Exploring the opportunities and challenges of research engagement with China

Research collaboration with China has always been complex for UK academics because of several barriers to entry including language, cultural and regulatory gaps. On top of these core difficulties, new and disruptive challenges are today rising to the fore and making academic collaboration with China even more uncertain. Most notably, concerns over the integration of the Chinese civilian and military research and development ecosystems, based on China’s Military-Civil Fusion strategy are leading some politicians, industries and members of the public to call for the UK to disengage with China and to emulate countries like Australia and the US in introducing strict security measures regulating international research collaboration. However, UK-China research partnerships also bring significant economic, social and scientific benefits to the UK, China and beyond, making decoupling difficult.
To help navigate this complex landscape, the British Embassy Beijing, on behalf of the Foreign Commonwealth and Development Office, commissioned RAND Europe to conduct an independent and evidence-based study into UK academics’ research engagement with China. The study’s intended outcomes are to:

1. Improve the UK government and wider understanding of how and why UK academics engage with China on joint research activities.
2. Better understand how UK research organisations manage any resulting risks.
3. Inform ongoing efforts by the UK government and higher education community to help navigate this complex landscape.

To achieve these objectives, the RAND study team adopted a mixed-methods approach divided into three phases:

**Phase 1: Taking stock of existing evidence**
- Two literature reviews of bibliometric studies on UK-China research collaboration and academic and grey literature on the ensuing benefits and risks.

**Phase 2: Gathering new evidence**
- An update of the British Embassy Beijing database of UK-China joint research centres.
- 40 interviews with UK-based academics and support services from 34 UK research organisations across disciplines and institution types.
- An asynchronous survey of UK-based academics and support services gathering 43 responses from 25 UK research organisations.

**Phase 3: Combining and analysing data**
- A network analysis of UK-China joint research centres and data visualisation activities.
- Desk-based analysis and synthesis activities.
- A synthesis and recommendations external workshop gathering various UK government departments and the higher education community (FCDO, BEIS, MOD, DCMS).

The activities are, however, subject to some limitations. For example, there is a lack of sufficient data on other metrics of research collaboration to triangulate emerging findings from our network analysis of UK-China joint research centres. As such, these emerging findings should be bounded and further studies should be conducted to advance knowledge of UK-China research collaboration.
UK and Chinese research ecosystems have become increasingly integrated since the early 2000s, with increasing numbers of Chinese academics working in UK universities, growing levels of co-published papers and a surging number of joint UK-China research centres. In particular, metrics of research outputs show that collaboration greatly flourished during the so-called ‘golden era’ in UK-China relations (2014–2019).
However, some indicators are today starting to show a potential slow down, if not decline, of this trend. Our analysis of joint UK-China research centres reveals that starting in 2019 and continuing into 2020 and 2021, the number of newly set-up joint UK-China research centres sharply declined. Further studies of other research collaboration outputs after 2019 are however needed to corroborate and validate this emerging finding.

The increasing integration of UK and Chinese research ecosystems has been particularly skewed to technology-based disciplines. Our analysis of the academic disciplines studied in UK-China joint research centres corroborates existing studies on UK-China research collaboration and shows that the majority (78 per cent) of joint UK-China research centres focus on STEM disciplines.¹

1 These numbers have been rounded to the closest decimal for clarity and presentation purposes. Non-rounded figures are: STEM subjects (77.56 per cent), non-STEM subjects (12.82 per cent) and multidisciplinary topics (9.62 per cent).
The most common academic topic researched across all joint UK-China centres is engineering (28 joint research centres), followed by materials science (17) and environment/ecology (17), out of a total 156 joint research centres. A different categorisation and breakdown of STEM-focused research centres into the 17 sectors identified in the National Security and Investment Act (2021) shows that synthetic biology (47) is the most common discipline of interest for UK-China joint research centres, followed by advanced materials (21), energy (15), engineering (12), artificial intelligence (8), satellite and space technologies (8), communications (4), transport (4) and data infrastructure (3). This broadly coincided with the seven priority sectors defined by the UK Science and Innovation Network in China in 2017. However, high levels of political focus on and funding for STEM research in China and historical academic strengths in these topics may also explain the skew of joint UK-China centres towards STEM disciplines.
Our network analysis of joint UK-China research centres further reveals that a small proportion of research organisations account for most UK-China research collaboration when measured in terms of joint centres. One-fifth of the organisations account for two-thirds of research collaboration in joint centres. The most connected organisations overall are the University of Cambridge (UK), Southeast University (China) and the University of Edinburgh (UK).

Chinese institutions make up approximately two-thirds of the organisations involved in joint research centres, while UK research organisations make up one-third. As there are fewer organisations in the UK that have established research links with Chinese partners than vice versa, UK research organisations have a higher density of research links through joint centres than their Chinese counterparts. Seven of the top ten most connected organisations in the network analysis of joint UK-China research centres are indeed British. Further studies of other research outputs taking an institution-based, rather than country-based, approach are needed to triangulate these findings.
An analysis of our database of joint UK-China research centres also shows that more physical research centres are located in China than the UK, especially in coastal provinces and economically developed municipalities that have been at the centre of trade and migration flows and have historically benefited from preferential fiscal policies for economic experimentation, creating a favourable environment for innovation. The concentration of physical facilities in China rather than the UK may be explained by the incentives that exist for Chinese cities and universities to host joint research centres, including financial benefits ensuing from rural land expropriation and conversion.

Ultimately, a wide range of actors are involved in funding and sponsoring UK-China research collaboration, including joint research centres. Some of these actors include the National Natural Science Foundation of China (NSFC), the Chinese Academy of Sciences (CAS), the Ministry of Science and Technology (MOST), Jiangsu Science and Technology Department, UKRI, Innovate UK, Research Councils UK and the British Council. This list is, however, non-exhaustive and further studies should seek to systematically map out funding bodies and their role in UK-China research collaboration to understand the weight of each actor in this network and increase transparency on the origin of UK-China research funding. This may be done by analysing bibliometric data on the funding acknowledgements of co-authored papers.
Understanding the benefits and drivers of UK-China research collaboration: a UK perspective

Overall, UK research organisations and academics consulted for this study were very positive about their engagement with China. They spoke highly of their engagement with Chinese partners, stressing the benefits of working with leading researchers, emphasising the potential for delivering high-quality research outputs and progress in their chosen discipline, and praising the quality, rigour and insights of the Chinese partners they worked with. Herein lies a key difference between stakeholder consultations on the one hand and the literature review data on the other, which focused more on the strategic elements of UK-China research collaboration and produced a far greater emphasis on risks than was present in the interviews and survey data.

In addition, UK academics found establishing partnerships to be neither extremely easy nor extremely difficult. Of the stakeholders surveyed, 13.5 per cent felt the process was ‘very’ straightforward, while another 13.5 per cent felt the process was ‘not’ straightforward. Most researchers encountered some degree of difficulty and academics’ prior experience of conducting research in China often determined their ability to successfully navigate any potential challenges.

Some of the primary drivers motivating UK researchers’ collaboration with Chinese partners include accessing Chinese human capital and leading expertise, tackling common global challenges, accessing data, data subjects and enabling infrastructures, and other economic and reputational benefits. The prospect of improving the quality and impact of their research through world-leading collaborations drove many UK academics to establish collaborative activities with Chinese partners. Many UK researchers indeed praised the expertise and capacity for innovation of Chinese researchers and expressed a wish to collaborate with Chinese leading researchers as they would with leading researchers of any other nation. The existence of common global challenges like climate change and pandemics also pushed many UK academics to reach out to Chinese partners in search of collaboration for tackling global issues that cannot be addressed alone. Moreover, the potential to collect, access and observe data in different ways to in the UK motivated UK researchers to collaborate with China. This was both in terms of the type of naturally occurring phenomena that could be observed in China (e.g., unique diseases, soil data), alongside the structural considerations that make China attractive for conducting primary research. The promise of rapidly available data could fail to materialise, however, as China introduces increasingly robust but stringent data protection laws for sharing certain forms of data beyond its borders. Finally, some UK research organisations mentioned other economic and reputational benefits for collaborating with China, including access to Chinese funding, attracting Chinese students and improving their international reputation through global collaboration.

While UK academics consulted agreed on the overall benefits of collaborating with Chinese partners, there were clear differences between researchers of different disciplines. For UK STEM academics, research collaboration allowed complementarity by enabling UK and Chinese researchers to fill areas of knowledge where the other was lacking. For UK researchers in social sciences and arts and humanities, UK-China research collaboration offered the opportunity to engage with differing perspectives.

Developing trust and long-term relationship building underpinned many of the benefits and was considered an essential feature to reaping the rewards of UK-China research collaboration. Many of the most experienced stakeholders consulted stressed the importance of demonstrating cultural sensitivity when developing UK-China research collaboration. Given the challenges with culture and language, taking time, being flexible and starting collaborations slowly before gradually expanding them was considered best practice. Ultimately, many of the benefits of UK-China collaboration were contingent on personal networks and a strong operational understanding of how to conduct research in China. Understanding the language, knowing who the key figures in one’s discipline
are and being aware of differences in how both countries approach research were all deemed important. Some UK researchers and research institutions strongly valued organisations like UKRI China and the British Embassy Beijing that could provide this information.

Recent geopolitical developments including heightened global strategic competition and the advent of the COVID-19 pandemic have drastically disrupted research collaboration between the UK and China. Global strategic competition has damaged existing relationships between UK and Chinese partners by eroding trust and has in some cases hindered future collaboration opportunities. The public health situation and travel restrictions imposed by the Chinese and UK governments have also impacted UK academics’ ability to foster existing relationships with China and to set up new ones by creating a sense of disconnect between partners, reducing networking activities and constraining funding pools.

External events such as geopolitical tensions, the COVID-19 pandemic and Brexit have further contributed to reducing the pool of funding available to support joint UK-China research collaboration and have heightened competition for already limited resources, resulting in increasing difficulties in accessing UK funding for
Joint research projects. Most notably, the lack of sufficient funds to support joint UK-China research collaboration has arguably increased the risk of strategic dependency on China by incentivising UK academics to turn to their Chinese partners to secure Chinese government funds.

In the UK, the polarised political climate and domestic defence and security policies towards China have created new challenges for UK-China research collaboration. Specifically, strategic ambiguity over the UK government’s China policy has caused confusion and frustration among UK research organisations, who find it increasingly difficult to navigate this sensitive environment and understand the position of the UK government on engaging with China. In this regard, UK research institutions have requested greater clarity over the risks associated with partnering with China and have asked for additional guidance on risk management from the UK government. In the absence of such guidance, some UK research institutions have adopted a risk-averse approach, basing their decision to partner or not with specific Chinese stakeholders on potential reputational risks and the likelihood of wrongful affiliation and negative press coverage.

In China, heightened political sensitivity and tightened control over Chinese research institutions’ research agenda have contributed to narrowing the scope of topics that may be safely researched. This is particularly true in the social sciences and arts and humanities. The shrinking research space in China has had various effects on joint collaboration, from creating additional barriers to data and data subject access to deterring some UK researchers from continuing to work with Chinese partners. Moreover, growing hostility from the Chinese government vis-à-vis so-called ‘hostile foreign forces’, including Western academics, has fostered an environment of extreme caution in China, which has impeded the ability of UK academics to conduct fieldwork despite having had years of fruitful collaboration with Chinese authorities. The Chinese political context has also raised concerns among some UK research organisations over the physical and digital safety of their research staff; four interviewees and one survey respondent reported feeling at risk when working in China.

Beyond recent geopolitical developments in the UK, China and elsewhere, ‘traditional’ challenges have continued to plague and disrupt joint UK-China research collaboration, including difficulties in securing funding, threats to academic freedom and integrity, and high barriers to entry into collaboration with China. Despite efforts from the Chinese government to promote research integrity, China continues to experience cases of academic misconduct, as is the case elsewhere in the world. UK research organisations and academics across disciplines continue to be concerned with the level of academic misconduct in Chinese academia and the narrowing space for conducting free and independent research, which through joint collaborations may impact their own academic integrity and freedom. For many, this is a red line that should not be crossed, at the expense of terminating joint collaborative activities.

Moreover, in comparison to other international partnerships, UK academics generally have faced higher barriers to entry when collaborating with Chinese partners. These include cultural differences, communication issues, reliance on existing networks, language barrier and the necessity to foster long-term relationships to establish trust and respect. UK academics who have never worked with China before also report difficulties in accessing Chinese data and data subjects. This often came as a surprise to them due to overpromises from their Chinese counterparts and a general lack of understanding of Chinese data protection regulations and China more generally.

Interestingly, many of the challenges that have dominated the front pages in the past months, including risks of IP theft and transfer of dual-use technologies, had either been experienced to a much lesser extent by the stakeholders consulted for this study or were not reported at all during our consultations. This may be because sufficient safeguards had been put in place preventing the occurrence of these risks. However, this could also be due to a lack of awareness of the risks associated with collaborating with China among the UK research community.
Successful UK-China research partnerships share some common characteristics, which may be translated into good practices for UK research organisations seeking to create, manage and deliver high-quality and safe research between the UK and China. A list of perceived good practices collected from UK research organisations and academics throughout this study is articulated below. While this list provides a robust starting point from which to build and manage research partnerships with China, these good practices should be adapted by UK research organisations to the context in which they are applied, the institutions they work with and their ultimate objectives.

Good Practices for Building Connections and Partnerships

- Developing personal networks and building interpersonal trust through regular visits to China and continuous exchange of ideas even after the completion of a partnership.
- Understanding the Chinese research and academic landscape, including Chinese issues and publications, to choose the most appropriate partners.
- Fostering an alumni base of visiting Chinese PhD students and fellows to create an organic community of researchers with similar academic interests.
Good Practices for Building Connections and Partnerships

- Encouraging the learning and use of Mandarin as a working language to promote a symmetrical relationship, and reduce reliance on external partners for translation which may introduce miscommunication issues.

- Adopting a culturally sensitive approach to international collaboration, to avoid imposing a UK research agenda onto a China setting and improve mutual learning (i.e., it is as much about what the UK can offer to China as what Chinese partners and experiences can bring to the UK).

Good Practices for Mitigating Potential Risks

- Adopting a holistic approach and a centralised process for reviewing partnership requests and raising awareness of potential risks, independent from the country of origin.

- Scrutinising social media posts and other sources such as the Australian Strategic Policy Institute (ASPI) China Defence Universities Tracker to inform risk management and partnership decisions for safeguarding reputation.

- Adopting a scaled approach for scrutinising collaboration requests by the universities’ central offices as early as possible in the collaboration, to protect UK researchers from inadvertent breach of rules and agree the terms of engagement.

- Being transparent about the type of research conducted, the partners involved and the origin of the funding, to safeguard reputation.

- Applying a robust due diligence process informed by available guidance and knowledge exchange with stakeholders in the field.

- Slowing down, clarifying the ambitions of the partnership, and agreeing on respective expectations in the statement of intent to ensure a common understanding between international partners, whilst remaining flexible and capable of managing expectations in case these are not met.
Good Practices for Knowledge Sharing

Encouraging external knowledge exchange and guidance sharing with other UK research organisations and academics to benefit from their experience and share yours.

Leveraging existing networks and resources by seeking advice from relevant UK Government departments, including the British Embassy in Beijing, UKRI China Office, the Department for International Trade (DIT), the Centre for protection of National Infrastructure (CPNI), and Universities UK International (UUKi).

Fostering internal feedback and knowledge sharing between Chinese studies experts, academics who have engaged with China, and universities’ central offices to update and inform universities’ guidance.
In light of the findings identified, the study team formulated recommendations for the UK government on engaging in research collaboration with China. These recommendations were developed through desk-based analysis of study findings, as well as stakeholder consultations with UK research organisations and academics, and were stress-tested in an external workshop involving multiple UK government departments and the HEI community (including FCDO, BEIS, DCMS, MOD, UKRI, UUKi). A full list of potential actions within each recommendation is available in the research report. It is worth noting that the feasibility score for these recommendations takes into consideration current COVID restrictions in China, which are expected to remain in place for the foreseeable future.

### RECOMMENDATIONS FOR UK POLICYMAKERS

**Enabling Connections, Facilitating UK-China Research Collaboration**

1. Creating networking opportunities to enable innovative partnerships and promote a bottom-up approach to UK-China research collaboration.

2. Leveraging existing UK-China city region partnerships and networks to foster local research links in a global world.

3. Building upon existing networks and promoting expertise sharing in the UK research community to reduce barriers to entry to collaboration.
Sustaining the Benefits, Deepening UK-China Research Collaboration

4. Improving reciprocity in research collaboration ties between the UK and China.

5. Encouraging continuous engagement with Chinese partners to deepen and strengthen existing links, build trust and enable the flow of research benefits.

Mitigating Challenges, Safeguarding UK-China Research Collaboration

6. Raising awareness of China literacy in the UK research community and the general population to build a resilient and informed research ecosystem.

7. Creating and managing a joint repository of resources on research engagement with China to improve clarity and provide more guidance.

8. Exploring the applicability to the UK of other international and sectoral approaches for mitigating risks from research collaboration with China.

Investing in the Future, Empowering UK-China Research Collaboration

9. Investing in early career researchers to build a new generation of UK academics working with China and stimulate perennity of the UK policy.

10. Focusing future collaborative opportunities on areas of mutual benefits to the UK and China to maximise benefits and mitigate potential risks.