infrastructures and the European Research Infrastructure Consortium. The potential wholesale overhaul of the research infrastructure in the UK allows for a fundamental rethink of how research can be developed and coordinated across disciplines, countries and partners, but in order to do so well-resourced coordinating bodies need to exist to support this. RCUK already has the infrastructure to deal with cross-cutting research issues within its own funding bodies, and the recent decision to merge all RCUK bodies into a single agency (Kelly, 2016) allows for this recommendation to be easily incorporated into the agenda. Additional administrative support and research funding should be provided to the body to

allow them to undertake an even more central role in promoting British research and developing cross-sectoral, interdisciplinary and international research.

5. [P15] In the longer term, and if Associated Country status is not arranged, the UK will need to look to **develop alternative sources of funding for UK research**. First, this includes drastically increasing the budgets of existing research councils to make up for funding shortfalls due to reduced access to EU funding and subsequent increases in demand for UK-based funding. Second, initiatives such as the pre-existing RCUK international funding and activities opportunities should be expanded. Finally, in order to retain the UK's leading role in producing world-quality research, the development of new funding streams to replace specifically targeted EU funds is required. The collaborative and multinational nature of EU grants is something that is rightly lauded and the UK should retain this outward focus. In particular, schemes like Erasmus Plus, which funds staff exchange, and the ERC's grants, which support frontier research, should be emulated.

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