

Written evidence from the Russell Group (HOR0001)

I am writing with regards to your committee's ongoing inquiry into the UK's participation in Horizon Europe. To that end, I thought it would be useful to provide you with the Russell Group's position to help with your work.

My members and I believe that the UK's association to Horizon Europe is in the best interests of research and innovation in the UK. Association to the world's largest ever programme for multi-country R&D will open the door for high-quality collaboration with the best researchers, innovators and businesses in Europe and world-wide.

Ultimately, this will keep us at the forefront of scientific discovery and collaboration to tackle the biggest global challenges.

We have been pleased to hear the commitments from those in government that association is, and remains, the UK's objective. However, we also recognise it is prudent to prepare for all scenarios and develop alternatives in case the wider politics means association cannot be realised.

The Russell Group is currently supporting BEIS and UKRI as these alternative plans develop so that they are in the best possible shape, should they be required; however, in developing alternatives, it is important not to lose sight of the tremendous opportunities offered through Horizon Europe. We also remain concerned that any alternative plan would take a substantial time – many years – to implement and build momentum to the point where it might eventually deliver benefits that could match what will be readily available through Horizon Europe.

I have set out below, **and in Annex A**, key evidence and case studies demonstrating the value which association will provide to the UK, and hope you find this useful.

1. Horizon Europe facilitates unrivalled cross-border collaboration

Success in science comes through collaboration across borders and disciplines and under Horizon 2020 the UK had over 31,000 collaborative links with countries around the world.

The additional benefits of collaborative research through EU programmes far outstrip the monetary value we would receive in funding. A common framework of rules and funding cycles significantly enhances productive collaboration with the best partners

that would be challenging to replicate via bilateral deals or new multilateral schemes.

2. Horizon Europe brings a unique breadth and scale of funding

Securing association to Horizon Europe will be an enormous asset to the diversity of funding opportunities for researchers in the UK. The scale, ambition and associated risk assumed by the EU programmes, far exceeds anything that could be achieved on a bilateral basis.

EU research funding is often at a different scale to grants offered by UK funders enabling more flexible collaborations within Europe and internationally. Clinical trials are a key example.

EU-wide clinical trials enable access to a more extensive recruitment pool of patients with diverse socio-economic backgrounds as compared to the UK alone, meaning evidence can be gathered for approval of new treatments (pharma or non-pharmacological); this is especially important for rare diseases.

As well as facilitating collaboration in Europe, EU programmes support global collaborations and impacts, particularly important since the cuts to the ODA budget.

3. European research nations are key partners on our doorstep

Meeting the UK Government's ambition of becoming a 'science superpower' will require strategic collaboration with the strongest research nations in the world. Currently, UK co-authorship with EU countries far outstrips that with the USA both on a per capita basis and on field weighted citation index. Association to Horizon Europe will help facilitate deeper links with Europe, whilst also acting as a springboard to other countries worldwide such as USA, South Korea and Canada.

We know that Switzerland's experience of exclusion from Horizon 2020 caused considerable damage to their coordination and participation rates. However, the perception of Switzerland as a destination for talent and as a stable partner for research in a competitive environment was also damaged.

Not only do we want to work in close partnership with our European collaborators, but they highly value the opportunity to work with the UK too. In an [open letter](#), representatives of the European Union's research and innovation community welcomed the long history of close and trusted collaboration and shared success with the UK, and my own interactions with our counterpart groups in Europe confirm this.

4. The ERC and its impact

Scientific achievement rarely comes from a single discovery; ground-breaking research and innovation requires decades of support. This long-term investment is provided by the 'jewel in the crown' of the EU programmes, the European Research Council (ERC).

ERC funded research is especially impactful, with 19% of projects leading to a breakthrough and 60% leading to a major scientific advance. **We estimate that a UK-based alternative to the ERC would take at least a decade to reach the same level of impact and prestige.** Indeed, commitment to long-term basic research provides a significant return on investment as the development of the technology used in the COVID-19 vaccine, which was supported through EU R&D programmes, shows.

Moreover, the UK does disproportionately well in the ERC. Funding from ERC grants accounted for 30% of the UK's total funding from Horizon 2020. The UK won over 1,500 ERC grants, 1,400 of which were hosted at Russell Group universities worth €1.8bn and totalling more than ERC grants awarded to the whole of France.

The ERC also acts as a magnet for talent, drawing to the UK talented academics from Europe and beyond who not only bring strong research skills but also serve as teachers and participate in the wider research community. The quality of the work conducted by EU research staff is evident in that 75% of EU academics were selected by UK universities for REF 2014, compared to 56% of UK-national staff.

5. The Marie Skłodowska-Curie Actions will help train the next generation of researchers

It is clear the UK will need to significantly boost the number of highly skilled researchers to meet its ambitions for becoming a science superpower and association to Horizon Europe will help in that endeavour.

The Marie Skłodowska-Curie Actions (MSCA) have been pivotal in training a new generation of creative, entrepreneurial, and innovative early-stage researchers; the UK has won €1.1bn in MSCA from Horizon 2020, with over 3,600 grants signed. Association will enable researchers of any nationality in the UK to continue to tap into a breadth of MSCA benefits – including joint doctorates, innovative training networks (ITNs) and mobility – which go beyond the usual UK DTP/CDT opportunities.

This will play a key role in building the skills for a strong pipeline of the next generation of researchers, helping to attract excellent quality doctoral researchers to our universities, establish long-term links with collaborators in Europe and worldwide.

6. EU funding supports collaboration with industry partners at scale

Horizon Europe has an enormous amount to offer British businesses.

Nearly 2,000 individual businesses based in the UK participated in Horizon 2020, with €1.4bn being awarded to industry. This spans from the big industry players through to SMEs; 60% of funding awarded to UK industry under Horizon 2020 went to SMEs, totalling over €840m.

European schemes are an attractive proposition for businesses seeking to collaborate on R&D with universities. While an Innovate UK Smart Grant for business covers a portion of the costs (dependent on the size of the business but the maximum is 70% for an SME), Horizon 2020 funding pays 100% of the direct costs plus an overhead, regardless of the size of the business, and has more light-touch audit requirements, meaning a much better deal for university-business collaborations.

7. Supporting breakthrough technologies and start-ups in the UK

Association supports the Government's ambitions for innovation, growth and productivity.

Horizon Europe has powerful funding mechanisms to turn discovery research into breakthrough technologies and start-ups through instruments such as the ERC Proof of Concept (PoC) grant and European Innovation Council (EIC) Transition grants, the likes of which are not available through UKRI alone.

For example, an ERC Advanced Grant holder can apply for €150,000 PoC grant each year which can feed directly into a start-up resulting from the ERC grant, with 80% paid up front, enabling PIs to continue their fundamental research in the core grant while enlarging their team to explore a real application while benefiting from the shared skills and knowledge. This can be followed up by the new EIC Transition Grant, worth up to €2.5m to validate and demonstrate technology in an application-relevant environment and develop market readiness.

I hope you find this information helpful. If you have any questions on the above – or would like any more information that would be helpful to your evidence gathering, please do not hesitate to contact Colin McKinlay, our External Relations Manager, at colin.mckinlay@russellgroup.ac.uk.

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Annex A – illustrative case studies on the value of EU framework programmes

Case Studies illustrating the value of collaboration at European level

HARMONY: The Healthcare Alliance for resourceful medicines offensive against Neoplasms in Haematology (HARMONY) is a European Network of Excellence that captures, integrates, analyses and harmonises big data from high-quality, multidisciplinary sources with the purpose of unlocking valuable knowledge across the spectrum of hematologic malignancies. The scale of data needed for this research would not be possible at national level. The project involves 51 partners: 44 participants from 10 European countries and 7 pharmaceutical companies from the European Federation of Pharmaceutical Industries and Associations (EFPIA). The project brings together key stakeholders in the clinical, academic, patient, Health Technology Assessment, regulatory, economic, ethical and pharmaceutical fields. The HARMONY project's final deliverable is a big data platform that will integrate disease information to better understand the diseases and how to treat them most efficiently. UK partners include the universities of York, Cambridge and Newcastle, Barts Health NHS Trust and industry partners Amgen and Takeda.

SHYMAN: The University of Nottingham and its spin-out business, Promethean Particles, secured a major EU research project with an overall value of €9.7 million for the Sustainable Hydrothermal Manufacturing of Nanomaterials (SHYMAN). 18 partners helped design a new green technology that uses water to synthesise nanomaterials for use in, for example, scratch proof surfaces. Through the project the FP7 programme assumed the risk of funding a chemical plant operating initially at a far less efficient rate than existing technologies, but with the potential for it to operate much more efficiently in time once the methodology had been optimised. The academically-led funding along with the risk being taken by the EU programme made this innovative project possible within four years. The project led to Promethean Particles building the world's largest continuous multi-material nanoparticle manufacturing plant in Nottingham which opened in 2016.

Euro Ewing Consortium: coordinated by UCL, this consortium brought together 20 European partners including four UK universities (UCL, Manchester, Birmingham, Leeds) to improve treatment outcomes for patients with Ewing Sarcoma (ES), a fatal, rare bone cancer which mostly occurs in the young. The Euro Ewing Consortium (EEC) represented a culmination of effort by several study groups, allowing them to embark on wider and more ambitious collaboration to enable larger, more reliable clinical trials, defined standards of care to increase survival, and specialist cooperation with pharmaceutical companies to develop and evaluate new treatments. The project was funded under FP7 and ended in

September 2019 but is continuing thanks to the Ewing's Sarcoma Research Trust.

Case study of a MSCA Innovative Training Network which uses technology to improve the lives of people with dementia

EU funding has allowed the University of Nottingham to lead two Marie-Curie Innovative Training Networks (ITNs, [INDUCT](#) and [DISTINCT](#)) involving multiple university and industry partners across the EU as well as key international organisations. These ITN grants (total £7+ million) support 30 PhD early career researchers across Europe with a focus on using technology to improve dementia care. This has positioned the UK as a world leader in this area. Through the networks, the University has developed a cognitive stimulation therapy app for people with dementia now available through Android and Apple stores. This collaborative work has been built up over decades and has led to technology companies based in the Netherlands committing to supporting the second research network into 2023.

Case studies of university-business collaborations made possible by EU Framework Programmes

[SAFEcrypto](#): coordinated by Queen's University Belfast, this €4m project brings together a consortium of four academic institutions, one research-intensive cybersecurity SME and three multi-national security companies, providing a balance of expertise in theoretical cryptographic primitive construction, cryptographic architecture design and optimisations, side channel analysis and key management. The practical development of a quantum computer will render asymmetric cryptography, which is used in all of today's security systems, insecure by virtue of Shor's algorithm. SAFEcrypto provides a new generation of practical, robust and physically secure quantum-safe cryptographic solutions that ensure long-term security for future ICT systems, services and applications.

[POROUS4APP](#): The University of York Biorenewables Development Centre (BDC) is part of a consortium bringing together eight academic and industrial partners from across the EU on a four-year project to scale up a process for converting renewable resources (potato starch, alginic acid and fruit pectin) into a building block for energy storage and chemical catalysis. Together, the consortium will be trialling different methods for converting these feedstocks into a porous carbon, including using a patented process developed in York. The project's aim is to adapt the material for different uses, such as batteries for electric vehicles and green catalysts for the chemicals industry – to replace a fossil resource with a biorenewable one at a scale relevant for industry. During the project, the BDC has worked with the Green Chemistry Department at the University of York and Carbolite UK to create a custom rotating tube

furnace to convert renewable plant-based resources into materials used to produce batteries and catalysts.

Case study of a start-up supported by EU funding

[Exactmer](#), incorporated in 2018, is a spin-out company from Imperial College London, with a lab in East London currently employing 23 people and growing. Exactmer specialises in the synthesis of biopolymers and synthetic polymers using its patented Nanostar Sieving Technology, which allows the synthesis of the polymers in liquid phase. By using this completely new approach, Exactmer produces polymers of unprecedented precision and length, opening the way to supremely accurate polymers for use as pharmaceuticals, drastically reducing drug manufacturing costs. Exactmer now collaborates with AstraZeneca, Novartis, CPI and UKRI to make the UK the first country in the world to deliver this pioneering production process at a large scale. The Chief Executive Officer and Co-Founder of Exactmer, Professor Andrew Livingston, was awarded an ERC Advanced Grant and Proof of Concept Grant which has supported the creation of Exactmer and the fundamental research underpinning it.

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