

Written evidence submitted by UK Research and Innovation (TIP0018)

UK Research and Innovation (UKRI) is the UK's largest public funder of research and innovation. We are profoundly international in our approach as well as highly responsive to the strategic drivers of the UK position as outlined in the Integrated Review. In this response we highlight:

- The importance of our rich range of research funding in supporting the Indo-Pacific tilt
- The importance of our international offices in gathering information, liaising with other in-country entities and producing 'deep dives' to inform future choices
- The central role of UKRI in providing efficient and effective linkages between UK and overseas countries from discovery research to business innovation
- Our willingness to work more closely and intelligently with international partners to maximise the potential of working with this critical region.

Our response focuses on looking at challenges and opportunities in the region related to research, innovation and technology, looking first at the role of China in the region and then other countries with which UKRI has a key relationship.

General questions

- What are the UK's main interests in the Indo-Pacific region, and what are the main threats and opportunities?
- 1. It is important to recognise the significant role that China plays in the region when it comes to science and technology and the opportunities and challenges this presents for the UK.
 2. We are in an era of accelerated scientific and technological progress, and a changing world order with China becoming a key global and Indo-Pacific regional actor.
 3. Engaging with China will be integral to economic success, prosperity and security, including in relation to the UK's research and innovation capability. Within the Indo-Pacific there is therefore an opportunity to build engagement in China through research and innovation to maximise the UK's prosperity agenda and to address global challenges around climate, health and future pandemics.
 4. Engagement with China is needed for the UK to achieve and use its science and technology superpower status in the region to boost economic growth, shape international policy and norms in line with UK values, and act as a force for good.
 5. China is the top science nation in the region, in terms of the amount of high-quality research and innovation they invest in and produce. China has strengths in almost all research fields and technologies.
 6. Collaborating with China on research and innovation can deliver benefits for the Indo-Pacific in a number of ways:
 - a. **Science for Diplomacy** - Science engagement is an area of the bilateral relationship that has remained strong, keeping lines of influence open into the

Chinese system. Through networks and scientific collaborations, the UK and China can forge relationships in otherwise challenging bilateral spaces in line with Indo Pacific Tilt priorities.

- b. **Multilateralism** – Working with China on multilateral research and innovation programmes and via multilateral fora in the Indo-Pacific will benefit the UK and the region. For example, UKRI has funded programmes on agriculture, including research on rice plants in China and Southeast Asia. The work has led to policy changes on arsenic levels in food in the UK and Europe. UKRI also collaborates with Chinese partners through a full range of multilateral initiatives including CERN, Square Kilometre Array (SKA); British Antarctic Survey; the Belmont Forum, the Global Research Council, the Wheat Yield Initiative, the Global Alliance for Chronic Diseases; the International Institute for Applied System Analysis (IIASA); the Joint Programming Initiative for Urban Europe.
 - c. **Force for Good** - China represents around 18% of both the global population and economy, therefore effective action to tackle shared global challenges requires active engagement with China in the Indo-Pacific. For example, through research and innovation partnerships, the UK and China are tackling the rising threat of antimicrobial resistance, which is not restricted by borders.
7. There will also be a need to minimise strategic interest damage. To do this, the right measures must be in place to mitigate risks while recognising that China presents immense opportunities for the UK in the Indo-Pacific; working together has the potential to support not only UK economic development but also make strong contributions to global challenges such as climate change and global health.
8. UKRI has been at the forefront of bilateral research and innovation partnerships with China, delivering 363 joint projects via £370m in joint investment involving over 350 lead organisations in both countries. The headlines below demonstrate the potential opportunity and the importance of China within the Indo- Pacific for research and innovation.
- a. China is home to around 25% of the world’s R&D workforce and is the world’s second biggest spender on R&D, with a year-on-year expenditure increase of 11%, totalling approx. £245bn. In 2020, China’s total science, technology and R&D spending accounted for 2.4% of their GDP.
 - b. In China’s 14th Five-Year Plan, covering 2021-25, research and innovation is a key component. The Plan sets goals for domestic innovation, a commitment to more ‘open’ international cooperation and support for strengthening basic research.
 - c. The quality of UK-China scientific collaborations is strong, with 34,324 co-authored publications between UK and Chinese researchers from 2011 to 2015 it is the 5th strongest collaboration for the UK. UK-China publications perform significantly better than non-collaborative publications with Field-weighted Citation Impact (FWCI).
 - d. The UK is China’s 2nd largest partner in joint publications, after the US. China is also the UK’s third-biggest single-country partner for collaborative research.

- e. China presents enormous trade and investment opportunities for the UK with a domestic market of 1.4 billion people. Our relationship with China has technology and innovation at its heart and trade links which exceed £70bn.

Country specific questions

- What should the UK's approach be to strengthening relations with Indonesia, Japan and Taiwan?
- In what areas should the UK prioritise deeper collaboration with these countries (e.g. trade, education, science and tech, defence and security, development)?
- How can the UK improve its partnership with Indonesia in areas including land and environmental rights, and promoting open societies and rule of law in the region?
- How should the UK Government work with Japan to support the improvement of cyber security, development of advanced technologies, and values-based digital growth in the Indo-Pacific?

Taking these countries in turn, below is a summary of UKRI's relationship and any partnerships with these key regions as well as the opportunities this presents for research and innovation. The depth and breadth of relationships and knowledge shows that UKRI is exceptionally well-placed to support an Indo-Pacific tilt in research and development.

India

9. By 2030, India will be the world's most populous country (1.5 billion) and the third largest economy.
10. India has been identified as an 'emerging leader' in FCDO's 2021 PEP Strategy Results and by BEIS as a growing 'world leader'. The UK-India 2030 Roadmap, agreed by both Prime Ministers in May 2021, identifies science as a cross-cutting priority – across the prosperity, health, climate and defence pillars.
11. India has a centralized R&D system, meaning that government-to-government collaboration is needed to access public R&D funds, expertise and infrastructure.
12. R&I partnerships is an important lever for our wider global ambitions. As 'Make in India' is a priority, home grown solutions to major challenges (such as energy, food security and sustainable urban development) are sought. Partnering with India in R&I can lead to better global solutions and influence India's capacity to produce home-grown sustainable development.
13. India is the second largest Internet user in the world. Its approach to data policy and open information will influence global discussions. As India develops its data and emerging technology policies, partnering with India will provide useful connections for vital UK technology areas.
14. The UK's Own-Collaborate-Access model will be important with India. There is a question for the UK government about how India should be positioned within the wider Indo-Pacific tilt given some of the existing investments and interests expressed by India, including quantum and AI.

15. Many countries across the world are pursuing partnerships with India. For example, The National Science Foundation in the US is exploring bilateral partnership approaches for the first time; while Australia has positioned India as part of its core focus on emerging technology. It is worth noting that India has science attaches in the US, Japan, Russia and Germany, but not in the UK.
16. Between 2012 and 2020, UKRI funded 560 collaborative projects with UK and Indian researchers, totaling £541.7m.
17. There are extensive multilateral initiatives already between UKRI and Indian partners that can be extended or further developed, such as: the Deep Underground Neutrino Facility, CERN, the International Wheat Yield Partnership and the Global Alliance for Chronic Disease.
18. Further UKRI programmes in India include: UK-India COVID-19 Partnership Initiative, the India-UK Tackling AMR in the Environment from Antimicrobial Manufacturing Waste, the Cultural Heritage, Migration and the Indian Diaspora Programme, the ESRC-ICSSR Future of Bilateral Trade, the UK-India Laser Technology Programme and the Industrial Waste Challenge.
19. There are additional opportunities in space, agri-innovation, health, climate change and environment, sustainable cities, future aviation, critical metals, polar research and net zero/clean energy.
20. There are also a number of known challenges: mobility (especially concerns and mitigations around a purported 'brain drain'), bureaucracy (including a lack of coordination between ministries), investment, regulation and defense concerns (responding to international treaties such as the Nuclear Non-proliferation Treaty).

Japan

21. The Integrated Review identifies Japan as a close partner with whom the UK will work to deepen its bilateral relations. This position is further underlined through the government's tilt toward the Indo-Pacific.
22. The UK has in recent years increased and diversified the areas in which it works with Japan. This is largely attributable to the increase of funding through programmes such as the Fund for International collaboration and the breadth of activity and collaboration with several countries within the Indo-Pacific.
23. Japan's investment in R&D has exceeded 3% of GDP for the past 16 years, standing at 3.51% in 2020; with a continued increase in the governmental science budget each year.
24. UK researchers are the 4th largest group of visiting researchers to Japan (after China, USA and South Korea), accounting for 4.8% of the total. The UK is the 3rd most popular destination for Japanese researchers on mid/long-term overseas placements (8.7% of the total).
25. Collaboration with Japan is growing with UKRI-wide level engagement. The most recent UKRI-Japan Society for the Promotion of Science call inviting proposals within the social

sciences and humanities that address Covid-19 challenges saw nearly 170 applications for a maximum of 10 awards. The previous joint call in Life Sciences saw a comparable level of demand. This highlights the strong demand from the UK community for further expansion of opportunities to support partnerships with Japan. Collaboration with Japan now covers all areas of UKRI at a high level of intensity and excellence.

26. Japan offers potential for large scale investment in UK science and technology. There are significant opportunities for collaboration with Japan across strategically important technologies, including technology families outlined in the Innovation Strategy.
27. The UK and Japan are broadly aligned in their approach to digital and data policy with similar data protection regimes, attitudes towards digital infrastructure, cyber security, digital standards, and ambitions to ensure the free flow of data globally and spur on tech adoption and diffusion.
28. Between April 2012 and March 2020, UKRI and its councils funded 298 collaborative projects involving UK and Japanese researchers, totaling £240.7m. Funding levels suggest a rich community of partners are already in place who could maximise opportunities.
29. The UK already collaborates with Japanese partners across a number of multilateral initiatives, including CERN, the International Institutes for Applied Systems Analysis, SKA and the Belmont Forum.
30. UKRI has partnered with Japanese funders to produce specific calls on advanced materials, regenerative medicine and infectious diseases, life sciences and AI and society.
31. Priority areas that have been identified for deeper engagement include: synthetic biology, AI and robotics, arctic, healthy ageing, advanced materials, clean energy, digital technologies and science in and for society.
32. **Cyber Security:** As laid out in the Integrated Review, to cement the UK's position as a responsible and democratic tech superpower, with the capability to protect and promote our interests in, and through, cyberspace, additional investment in cyber security research is required. The Engineering and Physical Sciences Council (EPSRC) is currently scoping new cyber security research activities as part of the development of its next Delivery Plan. Ensuring the UK remains at the forefront of cyber security will need a global infrastructure approach to international communications as a system is only as strong as its weakest link. EPSRC will be exploring international collaborations on cyber security where these enable us to collaborate with other leading research nations to jointly tackle shared priorities. This will include exploring opportunities for joint activities with Japan given the common interests and approaches. For example, as discussed at the 11th UK-Japan Joint Committee on Science and Technology Cooperation in October 2021, the UK and Japan are taking similar approaches to Trusted Research, and there are strong existing links between our research communities in areas such as AI and Quantum Technologies.

Indonesia

33. Since the launch of the Newton Fund in 2014, UKRI has established a strong relationship with Indonesian funders. This has included the development and delivery of joint research and innovation programmes on infectious diseases, hydrometeorological hazards, and biodiversity.
 34. UKRI hosted a funders delegation in early 2020 with representatives of the Ministry of Research and Technology of the Republic of Indonesia (RISTEK-BRIN) and the Indonesian Science Fund (Dana Ilmu Pengetahuan Indonesia, DIPI).
 35. **Smart Island Energy Systems:** The Natural Environment Research Council (NERC) is planning to develop a programme around clean energy transitions in island nations, in partnership with Indonesia. Research into sustainable energy islands, encompassing all possible energy technologies and solutions, would leverage UK leadership and expertise built through existing UKRI and wider programmes. Such a programme would facilitate mutual learning between the UK and Indonesia – building on existing UKRI investments and a number of relevant UK examples of implementing low-carbon, sustainable energy island solutions. This work would enable the application of smart energy technologies and solutions to the over 130 inhabited islands that make up the UK.
 36. **Extension of Wallacea Biodiversity Programme:** Indonesia is one of the world's biodiversity hotspots, and the Indonesian government has a strategic focus on the sustainable management of biodiversity – balancing the need for conservation and economic development through natural resource management. The Newton Fund funded the Wallacea Research Programme, which forms part of a wider programme of activities (funded by multiple partners) focussed around Alfred Russell Wallace, and initiated by the Indonesian Government, ends in 2021. There is appetite to build on the successes of this programme, outside the Newton Fund framework, moving forwards.
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About UKRI

Launched in April 2018, UKRI is a non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy (BEIS). Operating across the whole of the UK with a combined budget of more than £7.9 billion (2021-22), UK Research and Innovation (UKRI) brings together the seven disciplinary research councils, Innovate UK and Research England.

Our vision is for an outstanding research and innovation system in the UK that gives everyone the opportunity to contribute and to benefit, enriching lives locally, nationally and internationally. Our mission is to convene, catalyse and invest in close collaboration with others to build a thriving inclusive research and innovation system that connects discovery to prosperity and public good.

November 2021