REPUTATIONAL IMPACTS OF INTERNATIONAL RESEARCH AND INNOVATION

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UK Funding Programmes for international R&I include bilateral, multilateral, international development, and unilateral funding. These investments enhance the UK's reputation as a global leader in generating research, innovation, social, economic, and environmental outcomes across national, EU, and international levels. They also position the UK as an attractive destination for conducting international R&I and as a global leader in directing the international funding landscape, cross-country collaboration, policy, and practice. This reputational building could lead to improved financial, relational, research, innovation, resource, political, social, and environmental impacts. This chapter discusses how each funding programme supporting international R&I generates reputational impacts, along with relevant case study examples. The discussion of the activities that generate a reputation for the UK R&I, the nature of the generated reputation and the related impacts are based on the review of literature conducted in this project.

5.1. UK's bilateral funding programmes

The UK generates a strong reputation for collaborative R&I through its strategic bilateral funding agreements with countries such as Australia, Brazil, Canada, Germany, Japan, Luxembourg, Norway, South Africa, South Korea, Switzerland and the USA. Government, funding agencies, and other related stakeholders are developing mechanisms to enhance bilateral collaboration. The agreements facilitate the exchange of knowledge and expertise through forums, specialist workshops, and conferences. They are also focusing on the bilateral development of new products, services, technological processes, business development opportunities, and societal value. Additionally, independent impact assessment agencies are being commissioned to conduct evidence-based assessments of bilateral agreements. These bilateral agreements result in enhancing the reputation of the UK as a trusted and reliable partner for co-funding, and a leader in bilateral collaboration for research, technology, and innovation, driving technological advancements, economic growth, entrepreneurialism, and addressing global challenges. The generated reputation results in financial, relational, resource, research, innovation, political, social and environmental impacts [Figure 5.1].

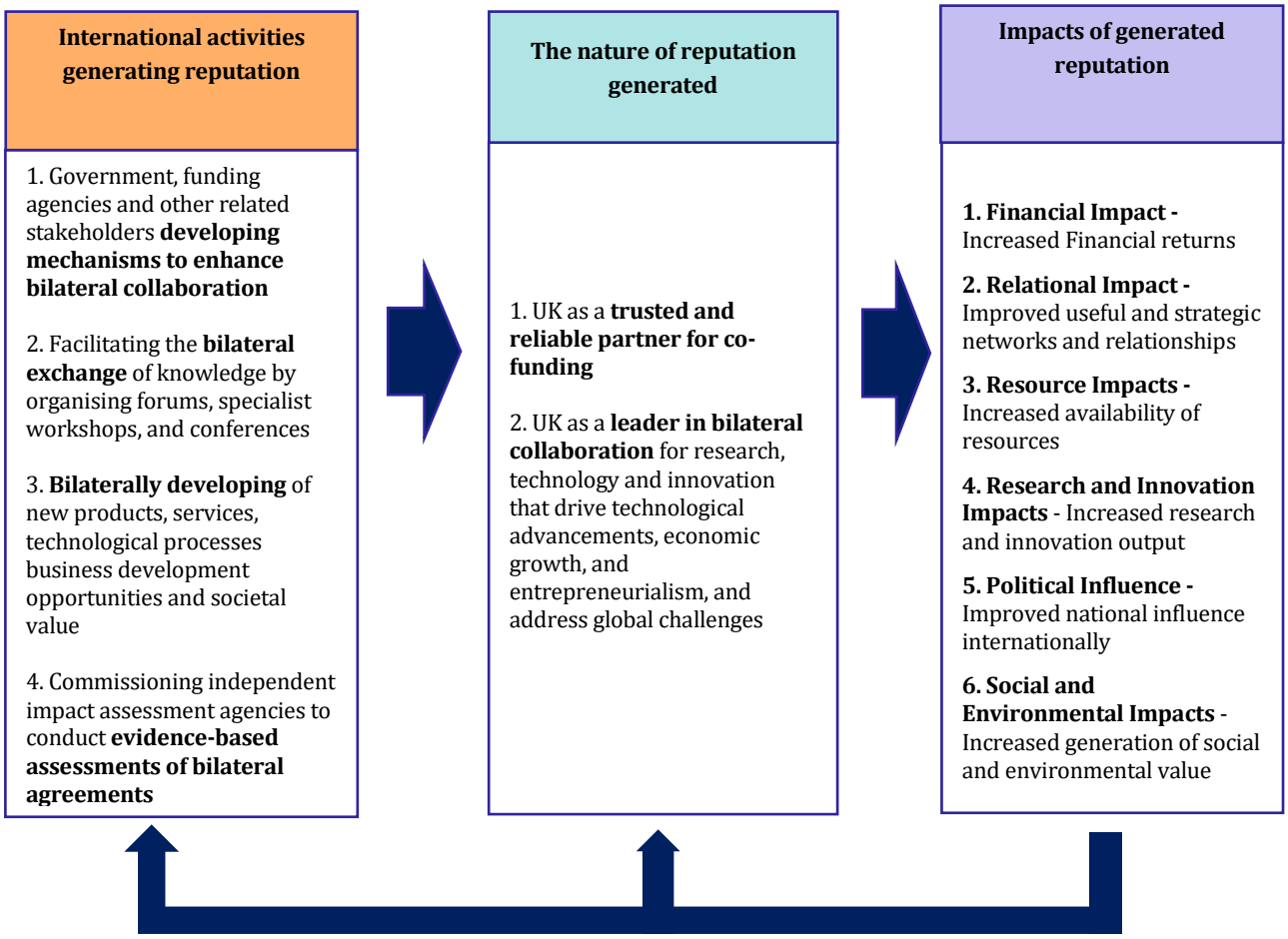

Figure 5.1: UK's bilateral funding programmes generating reputational impacts

5.1.1 International activities

Government, funding agencies and other related stakeholders developing mechanisms to enhance collaboration

Through bilateral agreements, the UK and UKRI engage in discussions with various international actors to improve funder-to-funder partnerships. These international partnerships allow UKRI to develop collaborative research and innovation funding programmes addressing global challenges and boosting economic growth. Examples of such international collaborations include Lead agency agreements with Sao Paulo Research Foundation, Luxembourg and Science Foundation Irland. UKRI's Arts and Humanities Research Council (AHRC) is collaborating on eighteen projects with the German Research Foundation (DFG), supported by a £6 million joint-fund. UKIR supports international collaboration teams under the Lead Agency Agreements providing a framework for joint peer review of proposals by two funding agencies in different countries. For example, the National Science Foundation (NSF) in the US and the Engineering and Physical Sciences Research Council (EPSRC) of UKRI in pursuit of their international collaboration and through the NSF-EPSRC Lead Agency Agreement, aim to promote transatlantic collaborative research by creating mechanisms that reduce barriers researchers may encounter when conducting international research.

Facilitating the exchange of knowledge by organising forums, specialist workshops and conferences

Depending on the focus, bilateral agreements aim to foster knowledge exchange among companies and research organisations in the countries involved. Since these bilateral agreements consider the unique strengths and characteristics of businesses, research organisations and other stakeholders of both countries, greater complementarity is achieved. Another key aim of bilateral agreements is to facilitate the exchange of knowledge and expertise by organising forums, specialist workshops, and conferences. For instance, the UKRI's collaboration with North America includes organizing talent and mobility opportunities, such as exchanges and networking schemes for doctoral students and researchers. This fosters the exchange of knowledge and expertise between UK and North American institutions, enhancing the research capabilities of both regions.

Developing new products, services, technological processes, business opportunities and societal value

Bilateral agreements also support the joint development of new products, services, processes and commercial output. For instance, the UK-China collaboration has resulted in the development of rapid COVID-19 testing solutions and research to reduce antibiotic-resistant

diseases. Additionally, UKRI-supported projects in China have produced over 100 intellectual property outputs and created 24 UK spinout companies, demonstrating the tangible commercial outputs of these collaborations. Projects funded under the SNSF-UKRI partnership include developing a new tool for eye imaging and sustainable solutions for circular plastics, showcasing innovation and commercial output.

UKRI's collaboration with the US and Canada has led to investments of over £3 billion, opening doors to new collaborations and leveraging funding from outside the UK. These collaborations have not only supported the development of new technologies but have also contributed to economic growth and societal benefits in both regions. Bilateral relationships between UKRI and Brazilian National Councils have been strengthened through significant projects such as a flagship climate science initiative in the Amazon region and research expeditions aimed at enhancing understanding of the Amazon's biodiversity and socio-cultural diversity. Other examples of funder-to-funder collaborations include UKRI's collaborations with the Swedish Research Council, the Wallenberg Foundations and a number of universities, as well as the Research Council of Norway (RCN). These efforts aim to enhance collaborations in addressing global challenges.

These collaborations empower researchers to conduct studies on topics of international significance, spanning a diverse range from land ownership and post-industrial marginalization to new insights in fields such as computing, medical sciences, and poetry responding to historical scientific developments. Additionally, other projects address emerging strategic challenges, such as promoting international justice through historical exploration and learning.

Commissioning independent impact assessment agencies to conduct evidence-based assessments of agreements

The outcomes of these agreements are often reviewed independently. Such reviews are important to further improve the relationship. UKRI India's impact on enhancing the UK-India research and innovation relationship has been independently evaluated by Elsevier. The assessment highlights the significant outcomes of UKRI India-funded projects, including their contribution to publications, development of technical products, and overall enhancement of the research ecosystem in both countries. These reviews offer recommendations for enabling funding, developing partnerships, deepening R&I, and ensuring the effectiveness of UKRI's international collaborations with the aim of maximizing the value of public funding, demonstrating the economic, technological, and societal impacts of UKRI's bilateral collaborations.

5.1.2 The nature of the generated reputation

UK as a trusted and reliable partner for co-funding

Successful engagement and delivery of these bilateral agreements have proven the UK to be a trusted and reliable partner in multi-million collaborative R&I projects worldwide. UKRI's partnerships with funding agencies in Sweden, and its partnership with India- supporting 260 projects and funded by fifteen funding agencies are just a few examples that demonstrate the UK's strong reputation as a trusted co-funder of international projects addressing the mutual interests of countries and common global challenges.

UK as a leader in bilateral collaboration for research, technology and innovation that drive technological advancements, economic growth, and entrepreneurialism and address global challenges

The joint efforts in multiple bilateral agreements with countries with complementary knowledge, skills, resources and networks further demonstrate the UK's commitment to tackling global issues through collaborative R&I. The broad range of international projects with a specific focus on country-specific strengths, social and economic needs, aspirations, and impacts underscore the UK's commitment to driving economic prosperity, social well-being, technological advancement, and competitiveness both at national and international levels. Successful collaborations and the development of new technologies and products highlight the UK's supportive environment for innovation and entrepreneurship.

For instance, the UKRI - India agreement has facilitated funding commitments of close to £400 million, supporting over 260 projects. These projects have generated an additional £450 million in further funding, mainly from public bodies, non-profit organizations, and commercial entities. The willingness of other funders to invest shows how the enhanced reputation of the UK and associated partners owing to the bilateral collaborations, developed trust and confidence, a reflection of the UK as a leader in international collaboration for developing R&I.

5.1.3 The impacts of the generated reputation

Table 5.1: Impacts of reputation generated through UK's bilateral funding programmes

Types of Impact	Specific Impacts
1. Financial Impact - Increased Financial returns	Enhanced business developmental opportunities for businesses of all sizes Enhanced access to funding and foreign investment
2. Relational Impact - Improved useful and strategic networks and relationships	Enhanced opportunities to access, strengthen, collaborate with, and/or develop new, useful local, regional, national and international networks
3. **Resource Impacts** - Increased availability of resources	Improved access to, and/or develop new, knowledge, expertise and resources
4. **Research and Innovation Impacts** - Increased research and innovation output	Improved opportunities to engage in larger international projects to innovatively develop new products, services and technologies for local and global markets
5. Political Influence - Improved national influence internationally	Strengthened bilateral relationships and trust between the UK and other nations, improving the UK's political influence
6. Social and Environmental Impacts - Increased generation of social and environmental value	Enhanced opportunities to jointly address mutual social and/or environmental challenges through bilateral R&I

Case Study: UKRI in North America Bilateral Funding Agreement

The UKRI in North America Bilateral Funding Agreement facilitates collaborative research and innovation projects between the UK and North American partners, leveraging mutual strengths to address global challenges and drive scientific advancements.

International R&I activities:

The breadth and scale of UK partnerships with North America have played a vital role in advancing institutional and individual research and innovation, from foundational partnerships to transatlantic careers. Since 2015, UKRI has funded around 3000 awards involving collaboration with North America, with over £3bn of investment which has opened doors to new knowledge and leveraged funding from outside the UK. UKRI has a crucial role to play in ensuring these valuable connections and collaborations can flourish.

The UKRI North America Office developed the first MoU on Research Cooperation with the US National Science Foundation in 2013. This MoU created the underpinning conditions for increasing collaboration between the two agencies, including Lead Agency opportunities, with a simpler application process enabling hundreds of talented researchers to collaborate on cutting-edge fundamental research. The UKRI North America Office, with staff based in Washington, DC, and Ottawa, plays a pivotal role in catalyzing and connecting to ensure partnerships deliver ever-increasing impact. Often drawing on UKRI NA Office networks, to date there have been around 100 collaborative research programmes supporting many research awards worth hundreds of millions of pounds, providing UK and US researchers with funding to address shared priorities across a vast range of research topics.

Over the past 15 years, the UKRI NA Office has enabled collaborations with over 50 funding partners across the US and Canada, and by extension with hundreds of US and UK universities. This network includes but is not limited to Federal Government departments, funding agencies, research institutes, and laboratories with hundreds of millions of dollars (US and Canadian) in annual budgets and hundreds of thousands of employees.

UKRI continues to engage across all disciplines and sectors in outstanding programmes with North American partners.

The activities associated with the joint agreement range from a longstanding collaboration on the Ecology and Evolution of Infectious Diseases, especially pertinent given the COVID-19 pandemic, to creating the conditions for future connections and emerging research areas such as International Summer Schools on quantum technologies. The joint agreement continues to scale up strategic engagement in global challenge areas, supporting UK government priorities. By building on this successful bilateral engagement, the UKRI recently joined US and Canadian partners in two major multilateral initiatives on clean energy and climate change, with a total of ~£25m UK investment, alongside an additional ~£60m from North American partners.

The nature of reputational impacts generated:

This bilateral agreement has increased trusted research partnerships. The reputation developed through the agreement and associated activities of the mutual understanding of each other results in a significant and long-term investment of time and resources in creating new streamlined, flexible, and responsive models for transatlantic research, through a combination of core funding, the Lead Agency mechanism and additional funding streams. The physical presence of the UKRI NA Office has resulted in in-person interactions essential for deep networks in both North America and the UK, and a deep understanding and trust of the research landscape and funding mechanisms across jurisdictions, essential for UK's reputation building as a reliable partner for co-funding.

Source: https://www.ukri.org/wp-content/uploads/2023/06/UKRI-09062023-Digital-9266-North-America-Impact-Assessment-TC-V4.pdf

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5.2. UK's multilateral funding programmes

The UK's engagement in multilateral funding programmes such as EU Horizon Europe plays a crucial role in enhancing its reputation in research and innovation globally. Politicians and stakeholders take a proactive role in negotiating bespoke deals with improved financial terms to ensure that UK scientists have access to the world's largest research collaboration programmes and international researchers benefit from the UK's strengths. Additionally, these funding programmes foster global research collaborations by creating opportunities for UK researchers and businesses to collaborate with international counterparts. These programmes also offer access to unique resources and infrastructure further enhancing these efforts, and promoting a robust and interconnected research environment. These programmes thus improve the UK' reputation as a proactive and influential leader in international collaborative research, innovation, and technology advancement. These activities also reinforce the UK's leading role in global R&I, complemented by the demonstration of the UK's dedication to driving economic prosperity and social well-being at both national and international levels. The enhanced reputation generates financial, relational, resource, research, innovation, political, social, and environmental value [Figure 5.2].

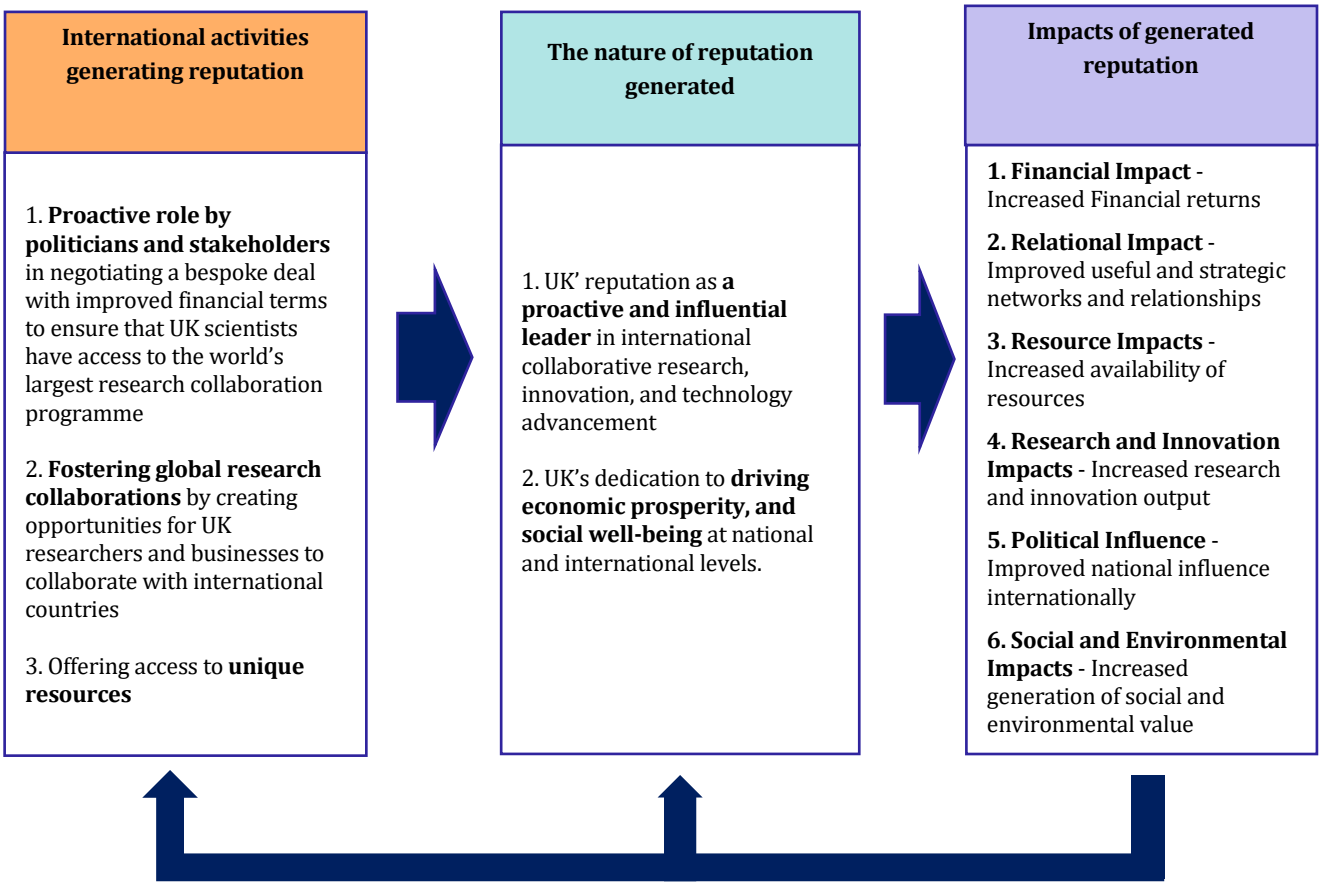

Figure 5.2: UK's multilateral funding programmes generating reputational impacts

5.2.1 International activities

Proactive negotiation for bespoke deals in multilateral funding programmes

The UK government and stakeholders negotiate a bespoke deal for the UK's association in multilateral funding programmes. For instance, such negotiation has occurred concerning the UK's association with Horizon Europe, ensuring favourable financial terms and equal participation rights for UK scientists. By securing a tailored agreement, UK leaders showcased a proactive commitment to strengthening collaborative relationships with European and global partners in association with Horizon Europe in 2023. These negotiations not only benefit the UK but are also of significant value to partner countries, which immensely benefit from the UK's strong research, innovation, and associated resources and infrastructure.

The Horizon Europe agreement solidified its commitment to collaborative research, enabling UK-based entities to participate fully in the program alongside EU counterparts. This negotiation emphasized the UK's dedication to maintaining its leadership in global research and innovation efforts despite Brexit uncertainties. This proactive approach assures UK researchers of ongoing access to significant funding opportunities and collaborative networks and enables UK researchers to lead consortia in cutting-edge projects across fields like health and artificial intelligence. Moreover, inclusion in Horizon Europe's governance enhances the UK's influence and role in shaping collaborative research agendas, driving economic growth, and cementing its role as a leading force in global science and technology.

Fostering global research collaborations

Through active participation in multilateral funding programs, the UK expands the breadth and influence of its research endeavours, exemplifying leadership in establishing global research networks. In initiatives like the Trans-Atlantic Platform for Social Sciences and Humanities (T-AP), the UK underscores its dedication to global collaboration in research and innovation, fostering substantial partnerships extending beyond European borders. The UK contributes to the excellence of the European Research Area (ERA) along with non-EU European countries, such as Norway, Iceland, and Switzerland. Canada's participation in Horizon Europe exemplifies this commitment, enhancing collaborative efforts between Canada and the UK and reinforcing transatlantic research alliances, thereby promoting research, innovation, and knowledge exchange. For instance, Canada's affiliation with Horizon Europe expands collaborative ventures between Canada and the UK and strengthens transatlantic research alliances, promoting innovation and the exchange of knowledge.

Another example is the Human Frontier Science Program (HFSP), established in 1989, which has granted over 7000 awards to researchers from more than 70 countries, and 28 HFSP awardees have later received the Nobel Prize for their scientific contributions. The program encourages interdisciplinary collaboration across fields such as physics, mathematics, chemistry, computer science, bioinformatics, nanoscience, engineering, and biology to advance our understanding of complex biological systems. Similarly, The Belmont Forum, established in 2009, to advance transdisciplinary science related to global environmental change has by 2020 awarded over €150 million in funding, benefiting 132 projects and more than 2,000 scientists worldwide.

The UKRI also announced the first projects under the £110 million Climate Adaptation and Resilience research programme at the Africa Climate Summit and UN High-Level Political Forum, supporting groundbreaking research in 26 African and Indo-Pacific countries. Moreover, the £337 million International Science Partnerships Fund (ISPF) offers UK researchers and innovators access to global talent, large-scale facilities, and diverse research ecosystems. This includes Global Centres for Clean Energy programme in collaboration with the US, Canada, and Australia, and a partnership with Japan to develop new technology for nuclear waste disposal.

Participation in programs like Copernicus, the European Earth Observation program, provides UK researchers access to state-of-the-art Earth observation data and services. Access to unique resources such as Copernicus enhances the UK's research capabilities in areas requiring extensive data and infrastructure. Through Copernicus, UK researchers can access high-resolution satellite imagery, real-time data on atmospheric composition, and comprehensive climate change indicators. The ability to leverage such advanced data attracts international collaborators seeking to utilize the UK's expertise in environmental monitoring and data analysis. Thus, the UK strengthens its innovative skills and showcases its scientific capabilities in fields such as environmental science, climate change, and space technology. This access not only supports the UK's scientific endeavours but also positions it as a preferred partner for global research initiatives.

These multilateral funding programmes underscore the UK's capacity to engage with leading global research entities, reinforcing its status as a centre for pioneering research and innovative advancements at an international scale.

5.2.2 The nature of reputation generated

UK' reputation as a proactive and influential leader in international research collaborations, innovation, and technology advancement

Engagement in these multilateral funding programmes significantly enhances the UK's reputation and commitment to international research, collaboration, innovation, and technology advancement. This leadership demonstrates the UK's strategic vision and reliability in maintaining its position at the forefront of global research and innovation. The UK solidifies its role in shaping collaborative research agendas and establishes itself as a leading force in global science and technology.

UK's dedication to driving economic prosperity, and social well-being at national, EU, and international levels

By fostering global research collaborations, the UK exemplifies its dedication to expanding the breadth and influence of its research endeavour in driving economic prosperity, and social well-being at national, EU, and international levels. Engaging in multilateral funding programs and initiatives enables the UK to collaborate with international countries on addressing common social-economic challenges, demonstrating the UK's dedication to driving economic prosperity, and social well-being at national, EU, and international levels.

5.2.3 Impacts of generated reputation

Table 5.2: Impacts of reputation generated through UK's multilateral funding programmes

Types of Impact	Specific Impacts
1. **Financial Impact** - Increased Financial returns	Enhanced business developmental opportunities for businesses of all sizes Enhanced access to funding and foreign investment
2. **Relational Impact** - Improved useful and strategic networks and relationships	Enhanced opportunities to access, strengthen, collaborate with, and/or develop new, useful local, regional, national and international networks
3. **Resource Impacts** - Increased availability of resources	Improved access to knowledge, expertise and resources Enhanced opportunities to access new national and international infrastructure and/or engage in national and international infrastructure development Enhanced perceiving of the UK as a resource for future R&I
4. **Research and Innovation Impacts** - Increased research and innovation output	Opportunities to engage in larger international profitable, and strategically relevant projects
5. **Political Influence** - Improved national influence internationally	Strengthened international relationships and trust between the UK and other nations, improving the UK's political influence

6. **Social and Environmental Impacts** - Increased generation of social and environmental value	Enhanced opportunities to collaboratively address global challenges

Case Study: UK's multilateral agreement in Copernicus

Copernicus is the Earth observation component of the European Union's Space Programme, dedicated to monitoring our planet and its environment for the benefit of all European citizens. It provides information services that utilize data from satellite Earth observation and in-situ (non-space) sources.

International R&I activities:

The European Commission oversees the programme, which is implemented in collaboration with Member States, the European Space Agency (ESA), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for Medium-Range Weather Forecasts (ECMWF), EU Agencies, Mercator Océan, the European Environment Agency (EEA), and the Joint Research Center (JRC).

Since rejoining Copernicus as a full participating state from January 1, 2024, the United Kingdom has significantly broadened its engagement and opportunities within the Copernicus Space Component, leveraging its reputation as a proactive and influential leader in international research collaborations, innovation, and technology advancement.

For instance, UK-based companies are actively participating in ESA's procurement processes via the ESA-STAR portal, which grants access to Invitations to Tender (ITTs) and enables companies to express interest well ahead of tender deadlines. The European Space Agency (ESA) coordinates the delivery of data from upwards of 30 satellites. This proactive involvement enhances their competitiveness in securing contracts for constructing, launching, and operating Copernicus Sentinels. Moreover, UK entities have the opportunity to apply to join the pool of Copernicus Contributing Missions (CCM) through ESA's Dynamic Purchasing System, thereby contributing supplementary data to the Copernicus services and expanding their engagement in the program.

European Earth observation data providers also play a crucial role in Copernicus as contributing missions, enhancing the program's capabilities to meet Earth observation needs across Europe. Companies seeking to join the pool of commercial data providers can submit applications via ESA's Dynamic Purchasing System, accessible through a simple registration process in ESA's procurement system, ESA-star portal. This participation fosters collaboration among commercial providers, advancing Europe's Earth observation objectives by complementing Sentinel data with very high-resolution data. The ongoing CCM procurement process, managed by ESA, aims to integrate advancements in commercial remote sensing technology to meet current and future demands of the Copernicus services, benefiting European citizens with free and open access to Sentinel data and Copernicus services.

The nature of reputational impacts generated:

Through these initiatives, the UK reinforces its reputation as a capable user of unique data and consolidates its position as a leading force in global Earth observation and space technology. Moreover, the UK's enhanced role in Copernicus underscores its capability to contribute to cutting-edge solutions in environmental monitoring and disaster management, thereby bolstering its global standing in space technology and Earth observation science. This reputation not only facilitates technological innovation within Europe but also strengthens international collaborations aimed at addressing global challenges through advanced satellite data and analytics.

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5.3. UK International development funding programmes

The UK generates a strong reputation for collaborative R&I through its international developmental funding programmes. International developmental programmes enable the UK to build reputation as a leader and an influencer of international R&I collaboration, technology, and innovation that drive technological advancements to address global challenges. Especially, the UK's commitment to addressing the challenges of emerging and developing nations enables the UK to develop reputation as a nation committed to global prosperity and a leader in directing the international funding landscape, policy, and practice. The impacts generated from the UK's reputation as a global leader in international research and innovation are rooted in its strategic approach to leveraging strengths in science and innovation, fostering academic links, developing expertise in global challenges, strengthening soft power and diplomacy, and ensuring sustainable engagement through equitable partnerships. These activities underpin the UK's influential role in directing international funding and collaborating across borders to address complex global challenges and promote socio-economic development worldwide. The reputation generated by engaging in international developmental funding programmes generates financial, relational, resources, research, innovation, political, social, and environmental impacts [Figure 5.3].

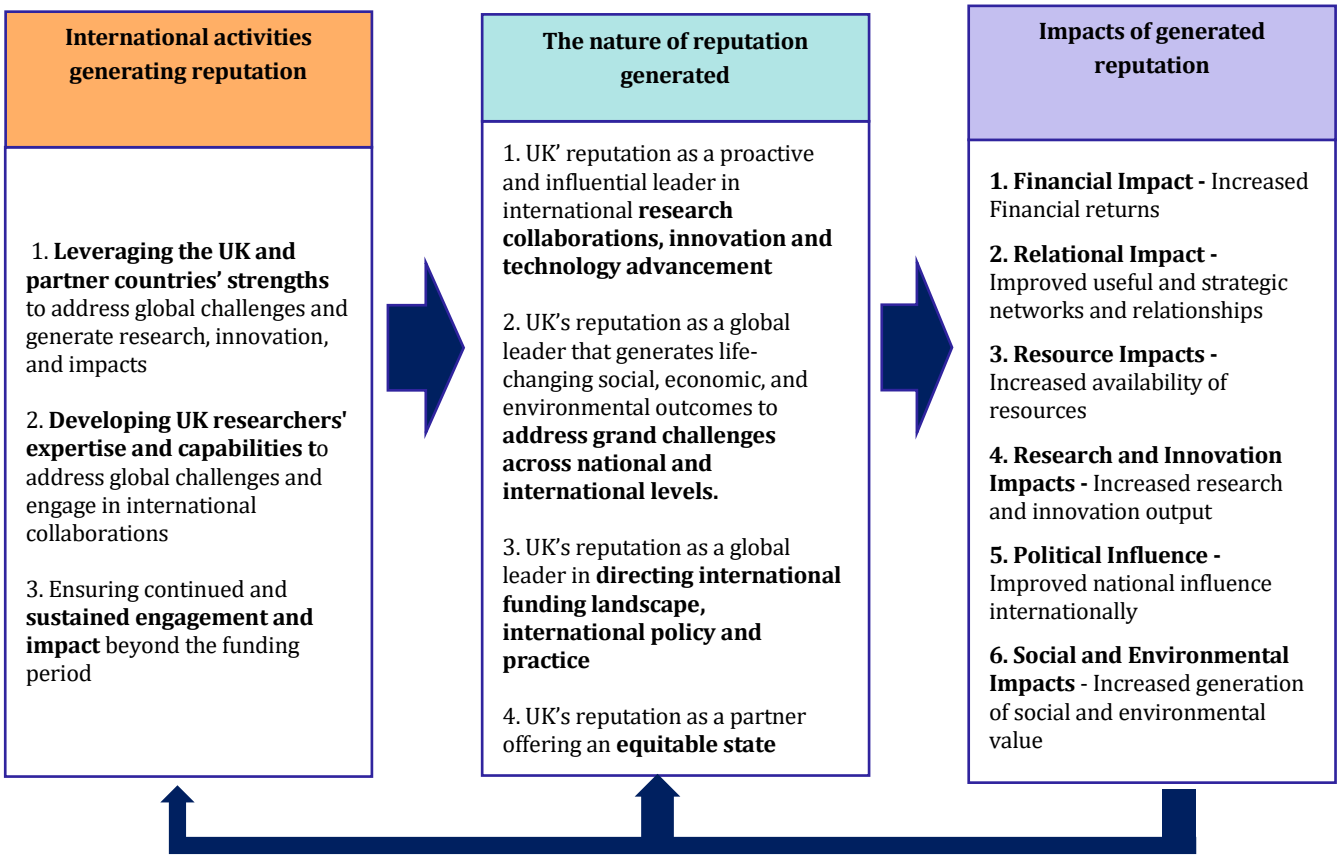

Figure 5.3: UK International development funding programmes generating reputational impacts

5.3.1 International activities

Leveraging the UK and partner countries' strengths to address global challenges and generate research, innovation, and impacts

The UK's international development programmes such as the Newton Fund effectively utilized the UK's strong science and innovation ecosystem to establish partnerships with emerging research leaders globally. This initiative not only showcases UK research excellence but also promotes knowledge sharing and capacity building in partner countries.

Between 2014 and 2021, the Newton Fund supported bilateral science partnerships with 16 developing countries across Africa, Asia, and Latin America, with a budget of £735 million. The UK researchers have been able to collaborate closely with partners in countries like Brazil and India, through projects funded by the Newton Fund, focusing on critical issues such as public health and sustainable development. In countries like the Philippines and Jordan, the Newton Fund facilitated systematic collaboration and cultural bridging, laying the groundwork for deeper and more efficient joint efforts. This framework proved instrumental in transforming existing links into platforms for broader scientific cooperation. International development funding, which focuses on the needs of developing countries, thus fosters the UK's standing and political influence in the globe as well as offers invaluable opportunities for UK researchers to capitalize on the strengths of the UK and international partners for the advancements in R&I and associated impacts.

Initiatives under the Global Challenges Research Fund (GCRF) and Newton Fund focus on fostering deep academic collaborations that yield impactful research outputs. By tapping into partner country expertise, these collaborations aim to address complex global challenges through interdisciplinary approaches. Collaborative projects on climate change adaptation funded through GCRF have integrated UK climate science with local knowledge systems in countries like Bangladesh and Kenya. This approach not only enhances research outcomes but also builds resilient partnerships capable of addressing shared environmental challenges. Such funds thus result in showcasing the UK's commitment to collaboratively address global challenges by integrating the unique strengths of partner countries with that of the UK. The Newton Fund and GCRF emphasize equitable partnerships and joint ownership of priorities, that foster trust and cooperation between UK institutions and their counterparts in partner countries. This approach fosters a sense of co-ownership and enhances the UK's reputation as a trustworthy and collaborative research partner. In the Philippines, stakeholders noted that the UK's approach to the Newton Fund stood out by establishing genuine partnerships, unlike common practices in the country. Funding for Global Collaborations such as initiatives like the £337 million International Science Partnerships Fund (ISPF) provides UK researchers with

access to global talent and large-scale facilities, reinforcing the UK's reputation in supporting large-scale research.

Developing UK researchers' expertise and capabilities to address global challenges and engage in international collaborations

There are different schemes introduced by the UKRI that enable the development of UK researchers' expertise and capabilities to address global challenges and engage in international collaborations. For instance, AHRC's and ESRC's International Placement Scheme, funds eligible PhD students and early career researchers to complete a research fellowship at an international institution in US or Japan for 2 to 6 months.

UK researchers gain firsthand experience working on research projects in regions like Southeast Asia and Latin America. The AHRC's support for these international placements and collaborative research initiatives aims to develop the skills and capabilities of UK scientists necessary to effectively engage in global challenges. This includes developing expertise in global challenge topics and fostering cultural competence.

The Newton Fund's bilateral science partnerships with 16 developing countries across Africa, Asia, and Latin America supported the mobilisation of UK science and research expertise to work with partner countries. Additionally, the Newton Fund initiatives played a crucial role in capacity building and skill development among UK researchers. This includes fostering the capability to navigate diverse cultural settings and engage in collaborative research that addresses pressing global issues, which is important to strengthen international research networks, and foster long-term partnerships and mutual understanding.

Ensuring continued and sustained engagement and impact beyond the funding period

Beyond the initial funding phase, initiatives supported by the Newton Fund and GCRF aim to sustain long-term partnerships and maximize their impact on global research and innovation. This involves nurturing relationships and exploring avenues for ongoing collaboration. Additionally, during the funding period, the exploration and adoption of long-term and sustainable models are encouraged. Projects initiated through the Newton Fund have transitioned into sustainable partnerships that continue to produce research outputs and influence policy decisions. For instance, collaborations in healthcare innovation have led to the development of new medical technologies, benefiting both UK industries and partner countries' healthcare systems.

5.3.2 The nature of the generated reputation

UK's reputation as a proactive and influential leader in international research collaborations, innovation, and technology advancement

By leveraging the UK's robust science and innovation ecosystem, the Newton Fund has built relationships with emerging research leaders globally, positioning the UK as a proactive and influential leader in international research collaborations, innovation, and technology advancement. The fund has facilitated the production of high-quality research outputs and tapped into partner country expertise, enhancing the reputation of the UK as an R&I influencer. This proactive approach demonstrates the UK's commitment to fostering international cooperation and advancing the global research and innovation agenda.

UK's reputation as a global leader generating life-changing social, economic, and environmental outcomes

The UK's emphasis on impactful research has solidified its reputation as a global leader in generating significant social, economic, and environmental benefits. For instance, through the Newton Fund, the UK has enhanced researchers' expertise in global challenge topics and influenced policy and practice in partner countries, making substantial contributions to sustainable development goals and societal well-being. Newton Fund has also built the capacity to commercialize innovations and develop solutions to address socio-economic challenges in partner countries. These contributions have enhanced the UK's reputation as a global leader in generating life-changing social, economic, and environmental outcomes.

The UK's reputation as a global leader in directing the international funding landscape, policy, and practice

Due to its involvement in international development grants, the UK is recognized globally for its leadership in directing international funding and fostering cross-country collaboration, supporting strategic investments that promote economic development, sustainable practices, and social welfare in partner countries. For instance, the Global Challenges Research Fund (GCRF), supports cutting-edge research to address the challenges faced by developing countries, and funds international collaboration, which enhances the UK's ability to build new, and strengthen existing global partnerships.

Newton Fund-supported activities have shown early signs of influencing policy and practice in partner countries. For example, in China, research funded under the Newton Fund on antimicrobial resistance contributed to a government decision to ban the use of colistin as a food additive in the agricultural industry. This demonstrates the impactful outcomes of UK-led

research collaborations in influencing regulatory policies at an international level. In India, for instance, the development of the CRADLE maternal care vital signs alert device, supported by Newton Fund research, has potentially influenced routine maternal healthcare practices across several countries. This innovation highlights the direct impact of UK-led research on improving healthcare outcomes globally.

While many Newton Fund projects are still in the early stages of dissemination and uptake, there are promising signs of their influence at policy and practice levels. Projects in India, Chile, and China have demonstrated how UK-led research can catalyze significant changes in healthcare practices, regulatory frameworks, and educational strategies, illustrating the lasting impact of these collaborative efforts beyond their initial phases.

Newton Fund's positive impact on government and diplomatic relationships, emphasizing its role as a significant source of 'soft power' for the UK. It has successfully helped establish new relationships in regions where ties were limited, such as Southeast Asia, and strengthened existing partnerships, like those with Brazil. Stakeholders noted that the Newton Fund positioned the UK favourably as a science and innovation partner of choice. For instance, initiatives in Kenya facilitated engagement with policymakers through bilateral Science Boards, enhancing diplomatic ties and facilitating broader international collaboration and perceptions of the UK as a global R&I collaborator.

UK’s reputation as a partner offering an equitable state

The Newton Fund and GCRF emphasize equitable partnerships and joint ownership of priorities, that foster trust and cooperation between UK institutions and their counterparts in partner countries. This approach fosters a sense of co-ownership and enhances the UK's reputation as a trustworthy and collaborative research partner. In the Philippines, stakeholders noted that the UK's approach to the Newton Fund stood out by establishing genuine equitable partnerships, unlike common practices in the country. This proactive stance was believed to give the UK a reputational advantage over international competitors in gaining attention and fostering deeper equitable collaborations.

5.3.4 The impacts generated by reputation

Table 5.3: Impacts of reputation generated through UK International development funding programmes

Types of Impact	Specific Impacts
1. **Financial Impact** - Increased Financial returns	Enhanced business developmental opportunities for businesses of all sizes
2. **Relational Impact** - Improved useful and strategic networks and relationships	Strategic and successful country-level partnerships
3. **Resource Impacts** - Increased availability of resources	Improved access to resources, large infrastructure, knowledge, funding, foreign investment, expertise, and networks
4. **Research and Innovation Impacts** - Increased research and innovation output	Improved international collaboration among countries leading to academic, economic, social, and environmental value creation
5. **Political Influence** - Improved national influence internationally	Enhanced opportunities to influence global and national policy, funding landscape, and practice
6. **Social and Environmental Impacts** - Increased generation of social and environmental value	Enhanced opportunities to simultaneously generate business, academic, social, and/or environmental value

Case Study: Efficiency NUE management: UK & Brazil project funded by Newton Fund

The NUCLEUS project, funded by the Newton Fund, aimed to enhance Nitrogen Use Efficiency (NUE) in agricultural systems through an interdisciplinary approach involving 12 institutions from the UK and Brazil.

International R&I activities:

The project, led by the University of Nottingham and São Paulo State University, aimed to address nitrogen loss from synthetic fertilizers, which impacts productivity and the environment. By integrating soil-plant systems, it sought to improve nitrogen use efficiency (NUE), reduce pollution, and support sustainable food production. Over 30 scientists from various fields participated, producing research publications with recommendations for different agricultural contexts.

Built on prior collaborations and supported by the Newton Fund, the project showcased the UK's leadership in international research. It included the development of a nitrogen sensor by Bangor University and the John Innes Institute, and engagement with Brazilian expertise in crop sensors and drone techniques.

Field days and demonstrations in Brazil attracted local engagement and presentations at international conferences. The project involved training early-career researchers and students, fostering future scientific leaders. It also established lasting relationships, leading to further collaborations and exchanges.

The collaboration enhanced academic ties between UK and Brazilian institutions, resulting in Memorandums of Understanding (MoUs) and student exchanges. UK researchers gained exposure to advanced Brazilian agricultural practices, improving understanding of global agricultural systems.

Success in securing follow-on funding through the Newton Fund Impact Scheme highlighted the project's value. The collaboration opened doors for UK institutions to participate in other international research initiatives.

The project's practical recommendations and technological innovations influenced agricultural practices, particularly in Brazil, demonstrating the UK's commitment to addressing environmental challenges through applied research.

The nature of reputational impacts generated:

The UK's ability to lead complex, interdisciplinary projects was solidified, showcasing its strengths in project management, scientific innovation, and international collaboration. The project highlighted the UK’s collaborative approach, integrating local expertise and fostering mutual benefits. The engagement with Brazilian agricultural practices and innovations demonstrated the UK's openness to learning and adopting global best practices.

The focus on improving NUE and reducing environmental pollution underscored the UK's dedication to sustainable agricultural practices and environmental conservation. The involvement of numerous early-career researchers and students from both countries emphasized the UK’s role in nurturing future scientific talent and fostering an international academic community.

In conclusion, the NUCLEUS project significantly enhanced the reputation of the UK’s research and innovation sector by demonstrating leadership in international collaboration, fostering technological and scientific advancements, and committing to sustainable agricultural practices. This reputation not only strengthened academic networks and increased research capabilities but also positioned the UK as a key player in global efforts to address environmental and food security challenges.

Source: UK Secondary Benefits Study The Newton Fund (2022)

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5.4. UK's unilateral support for international collaboration

The UK builds a strong reputation through unilateral grants that support both UK and international individual researchers and research groups to engage in international R&I that are not necessarily be part of bilateral, multilateral, or international development grant programmes discussed in the previous three sections of Chapter 5. These grants allow for overseas collaborators to be included as co-investigators and enable international academics to visit the UK for a limited timespan to develop collaborative projects with UK researchers. Depending on the nature of the grants, they are designed to cover part or all of the full economic costs (FEC) of cutting-edge research projects and international travel expenses. These initiatives demonstrate the UK's commitment to boost its reputation as a global leader and collaborator in supporting research and innovation. This section will discuss the activities that bolster the UK's reputation in international R&I, the nature of the reputation generated from these activities and the impacts of the UK's reputation as a global leader in R&I, and how the impacts further reinforce the UK's reputation [Figure 5.4].

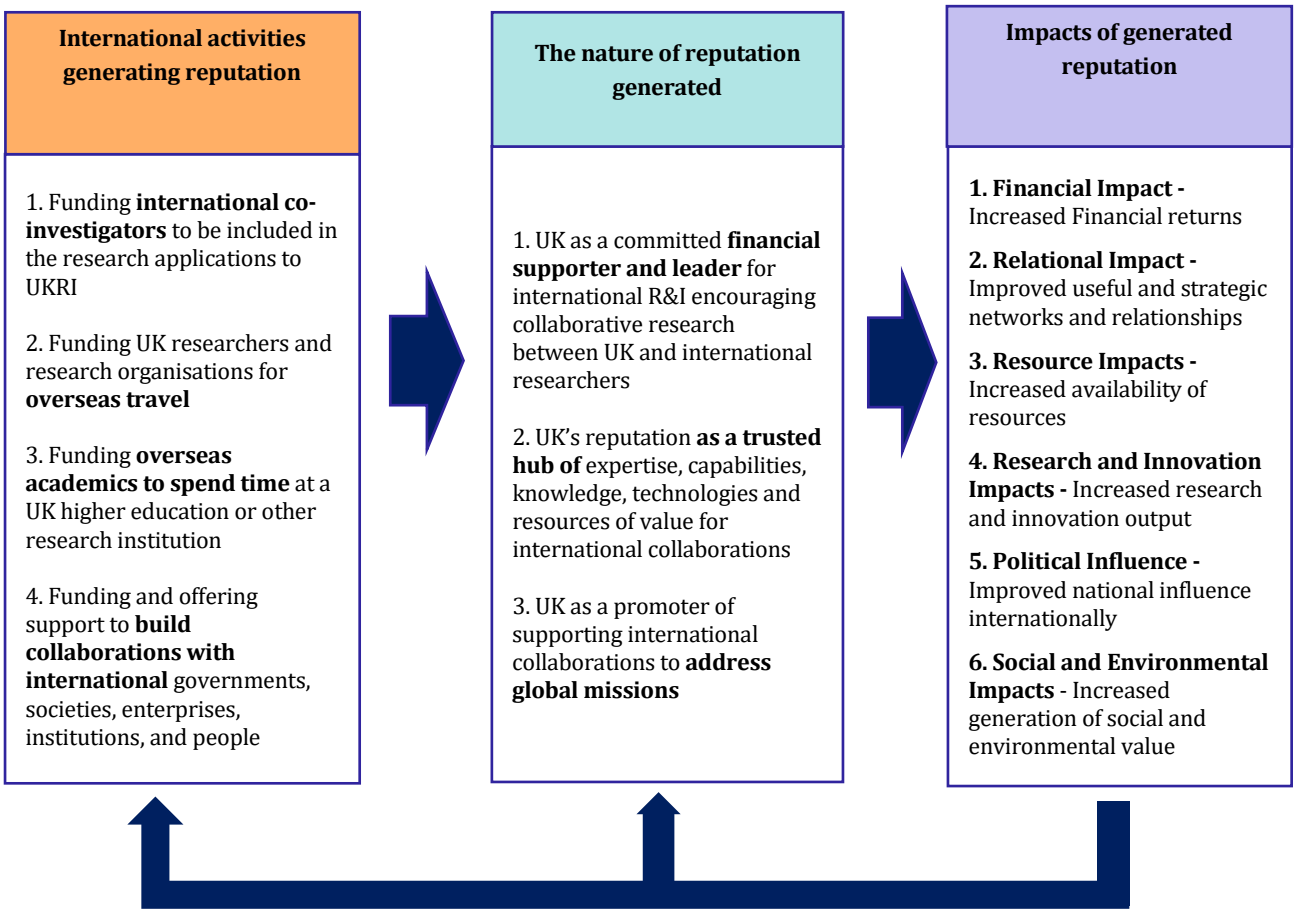

Figure 5.4: UK's unilateral support for international collaboration generating reputational impacts

5.4.1 International Activities

Funding international co-investigators to be included in the research applications to UKRI

The international co-investigator policy allows overseas collaborators to be included as co-investigators on applications to UK Research and Innovation (UKRI) research funding opportunities. The international Co-I funding covers the Co-I costs depending on the specific international project. The Co-I funding policy emphasises that international collaboration is inherently critical for UKRI and its research councils such as Arts and Humanities Research Council (AHRC), Economic and Social Research Council (ESRC), and Medical Research Council (MRC) as it serves as a fundamental underpinning of a broader international initiative. It facilitates UK-based researchers to collaborate with their peers worldwide enhancing the quality and impact of their research, particularly in the fields that are new to UK-based researchers. For instance, the International Co-I supports' research in areas such as social science focusing on populations not based in the UK, or in health space, where global collaboration is needed to understand global health, diseases not present in the UK, or rare conditions with few patients in any one country (Review of the International Co-Investigator Policy, 2023).

For example, UKIR's Metascience Research grants support collaborative research with international organisations. This includes project co-leads based in non-UK research organisation that can be included in research grants available for international activities and international partner organisations, committed to achieving equality of opportunity for all funding applicants. This also enhances opportunities for both UK and international researchers to address challenges or seize opportunities that are not possible within a single country.

Funding UK researchers and research organizations for overseas travel

Funding UK researchers and research organizations for overseas travel facilitates international collaborations, accessing unique resources and expertise, and building a competitive edge.

International travel awards provided by the Biotechnology and Biological Sciences Research Council (BBSRC) support researchers with their visits abroad to establish initial contacts with international partners or prepare proposals for international programs, for up to one month, or attend European consortia-building events. It also aims to support researchers' stays of up to one month at facilities not available in the UK to conduct specific work or access techniques and materials beneficial to BBSRC research projects or research teams. Similarly, the Engineering

and Physical Sciences Research Council (EPSRC) offers overseas travel grants, up to 80% of the full economic cost (FEC) of the project in any area within the remit of EPSRC to UK-based researchers to acquire new techniques or establish and develop international collaborations.

Funding overseas academics to spend time at a UK higher education or other research organisations

UK offers funding for overseas academics to spend time at UK higher education or research institutions through funding programmes such as the British Academy's Visiting Fellowship. This programme attracts global talents by inviting academics from around the world to visit the UK for up to six months and develop collaborative projects regardless of their career stage or discipline within the humanities and social sciences. It helps build new links and foster future partnerships between international scholars and UK researchers to strengthen global collaboration. This collaborative effort highlights the UK's role in fostering international research networks and partnerships. By enabling overseas academics to engage in research and professional development at UK institutions, the programme contributes to the development of high-quality research outputs in the humanities and social sciences and further exchange of knowledge showcasing the UK's capacity to produce impactful and innovative research outcomes. The Visiting Fellowship programmes underscores the British Academy's dedication to international engagement and creating a welcoming research environment for global academics.

Funding and offering support to build collaborations with international governments, societies, enterprises, institutions, and people

In addition to academically focused unilateral funding programmes, the UK also offers funding and support to build collaborations with international governments, societies, enterprises, institutions, and people. For example, the Global Expert Missions (GEM), funded by Innovate UK fund and foster international collaboration with governments, societies, enterprises, institutions, and individuals worldwide. Aimed at addressing global challenges from international perspectives, the GEM programme supports the UK government's ambitions to become the international partner of choice and a global hub for innovation. It highlights the best of the british technology, research, and expertise, and enhances the UK's innovation partnership with global economies. The GEM programme's global collaboration with multiple stakeholders has been well-evidenced in examples such as Innovate UK's collaboration with industry leaders and sector experts, and leading public and private sector organisations in Australia to explore developments in Critical Materials for Electrification. Also, Innovate UKs GEM programme in partnership with UKRI India, WRAP collaborated with industry leaders and sector experts to

explore development in Sustainable Plastic Packaging (Sustainable Plastic Packaging in India 2023). A 5-day GEM mission, comprising of seven UK delegates active in the UK Advanced Manufacturing industry was conducted in three separate locations in Türkiye. This mission was carried out in collaboration with key stakeholders from both private and public sector organisations, focusing on the ways materials and manufacturing organisations can be more sustainable and resource-efficient, leading to increased resilience and/or technological advancement (Advanced Manufacturing and Materials in Turkey 2022). All these activities showcase the UK's commitment to supporting international R&I collaborations and addressing global challenges, benefiting the affected stakeholder groups.

Other impactful examples are Innovate UK's Global Business Innovation Programme, Global Incubator Programme, and Business Growth Programmes, which further enable UK businesses to grow by engaging in impactful international collaborations and driving innovation across borders. These programs support UK companies in expanding globally and fostering partnerships with international researchers, SMEs, and academic institutions. Another example is the UKRI's Engineering and Physical Sciences Research Council (EPSRC) international Centre-to-Centre research collaboration call, which funded twelve partnerships in various fields including quantum computing and electric vehicles, enabling leading UK research groups to collaborate with top international researchers on their projects.

5.4.2 The nature of the generated reputation

UK as a committed financial supporter and leader for international R&I encouraging collaborative research between UK and international researchers

The international co-investigator policy for overseas collaborators, UKIR's Metascience Research grants, and the Global Expert Missions (GEM) programme exemplify the UK's commitment and contribution to global R&I, including nurturing both UK and international researchers and their collaborations.

The UK's reputation as a considerate, supportive, and inclusive research environment is reflected in several key practices including, encouraging funding applications from a diverse range of researchers, supporting flexible working arrangements tailored to individual researchers' personal circumstances, providing support for career breaks, offering assistance for people with caring responsibilities, and promoting alternative working patterns. The British Academy's Visiting Fellowship programme particularly encourages applications from historically and/or structurally disadvantaged groups, low-income countries, and female researchers. The UK has built a reputation for offering international researchers transparent and merit-based career progression, outperforming other European countries in terms of the

career opportunities available to academics (MORE4 study), underscoring the UK's dedication to creating and accommodating equitable research environment for international researchers

UK's reputation as a hub of expertise, capabilities, knowledge, technologies, and resources of value for international collaborations

UK has built reputation as the go-to research partner of choice and enhanced its domestic research by attracting increased foreign investment and talent (The UK's role in global research: how the UK can live up to its place in the world). Global Expert Missions (GEM) advance the UK's vision of becoming a global hub for UK innovation, by showcasing the best of British technology, research, technology and expertise and establishing the UK as the trusted partner of choice for innovation collaborations. To align with the UK's R&D ambitions, the UK has to maintain and enhance its status and reputation as a preferred collaborator and destination (R&D People and Culture strategy). These reputational ambitions have been fulfilled by UK's international mobility for both countries and research organisations. The UK has established a prestigious reputation as a hub of expertise, knowledge, and technologies with its research organisations playing a significant role in attracting international researchers (Highly skilled migration and the negotiation of immigration policy: non-EEA postgraduate students and academic staff at English universities), along with the highly skilled technician workforce that provides essential support to research (Impact of Brexit on the technical workforce at Russell Group universities).

UK as a promoter of supporting international collaborations to address global missions

The UK's reputation as a promoter of supporting international collaborations to address global missions is reinforced through its commitment as a financial supporter and innovative partner. Programs like the Global Expert Missions (GEM), illustrate this commitment by fostering international collaboration with governments, societies, enterprises, institutions, and individuals worldwide, by addressing global challenges from an international perspective.

5.4.3 The impacts of the generated reputation

Table 5.4: Impacts of reputation generated through UK's unilateral support for international collaboration

Types of Impact	Specific Impacts
1. **Financial Impact** - Increased Financial returns	Increased foreign investment in UK R&I.
2. **Relational Impact** - Improved useful and strategic networks and relationships	Enhanced opportunities to develop strategic and successful partnerships among institutions and individuals.
3. **Resource Impacts** - Increased availability of resources	Enhanced access to, and/or develop new national and international resources, funding, capabilities, infrastructure, knowledge and networks
4. **Research and Innovation Impacts** - Increased research and innovation output	Increased opportunities to collaboratively develop new products, services, technologies and processes for local, national and global markets. Long-term commitments from international stakeholders on UK R&I
5. **Political Influence** - Improved national influence internationally	Increased "Soft" influence of the UK globally
6. **Social and Environmental Impacts** - Increased generation of social and environmental value	Enhanced opportunities to simultaneously generate business, academic, social, and/or environmental value

Case Study: Global Expert Mission (GEM) programme on XR and Mental Health Technologies in the US

The Global Expert Mission (GEM) programme on XR and Mental Health Technologies in the US 2023 was funded by Innovate UK. This programme supports the UK's Industrial Strategy by building strategic international partnerships and providing deep insights into opportunities for UK innovation.

International R&I activities:

The Global Expert Mission to the US in March 2023 aimed to gain a deeper understanding of the XR and mental health technologies ecosystem and identify opportunities for collaboration based on findings from the Northeast Coast of the United States. The challenges were specific to the US healthcare system, such as waiting times for diagnosis, costs of in-hospital care, mental health awareness, and the need for at-home care solutions, education and empathy training for healthcare professionals, remote collaboration between healthcare professionals and patient diagnosis. Despite the nascent stage of XR technology in both the UK and the US, the mission provided valuable insights into overcoming regulatory barriers, market access issues, and ethical and accessibility challenges.

The mission included various activities such as site visits to leading XR technology companies, workshops with healthcare providers, and meetings with regulatory bodies. These activities helped participants gain a comprehensive view of the current landscape and the potential for future innovations. Additionally, the mission facilitated networking opportunities, enabling UK and US experts to establish connections that could lead to future collaborative projects.

The nature of reputational impacts generated:

This understanding not only fosters collaboration but also offers reputational advantages by positioning the UK as a key player in advancing mental health technologies and influencing global healthcare practices. By addressing these challenges and engaging in these activities, the mission not only enhanced the UK's reputation in the field of mental health technologies but also demonstrated its commitment to leveraging cutting-edge technology to improve healthcare outcomes globally. This strategic positioning is crucial for influencing global healthcare practices and ensuring that the UK remains at the forefront of technological advancements in mental health care.

Source: https://iuk.ktn-uk.org/projects/global-expert-missions/xr-and-mental-health-technologies-in-the-us-2023/; Follow Global Alliance on the latest Global Expert Mission in AI in Construction to Switzerland - Innovate UK Business Connect

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About the Innovation and Research Caucus

The IRC supports the use of robust evidence and insights in UKRI's strategies and investments, as well as undertaking a co-produced programme of research. Our members are leading academics from across the social sciences, other disciplines and sectors, who are engaged in different aspects of innovation and research system. We connect academic experts, UKRI, IUK and the ESRC, by providing research insights to inform policy and practice. Professor Tim Vorley and Professor Stephen Roper are Co-Directors. The IRC is funded by UKRI via the ESRC and IUK, grant number ES/X010759/1. The support of the funders is acknowledged. The views expressed in this piece are those of the authors and do not necessarily represent those of the funders.

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