

Horizon Europe: Maintaining UK leadership in global R&D collaboration

To make the UK a science superpower, we must be able to collaborate with the best minds around the world. Association to Horizon Europe will provide access to unprecedented opportunities for cross-border collaboration as well as a scale and breadth of funding that will bring multiple benefits to Britain.

The Government's determination to secure association has been underlined by the decision to make it part of the Brexit deal, stating clearly that association is its top priority and setting out a long-term, ringfenced commitment to the funding needed for it.

Action to deliver association and the benefits it provides should now be our top priority.

The benefits of full UK association to Horizon Europe

Unrivalled collaboration and scale of funding

Horizon Europe is the world's largest ever programme for multi-country collaborative R&D and opens the door for high-quality collaboration with the best researchers, innovators and businesses worldwide. Under the previous programme, Horizon 2020, the UK established 31,000 collaborative links with countries around the world. These links were made possible by the near frictionless collaboration provided by Horizon. It allows members to operate at the same scale as USA or Chinese counterparts - crucial to research such as clinical trials as it gives members access to a vast network of patients to trial potentially life changing medical treatments.

The scale, ambition and associated financial risk assumed by the EU programmes, far exceeds anything that could be achieved on a bilateral basis. More importantly, the funding streams, processes and networks are in place and can be tapped into as soon as association is secured.

Britain as a global player

Making Britain the best place in the world for science will require strategic collaboration with the strongest research nations in the world. Association to Horizon Europe will help facilitate deeper links not just with Europe – it will also act as a springboard to partnerships with universities and businesses in other countries worldwide such as USA, South Korea and Canada as well as developing nations

Using these partnerships with the strongest research nations around the world to deliver scientific breakthroughs demonstrates the breadth and diversity of our diplomatic, trade and cultural links around the world, making the UK a more attractive nation to partner with.

Exclusion from the programme risks undermining our global reputation as a destination for talent and as a stable partner for research in a competitive environment.

The European Research Council

Association to Horizon Europe also means the UK can continue to benefit from significant investment through the European Research Council (ERC), which is world-leading in funding only the highest-quality discovery research over the long term at all career stages. ERC research has proven impact. The Chief Executive of BioNTech has said the ERC's backing made their Covid-19 vaccine possible and 60% of projects funded by it led to a major scientific advance.

The UK does disproportionately well from the ERC; winning more than 1,800 ERC grants under Horizon 2020 - 30% of the UK's total funding from Horizon 2020. Russell Group universities received 1,400 of those grants, worth €1.8bn and more than were awarded to the whole of France.

People and Talent

Government has already set out its plans to boost the number of highly skilled researchers in the UK. Association to Horizon Europe with the access it provides to unrivalled funding streams, facilities and networks will help in that endeavour - not just in terms of attracting the best international talent to our country but because of the training it provides to researchers.

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 to Horizon Europe will open the door to many more of these opportunities for UK scientists.

Business Collaboration

Horizon Europe has an enormous amount to offer British businesses, and many have benefitted from previous programmes; nearly 2,000 individual businesses based in the UK participated in Horizon 2020, with €1.4bn being awarded to industry. More than half of the UK businesses (60%) awarded funding under Horizon 2020 were SMEs and received more than €840m.

Horizon funding also reduces the financial risk for businesses. Horizon funding pays 100% of direct costs plus an overhead, regardless of the size of the business. In comparison Innovate UK Smart Grants for business covers a maximum of 70% for an SME. Audit requirements are light-touch making it more attractive for university-business collaborations.

Helping turn ideas into real world impacts

Association to Horizon Europe will support the Government's ambitions for innovation, growth and productivity, enhancing the measures it has already put in place. If association is secured British-based researchers will be able access more networks, support and funding to develop new start-up businesses

ERC Proof of Concept grants can explore the commercial or societal potential of frontier research projects, helping to turn basic research into start-ups. Researchers receive 80% of the grant up front so they can continue their fundamental research in the core grant while enlarging their team to explore whether a practical application or product can be developed. The new European Innovation Council (EIC) Transition Grants, each worth up to €2.5m, are designed to validate and demonstrate technology in an application-relevant environment and develop market readiness.

Access to this additional support will make it easier for start-ups to grow and applications to be brought to market more quickly – creating jobs, boosting the regional and national economy and benefitting UK citizens.

Annex A – Case studies demonstrating the benefit of full association to Horizon

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.

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.

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

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.