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Scoping study for UK-Vietnam Cooperation in Science, Technology and Innovation (STI)

Discussion Paper

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Paula Knee, France Sadeski, Brian Owino, Julie D'Hont, Nguyen Thuoanh

This report has been commissioned by South Asia Research Hub, Foreign Commonwealth and Development Office, Government of UK. However, the views expressed do not necessarily reflect the official policies of the Government of UK

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1 Introduction

1.1 Overview of the scoping study

Technopolis were commissioned to undertake a *Scoping study for UK-Vietnam Cooperation in Science, Technology and Innovation (STI)* to explore and make recommendations as to how and in what domains UK and Vietnam might cooperate in science, technology and innovation.

This report presents a discussion paper of the key findings of the study presenting:

- A conceptual framework to underpin considerations of international STI cooperation (Chapter 2)
- A summary of the most recent developments in STI policy in the UK and Vietnam (Chapters 3 & 4)
- Challenges to UK-Vietnam STI cooperation (Chapter 5)
- Options for cooperation (Chapter 6)

The study methodology entailed:

- Desk research: reviewing literature, policy documents and programme websites in the UK and Vietnam
- Consultation: via semi-structured interviews with relevant stakeholders in the UK and Vietnam (conducted in Vietnamese by a local consultant who is an expert in the Vietnam STI system). The 12 UK interviews encompassed a range of policy-makers responsible for international STI activities across governments departments and covering different STI disciplines and application domains. The 14 interviewees in Vietnam encompassed policy-makers responsible for STI activities across governments departments and representative of the university and business sectors.
- Regular review and discussion with FCDO

The findings of the study are limited to the extent that the number of interviewees was finite and the assessment of Vietnam's STI capabilities was based existing data analyses (e.g. we did not undertake a bibliometric analysis of research outputs).

A separate Appendix document provides more detail of the fact-finding in UK and Vietnam.

Note on the scope of the study / terminology

The term science, technology and innovation - 'STI' – can mean different things to different people. In the course of this study it has been understood by stakeholders consulted in different ways. For some STI is about research, development and /or innovation activities in the science and technology fields and tends to relate to actors in the research base in universities and public research institutes and innovation actors in private businesses. For these the disciplinary domains are broad (encompassing natural sciences and engineering in particular, but for some wider research domains as well). For others STI refers to a narrower focus on specific technologies, most typically those in IT, communications, digital and data (though for some also technologies in other areas such as biotech and biology more broadly) and encompasses deployment and use as well as R&D and innovation activities.

In this report we use the term 'STI' to encompass all of the above and 'RDI' when we are referring to the narrower definition of research and development (R&D) and innovation activities more closely aligned with the research base and innovation actors in private businesses.

2 International STI cooperation: objectives and mechanisms

2.1 Objectives

Nations engage in international cooperation in science, technology and innovation (STI) for a wider range of reasons from scientific endeavours to advance human knowledge through solving global challenges to enhancing national economic performance and well-being and fostering ethics and values. Eight high-level objectives for international cooperation in STI can be identified in scientific literature as well as strategic documents of Ministries of Foreign Affairs, Ministries of the Economy and Development Agencies :

- Science
- Addressing global challenges
- Economic prosperity
- Socio-economic
- Ethics and values
- Development assistance
- National security
- Diplomatic ties and global influence

We drew on this research to develop a conceptual framework for international STI cooperation for this study (Table 1) The first six objectives are grounded in:

- **Efficient use of limited resources**: pooling knowledge and financial resources bilaterally and/or multilaterally to: advance the frontiers of human knowledge; develop solutions to the global challenges that affect everyone (climate change, biosecurity, food security, cybersecurity, etc); and develop solutions to the specific development challenges faced by LMICs (e.g. tropical diseases, resilient crops, etc, plus supporting STI capability development)
- **Access a wider knowledge and skills base** (and deepen understanding of the STI capabilities of other countries): to enhance national STI capabilities that drive economic performance and improved well-being.
- **International coordination:** in IP, standards and regulation to facilitate international trade (accessing markets and supply-chains) and safe, appropriate and ethical use of STI-based products, processes and services

Furthermore, international STI cooperation can also be used as a tool for national security and diplomacy (the final two objectives in Table 1) by:

- Providing rationales and mechanisms for developing and deepening international relations
- Providing scientific advice to inform foreign policy
- Accessing knowledge and technologies relevant to national security and/or acquiring knowledge on the STI capabilities of other countries that pose a risk to national security

Table 1 Conceptual framework for international STI cooperation

Objective (title)	Objectives (high-level)	Objective (intermediate)	Stakeholders
Scientific	• Enhancing human knowledge • Scientific problem-solving • Scientific excellence	• Accessing & combining a wider scientific knowledge base • Pooling financial resources to conduct research • Cost-effective access to large-scale research facilities	• Scientific community (in academia, public research institutes) • Government (policymakers / RDI funders)
Addressing global challenges	• Using scientific knowledge, technology and innovation to develop solutions to solve global challenges e.g. in health, climate	• Pooling resources & undertaking collective activities to tackle global societal challenges	• Scientific community • Government (policymakers/ RDI funders) • Government (policy delivery/ RDI users) • Industry (as providers of innovative solutions)
Economic prosperity	• Improving national competitiveness through improving capabilities of national STI actors (in industry & research base) • Facilitating trade in STI-based products & service	• Gaining access to state-of-the-art knowledge from overseas • Understanding STI capabilities of other countries • Access to new markets for STI-based products & services • Access to technology supply-chains	• Industry • Government (policymakers/ RDI funders) • Government (policy delivery/ business support)
Socio-economic	• Improving knowledge & capabilities of national STI actors (in industry & research base) to support national well-being (e.g. in health & environmental protection) • Supporting regional integration	• Gaining access to state-of-the-art knowledge from overseas • Accessing solutions	• Scientific community • Government (policymakers/ RDI funders) • Government (policy delivery/ RDI users) • Industry (as providers of innovative solutions)
Ethics & values	• Ensuring commonality of responsible research practices worldwide • Preventing direct & indirect harm from research and from uses of technology – nationally & internationally	• Making international agreements on research practices / research ethics • Influencing rules, norms & standards for emerging technologies, data, cyberspace etc	• Government (policymakers) • Government (policy delivery) • Scientific community • Industry
Development assistance	• Improving STI capabilities of LMICs to support their development • Developing solutions to specific socio-economic challenges faced by LMICs	• Providing technical assistance to develop / improve STI capabilities • Combining STI knowledge & financial resources to address socio-economic challenges faced by LMICs	• Government (policymakers) • Government (policy delivery) • Scientific community • Industry
National security	• Accessing and using scientific knowledge, technology and innovation for security purposes (defence, health security, cyber security, etc) • Ensuring nation has STI capabilities to support national security	• Gaining access to state-of-the-art knowledge from overseas • Accessing solutions • Understanding STI capabilities of other countries	• Government (policymakers) • Government (policy delivery) • Scientific community • Industry (as providers of innovative solutions)
Diplomatic ties / global influence	• Building diplomatic relations through science	• STI cooperation agreements • Deploying STI to address global and development challenges	• Government (policymakers) • Government (policy delivery)

Source: Technopolis

2.2 Mechanisms

Worldwide and in the UK a range of policy mechanisms are used to support for international STI cooperation:[1]

- **Access to knowledge & facilities** such as
  - Ensuring global and fair access to research publications and data (e.g. though policies supporting open source publishing, open access data, etc)
  - Membership of / funding for international research facilities and infrastructures
- **Funding / finance** including
  - Public funding programmes to support bilateral and/or multilateral R&D and innovation (RDI) collaboration focused on fundamental research, applied R&D or innovation (including RDI for development challenges)
  - Support for multilateral bodies (often NGOs) that fund R&D to address global challenges and/or development challenges faced by LMICs
  - Support for promoting and accessing international private sector finance
- **Mobility of researchers and innovators** such as
  - Programmes or schemes that encourage and support short and longer-term movement of researchers and innovators (fellowships, entrepreneurs in residence, travel grants, etc)
  - Innovator / entrepreneur visa schemes
- **Network and relationship building:** such as short-terms visits or missions to /from a partner country
- **International coordination / cooperation**: to form agreements and /or common approaches to intellectual property (IP), standards & regulation for emerging technologies use of technologies, research practices and ethics
- **Overseas development assistance (ODA)**[2] (as defined by the OECD) to, for example, support capacity building in STI and STI policymaking and may be delivered bilaterally or via multilateral institutions
- **Agreeing /signing memoranda of understanding in STI**, signalling the intent to cooperate on STI

No single mechanism provides a complete route to achieving any of the eight objectives and therefore, in practice several mechanisms are used in parallel (Table 2).

[1] The appendix to this study provides a detailed list of mechanism currently in use for international STI cooperation across key UK government departments and agencies

[2] As defined by OECD https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/officialdevelopmentassistancedefinitionandcoverage.htm

Table 2 Mapping of purpose of international STI cooperation and mechanisms to enable or facilitate international STI cooperation

Mechanisms	ACCESS TO KNOWLEDGE & FACILITIES		FUNDING / FINANCE				MOBILITY		NETWORK BUILDING	INTERNATIONAL COORDINATION / COOPERATION			'PURE' ODA	STI MoUs
Purpose	Access to global research publications/ data	Access to global research facilities/ infrastruc-tures	Public funding programmes for bi/multi-lateral RDI collaboration (research)	Public funding programmes for bi/multi-lateral RDI collaboration (applied R&D/ innovation)	Multi-lateral funding R&D bodies (e.g. NGOs)	Access to international private sector finance	Mobility programmes: Researchers	Mobility programmes: Innovators/ entrepreneurs	Support for STI network & relationship building	On IP systems	On standards & regulation	On research practices / ethics	Technical assistance	Bilateral STI MoUs
Scientific	●●●	●●●	●●●	●●	●●		●●●		●●●			●●●		●●●
Addressing global challenges	●●●	●●	●●	●●●	●●●		●●●				●●	●●	●	●●
Economic prosperity	●●	●	●●	●●●		●●●	●●	●●●	●●●	●●●	●●●	●●		●●
Socio-economic	●●	●	●●	●●●		●●	●●	●●●	●●●	●●●	●●●	●●		●●
National security	●●●	●●	●●	●●					●●	●●●	●●●	●●●		●
Ethics & values	●●	●	●●	●●	●●		●●	●●	●●	●●	●●	●●●		●●
Development assistance	●●	●●	●	●●	●●●		●●	●●	●●	●●	●●	●●	●●●	●
Diplomatic ties / global influence		●●	●●	●●	●●	●	●●	●●	●●●	●●	●●	●●	●●	●●●

●●● / ●● / ● = high / medium / low degree of alignment between purpose and instruments for international STI cooperation (high is selected to denote they key mechanisms used for each purpose); grey cell = no alignment

Source: Technopolis

2.3 Partner countries

The choice of partner countries is dependent on the underlying objectives of cooperation.

The *Scientific* objective of international STI cooperation is centred on developed countries with highly developed R&D systems working together to advance human knowledge (often referred to as '*best-with-the-best'*). No one country has the pre-existing knowledge or resources to so this alone, particularly where costly research equipment and infrastructure is required. International R&D collaboration also enables the flow of knowledge and skills across borders, enabling developed nations to retain high-level STI capabilities and avoid capture of knowledge that may prove useful to enhancing economic performance and well-being.

STI cooperation for *Development Assistance* is principally an ODA activity and therefore targeted at LMICs. These activities can be undertaken via multilateral partnerships of developed countries (as ODA donors) and LMICs (who will benefit), with national budgets pooled via multilateral organisations such as the WHO and Gates Foundation in health and CGIAR in agriculture, or bilaterally such as the UK Newton Fund, GCRF, Health Research Programme and Product Development Partnerships.

STI cooperation to *Global Challenges* can entail cooperation with both developed countries and LMICs. Partnering with other developed countries to conduct RDI activities to deepen understanding and develop potential solutions to address challenges such as climate change, biosecurity etc, and/or with LMICs who are often at greater risk from the effects of climate change, infectious disease, natural disasters, etc. With the former typically being funded from R&D budgets and the latter from ODA budgets.

However this pattern of country choice for international STI cooperation is changing as LMICs such as China and India are becoming significant investors in STI and are, in some fields, rapidly becoming world-leaders. So, while officially LMICs, they can be, and wish to be considered as, equal partners in STI cooperation. They are also increasingly acting as ODA donors to LMICs that have lower capabilities in STI.

3 Recent UK policy developments in STI

3.1 Integrated Review: UK as a science superpower

The different purposes for international STI cooperation have, in the past, **largely been the responsibility of different departments and agencie**s e.g. BEIS and UKRI responsible for the scientific and economic / socio-economic objectives and DFID/ FCDO for development assistance, STI to address development challenges and diplomatic ties. However, in recent years the lines between the responsibilities have become less distinct as programmes such the Newton Fund and the Global Challenges Research Fund (GCRF), led by BEIS, have sought to make closer links between national STI capabilities and addressing development challenges.

The UK Integrated Review[3] places science and technology at its heart with ***sustaining strategic advantage through science and technology*** as the first of four overarching and mutually supporting objectives within the Government's overarching national security and international policy objectives and priority actions to 2025. The Integrated Review sees science and technology contributing to strategic advantage in several ways: enabling economic growth; sustaining the UK's security and military advantage; addressing global challenges (both as a good in its own right and to support national security); and as a means for international influence.

The role for international STI cooperation is equally multi-faceted, putting S&T at the heart of alliances and partnership and supporting the UK's choices to own, collaborate or access the scientific knowledge and technologies the country needs in different ways. Ensuring we can access state-of the-art knowledge globally both to secure UK S&T ownership and support collaboration with others to achieve our goals. Cooperation will also support access to technology supply-chains needed and provide routes to market and access to international finance for UK S&T based products and services. Finally, it will enable the UK to shape the responsible use of technology.

3.2 Technologies

The recently published Science and Technology Framework 2023 presents the five technologies identified as most critical for the UK and International Technology Strategy 2023 makes these the priority technologies for international activities:

- Artificial intelligence
- Engineering biology
- Future telecommunications
- Semiconductors
- Quantum technologies[4]

While this suggests that these technologies will be the focus of international STI activities, it is not clear to what extent these will be the sole focus. For example for UKRI international collaboration encompasses the breadth of the UK research capabilities and community, and a restriction to these five technologies across the broad would be a significant change in approach. It would also limit the focus of ODA investments in areas of STI essential for development (in health, agriculture, etc).

[3] Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy 2021 (& 2023 update)

[4] The International Technology Strategy 2023 also notes that all are underpinned and enabled by data

3.3 Recent initiatives in STI cooperation

3.3.1 International Science Partnerships Fund

To date, since the publication of the Integrated Review and the closure of GRCF and the Newton Fund,[5] the only specific fund for international STI cooperation is the **International Science Partnerships Fund (ISPF)** announced in December 2022 and summarised in the table below. The announcement declared the fund to be focused on four broad themes and the consultation undertaken for this study also indicated that it will also focus on the five critical technologies identified in the Science and Technology Framework 2023 and International Technology Strategy 2023.

Table 3 Summary of the International Science Partnerships Fund (ISPF)

<table>
<tr><th colspan="2">International Science Partnerships Fund (ISPF), led by DSIT</th></tr>
<tr><td colspan="2">A new fund launched in December 2022
ISPF will allow UK researchers and innovators to collaborate with international partners on multidisciplinary projects. It will help the UK and its partners to deliver bigger, better science than one country can do alone.
ISPF will give researchers and innovators access to global talent, large-scale facilities, research ecosystems and markets to swiftly move forward ideas to greater maturity, applicability, and commercialisation. It will stimulate research impact in line with the UK's ambition to become a global science and tech superpower.
The fund will help to:
• Deliver important science that can only be fully realised by working internationally
• Tackle global challenges and develop future technologies, positioning UK researchers and innovators at the heart of global solutions
• Enable international partners to collaborate in an agile way
• Strengthen the influence and connections of the UK and UK R&D community domestically and around the world
ISPF is managed by the DSIT and will be delivered by trusted partners (e.g. UKRI (the Research Councils, Innovate UK) and the Academies). The funding is part of the UK's commitments to prioritise strategic international science partnerships.</td></tr>
<tr><td>ODA or non-ODA funding</td><td>Phase 1 is non-ODA funding. Future phases are expected to be mix of ODA /non-ODA</td></tr>
<tr><td>Budget</td><td>£119 million has been assigned to Phase 1 (over 3 years to Oct 2026)</td></tr>
<tr><td colspan="2">STI themes</td></tr>
<tr><td colspan="2">4 themes under which partner organisations will establish their own programmes and calls:
• Resilient Planet - Leading the green industrial revolution to protect the planet
• Transformative Technologies - Developing responsible technologies to secure our place in tomorrow's world
• Healthy People, Animals and Plants – Researching and Innovating for secure and healthy populations
• Tomorrow's Talent – Nurturing talent to drive inclusion, research and innovation.
Interview suggested it will focus on the five technologies in the recently published S&T framework:
• Artificial Intelligence (AI)
• Engineering biology
• Future telecommunications
• Semiconductors
• Quantum technologies</td></tr>
<tr><td colspan="2">Partner countries</td></tr>
<tr><td colspan="2">A process has been run to select countries for Phase 1 but they are not, as yet, in the public domain.
Calls have already been launched in partnership with the following countries</td></tr>
<tr><td>• Singapore (with Innovate UK) on industry led collaborative R&D focused on:
– Advanced manufacturing and materials</td><td>• International (led by 2 Councils, AHRC & ESRC) – no partner countries specified, focused on:</td></tr>
</table>

[5] The previous large-scale programmes targeting international STI cooperation (with total funds of GRCF: £1.5billion and Newton Fund: £735 million)

– Agrifood tech – Mobility and transport – Cybersecurity – Health and life sciences • **South Korea (with Innovate UK)** on industry led collaborative R&D focused on: – Advanced manufacturing and materials – Artificial intelligence – Future mobility (including battery technologies) – Energy storage system – Hydrogen • **USA (led by 7 Research Councils)** focused on – Global Centers on Clean Energy and Climate Change – Projects can also include **Canada and Australia**	– International research on climate change adaptation and mitigation – on international and interdisciplinary research on participatory and culturally-appropriate mitigation and adaptation responses to climate change focused on vulnerable populations. • **India** - new programmes recently announced (April 2023) – Improving farmed animal health and welfare through better understanding of infectious diseases and resistance to treatment – **with BBSRC** – Technology and skills partnership programme- **with STFC**

Source: ISPF webpages, Innovate UK calls, interviews with UK stakeholders

3.3.2 Technology Centre of Expertise

The FCDO is planning a new Technology Centre of Expertise (CoE) to provide **access to digital and technology expertise from the UK Government, private sector, civil society, and academia** that can support countries to transform their economies in a sustainable and inclusive manner and counter the rise of digital authoritarianism, that is, one which supports technology development and shapes an enabling environment that enhance security and support democratic principles. There is a pilot of the CoE in Ghana and a business case being developed for a wider initiative. The International Development Strategy also refers to multiple new UK Centres of Expertise suggesting that there may be more such centres being planned in areas such as manufacturing, agriculture, green cities and infrastructure, building on existing UK expertise, evidence and technology in these sectors.

3.3.3 Asia-Pacific Digital Trade Network Expertise

The Asia Pacific Digital Trade Network (DTN) is a joint DSIT-DBT initiative (previously a joint DIT-DCMS initiative) to **increase the UK's technology presence and capability in Asia Pacific.** It Is not focused on R&D and innovation activities in the sense of developing new products, processes and services but on accelerating the growth of UK digital technology and digital trade through helping UK businesses find opportunities for new partnerships, increased trade and investment, and greater market access. It also aims to help overseas businesses connect with and understand the UK's technology ecosystem while promoting the UK as an investment and scaling-up destination for Asia Pacific technology companies and investors. Currently the DTN has a presence in Australia, Japan, Indonesia, Singapore, South Korea and Thailand and is expected to be extended to Vietnam very soon.

We note that there is a much larger activity to support international STI cooperation across government in addition to these recent activities. The majority are supported by and/or funded by UKRI and its constituent research councils and Innovate UK,[6] plus a lower level of activity under the Department of Health and Social Care, the Department of Energy Security and Net Zero, the Department for Culture, Media and Sport[7] and FCDO itself.

[6] UKRI falls within the Department for Science, Innovation and Technology (DSIT)

[7] Though most of the DCMS activities were moved to DSIT when it was established in February 2023

3.4 Partner countries

The International Technology Strategy does not identify target countries and no priority countries for STI cooperation have been announced publicly. However the policymakers developing the ISPF have undertaken a process to identify priority countries (largely based on their research performance in terms of bibliometric indicators)[8], although the information is not in the public domain. The interviews conducted for this study indicated that It is expected that **the ISPF will focus on a limited set of countries for around 70% of the budget with the remaining 30% addressing a larger group of countries**. To note, the 70% does include LMICs as India is on the list. As Table 3 indicates ISPF partnerships with Singapore, South Korea, USA and India have already been announced. Given that the G7 plus South Korea and Australia represent the nine of the ten highest investors in R&D (with China as the tenth member of the group)[9] it seems reasonable to expect these to be the focus of much international STI cooperation. However, with the increased focus on the Indo-Pacific region in the Integrated Review it is also expected that a number of countries from this region will also be the focus of STI cooperation, possibly via the ISFP (and the 30% assigned to a wider group of countries) but also by other means.

3.5 STI cooperation with middle income countries

A number of middle-income economies with growing economies are becoming increasing attractive as STI partners and as markets for UK technology and innovations due to the size and rapid growth of their economies and populations and their increasing investment and interest in STI. Some of these countries are also important 'middle-ground' countries whose approach to the deployment and governance of technology may be open to influence by the UK (and other open societies) regarding responsible use of technology**. Vietnam is deemed to fall into both these categories as well as being a country located in the Indo-Pacific region.**

[8] Number of publications, citations, etc
[9] OECD Gross domestic spending on R&D https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm

4 Lessons learned from GCRF and the Newton Fund

GCRF and the Newton Fund were the first large scale programmes to support STI cooperation with LMICs. Both funds were classified as ODA funds with a total of £2.24 billion allocated over a period of 5-6 years (£1.5 billion allocated to GCRF and £735 million to the Newton Fund).[10]

Both funds had dual objective; primarily to address challenges faced in LMICs but also to generate research and innovation benefits for the UK:

- GCRF: "*supported cutting-edge research to address challenges faced by developing countries*" also phrased as "*dedicated funding to research focused on addressing global challenges which most significantly impact upon developing countries*."[11,12]
- Newton: "*Its main purpose is to promote economic development and welfare in Partner Countries by improving their research and innovation capacity and unlocking further funding by developing innovative solutions that support poverty alleviation. An expected secondary objective is to objective is to secure benefits to the UK through further research opportunities for the UK research and innovation base, improving UK innovation skills and unlocking opportunities for trade*."[13]

Both funds were delivered in the main by the Research Councils[14] but operated differently. GCRF supported challenge-led disciplinary and interdisciplinary research that addressed the UN's Sustainable Development Goals (SDGs). It encouraged partnerships with over 70 LMICs but had no explicit requirement to partner with host country governments or for match funding. The Newton Fund supported bilateral science partnerships with 16 LMICs with each country co-designing and match funding the activities undertaken. For both funds, the vast majority of funding was allocated to UK RDI institutions or, in case of Innovate UK's Newton Fund, UK businesses.

Both funds have closed and evaluations have been conducted. The final evaluation of the Newton Fund has been published and first evaluation report of the GCRF evaluation has been published[15] and both funds have been reviewed by the Independent Commission for Aid Impact (ICAI).[16] The key findings of which include:

The funds are delivering benefits for both the UK and LMICs delivering research outputs in the form of papers and patents focused on development challenges and the creation of equitable partnerships. The very existence of the funds has enabled these partnerships to be developed and has helped to improve the UK's STI reputation among partner countries. Both funds experienced a number of challenges and the evaluations make recommendations for improvements:

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[10] The timing of the two funds was slightly different and the final allocations were slightly lower due to the ODA budget cuts announced in late 2020

[11] https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/global-challenges-research-fund/

[12] *GRCF Evaluation Stage 1a: Review of Management Practice* https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/global-challenges-research-fund/

[13] The Newton Fund, Operational Framework, August 2020

[14] GCRF and the Newton Fund commenced before UKRI was established. A small proportion of both funds was delivered by Innovate UK (around 7% of the total Newton Fund budget) and the academies – Royal Society, Royal Academy of Engineering, British Academy – and the UK Space Agency

[15] https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/global-challenges-research-fund/

[16] https://icai.independent.gov.uk/review/newton-fund/ ; https://icai.independent.gov.uk/wp-content/uploads/ICAI-GCRF-Review.pdf ; https://icai.independent.gov.uk/wp-content/uploads/2019-ICAI-Follow-up-GCRF.pdf

The challenge of aligning research and innovation excellence (a requirement of UKRI funding bodies) with generating development impact. This was not only related to the design of programmes and the selection of projects for funding but also to the long timescales (typically many years) between research activity and societal impact. RDI relationships and skills were developed during funded activities, which are beneficial in and of themselves, but addressing wider global challenges based on the research outputs will take much longer. The GCRF evaluation proposed that alternative methods are needed for the review and selection of projects that encompass 'ODA excellence' (that include gender, inclusion, poverty) as well as research and innovation excellence/ academic quality.

The need for a clear strategy for the funds. While both funds did develop relationships with public agencies /bodies in partner countries (this was essential in the case of the Newton Fund to secure matched funding), both evaluations recommended more concerted effort in this regard. They recommended that any future fund have an overarching strategy in place at the outset[17] that clearly defines the target development outcomes and also the journey from research and innovation activities to development impact (i.e. to link strategy to practical change on the ground) – to ensure the funds are more than the sum of their parts. For Newton, where the UK-partner country model was praised, it was recommended that partner country strategies (possibly including country-level theories of change) are also developed in close collaboration with delivery partners and with relevant agencies in partner countries to guide the programmes.

The Funds targeted middle-income countries which may lead to an insufficient focus on poverty and gender. The funds target middle-income countries as they are most able to engage in STI cooperation which means that low-income countries tend to be underserved and, for both funds, gender as an outcome (and not just an input)[18] was not a sufficiently targeted.

A better balance of capacity building with research funding. While there were some specific capacity building initiatives within GCRF and the Newton Fund, ICAI noted that GCRF was seeking to build research capacity in LMICs by encouraging UK universities to include southern institutions in their applications, but that capacity building was not approached in a structured way, particularly in the early rounds. Noting also that there was no analysis of existing capacities or identification of geographical or thematic priorities and, that the focus on research excellence may continue to advantage developing countries that already have credible research institutions, rather than directing investment towards poorer countries where capacity building may be most needed. For the Newton Fund ICAI was concerned that it focused mainly on individuals rather than building sustainable research capacity.

[17] Noting that the timing of budget allocations of both funds meant they had to get and running very quickly at the start and begin expending budget without such strategies in place

[18] i.e. the gender of those funded in RDI projects / activities

5 STI in Vietnam

5.1 STI strategy

Vietnam is one of the fastest growing economies in SE Asia and in the world. It achieved World Bank's middle-income status in 2010 and is the sixth-largest economy in the 10-member ASEAN trading bloc and fourth in GDP per capita.[19,20,21] As a result Vietnam's economy is shifting, with traditional industries and exports (commodities such as from oil and mining, agriculture, fisheries, aquaculture) being supplemented with increasing activity in sectors such as manufacturing, construction, tourism and business services. Vietnam's top three export sectors are now telecommunications equipment; textiles and garments; and computers, electronics and integrated circuits.[22] Building on these developments, Vietnam's ambition is to become an upper middle-income country by 2035, with South Korea, Singapore and Japan as its role models and continue to improve its position within the Global Innovation Index.[23] Vietnam's current ***Strategy for Development of Science, Technology and Innovation by*** 2030, published in 2022, identifies STI as a top national priority for achieving this goal.[24,25]

The STI Strategy has the ambition that the "*level and capacity for technology and innovation of enterprises will reach over average rate in the world; some sectors of science and technology will reach international level… and some S&T organisations will reach regional and world level.*"

Following from the previous STI strategy for 2011-2020, it seeks to further develop and improve capabilities across the STI system including:

- Improve the innovation capabilities of businesses as well as the more general absorptive capacities of businesses to adopt technologies and innovations
- Improve the R&D and innovation capabilities within the research base in universities and government research institute – including improving the links between the research base and industry
- Improve the structure and performance of the national innovation system (NIS)/ STI system including the policymaking to support it

In strategy is equally broad in terms of the STI domains it targets (Table 4). Although, while broad, it is clear that applied R&D and innovation is the primary focus of the activities. Vietnam seeks to utilise STI to:

- Improve labour productivity (with a strong focus on the Fourth Industrial Revolution in processing and manufacturing sectors), the quality of products and services (jncluding a greater proportion of high-tech products) and the competitiveness of enterprises
- Develop solutions and technology to develop green economy and circular economy and protect the environment
- Respond to challenges from epidemics and climate change
- Research and apply science and technology to the development of defence industry

[19] Vietnam Today, the first report of the Vietnam's Future Digital Economy Project, CSIRO, March 2018
[20] The 10 members of regional group of Association of Southeast Asian Nations (ASEAN) are: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam
[21] World Bank https://www.imf.org/external/datamapper/NGDPDPC@WEO/THA/IDN/PHL/VNM/MYS
[22] Vietnam Today (ibid)
[23] Vietnam: Science, Technology and Innovation Report, Policy Brief, Australia-World Bank Group, Strategic Partnership in Vietnam, 2020
[24] Strategy for Development of Science, Technology and Innovation by 2030, Socialist Republic of Vietnam, May 2022
[25] Referred to as the '*STI Strategy*' in this report

Table 4 Priority STI domains of Vietnam[26]

STI strategy priority*	Additional information on areas of interest**
Information and communications technology	Digital transformation, artificial intelligence, Internet of things
Biotechnology	Research and manufacture drugs and vaccines to meet the needs of medical examination and treatment and disease prevention and control; research on stem cell technology in the pharmaceutical industry, gene technology, production of raw materials and biological drugs, functional foods derived from herbs
New material technology	New multifunctional materials used for electronic devices; development of smart materials for environmental treatment and green agriculture related materials
Manufacturing technology and automation	Mechanical technology, supporting technology, technology of preserving and processing agricultural products; mining and mineral processing
Marine technology	Treatment of the environmental pollution for sustainable development of marine economy
Technology to prevent natural disasters and respond to climate change	
Environmental technology	
Energy technology	New energy development, hydrogen energy and energy storage, renewable energy
Space technology	Researching, acquiring and mastering techniques and technologies for designing and manufacturing a number of important equipment used in small satellites, earth stations, terminals
Smart advanced construction, transportation and infrastructure technology	Develop green, clean, emission-reducing, anti-climate change technologies for public transport
Social science	

Source: *STI Strategy; ** additional detail (where provided) from interviews, with STI stakeholders in Vietnam

The scoping study team notes that while the STI Strategy spans action across the STI system and STI actors, the World Bank review of STI in Vietnam in 2020 (intended as input to the STI Strategy 2021-2030) concluded that the national innovation system (NIS) remains overly focuses on the supply side i.e. on the production of science and technology and R&D based innovation.[27] **It advised that Vietnam place a greater focus on activities to improve businesses' capabilities for adoption and diffusion of technologies alongside and improving linkages within the NIS** (including links between businesses and the research base and between government research institutes and universities), **improving governance and STI policy-making throughout the system.**[28] The World Bank also advised **reforms to the business environment** (regulation, access to finance), **improved digital infrastructure and connectivity and improvements to human capital more generally – workforce skills, management skills in business**.

[26] A table presenting the more detail in each category as specified in the STI Strategy is provided in the Appendix to the Scoping Study

[27] The World Bank made the same conclusion in its prior review of STI in Vietnam in 2016 (*Vietnam 2035 Report 2016*)

[28] Vietnam: Science, Technology and Innovation Report, Policy Brief, Australia-World Bank Group, Strategic Partnership in Vietnam, 2020

5.2 Areas of expertise

Area of Vietnam's STI expertise within the research base, as determined by levels of international co-publication in academic journals, are presented in Table 5. Two-thirds fall into the top 5 categories in the physical sciences that can be expected to contribute to advances relevant to the application domains of manufacturing and automation, ICT, materials, space and energy technologies and construction, transportation and infrastructure technology, as well as potentially making contributions to environmental and marine technologies. The top 10 Vietnamese organisations with international publications are all universities and they publish most frequently (in terms of number of co-published papers) with the USA, Korea, Japan, China and Australia, with the UK in 8th position.[29]

Interviewees noted that **Vietnam has invested quite heavily in physics, IT and AI and that, as an agriculture-based country, has developed a strong performance in, for example, genomics for agriculture.**

Table 5 Vietnam: fields with highest levels of international co-publications 2016-2021[30]*

Research fields (rankled order)		No. of co-authored publications 2016-2021	% of total
1	Engineering	19,364	20%
2	Computer science	14,714	15%
3	Physics	9,893	10%
4	Mathematics	9,567	10%
5	Material Science	9,355	10%
6	Medicine	7,701	8%
7	Environmental science	7,518	8%
8	Chemistry	7,179	7%
9	Agricultural science and biology	7,129	7%
10	Social science	5,353	5%

Source: MOST, Vietnam (based on Scopus Database of Elsevier, April 2022); * i.e. papers co-authored by author(s) from Vietnam and at least one other country

5.3 Area of interest for cooperation with the UK

The thirteen Vietnamese stakeholders interviewed identified that motivations for cooperation with the UK are based in learning from UK experts (in the public and private sectors) via training, consulting and exchanges and building long-term mutually beneficial cooperation activities, plus areas related to improving STI skills, improving policy to develop the ecosystem and improving higher education capabilities, notably:

- Medical and pharmaceutical research
- Drugs and vaccines manufacturing technology
- Food preservation and processing technology
- Supporting technology
- Semiconductor technology

[29] A table presenting the more detail on co-publication partners is provided in the Appendix to the Scoping Study

[30] A table presenting the more detail in each category identified via reports from the MOST and research organisations is provided in the Appendix to the Scoping Study

- New multifunctional materials used for electronic devices
- Artificial intelligence and digital transformation
- Treatment of the environmental pollution for sustainable development of marine economy
- New energy, clean energy and renewable energy
- Green, clean, emission-reducing technologies for public transport
- Higher Education
- STI skills
- Building and operating the ecosystem that supports startups and innovation

6 International development donor programmes in Vietnam

Below we present a summary of an analysis of donor programmes in Vietnam. A description of each programme is provided in the Appendices.

Table 6 Summary of the analysis of donors in Vietnam

Strategic metric	Best practices identified	Factors to take into consideration
Context/ Relevance	Most multilateral donors or partners aim to align their STI/programme strategy to match the country needs/at national, regional to local levels – this includes a consideration of any thematic focus. Evaluations of donor programmes suggest that multilateral donor programmes that align to the existing or planned interventions by national governments have been more successful more than those that do not. A recent World Bank review of new interventions in STI highly recommended that a capacity assessment of the local implementing partner is conducted to inform programme approach to implementation, notably in the context of innovation schemes being implemented through public private partnerships[1]. Technical capacities reinforcement to lead innovation projects shall be part of the intervention. A Technical assistance team could be required.	Vietnam Vision 2030; key national policy goals per theme. National Digital Transformation Programme 2025. Vietnam Green Growth Strategy. Vietnam Renewable energy Development Strategy 2016 National Digitization strategy
Coherence	Analysis of the donor programmes suggest that the anticipated programme goals and targets should consider assessment of socio-cultural practices and how these affect different elements of the partnerships. In designing targets or objectives, it is advisable to engage local key stakeholders in a dialogue. Thus, donor led-STI programs need to have clear lines in terms of: • Harmonized leadership commitments at different levels within one institution and among institutions involved • Coordination between international and national partners; but also among national partners. • Matching timelines of key national/institutional policies. • Coherence in stakeholders programme workflows.	Coherence of socio-cultural practices Contribution and administrative roles of government agencies or stakeholders involved to ensure there is coordinated flow of activities.
Impact	Evaluation of donor programmes suggests that developing and using a clear theory of change for each intervention is key to defining the right intervention pathway and communicating about it. A theory of change is more impactful if developed and/or validated with stakeholders. In addition, possible constraints in achieving outcomes as well as level of efforts required from each stakeholder, shall be considered when designing donor led projects; risks shall be identified and mitigated, notably divergence of interests from various stakeholders or change in leadership. For e.g. the World Bank cancelled the Inclusive Innovation Project[2] due to lack of focus on delivering and conflicting interests of public institutions. Vietnamese public institutions did not have prior significant experience in implementing STI programs especially with the private sector.	Public institution practices-by understanding what intervention channels are, and how they are used by public institutions. Stakeholder mapping - considering and mapping key stakeholders at different levels enables definition on level of intervention needed for each intended outcome. Understanding regional disparities – it allows to design what is achievable within time and resource limits. Encouraging discussion with public institutions on the role of the private sector in the STI promotion in the economy
Sustainability	To ensure sustainability of large projects, the World Bank recommends conducting socio-environmental impacts assessment of the programme or for different components of the programme.	

Strategic metric	Best practices identified	Factors to take into consideration
Effectiveness	A World Bank evaluation recommended initial piloting of small-scale projects prior to scaling. Programme design should include both long term and short team priorities, allowing for continuous improvement based on the monitoring and evaluation. Strategic collaboration with key stakeholders is a must. Nesting community efforts can support overcoming barriers to implementation.	Short term and long-term goals - indicating how short-term goals feed into long terms targets.
Mechanism	Donors' evaluation reports indicate that STI interventions involving private sector are quite recent. Mechanisms involving expert exchanges are very successful including with research institutions and notably universities. Matching grants mechanisms faced challenges with the private sector. Matching grant instruments to support private sector through the government require upfront buy-in by government agencies in Vietnam (being a social state)-this can strengthen the role of private sector in innovation. The FIRST Programme recorded success in engaging public research institutions and international knowledge transfer in STI for R&D. For long-term programs it is recommended to assess the appropriateness of mechanism depending on themes and stakeholders involved.	Multiple mechanisms: grants, credits, investments through public-private partnerships, technical assistance in technology transfer and research cooperation, technical expert exchange programs, fellowships, and knowledge transfer.

Source: Technopolis

7 Challenges in UK-Vietnam STI cooperation

7.1 From the Vietnam perspective

From the perspective of Vietnam, challenges to STI research cooperation with the UK include:

- Unaligned motivations: the UK's preference for working on highly advanced research topics and while Vietnam's interested in less advanced research with a greater focus on application
- A general lack of awareness of each other's capabilities and interests and a lack of connections and networks among the UK and Vietnamese STI actors
- Different funding mechanisms and processes which have, in the past, have created delays in implementing cooperation. This was a particularly challenging issue for the Newton Fund where the cooperation required matched funding and close alignment of processes in terms of timescales of decision-making and expenditures
- Language barriers – although English language capabilities tend to be greater among the STI community in Vietnam (compared to other areas of society) it can still be insufficient for research partnerships (and very few UK researchers speak Vietnamese)
- To date any partnerships have tended to be at the individual level rather than via a stable and longer-term programme, resulting in ad hoc partnerships and limiting learnings and spillovers.

7.2 From the UK perspective

From a UK perspective, challenges fall into two groups – practical implementation challenges and more strategic challenges. The strategic challenges align to a certain extent with the findings of the GCRF and Newton Fund evaluations.

Practical implementation challenges (noting that many of these align with the challenges identified by stakeholders in Vietnam):

- Differences in research capabilities: Most UK researchers are working at (and wish to work at) a higher level than Vietnamese researchers and therefore UK researchers tend to seek international partners from equally advanced countries. Where UK-Vietnam collaboration does occur it is because Vietnam is an interesting use-case or location for application of UK research e.g. where UK researchers are working on global and/or development challenges.
- Differences in research funding mechanisms: As shown by the experience with the Newton Fund, unaligned research mechanisms and decision-making processes impede and delay research collaborations, which can decrease motivation for future collaborations.
- Matched funding requirements: while this has benefits regarding more equitable partnerships, it can also increase timescales to agree a programme of activity at government-to-government level and then be hampered by the difference in Research funding mechanisms and decision-making processes.
- Programmes that combine both ODA / non-ODA funding are both strategically and administratively complex to implement (e.g. it can be difficult to align the aims and objectives and to align different reporting requirements) and difficult to explain to the target partners and participants. As a result, this complexity can hinder the very activities they aim to support.
- Scale of research in Vietnam: in order to make a collaborative research programme worthwhile (rather than ad hoc individual projects), there needs to be sufficient quantity of research activity in Vietnam (or any other country) to run a programme i.e. there needs to

be sufficient research activity (as well as capability) to generate enough projects to select from and to undertake.

At a more strategic level:

- **Perception of UK research community that ODA support is required to partner with Vietnam**. Where STI cooperation with Vietnam is concerned, UK research funders perceive it in terms of ODA support i.e. without ODA-driven programmes it is unlikely to be undertaken. UK researchers are principally motivated to collaborate with researchers in other highly developed countries doing the most leading-edge research. The Newton Fund and GCRF were welcomed by the research community (funders and researchers) but a similar level of activity is unlikely to be replicated without similar ODA-focused funding programmes.
- **Tension between ODA and non-ODA forms of support and STI domains of interest to UK and Vietnam**. ODA funding tends to constrain STI activities to specific challenge domain (e.g. improving health, improving agricultural yields, climate change mitigation / adaptation) which while attractive to countries such as Vietnam, isn't the sole focus of their STI ambitions. Vietnam is interested to partner with the UK in semiconductors, digital and AI, functional materials, pharmaceutical research etc, areas which have not traditionally been the focus on ODA activities and, as noted above, are domains where UK researchers are more likely to be motivated to work with other developed countries than to partner with Vietnam.
- **Choice of Vietnam as a location for STI /RDI partnerships**. For ODA driven STI programmes outside of the Newton Fund (e.g. FCDO, DHSC programmes), the work is generally geographically 'agnostic' as it seeks to solve global challenges and/or problems common to many developing countries. While some of the research (but not all) is physically located outside the UK the choice is not driven (or has not been driven to date) by wider geo-political drivers. In addition, programmes focused on global challenges and problems common to many developing countries can be driven by UK interests rather than partner country interests. However there is an increasing interest in developing more equitable partners with middle-income countries.
- As a result of the Integrated Review and the discussions in government around it, Vietnam is increasingly on the radar for STI/RDI policymakers and funders, as are other countries in the region (particularly Indonesia, Thailand, Malaysia – with interviewers noting that Singapore has been a focus for STI for some time already)
- **Mixed views across UK STI stakeholders on the purpose and role of STI partnerships with Vietnam**
  - As a result of the Integrated Review, STI and RDI policymakers and funders in the UK are aware of the increased interest in the Indo-Pacific region, but many are unclear of what this means in practice and how the Integrated Review and the related S&T strategies are intended to be implemented.
  - The breadth of rationales for STI cooperation in the Integrated Review mean that there are different understandings of, and views on, the mechanism for implementation. Some see it as a rationale for further R&D and innovation programmes (something akin to the Newton Fund and GCRF, and an expectation that ODA funding is likely to be needed). Some see it as focused on trade (largely UK exports) in technologies - and possibly science-based products and services, although trade is largely discussed in terms of IT, digital, communications, data technologies. Others see the rationale as influencing the responsible use of technology (again largely perceived in terms of IT, digital, communications, data) and using science as a tool for diplomacy more broadly.
  - Coordination regarding STI activities in the Indo-Pacific region is not yet effective

8 Options for UK-Vietnam STI cooperation

As presented in the sections above there are number of different rationales for engaging in STI cooperation with Vietnam and different UK STI stakeholders interested in, and responsible for, implementing these different rationales. As a result the very term 'STI cooperation' means different things to different people which impedes discussions and decisions regarding STI cooperation with Vietnam (and with other middle-income countries in the Indo-Pacific region). Clarity of objectives for cooperating with Vietnam in STI or acknowledging what the range of objectives are would help. As noted in section 2, different support mechanisms can meet a number of objectives which, while beneficial, can also lead to tensions between different parts of the STI system in the UK e.g. where the needs of science for development or diplomacy is misaligned with scientific or economic objectives of UK STI actors. **This indicates that discussion and coordination is needed within UK government** to identify, prioritise and balance different rationales for STI cooperation and agree how mechanism (and their budgets) can be used most effectively. This will enable the UK to approach officials and STI actors in Vietnam with a more coherent 'offer'.

There are various potential components of a UK 'offer' for STI cooperation with Vietnam, that can be grouped under the following headings (these are presented in more detail in Table 7):

- Programmes to support collaborative (applied) R&D and innovation activities
- Activities that support building of networks between UK and Vietnam R&D and innovation actors
- Activities that seek to influence the location of specific ODA R&D programmes / activities
- Activities to support capability building in STI policymaking in Vietnam to further develop and improve the national innovation system
- Activities to influence and support the responsible deployment of technology

Table 7 Options for actions to support STI cooperation between UK and Vietnam

Mechanism	Intervention	ODA / non-ODA	Purpose	Alignment with rationales (from UK perspective)*	Implementation considerations
Funding	Bilateral collaborative R&D and innovation programmes (along the lines of the Newton Fund / ISPF)	ODA	To enable UK and Vietnam policymakers and R&D and innovation funders to support programmes for the R&D and innovation communities (i.e. businesses, universities, research labs) to develop solutions to challenges relevant to Vietnam in areas where there is mutual research interest (with UK) and in domains that align with ODA requirements	• Technical assistance • Global challenges** • Scientific • Ethics & values • Diplomatic ties	• Identifying challenges of UK/Vietnam mutual interest – it may be better to focus on a small number of significant challenges rather than programmes based on large open calls in broad themes. Flexibility in deploying collaborative R&D mechanisms may also be needed e.g. UK could fund travel and/or short secondments for Vietnam partners/ researchers to come to the UK (see • Connections and networks between and UK / Vietnam STI actors will need to be improved to develop effective partnerships to deliver projects (see row on Network Building) • Considerable time is likely to be needed to identify challenges & develop project partnerships (& ideally agree implementation processes in UK &Vietnam), so it would be beneficial to, first, assign time and budget to activities to identify challenges & build networks, followed by a programme to support R&D and innovation projects
Funding		Non-ODA	To enable UK and Vietnam policymakers and R&D and innovation funders to support programmes for the R&D and innovation communities (i.e. businesses, universities, research labs) to develop solutions to challenges relevant to Vietnam in areas where there is mutual research interest (with UK)	• Global challenges** • Scientific • Ethics & values • Diplomatic ties	
Funding	FCDO ODA funding programmes to more directly target Vietnam	ODA	To enable the UK to increase its STI footprint in Vietnam both directly and via international partners	• Global challenges** • Scientific • Ethics & values • Diplomatic ties	• This funding has tended to be 'location agnostic' – going to where skills and/or need is located. This would be a shift in thinking / approach, which may not be welcome within FCDO (or the multilateral organisations that the UK contributes to). Discussions within FCDO will be needed to determine the feasibility of such an approach • RED is considering a number of Centres of Expertise (in addition to the Tech CoE), these might consider Vietnam as a location
Funding / Development Assistance	Innovation transfer / innovation exchange activities: building bridges to identify and develop innovate solutions and /or support innovation transfer / innovation exchange and learning from one sector to another to solve challenges in Vietnam	ODA and/or non-ODA versions	To enable Vietnam's public agencies and large private businesses ('challenge holders') to specify some specific challenges requiring innovation – then enable innovative UK and Vietnam businesses to propose solutions (solution providers') with options for public innovation support for technology development or adaptation and/or knowledge transfer between challenge holders and solutions providers.	• Global challenges** • Technical Assistance • Economic prosperity • Ethics & values • Diplomatic ties	• The Vietnam challenges could be development focused (so eligible for ODA funding) or more general economic /social challenges (so non-ODA funding) • Innovate UK runs two similar programmes via the KTN: Open Innovation in Kenya, Nigeria and South Africa and Global Alliance Innovation Exchange that runs in UK and globally

Development assistance	Awareness of and access to the UK Tech Centre of Expertise (CoE) by stakeholders in Vietnam	ODA	To provide strong links between UK and Vietnam regarding responsible use of technologies	• Ethics & values • Diplomatic ties	• Proactive effort by UK to ensure that relevant Vietnam STI policymaker and stakeholders are aware of offering of the Tech CoE and have clear routes to access it.
Network Building	Short-term visits between UK and Vietnam R&D and innovation actors	Non-ODA	To build and deepen links between UK and Vietnam R&D and innovation actors in key areas of mutual interest With some visits focused on actors in applied R&D (universities, research institutes) and others on focused on innovative businesses (and combinations of both)	Precursor activity to: • Global challenges** • Scientific • Ethics & values During implementation supporting • Diplomatic ties	• This is a relatively low-cost solution (compared to R&D programmes) but would require considerable administrative and diplomatic/ embassy support but could form the basis for subsequent wider and deeper cooperation • Process could be modelled on some existing schemes used by Innovate UK, such as Global Expert Missions, and activities, such as 'missions', to support international trade
Mobility / Network building	Short and medium-term secondments between from Vietnamese R&D and innovation actors to the UK (possibly followed by short visits from UK partners to Vietnam partner)	ODA / non-ODA?	To build and deepen links between UK links UK and Vietnam R&D and innovation actors in key areas of mutual interest	Precursor activity to: • Global challenges** • Scientific • Ethics & values During implementation supporting • Diplomatic ties	• These could be standalone activities or part of a collaborative R&D project • There is a risk that a standalone secondment might not be of sufficient interest to UK RDI actors. They might be incentivised if offered as a follow-up to a successful visit (row above) with a view to building potential research collaboration
Development assistance	Capability building in STI policymaking	ODA	To share knowledge and learning from the UK regarding specific areas of STI policymaking of interest to Vietnam and where UK has specific experience – in order to make improvements to Vietnam's National Innovation System	• Technical assistance • Ethics & values • Diplomatic ties	• It may be a challenge to identify STI policy domains where Vietnam's needs and UK expertise (of relevance to the Vietnam context) align and where there is limited activity supported by other bilateral / multilateral donors • The UK could review the areas proposed by the World Bank as needing actions as a starting point. For example university-business links where the UK's historical experience and learning may have some relevance (e.g. inception and evolution of HEIF and it use by different types of universities) and wider policy approach for higher education • Other areas might be in research ethics, research collaboration agreements, IP, standards
STI MoU	An STI specific MoU with Vietnam		To form the basis for a coordinated set of activities such as those in rows above	• Diplomatic ties • Global challenges* • Scientific • Ethics & values	• UK and Vietnam could consider taking the S&T elements of current broad MoU (and possibly Digital Agreement) into an S&T specific MoU and agree annual implementation plans

Source: Technopolis. *from Table 1 (and in order of relevance/ degree of alignment); **here global challenges are those focused on effects for LMICs (e.g. climate effects for LMICs, global health issues for LMICs)

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