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Exiting the EU – Insights on the UK Government's White Paper

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# ENSURING THE UNITED KINGDOM REMAINS THE BEST PLACE FOR SCIENCE AND INNOVATION

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***Key points*:**

- Potential loss of access to EU Horizon 2020 programme threatens UK R&D & **Innovation**, creating the need for new research programmes that support academic and industrial collaboration within the UK and with third countries
- Potential loss of freedom of movement threatens the UK's global leadership in **Collaboration**, necessitating promotion of favourable working and visa conditions for foreign workers in science and industry
- Potential loss of access to €80bn funding stream threatens UK Science **Funding**, requiring new funding streams that promote both academic and industrial collaboration and competitiveness

## CHALLENGES TO UK SCIENCE & RESEARCH

Scientific research is a vital contributor to both the UK's economy and its reputation as a world leader in knowledge and innovation. Given the EU's heavy investment in research, Brexit threatens the foundations of the UK's role in European research but also provides an opportunity to restructure and refocus the country's strategy around science and research funding in several key ways.

73% of Nobel Prizes that the UK has shared in since 1990 included collaboration with international colleagues

*Nobel Foundation*

### *Innovation*

Innovation is fundamental to driving economic and technological growth and productivity. Membership of the European Union (EU) has been an important factor in these achievements for UK R&D. The Horizon 2020 programme, worth €80bn from 2014 to 2020, is the flagship research and innovation programme of the EU. With support from this programme and its predecessors, the UK has achieved an outstanding record in innovation. For example, the

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UK rose from tenth position in the Global Innovation Index in 2011 to second place in 2015, and third in 2016.

Nevertheless, despite the announcement of funding worth an extra £2 billion a year by 2020/21 in the Autumn Statement, gross domestic expenditure on UK R&D, at 1.7% of GDP, continues to lag behind the OECD (2.4% of GDP) and EU (2% of GDP) and faces a potentially serious shortfall after Brexit. This may compound the continual issue of commercialising R&D. The UK has failed to climb higher than seventh place in recent years in the annual Global Competitiveness Report and could continue to underperform without the clear strategy to link industry and science that Horizon 2020 offers. Industry-science linkages are already noted as being below the OECD median.

### *Collaboration*

International collaboration is a key aspect of the exchange of ideas important for innovation and a vital constituent to a highly mobile field of employment like science. Horizon 2020 endorses cross-border and interdisciplinary collaboration, and the EU principle of freedom of movement reduces the difficulties inherent in labour mobility. The UK has a highly mobile research community with almost 70% of publishing academic staff having affiliations with non-UK institutions in 1996-2011. Similarly, non-UK EU nationals are now heavily integrated within British universities, comprising more than 16% of all academic staff and around 5.6% of the student population. 60% of UK collaborations are with EU partners[2]. This international collaboration is clearly linked to higher research impact, as internationally co-authored papers are generally associated with higher publication impact.

Any change to the current state of mobility would increase administrative burdens and severely curtail shorter-term visits and exchanges. Access to programmes that facilitate these limited duration stays, such as the Erasmus Plus exchange, remains uncertain and unknown after Brexit. In addition, EU academics may face increased restrictions on permanently relocating or staying within UK research and academia.

In terms of collaborative research and grants, EU programmes remove red tape as large projects and programmes can be developed and coordinated centrally, which will become more difficult post-Brexit. Ultimately, there may be a need to coordinate separately with different governments or funding bodies for all collaborating institutions, as guidelines will not necessarily be harmonised across all partner countries. This will act as a disincentive to the involvement of UK institutions in EU collaborations.

### *Funding*

Funding is a key part of EU Framework Programmes such as Horizon 2020, which produces significant impact upon scientific research in the UK. The UK is one of the largest recipients of EU research money with the Office for National Statistics estimating that the UK contributed €5.4 billion to research but received €8.8 billion over the period of 2007-2013. Approximately 10% of total UK science funding comes from the EU, and this percentage has been rising.

Although HM Treasury has confirmed that it will underwrite any funds currently awarded to UK-based researchers throughout the duration of their projects, some organisations have already reported difficulties in engaging with EU-funded projects due to the uncertainty surrounding Brexit. The case of Switzerland provides a negative example of being shut out from EU funding streams, where uncertainty and renegotiations led to a significant drop in research funding to the country for Horizon 2020 as compared to FP7.

[2] Royal Society. (2016) p. 4

## Policy Implications Associated with the White Paper

The White Paper outlines three broad goals regarding science, research and innovation in the Brexit negotiations. While it highlights the ways in which the UK has excelled in science and innovation, it is often limited on outlining specific approaches to address how this will be continued post-Brexit. All three areas in the White Paper, which are outlined below, must be addressed in concrete terms to ensure that Brexit does not harm the UK's leading role in the area.

### *Keeping Science, Research & Innovation at the Heart of the UK's Industrial Strategy*

The 2017 Green Paper on Building Our Industrial Strategy provides clearer detail on how the government plans to tailor its science and research strategy post-Brexit. An additional £2 billion per year for R&D funding has been promised by 2021 (an approximately 6.5% increase, not adjusted for inflation), which will help to close the gap left by EU funding programmes. However, even with this increase, the UK will lag behind the OECD average for R&D spending. The Green Paper rightly notes the need to ensure that research and innovation occurs beyond the 'Golden Triangle' of Oxford, Cambridge and London, and the creation of UKRI will help to consolidate and coordinate the UK's research capacity. The Industrial Strategy Challenge Fund will help to build on existing strengths in research within the UK.

> UK universities occupy the top four positions as recipients of Horizon 2020 funding. Each institution has received more than €80m so far.
>
> *Department for Business, Innovation & Skills*

The government has agreed to underwrite any research funding obtained from EU pots even after the UK leaves the EU. Overall, the UK would benefit from remaining a part of EU scientific funding schemes by attempting to maintain some form of Associated Country status. As the Swiss case has shown, this option will likely be more cost effective than developing a bespoke UK funding scheme and allow the UK to rely on pre-existing institutions and infrastructure to deliver this funding. 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 record for EU-funded research. The UK is a net beneficiary of funding and access would likely require an arrangement allowing free movement of labour between countries. This stipulation makes Associated Country status unlikely.

The government's strategy outlined in the Green Paper and the Industrial Strategy Challenge Fund also allows scope for funding to be targeted to 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. Changes in funding guidelines could ensure that non-university stakeholders are included more centrally in the research process and that universities are able to more actively engage with business funding opportunities.

### *Developing Close Engagement with the Science and Research Base*

The High Level Stakeholder Working Group on EU Exit, Universities, Research and Innovation is a welcome development in ensuring that researchers have a voice in Brexit negotiations. The government promises to continue to work closely with Higher Education and research to respond to concerns raised by Brexit, and this approach is necessary in avoiding loss of research expertise or future opportunities due to the uncertainty around exiting the European Union. These assurances are vital also in terms of students, as EU students will be adversely affected by Brexit, which will have knock-on effects on universities and enrolment. However, any assurances so far only apply until the UK leaves

the EU, or one or two years afterwards. Longer-term assurances must be established as soon as possible, including transition agreements immediately post-Brexit (and after existing EU grants finish) and longer-term, ring-fenced support for research and innovation.

### *Being a Global Leader in International Collaboration*

The White Paper notes the UK's success in international collaboration and that the government would 'welcome agreement to continue to collaborate with our European partners on major science, research and technology initiatives', but does not provide any details on how this will be done or what form it will take. Most importantly, there is no discussion on whether the preferred route would be a continuation of commitment to EU-level initiatives, or an attempt to develop new UK-centric international collaborative processes.

Schemes like Erasmus Plus (which funds staff and student exchange) particularly could be emulated in the form of outward-mobility agencies, which would build collaboration opportunities and encourage greater exchanges of ideas. Certainly, changes in funding approaches would allow collaboration to grow with other new and emerging research-heavy regions such as China, presenting a chance for UK researchers to draw on even more expertise and funding and research opportunities.

## *Conclusion*

- Coordinating research and innovation funding and priorities within the UK and with international partners allows for participation by both academic and industrial partners in a sustained, collaborative and interdisciplinary way.
- Developing alternative sources of funding that emphasise both intersectoral and interdisciplinary collaboration and frontier research would secure the UK's long-term future in scientific research, building a research environment that involves both industry and academia in a way that is tailored specifically to a British agenda and UK-centric aims.
- The government must work closely with all stakeholders in academia, research and business to ensure that post-Brexit arrangements for science and research allow for the UK to maintain its strong position in research and innovation.

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