Measuring the Reputational Impact of International R&I Investments

IRC Report No 033

Executive Summary

Background - International Research and Innovation (R&I) activities involve collaborations at national, organisational, and individual levels between the UK and other countries. These collaborative activities include joint research, product-, service- and process- innovations, infrastructure development, knowledge sharing, talent development, network building and addressing social and environmental challenges. The UK's funding programmes, policies, and regulatory frameworks play a crucial role in supporting these international R&I collaborations.

An aim of the international R&I investment by the Department for Science, Innovation, and Technology (DSIT) and UK Research and Innovation (UKRI) is to enhance the UK's global reputation and influence (Integrated Review Refresh, 2023). Reputation is a term used to indicate the perception of a nation, organisation or an individual. National reputation is defined as a country having a good name or image in the world nations as a collective judgement of foreign countries (Mercer, 1996).

Significance of reputation generated through international R&I investment - Reputation generated through international R&I amplifies the benefits by unlocking new opportunities and competitive advantages. Strengthened positive reputation generates additionality by significantly improving access to resources, boosting research output, increasing influence in global policy, and generating positive societal and environmental impacts. Financially, reputation attracts additional investments and R&I funding opportunities and opens-up new markets. Relationally, reputation enhances strategic networks and partnerships required for continued and scaled-up future value generation that is not possible otherwise.

Gap in our knowledge - Despite the critical importance of reputation building, there remains a substantial gap in understanding, capturing, and measuring how international R&I activities influence the UK's reputation. This lack of knowledge poses challenges in effectively identifying the reputational benefits derived from the UK's investments in international R&I.

Contribution of this report - In light of this, the report aims to make an initial step to provide valuable insights into developing a conceptual framework on how international R&I activities

and associated investments enhance the UK's reputation, and to outline methods that can be adopted to effectively capture and measure the reputational impacts.

>> Due to the lack of existing literature explicitly discussing reputation building through international R&I investment, **a conceptual framework** (Figure 2) was developed by reviewing and integrating literature on reputation, brand building, and soft power etc (see Appendix 1 for these similar concepts) across various organisations and contexts, including international R&I engagement by corporations.

>> The report then analyses example programme evaluation reports (Table 4) and broader literature (Table 5) on measuring reputation to discuss **methods** that could be used to capture and measure reputational impacts. A pilot text mining experiment is also detailed, highlighting challenges such as the lack of suitable data that captures reputational impacts (Appendix 3).

>> The report concludes with key lessons for enhancing the capture and measurement of reputational impacts by presenting **matrices**. The matrices deconstruct the concept of 'reputation' into multiple dimensions - including national (Table 6) and organizational-level (Table 7) reputation building, as well as by investment type - enabling the development of targeted measures tailored to each investment context (Table 8). These insights offer practical value for policymakers, funding bodies, and research institutions (including universities and businesses engaged in international R&I) to better recognise, leverage, and benefit from the reputational gains generated through such investments.

Future evaluations and research could adapt and test the conceptual framework, methods, and matrices presented in this report to more effectively capture and assess the reputational impacts of international R&I. Refining the associated measurement scales would further enhance the rigour and reliability of how reputation is understood and evaluated in the context of such investments.

An overview of reputational impacts of international R&I

The conceptual framework suggests that the UK's investment in international R&I bolsters its reputation at both national and organisational levels (Figure 1). The reputation built at the organisational level collectively contributes to the national reputation. It is important to note that whilst this conceptual framework has been built from the available literature, a lack of robust, quantifiable empirical evidence exists surrounding reputation developed through international

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R&I investment. By using the diverse reputational benefits of international R&I investments identified in this report, we can gain a comprehensive understanding of how the UK can leverage these efforts to measure, establish and maintain a robust, positive reputation on the global stage.

National Reputation

Investment and Economic Attractiveness of the UK

Leadership and Influence of the UK

Research Support and Infrastructure of the UK

Trustworthiness and Reliability of the UK

Social and Environmental Responsibility of the UK

Organisational Reputation

Organisation's Research and Innovation Expertise

Organisation's Resourcefulness

Credibility of Organisation

The Financial Strength of Organisation

Organisation's brand awareness as a trusted influencer in advancing global research, environmental stewardship, and social value creation.

Figure 1: National and International Reputation building through International R&I Investment

National reputation

As reputation is perceptual and predominantly shaped by a country's actions and behaviour, it can be either positive or negative. The conceptual derivation and programme evaluations suggest that the UK's investment in international R&I can significantly enhance the positive reputation of the UK as a 'Great Research, Science and Innovation Nation' with unique R&I capabilities, resources, talent and skills.

》》 First, international R&I investment boosts international perception of the UK's economic attractiveness, positioning the country as a prime destination for research and innovation investments.

》》 Second, the UK's leadership and influence in the global R&I landscape are reinforced, showcasing its proactive and strategic role in driving international collaborations and advancements.

>> Third, the robust research support and infrastructure provided by the UK for international R&I further solidify its reputation as a hub for cutting-edge research and innovation.

>> Fourth, the UK's trustworthiness and reliability as an international R&I funding partner are highlighted, demonstrating its commitment to equitable and transparent international R&I collaborations.

>> Fifth, the UK's investment in socially and environmentally responsible international R&I also enhances its reputation as a compassionate nation, underscoring its role in promoting global well-being.

>> Conversely, incidents such as the discontinuation of international R&I funding programmes or cases of intellectual property theft and espionage can negatively affect the UK's reputation as a reliable, secure and capable nation for supporting and investing in international R&I.

Organisational reputation

UK investment in international R&I significantly enhances the reputation of the UK organisations that receive this support.

>> First, international R&I funding bolsters recipient organisations' reputation for research and innovation expertise and capabilities, showcasing their ability to produce high-quality, impactful outputs.

>> Second, the resourcefulness of these organisations is highlighted, demonstrating their capability to access and use unique resources.

>> Third, the international credibility of these organisations is strengthened, positioning them as reliable and esteemed partners in the global R&I landscape.

>> Fourth, the financial strength of these organisations is also recognised and made visible, enhancing their reputation as financially robust entities.

>> Fifth, these organisations' brand awareness is improved as important and trusted influencers, capable of shaping and driving advancements in the global research and innovation arena and generating social and environmental value.

Measuring reputational impacts of international R&I investment

⟫ Methods to measure reputational impacts

Tracking and measuring the reputational impacts of international R&I investments pose several challenges, particularly in defining reputation as a psychological construct. This complexity contributes to a lack of explicit literature and data on the subject. Additionally, complexities in the context of international R&I and the interactions between different types of R&I activities reduce the potential to establish causality between specific R&I investments and associated reputation building. The intangible nature of reputation also creates complex feedback loops associated with R&I activities, reputation building, and their impacts.

Despite these challenges, a combination of methods and data can be used to measure the UK's reputation resulting from international R&I investments. Considering the strengths and limitations of each method, it is advisable to employ a combination of methods. Such a mixed-method approach would provide a comprehensive understanding and allow for triangulation and validation of the findings on reputational impacts.

Some of these methods have already been utilised in the UK's international R&I programme evaluation reports. Yet, since these evaluation reports examine the broader impacts of a funding programme, they have placed less emphasis on reputation, often overlooking its multi-dimensional nature.

Below, we summarise potential methods to capture and measure reputation, along with their advantages and disadvantages.

⟫ **Surveys**: Surveys are a widely adopted method for data collection in research and evaluation, with online formats now being the most prevalent. They typically gather quantitative information but can also provide qualitative insights through open-ended questions. Surveys can be used to assess either (A) the general reputation of the UK generated from its overall investment in international R&I, or (B) the reputational impacts of specific grants or programmes. A key challenge in survey design is determining the type of reputation being measured and identifying the appropriate target audience, as reputational impact depends on whose reputation is being assessed and by whom.

For measuring the general reputation of the UK based on its overall investment in international R&I, surveys distributed to a broad range of national and international

stakeholders may be appropriate. However, this approach makes it difficult to establish a causal link between specific R&I investments and the overall reputation.

In contrast, to evaluate the reputational effects of specific grants or programmes, surveys can be tailored to those initiatives and sent to funding recipients and their beneficiaries—provided these individuals can be accurately identified. Such targeted surveys can yield quantifiable insights, particularly regarding direct reputational benefits at the organisational and individual levels. With well-crafted questions, it may also be possible to assess national-level reputation gains resulting from specific funding programmes.

However, surveys are generally less effective at capturing detailed insights into *how* specific investments contribute to national reputation. Additionally, they are resource-intensive to design and analyse, and are subject to response bias, particularly among beneficiaries.

» **In-depth interviews and case studies**: In-depth interviews and case studies provide rich, detailed insights into specific instances of reputation building, capture the complexities and nuances that quantitative methods may miss, and offer flexibility to adapt to various contexts. However, they have limited generalisability, can be resource-intensive, and may be influenced by the biases and interpretations of the beneficiaries of funding, when they are interviewed to gather insights, as well as the researchers involved in gathering and analysing data. Due to their limited generalizability, in-depth interviews and case studies may be less suitable for assessing the overall extent to which national reputation is built through international R&I investments. However, they are valuable for exploring *how* reputation is generated in specific contexts. These qualitative methods are particularly effective for examining reputational impacts linked to targeted programmes or specific beneficiary groups, such as organisations or communities, from whom rich, detailed data can be collected.

» **Text mining:** Text mining tools can be used to analyse large volumes of text data from project and programme reports and case studies to uncover patterns and insights related to reputation building. However, for text mining to be effective, it is essential to have data that explicitly captures reputation-building aspects. As part of this project, the research team in collaboration with the analysts of DSIT and UKRI piloted a text mining approach. It concluded that, despite its potential usefulness to measure reputation, there is a lack of

suitable data explicitly addressing reputation building, particularly at the national level. For more details on this experiment, please see Appendix 3.

⟫ **Collaboration and network analysis/ bibliometric analysis:** Collaboration and network analysis maps international interactions by visualising co-authorships, co-patenting, and co-recipients of grants, showcasing the breadth of engagement across institutions and disciplines. Network analysis offers a holistic view of collaboration networks, identifies key players, provides clear visual representations, and allows for longitudinal analysis. Bibliometric analysis identifies the citation of patents and publications stemming from international R&I investments, demonstrating their visibility. Although the data sources are readily accessible for bibliometric and network analysis, they may not be the most effective for capturing the multi-dimensional nature of reputational impacts of international R&I investment. The findings of these techniques can be misinterpreted without proper context and may not capture the full depth and breadth of reputational benefits, as it often only focuses a limited range of activities e.g. co-authorships, co-patenting, co-grant recipients and citations.

⟫ **Social media and online sentiment analysis:** Sentiment analysis tools use natural language processing to analyse social media mentions and online discussions, assessing public sentiment towards a country's research contributions. Engagement metrics track likes, shares, and comments related to research outputs on social media platforms. Social media and online sentiment analysis are cost-effective compared to traditional research methods. However, they lack the ability to derive direct causality, may suffer from a potential lack of data on funding acknowledgment, can be noisy with irrelevant information, may not capture nuanced opinions, and are limited by platform-specific biases that can overlook other important communication channels.

⟫ **Media coverage analysis:** Media coverage analysis assesses the volume and tone of media coverage regarding the country's international R&I engagement. Media coverage analysis provides a broad view of how a country is portrayed in the media and allows for tracking changes in reputation over time. Content analysis serves as a valuable method for examining media coverage by systematically analysing text, images, audio, and other content forms. It helps identify patterns, themes, and underlying meanings within media reports, offering insights into the messages conveyed, the perspectives of writers, and audience perceptions. However, media coverage analysis lacks the ability to derive direct

causality, can be subjective, may suffer from coverage bias, and might not accurately reflect changes in reputation directly linked to international R&I investments due to inherent media platform and reporting biases.

Dimensions of reputation to develop a measurement scale

In order to capture reputation using mixed methods, it is important to have a broader understanding of the multiple dimensions of reputation. As such, we propose three matrices (Table 6, 7 and 8 in the report) for reputation building from investment in international R&I. The matrices highlight the multifaceted reputational benefits of international R&I investments at both the national and organisational levels.

Many of these reputational impacts are closely linked to specific types of R&I investments. This underscores the importance of using tailored reputation dimensions when investigating the causality between specific types of R&I investments and the reputation they generate. Table 1 presents how specific reputational dimensions are predominantly associated with various types of R&I investments such as research, product and service innovation, knowledge sharing, talent development, network building, resource and infrastructure development, and social and environmental value generation. As these are developed based on the review of literature that does not explicitly discuss international R&I investment related reputation building, future empirical evidence could further validate and refine these multiple reputational dimensions associated with different types of R&I investments.

Table 1. Reputation Matrix by the type of International R&I Investment

Type of UK's International R&I Funding	Dimensions of Reputation Building
UK Funding for Research Output Production	**Research Intensity:** Recognition of robust research activities and output. **Impact Generation from Research:** Reputation of the ability to produce significant and impactful research outcomes. **Source of Unique Knowledge and Resources:** Signalling as a provider of unique knowledge, resources, and collaborative opportunities. **Scientific Capability and Expertise:** Recognition of scientific expertise and capabilities. **Influence on the Research Landscape:** Demonstrating the ability to shape and influence the global research environment. **Trustworthiness:** Reputation as a reliable and impartial collaborator
UK Funding for Product Innovation	**Financial Strength:** Showcasing financial robustness and stability on an international platform. **Customer Confidence:** Enhancing customer trust and confidence in innovative products. **Brand Awareness:** Strengthening global recognition and visibility.
UK Funding for Service Innovation	**Customer Confidence:** Building trust and confidence in the innovative services. **Enhanced Credibility:** Strengthening the credibility in delivering international, customised, and culturally embedded innovative solutions. **Brand Awareness:** Increasing the global recognition and visibility. **Employee Reputation:** Enhancing the reputation of individual employees, such as award-winning designers and academics, who are critical to service innovation.
UK Funding for Knowledge Sharing and Talent Development	**Source of Unique Knowledge and Collaboration:** International signaling as a provider of unique knowledge, resources, and collaborative opportunities. **Influence on International Knowledge and Skills:** Demonstrating the ability to shape and influence the global knowledge, skills and R&I landscape. **Education Provider and Knowledge Sharer:** Building the reputation as an excellent provider of education, developer of talent and sharer of knowledge and skills. **Trustworthiness:** Enhancing the international reputation of reliability and integrity. **Customer Confidence:** Increasing customer trust and confidence.
UK Funding for Social and Environmental Impact Generation	**Social Value Generation:** Showcasing the ability to create significant social value. **Environmental Value Generation:** Signaling the ability to produce environmental benefits. **Customer Acceptance:** Increased acceptance and approval of customers. **Trustworthiness and Compassion:** Reputation as a trustworthy and compassionate entity.

Type of UK's International R&I Funding	Dimensions of Reputation Building
UK Funding for Resource and Infrastructure Development	• **Infrastructure and Resource Development:** The reputation of the ability to engage in developing new infrastructure and resources. • **Access to Advanced Resources:** The reputation of having access to advanced, competitive, and unique resources and infrastructure.
UK Funding for Network Building	• **Competitive Positioning and Signalling:** Enhanced competitive positioning and signalling as a member of a reputed alliance with other esteemed members. • **Legitimacy in Global Networks:** Improved legitimacy as a member of a global network.

Key recommendations

1. **Incorporate reputational impacts into funding allocation decisions:** As highlighted in the report, reputation cultivated through international R&I investments strengthens the UK's competitive edge far beyond direct output of the funded projects. A robust, positive reputation drives financial growth by attracting investment, unlocking expanded R&I funding, and opening new market opportunities. It also enhances access to resources, collaboration opportunities, policy leverage, societal outcomes, and the strategic partnerships essential for future value creation. Together this positions the UK as a global influencer, amplifying its soft power and shaping international decision-making.

   Therefore, when evaluating funding allocations for international R&I projects, policymakers and funders should explicitly consider these ripple effects and multi-dimensional reputational gains. This means integrating the potential for reputation building as a key criterion in grant application evaluation and review processes as well as higher level decisions on the amount of international R&I investments.

2. **Incorporate reputational impacts in programme evaluations:** It is evident from the report that current programme evaluations often do not adequately capture the multi-dimensional reputational impacts of international R&I investments, and are rarely tailored to capture the specific reputational outcomes relevant to individual programmes. To address this gap, funders could incorporate targeted questions on reputational dimensions into both existing and future impact evaluations. Doing so would enable a more comprehensive understanding of reputational impacts and provide a cost-effective means of data collection to inform future strategic decisions and refine the measurement scale.

3. **Request reputational impacts to be mentioned in project outcome reports:** To better understand and harness reputational impacts of projects, it is important to collect more explicit data—such as recognising reputation as a distinct outcome area within impact tracking systems like ResearchFish. Currently, UKRI-funded international R&I projects often fall short in this area, limiting visibility of these strategic impacts. It is also important to provide clear guidance to those reporting project outcomes, as they may not be familiar with the multi-dimensional nature of reputational impacts and how to effectively capture them. With improved reporting of multi-dimensional reputational impacts generated from projects, reputational impacts could be more effectively analysed using text mining techniques to extract insights at scale and inform future funding and policy decisions.

4. **Develop robust measurement tools for capturing reputational impacts:** In order to effectively integrate reputational impacts in key strategic funding decisions and associated evaluations and impact reporting, it is recommended that funders develop robust measurement tools to gather feedback from grant recipients, other beneficiaries, international funders, and wider stakeholders on their perception and experience of reputation building through international R&I investments. This report offers a starting point to develop such measurement tools by outlining important dimensions of reputational impacts and methods that could be used to measure them. Such tools and measurement scales could then be used to evaluate programmes, assess project impacts, and independently gather data on national reputation building through international R&I investments.

5. **Tailor measurement to specific reputation dimensions and stakeholders:** When developing measurement scale, it is important to recognise that reputational impact depends on whose reputation is being assessed by whom using which methods. When the focus is on a specific dimension of reputation (e.g., the trustworthiness of the UK as an international funding partner) or specific type of investment (e.g. investment to support product and service innovation), policymakers and funders should select targeted reputational dimensions and methods and identify the most relevant respondents. For instance, qualitative interviews with international funders and beneficiaries can be particularly valuable for assessing trustworthiness and understanding how specific types of reputational impacts are generated for distinct beneficiary groups through targeted international R&I programmes.

6. **Adopt a mixed-method approach for a comprehensive measurement:** To comprehensively understand and validate findings on reputational impacts, it is advisable to employ a combination of methods. This mixed-method approach could utilise a range of tools such as surveys, in-depth interviews, detailed case studies, workshops, bibliometric analysis, text mining, social media and online sentiment analysis, and media coverage analysis, depending on the specific objectives and data accessibility. A mixed-method approach also allows for triangulation and validation of findings.

7. **Further refine measurement scales:** Policymakers and funders should continuously adapt and test the conceptual framework, methods, and matrices presented in the report to capture and measure the reputational impacts of international R&I. Further refining the associated measurement scales will enhance the rigor and reliability of evaluating reputation generated through such investments. This includes exploring and integrating the multi-dimensional nature of reputation as outlined in the report's matrices.

8. **Address negative reputational impacts proactively:** Policymakers and funders should recognise that the abrupt discontinuation of international research and innovation (R&I) funding - such as through budget cuts - and the absence of safeguards to protect project outputs (e.g. against intellectual property theft) can significantly damage national reputation. Strategies should be in place to mitigate such negative impacts and maintain trust and reliability as an international R&I funding partner.

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Authors

» Professor Muthu DeSilva – Birkbeck, University of London
» Dr Dize Dinkol – Birkbeck, University of London

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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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Contact: info@ircaucus.ac.uk

Website: https://ircaucus.ac.uk/