Future Partnership Project

Royal Society and Wellcome Trust

Submission from the Royal Academy of Engineering

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About the Royal Academy of Engineering

As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

Future Partnership Project

Key messages

- The UK should seek the closest achievable association with future EU research and innovation programmes. A future UK-EU partnership should seek to build on existing strengths, mutual successes, established relationships and shared history. A future partnership should continue to support collaboration and partnership at many different levels, at a range of scales, and across the research and innovation pipeline. The partnership should provide stability and certainty for all partners involved.

- The Academy seeks to ensure that the involvement of UK businesses and the role of innovation, as well as the involvement of universities and the role of research, are recognised and well represented in discussions regarding the UK's future research and innovation relationship with the EU. The whole research and innovation system should continue to be involved in a future UK-EU partnership.

1. Introduction

1.1. The Royal Academy of Engineering welcomes the opportunity to inform the Royal Society and the Wellcome Trust's Future Partnership Project. The Academy is working closely with the engineering profession to provide evidence-based advice to government and ensure that the needs of all sectors that have a dependence on engineering, and the value of existing partnerships and collaborations, are understood and represented in the negotiations. The alliance of the 38 UK professional engineering organisations, known as Engineering the Future, led by the Academy, published the report *Engineering a Future Outside the EU* in October 2016.[1] The Academy is also working closely with its sister national academies to explore how best to support government on issues related to research and innovation.

1.2. The Academy seeks to ensure that the involvement of UK businesses in EU research and innovation programmes, and the role of innovation, as well as research, are recognised and well represented in national discussions regarding the UK's future research and innovation relationship with the EU. While Higher Education Institutions represent the greatest share of UK participations in EU research and innovation programmes, accounting for 58% of UK participations in Horizon 2020, it is also important to recognise the significant involvement of UK businesses, with businesses accounting for 27% of UK participations in Horizon 2020 at September 2017.[2] Furthermore, compared to other EU member states, UK businesses, particularly SMEs, have been successful at securing EU research and innovation funding. For FP7, the UK was the third most successful country, behind France and Germany, when assessed by the financial contribution to businesses, with UK businesses receiving €1,257 million, and by the number of business participations, at 4544.[3]

1.3. EU research and innovation programmes are unique in the scale and scope of the support they provide for multinational cooperation. For example, Horizon 2020 programmes are the only international research and innovation programmes of their

[1] Engineering a future outside the EU, Royal Academy of Engineering and EtF, October 2016
[2] UK Participations in Horizon 2020, Department for Business, Energy and Industrial Strategy, November 2017
[3] Seventh FP7 Monitoring Report 2013, European Commission, March 2015

scale anywhere in the world. Other international research and innovation programmes are orders of magnitude smaller and are often thematically based or focused on a narrower geography.[4] Given the unique nature of EU research and innovation programmes and the UK's extensive and long-term involvement, the Academy's response focusses on the lessons learnt from the UK's participation in EU research and innovation programmes.

2. Elements that underpin successful partnerships

2.1. Underpinning the success of the EU research and innovation programmes is the comprehensive provision of support for international collaboration. There is widespread agreement across the engineering community that international collaboration brings huge benefits to engineering research and innovation in the UK. Collaboration facilitates innovation as new ideas are generated, shared, refined and challenged. Collaboration also gives UK businesses and organisations that specialise in innovation access to a broader range of knowledge, people and facilities than could be obtained in the UK alone. Collaboration is often a requirement of EU research and innovation funding instruments. For example, for Pillar 2, Industrial Leadership, of Horizon 2020, the average number of project partners is just over four, rising to more than 10 for Pillar 3, Societal Challenges.[5] Such programmes have made collaboration with other EU member states relatively easy, much more so in comparison to collaboration with non-EU countries, where a lack of dedicated funding and frameworks hinder engagement.[6]

2.2. A key element of success of the EU research and innovation programmes is that they enable a diverse range of international research and innovation collaborations at multiple levels, for different purposes. From the Marie Sklodowska-Curie Action grants which enable individual researchers to experience training in different countries, starting at the PhD level; right up to large and complex consortia projects. EU research and innovation programmes can facilitate collaborations between multiple businesses, increasing the ease with which businesses can collaborate, scale-up and work towards shared missions, often for societal benefit. One such example is the Clean Sky aeronautical research programme, which was established in 2008 as a Joint Technology Initiative (JTI), and is now receiving support from Horizon 2020.[7] It addresses the key societal challenge of developing smart, green and integrated transport. Such initiatives involve very large budget commitments from the EU, as well as other partners, which run into the billions collectively, and dwarf the great majority of national collaborations in the UK or elsewhere.[8] In addition, the example of the Clean Sky JTI illustrates the importance of being able to coordinate large-scale national initiatives across borders in an industry where supply chains are very internationalised.[9] Many of the activities facilitated by JTIs, such as creating large-scale demonstrators, are often inherently international activities and may be considered too risky for one country to embark on alone.[10] The amount of funding provided by the EU, and the leverage this achieves, combined with its ability as a neutral convener to bring

[4] The role of EU funding in UK research and innovation, Technopolis, May 2017
[5] The role of EU funding in UK research and innovation, Technopolis, May 2017
[6] RAEng submission to House of Lords Science and Technology Committee Leaving the EU: implications and opportunities for science and research inquiry, September 2016
[7] Appendix: Case studies, The role of EU funding in UK research and innovation, Technopolis, May 2017
[8] The role of EU funding in UK research and innovation, Technopolis, May 2017
[9] The role of EU funding in UK research and innovation, Technopolis, May 2017
[10] Engineering a future outside the EU, Royal Academy of Engineering and EtF, October 2016

together industrial competitors to collaborate and work towards common goals is a key element of its success.

2.3. Although it is clear that substantial benefits can be reaped from collaboration, the benefits are perceived to be maximised when funding is focussed on activities which require collaboration to succeed.[11]

2.4. Stability and certainty are key elements of success for a future partnership. The seven-year funding cycles characterised by the Multiannual Financial Frameworks, such as FP7 and Horizon 2020, provide stable, long-term funding with accompanying long-term strategies. This stability, combined with policy consistency, has enabled UK and EU researchers, institutions and businesses to deliver research and innovation excellence with long-term planning, and can have a positive impact upon leverage as the long-term visibility can give investors confidence.

2.5. Ensuring that international research and innovation partnerships complement national funding streams is crucial for success. As a member state of the EU, to date, the UK has had the opportunity to shape the EU research and innovation agenda to maximise alignment with the UK's outlook and priorities. Consequently, EU research and innovation programmes have largely provided support for activities beyond those supported by the UK's research and innovation portfolio. For example, an assessment of the motivations for SME engagement in FP7 concluded that 'access to financial assistance not available nationally or regionally' was rated particularly highly as a motivation for UK SMEs, emphasising the fact that SMEs do not have ready access to support of this nature within the UK.[12] In terms of share of overall SME participation in FP7, SMEs from the UK represented 12%, the second highest proportion behind Germany; the UK's SME participation in Horizon 2020 so far is slightly above its level of engagement in FP7.[13]

2.6. People are integral to the success of research, innovation and collaboration. To date, free movement has allowed UK researchers and innovators to achieve more than they would alone and to build lasting relationships with researchers and innovators across the EU, often through participation in EU research and innovation programmes. The recent reassurance on EU citizens' rights in the UK[14] and the agreement on continued participation for the UK in Horizon 2020[15] signals a positive step forward in the first phase of negotiations.

3. The shape of an ambitious new partnership

3.1. The elements that have underpinned the UK's successful partnership with the EU to date, as outlined previously, should also underpin an ambitious and close future partnership. The UK should seek the closest achievable association with the EU

[11] RAEng submission to House of Lords Science and Technology Committee Leaving the EU: implications and opportunities for science and research inquiry, September 2016
[12] Performance of SMEs within FP7, An interim Evaluation of FP7 components, Vol 1. Main report, May 2014
[13] Evaluation of UK involvement with the research framework programme and other European research and innovation programmes, March 2017
[14] Technical note: citizens' rights, administrative procedures in the UK, Government, November 2017
[15] Joint report from the negotiators of the European Union and the United Kingdom government, December 2017

research and innovation programmes.[16] A future research and innovation partnership should build on existing strengths, mutual successes, established relationships and shared history.

3.2. The whole research and innovation system should continue to be involved in the future partnership. This includes research and technology organisations such as Catapults, and businesses of all sizes, from large corporations to SMEs, innovators and entrepreneurs, as well as researchers and universities. Support should continue to be targeted at collaboration and partnership at many different levels, at a range of scales, and across the research and innovation pipeline.

3.3. As a member state of the EU, the UK has had the opportunity to shape the EU research and innovation agenda to maximise alignment with the UK's priorities and strengths. A future partnership should seek to maintain dialogue between EU and UK partners. Ideally, the UK should have the opportunity to shape decisions relevant to the UK's research and innovation landscape, so that the UK's ability to capitalise on its own public research and innovation investments is maintained.

3.4. A future partnership with the EU provides an opportunity to evaluate and re-assess priorities of mutual benefit for all partners. With the development of the UK government's Industrial Strategy and the establishment of UK Research and Innovation (UKRI), there is the opportunity to better align priorities and collaborations in areas of strategic importance to the UK, and to ensure efforts continue to complement the UK's research and innovation portfolio.

3.5. As a member of the EU, the UK has been involved in the development of regulations; in doing so the UK has had the potential to ensure that regulations do not adversely affect the development and delivery of UK products and services. A new partnership should enable the UK to engage with EU discussions on regulation of new technologies and changes to existing regulatory frameworks, and to seek harmonisation where this is desirable, as well as allowing for input of UK expertise on technical matters.

3.6. As acknowledged earlier, people are integral to the success of research, innovation and collaboration. It will be essential that the UK's future immigration system is designed to allow the realisation of the ambitious and close partnership for research and innovation that the UK is seeking with the EU. This should include ensuring that talented researchers and innovators from non-UK EU countries have certainty, both near-term and long-term, about the opportunities to work in the UK and likewise for UK researchers to work in other EU countries.

4. Practical steps to achieve such a partnership

4.1. The negotiations relating to a future UK-EU research and innovation partnership are taking place against a backdrop of strong and successful collaboration. The publication of *Collaboration on science and innovation: a future partnership paper* by the UK government in September 2017,[17] laid out the UK's intention to seek to agree, through

[16] Engineering a future outside the EU, Royal Academy of Engineering and EtF, October 2016; Higher Education, Research and Innovation: After Triggering Article 50, seven national academies, March 2017
[17] Collaboration on science and innovation: a future partnership paper, UK government, September 2017

full and open discussion, a far-reaching science and innovation agreement with the EU that established a framework for future collaboration, for the benefit of UK and European prosperity. The Academy welcomed the positive and open tone of the government's science and innovation position paper and encourages the government to continue reaffirming the UK's position as a country with a global aspiration, which is very much welcoming and open for business.[18]

[18] Science and innovation: working with EU partners, RAEng News release, September 2017