

UK Research
and Innovation

Together for Impact

A decade of UK-India partnership



About

UK Research and Innovation (UKRI)

Operating across the whole of the UK with a combined budget of more than £6 billion, UK Research and Innovation brings together the seven Research Councils, Innovate UK and Research England.

We are an independent organisation with a strong voice for research and innovation, both to government and internationally. We are supported and challenged by an independent chair and board and we are principally funded through the Science Budget by the Department for Business, Energy and Industrial Strategy (BEIS).

Our mission is to be a trusted partner and to ensure research and innovation continues to flourish in the UK. We will support and help connect the best researchers and innovators with customers, users and the public. We will invest every pound of taxpayers' money wisely in a way that maximises impact for citizens, in the UK and across the world.

We will be measured by the impact we deliver, and this will have three elements:

- We will push the frontiers of human knowledge and understanding
- We will deliver economic impact and social prosperity
- We will create social and cultural impact by supporting our society and others to become enriched, healthier, more resilient and sustainable

UK Research and Innovation India (UKRI India)

UK Research and Innovation India (formerly RCUK India), based at the British High Commission in New Delhi, plays a key role in enhancing the UK-India relationship in research and innovation. Since 2008, when the office was established, the UK, the government of India and third parties have together invested over £300 million in co-funded research and innovation programmes comprising over 140 individual projects, involving over 175 different UK and Indian research institutions and more than 100 industry partners.

Through these collaborative programmes, UKRI enables a strong, strategic and mutually beneficial partnership with India. Our joint portfolio with India - one of the world's fastest growing large economies and a major research power - drives shared prosperity, extends the frontiers of human knowledge and, forges a strong partnership addressing shared global development goals. Collaborative projects cover an array of themes, including, energy, environment, food security, health, next generation IT networks, social sciences, and humanities.

Acknowledgments

This study was authored by:

- Uwe Brandenburg, Global Impact Institute
- Janet Ilieva, Education Insight
- Joseph Taylor, Universities UK

Additional research support was provided by Richard Grubb, Universities UK.

Foreword



Professor Andrew Thompson

Executive Chair, Arts and Humanities Research Council
International Lead, UK Research and Innovation

Over the last decade the partnership between UK Research and Innovation (UKRI) and its Indian collaborators has grown from strength to strength; with a portfolio of joint investments that has accelerated from less than £1 million to more than £300 million (₹2,700 crore) and now spans the full spectrum of research and innovation from the arts to astronomy. I welcome the findings of this external report, commissioned by UKRI India, which show that nearly 90% of researchers evaluated the overall impact of the UK-India funding to be very high or high. It shows that the joint funding has resulted in an impressive volume of output, with half of the Indian researchers (who responded to the survey) and over a quarter of the UK researchers producing more than five papers attributed directly to the UK-India grant, and a high degree of additionality, with more than three-quarters claiming that the joint research only took place because of the UK-India grant. The greatest benefits were thought to be to the community around the researchers in India or the UK, but half attributed a global-level impact to the UK-India partnership.

As the creation of new knowledge becomes ever more crucial to prosperity and addressing global challenges, the UK and Indian research and innovation communities become more important to each other - 80% said the UK India research relationship would become more important in the future. In the last ten years the UK has risen from fourth to become India's second largest collaborator, in the next ten years India will rise to become the world's third largest economy. The creation of UK Research and Innovation comes at an exciting time for both the UK and India. As the UK aims to raise total research and development investment

to 2.4% of GDP by 2027, and invests £4.7 billion of additional public funding between now and 2020/21, so is India boosting investment in research and innovation - together presenting a huge opportunity for collaboration in business-led innovation and high-quality, high-impact research that changes lives. We will continue to celebrate the successes of the UK-India research and innovation partnership and we look forward to growing together as we embark on a new, even stronger, era of world-leading UK-India collaboration that benefits both our countries and has impact for global good.

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Executive summary

This report is released in the same year as UK Research and Innovation (UKRI) comes into being. UKRI brings together the seven Research Councils, Innovate UK and Research England to:

- Push the frontiers of human knowledge and understanding;
- Deliver economic impact and increase social prosperity and;
- Create social and cultural impact.

To achieve this the organisation must enable engagement with excellence around the world. UK Research and Innovation is starting from a position of strength. Having international teams in Beijing, New Delhi and Washington DC for the last 10 years has transformed the UK's relationship with three of the world's largest and most dynamic hubs for research and innovation. The UK Research Office and Innovate UK Brussels office also provide a valuable mechanism in facilitating and deepening UK research and innovation partnerships with European partners.

RCUK India, now becoming UKRI India, was established in 2008 to help realise the ambition of the UK and India to increase the amount of joint research conducted by the two countries. This report is intended to illustrate the impact that the office has had over the last decade. The content is based on a review of secondary data and a comprehensive review of primary data obtained through a survey of participants from both countries in funded projects. The survey sought to assess the impact of these bilateral activities on the individual participants, their institutions, and their research field as well as identify any wider societal benefits. Because these projects were supported by RCUK prior to creation of UKRI, the results do not fully represent the impact from some of the Innovate UK projects for business-led innovation.

Research collaboration between the UK and India has nearly tripled since 2007 by co-authorship. The UK has advanced from being India's fourth largest international research collaborator to being its second globally and its first in Europe. The average field-weighted citation impact (FWCI) of joint research over this period has been higher overall than the national average for both countries and has increased by two thirds over the last decade. This has taken place within a global context of greater expenditure on research and an increase in annual publications. Scholarly output for both the UK and India has increased in absolute values as has India's proportion of the global share. Investment in research and development as a proportion of GDP has remained relatively flat in

both countries since 2008, though there have been some increases in real terms. This is particularly true in India where the economy has grown by over seventy-five per cent. Both countries' Governments recognise the importance of research and innovation in achieving sustainable economic growth and long term societal well-being and have stated their commitment to increasing the amount that is spent on research in relative and absolute terms.

The India office was established in 2008 to develop positive, sustainable, and influential relationships with key stakeholders; support the facilitation of high quality bilateral research collaboration and build the profile of the Research Councils to influence and deliver valuable high impact outputs. During its operation, the office has overseen the growth of the bilateral portfolio from £1,000,000 to over £300,000,000. This comprises over 140 individual projects, involving over 175 different UK and Indian research institutions and more than 100 industry partners.

To deliver its work, the team have built relationships with key stakeholders across the Indian research landscape including Department of Atomic Energy, the Department of Biotechnology, the Department of Science and Technology, the Indian Council of Historical Research, the Indian Council of Medical Research, Indian Council of Social Science Research, the Ministry of Earth Sciences, and National Institute of Urban Affairs. These bodies have worked with the UK research councils to deliver activities in areas as diverse as energy, food security, manufacturing and social change.

The breadth of the Research Councils' India activity has grown both in terms of the range of partners engaged as well as the amount of funding distributed, and shown commitment to key global responsibilities in a world where challenges cross national boundaries. The India office plays a central role in the Councils' delivery of UK Government initiatives like the Global Challenges Research Fund and the bilateral Newton-Bhabha Fund. These programmes are funded through the UK Government's Overseas Development Assistance (ODA) budget. They have and continue to support valuable research between the two countries that could help to address shared global challenges. This funding has been instrumental in building the UK-India research landscape. In future, the shared priorities such as data science suggest a complementary role for other sources of funding to ensure that the full potential of the collaborative research relationship between the UK and India is realised.

Over the past ten years, the India office has overseen demonstrable progress against all of its objectives.

During this period the collaborative output of both countries has nearly tripled, its impact has increased, and the UK has moved from India's fourth largest partner in the production of collaboration research to her second, and the first in Europe.

As UKRI India it has an opportunity to ensure that the bilateral relationship in 2028 is as strong as the indicators suggest that it can be. India is expected to be the third largest economy in the world and research and innovation expenditure in both countries is expected to increase. Over half of all UK scholarly output is currently produced with an international partner and if trends continue, this proportion will increase further. It is likely that the UK's share of total research produced may fall but this does not necessitate a fall in quality. UKRI India has a crucial role to play in supporting and growing the international networks that are necessary to ensure that UK academics continue to have access to excellence, whether that be in terms of facilities, people or ideas and so are able to maintain the UK's position as a leading research and innovation nation in an increasingly competitive global environment.

Within the UK, the Government's Industrial Strategy sets out an ambition to become the world's most innovative economy¹. This is to be achieved in part by raising total investment in research and development expenditure to 2.4 per cent of GDP by 2027. The Strategy also sets out four grand challenges related to 'the industries of the future'. These are ageing society, artificial intelligence and data economy, clean growth, and future mobility².

The ten years of the office in India's operation have seen the creation of a successful international partnership. Now, UKRI has an opportunity to expand this further and support academics in both countries and beyond to deliver high-impact research and innovation that helps to address current and future global challenges.

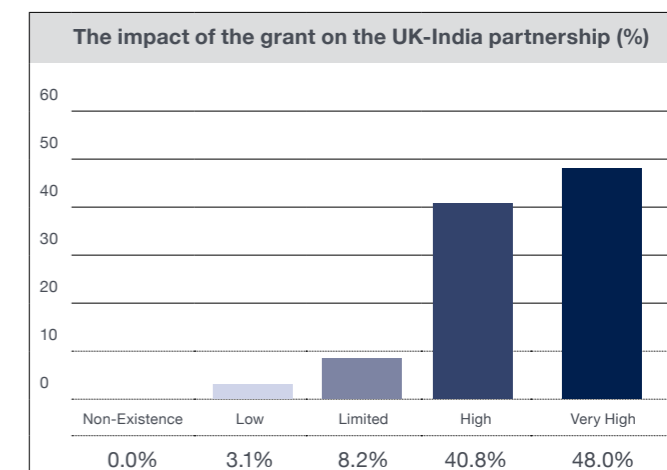
Key findings

The survey of project participants established a very high impact on the participating UK and Indian researchers and their institutions. In addition to addressing global and national challenges, these projects are also perceived to have brought considerable benefits to their immediate region.

Impact on human knowledge

The research funding has resulted in an impressive volume of research output. Half of the Indian researchers and over a quarter of the UK researchers produced more than five research

papers attributed directly to the UK-India grant. Overall, over three-quarters of the Indian and two-thirds of the UK researchers produced more than two research papers. Almost 90 per cent said the impact on their partnership was very high or high.



Impact on economy, society and culture

Nearly three-quarters of the respondents (73.1 per cent) identified the local communities as the key beneficiary. More than half (59.1 per cent) agreed or strongly agreed the research funding had a national level impact on the two countries and over half attributed a global-level impact to the UK-India partnership.

Beyond India/UK (Global Impact)	Strongly agree / agree	51.6%
	Uncertain	38.7%
	Strongly disagree / disagree	9.7%
Nationwide in India/UK	Strongly agree / agree	59.1%
	Uncertain	31.2%
	Strongly disagree / disagree	9.7%
On the immediate community surrounding the partnering institutions and organisations (in UK and India)	Strongly agree / agree	73.1%
	Uncertain	18.3%
	Strongly disagree / disagree	8.6%

Most of the researchers (88.8 per cent) evaluated the overall impact of the UK-India funding to be high or very high. The area which was impacted most was the broader society (e.g. local farming communities; NGOs and other stakeholders)

followed by policy impact and business-led innovation scored lower, reflecting past grants' focus on more fundamental research.

Impact on individuals

The UK-India coordinated funding had a significant personal impact on the research activities and the career of the respective respondents. High or very high positive impact on one's research was attributed to 80.3 per cent of the UK and 84.4 per cent of Indian respondents. The Indian researchers perceived participation to have important benefits for their careers: 59.4 per cent stated high or very high impact.

Impact of the UK-India grant on Indian respondents (%):		
Your research	High or very high	84.4%
	limited	9.4%
	non-existent or low	6.3%
Your career	High or very high	59.4%
	limited	28.1%
	non-existent or low	12.5%

The survey established that the most significant benefit of the funding for the researchers was expanded network of international collaborators (72.1 per cent and 87.5 per cent of the researchers from the UK and India respectively) followed by researchers' enhanced reputation as experts in their field (70.5 per cent for the UK and 84.4 per cent for the Indian researchers).

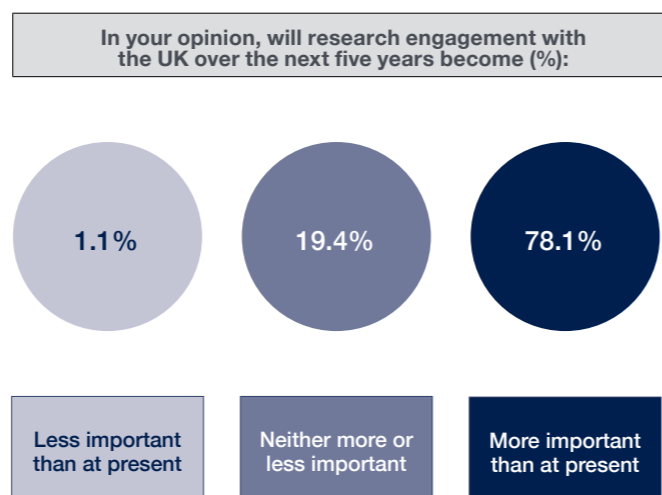
Impact on institutions

Participation appears to have supported wider institutional development and capacity building in India and the UK. The most significant identified benefits for the researchers' home institution were the support received for academic mobility and exchanges (as identified by 68.9 per cent of the UK and 74.2 per cent of the Indian researchers), followed by support for early career researchers (stated by 67.2 per cent of the UK and 51.6 per cent of Indian researchers).

Looking forward

Capacity building is a compelling common theme highlighted by both the UK and Indian researchers. There is a strong will that more student and researcher exchanges, reciprocal visits and short-term visits take place in future. Indian researchers had a strong focus on opportunities for early career researchers.

Both the UK and Indian researchers were enthusiastic about the future research engagement between the two countries over the next ten years. There is an expectation of an increased and strengthened research and innovation partnership built through continuous collaboration.



(page 6)

- 1 HM Government (2017) Industrial Strategy: Building a Britain fit for the future, London: Department for Business, Energy & Industrial Strategy.
- 2 HM Government (2017) Industrial Strategy: Building a Britain fit for the future, London: Department for Business, Energy & Industrial Strategy.

The research landscape in 2008

In 2008, the world was at the end of a period of sustained economic growth that had lasted from 1996 to 2007. The global GDP nearly doubled from approximately \$31.55tn to \$57.86tn in current values³. Over the same period, expenditure on research and development increased dramatically from around \$622.24bn to \$1.13tn, breaking the trillion-dollar mark in 2006. This represented increase was still significant, in real terms, at over forty per cent⁴. This large increase in overall investment produced a substantial increase in scholarly output, nearly doubling in scholarly publications; from 1,182,191 publications in 1996 to 2,117,835 in 2007⁵.

This increase in expenditure and output accompanied a period of wider transition in the research landscape. This transition was characterised by:

“absolute growth of the R&D and innovation related activities; the rise of the BRICS economies in scientific and technological fields; significant globalisation of R&D... and enhanced internationalisation and mobility of highly skilled people....”

OECD Science, Technology and Industry Outlook 2008⁶

In 1996, the ten largest producers of scholarly output in order were the United States, the United Kingdom, Japan, Germany, France, Canada, Italy, the Russian Federation, China and Australia⁷.

In 2008, it was the United States, China, United Kingdom, Germany, Japan, France, Canada, Italy, Spain, and India⁸. Though the relative position of these nations changed, the output of all, including Australia and the Russian Federation, increased.

The inclusion of India in the top ten research producing nations in 2008 is demonstrative of the transition that was underway in the research landscape. The annual scholarly output of the so-called BRICS nations (Brazil, Russia, India, China, South Africa) increased by over eighty per cent, from 191,582 publications in 1996 to 361,984 in 2007⁹. The output of all five nations grew, though the greatest increases in absolute terms came from China and India. This rise was accompanied, albeit to a lesser extent, by an increase in the BRICS nations share of total research output¹⁰.

- 3 World Bank (2016) GDP (current US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2007&start=1996> (Accessed: 18 April 2018).
- 4 World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2007&start=1996> (Accessed: 18 April 2018).
- 5 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).
- 6 OECD (2008) OECD Science, Technology & Industry Outlook 2008, Available at: <http://www.oecd.org/sti/inno/oecdsciencetechnologyandindustryoutlook2008.htm> (Accessed: 18 April 2018).
- 7 Scimago Lab (2017) SJR - International Science Ranking, Available at: <http://www.scimagojr.com/countryrank.php?year=1996> (Accessed: 18 April 2018).
- 8 Scimago Lab (2017) SJR - International Science Ranking, Available at: <http://www.scimagojr.com/countryrank.php?year=2008> (Accessed: 18 April 2018).
- 9 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).
- 10 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

1996 – 2007, not only saw increased production but greater international collaboration. In 2008, all top ten research producing nations had increased their collaborative output in absolute terms. With the exception of China, research produced with an overseas partner also accounted for a greater share of these countries' total output. By the end of the period, over thirty per cent of these nations' collective annual scholarly output was the product of international collaboration¹¹.

India saw growth in most indicators. Research and development expenditure as a percentage of GDP grew from a low base of approximately .63 per cent in 1996 to near .82 per cent in 2007¹². The growth in GDP was dramatic, rising from \$0.39tn to \$1.20tn¹³ in current values and more than doubling in real terms¹⁴. Annual research output over the period also more than doubled, from 21,630 publications in 1996 to 52,867 in 2007, a rise in proportion of the global share from approximately 1.83 per cent to 2.50 per cent¹⁵. The fraction of internationally collaborative output also increased slightly, from 14 per cent to 17.7 per cent. As with the UK, this increase in output was accompanied by steady improvement in the Field Weighted Citation Impact (FWCI), from 0.52 to 0.78¹⁶. At the subject level¹⁷, nearly all areas registered improvement over the period in terms of FWCI, with relative strengths in Chemical Engineering, Energy, Materials Science and Psychology.

At a policy level, innovation and technology was a key focus area of India's Eleventh Five Year Plan¹⁸. Produced by the Planning Commission, the Plan sets out the intended roadmap for Indian economic development from 2007 – 2012. The relative underinvestment in R&D is recognised as a weakness given the importance of an established

research infrastructure to the nation's long-term growth. Eight key goals are identified to ensure the continued development of the research base, one of which was the promotion of "strong linkages with advanced countries". Latterly, the Plan sets out the perceived benefits of international collaboration: complementary exchange of ideas and methodologies, creating access to leading research facilities and accelerating the acquisition of new knowledge. In short, "international collaboration affords the way forward for development of advanced technologies, high tech equipment / facilities and new-generation materials¹⁹".

The performance of the UK from 1996 – 2007, was consistent with international trends. Research and development expenditure as a percentage of GDP was broadly flat, ranging from approximately 1.61 per cent in 1996 to 1.63 per cent in 2007²⁰. GDP grew from around \$1.41tn to \$3.07tn (in current US\$ values)²¹, with real GDP growth of around thirty-eight per cent²². Concurrently, annual scholarly output grew from 91,521 to 152,941 publications, a slight fall in terms of the proportion of global output from 7.74 per cent to 7.22 per cent. By 2007, 36.3 per cent of the UK's annual research output was the product of international collaboration, a proportion that had grown steadily from 24.2 per cent in 1996²³. The relative metric FWCI of UK research increased slightly from 1.34 in 1996 to 1.50²⁴ in 2007.

At the policy level, the UK Government's Science and Innovation Investment Framework 2004 – 2014 set out an ambition to, "retain and build sufficient world class centres of research excellence, departments as well as broadly based leading universities, to support growth in its share of internationally mobile R&D investment and highly skilled people."²⁵ Recognising

the importance of international engagement, RCUK, the coordinating body of the seven research councils (Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); and the Science & Technology Facilities Council (STFC) published its first strategy for international engagement in 2007. The strategy set out RCUK's ambition to support enabling activities, promote researcher mobility from and to the UK, provide access to leading resources in the UK or overseas, engage with the international research agenda in order to promote the UK as a partner, and ensure that Britain remained an attractive environment for research and innovation²⁶.

The UK's position as global leader in both the quality and quantity of its research output was illustrated by the results of the 2008 Research Assessment Exercise (RAE 2008). RAE 2008 was a review of research output submitted by 52,400 staff from 159 Higher Education Institutions conducted by the funding councils of the four nations²⁷. The assessment found that 150 of the 159 institutions that participated demonstrated some world leading quality research and over half of the research submitted was either 'world-leading' or 'internationally excellent'²⁸. The strength of the sector was echoed in the Department for Business, Innovation and Skills' 2011 report, International Comparative Performance of the UK Research Base²⁹. The report looked at the performance of the UK research base relative to that of China, Germany, Japan and the US over the period 2006 - 2010. The report found that UK research was high-

quality and efficient, mobile and international, and also well-rounded (in terms of subject spread), but noted mixed performance in knowledge transfer and highlighted vulnerabilities in terms of declining global share of researchers and research spending with the warning that, "inability to sustain R&D spending at levels comparable to the global average may also have consequences for the UK's future research performance relative to other countries"³⁰.

Within this context of a global increase in research output and increasing internationalisation of authorship, there was a corresponding increase in publications with an Indian and UK author. Collaborative output increased from just under 400 published articles in 1996 to over a thousand in 2007³¹. At the end of the period, India-UK joint publications accounted for just over two per cent of India's total scholarly output and approximately 0.7 per cent of the UK's. As a share of both countries output produced with an international collaborator in 2007, this represents approximately 11.50 per cent for India and nearly two per cent for the UK. In terms of the impact of this research, the average FWCI across the period of 1996 – 2007 was higher than that of both countries³². A 2007 bibliometric study for the Foreign and Commonwealth Office³³ examined India's national research performance and international collaboration over the period 1996 - 2005. The report compared the levels of collaboration between India and UK with the country's collaboration with other leading research nations: Australia, Canada, China, France, Germany, Japan and the USA. For this period, the UK was the fourth largest partner nation after the USA, Germany and Japan in order of volume. At the subject level, the UK recorded the second highest levels of collaboration (after

11 Scimago Lab (2017) SJR - International Science Ranking , Available at: <http://www.scimagojr.com/countryrank.php?year=2008> (Accessed: 18 April 2018).

12 World Bank (2018) Research and development expenditure (% of GDP), Available at: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS> (Accessed: 18 April 2018).

13 World Bank (2016) GDP (current US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2007&start=1996>(Accessed: 18 April 2018).

14 World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2007&start=1996>(Accessed: 18 April 2018).

15 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

16 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

17 Using the All Science Journal Classification (ASJC) taxonomy. <https://www.scival.com/benchmarking/analyse>

18 Planning Commission, Government of India (2008) Eleventh Five Year Plan (2007-2012): Inclusive Growth, New Delhi: Oxford University Press.

19 Planning Commission, Government of India (2008) Eleventh Five Year Plan (2007-2012): Inclusive Growth, New Delhi: Oxford University Press.

20 World Bank (2018) Research and development expenditure (% of GDP), Available at: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS> (Accessed: 18 April 2018).

21 World Bank (2016) GDP (current US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2007&start=1996>(Accessed: 18 April 2018).

22 World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2007&start=1996>(Accessed: 18 April 2018).

23 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

24 SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

25 HM Treasury; Department of Trade & Investment; Department for Education and Skills (2004) Science & innovation investment framework 2004 - 2014, London: The Stationary Office.

26 House of Parliament (2007) House of Commons - Science and Technology - Seventh Special Report, Available at: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>(Accessed: 18 April 2018).

27 Research Assessment Exercise (2008) RAE 2008: News: 2008: RAE2008 confirms UK's dominant position in international research, Available at: <http://www.rae.ac.uk/news/2008/results.asp> (Accessed: 18 April 2018).

28 Research Assessment Exercise (2008) RAE 2008: News: 2008: RAE2008 confirms UK's dominant position in international research, Available at: <http://www.rae.ac.uk/news/2008/results.asp> (Accessed: 18 April 2018).

the USA) in the Clinical and Health fields³⁴.

The launch of RCUK India in 2008 came at the end of a period of extended global GDP growth and a corresponding increase in expenditure on research and development in absolute terms. This increased spending contributed to a dramatic rise in production. Though the scholarly output of all the leading research nations increased, there was variation in the relative national shares with the emergence of China and India. In parallel, the amount of scholarly output produced by authors from at least two countries increased. Collaboration between the UK and India reflected these broad trends; more than doubling between 1996 and 2007 with generally strong performance in terms of FWCI relative to both national and global averages. The importance of international collaboration was reflected in the policy of both countries with complementary ambitions to promote the exchange of ideas and methodologies, enable access to world-leading facilities and accelerate the increase of the global knowledge base.

²⁹ Elsevier (2011) International Comparative Performance of the UK Research Base - 2011, London: The National Archives.

³⁰ Elsevier (2011) International Comparative Performance of the UK Research Base - 2011, London: The National Archives.

³¹ SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

³² SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

³³ Evidence Ltd (2007) Report to the UK Foreign and Commonwealth Office: India's national research performance and international collaboration (1996-2005): A bibliometric study, Leeds: Evidence Ltd.

³⁴ Evidence Ltd (2007) Report to the UK Foreign and Commonwealth Office: India's national research performance and international collaboration (1996-2005): A bibliometric study, Leeds: Evidence Ltd.

RCUK India programme activity 2008-2018

Launch

In January 2008, Gordon Brown, then Prime Minister of the UK, visited India³⁵. During the visit, he met with the Indian Prime Minister Manmohan Singh. Both Prime Ministers reiterated their commitment to increasing the amount of joint research. In October 2008, the RCUK India office was setup to help realise this goal.

The RCUK India office was established with the following objectives³⁶:

- Influence: To develop positive, sustainable and influential relationships with key stakeholders.
- Excellence: To support the facilitation of high quality research collaboration between India and the UK.
- Impact: To build the profile of the RCUK office to influence and deliver valuable, high impact outputs.

The three objectives of the office were designed to support the overall objectives of the RCUK International Strategy, which were to encourage collaboration between UK researchers and the best researchers from around the world; promote the movement of researchers to and from the UK; give UK researchers access to data facilities and resources; influence the international research agenda and promote the UK as a

world centre for research and innovation³⁷.

RCUK India has retained the three objectives of its launch with the addition of a fourth, Responsibility³⁸. This latter objective was introduced in acknowledgment of India's socio-economic objectives and the role of research in tackling international issues. In material terms, Responsibility reflects the growing importance of mechanisms such as the Newton Bhabha Fund and the Global Challenges Research Fund.

Delivery

Over the past ten years, RCUK India has overseen the growth of the bilateral portfolio from £1m to over £300m comprising over 140 individual projects, involving over 175 different UK and Indian research institutions and more than 100 industrial partners. A concise summary of RCUK India's activities beginning in 2009, its first full calendar year of operation, is included (see following page).

³⁵ BBC (2008) BBC NEWS| Politics| Brown announces India aid package, Available at: http://news.bbc.co.uk/1/hi/uk_politics/7198546.stm (Accessed: 18 April 2018).

³⁶ Research Council UK (2008) Prime Minister's seal of approval for new Research Councils UK Office in India, Available at: <http://webarchive.nationalarchives.gov.uk/20090605094505/http://www.rcuk.ac.uk/news/081020.htm>(Accessed: 18 April 2018).

³⁷ House of Parliament (2007) House of Commons - Science and Technology - Seventh Special Report, Available at: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>(Accessed: 18 April 2018).

³⁸ Research Council UK India (2013) Research Councils UK: Engaging with India, New Delhi: Research Council UK.

2009	
UK annual spend portfolio on projects and programmes related to India	£1,245,631
<i>Key Indian partners</i>	
Department of Science and Technology	
<i>Key UK partners</i>	
Economic & Social Research Council (ESRC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Food Security and Agricultural Technologies; Manufacturing and Economy; Social Change	
2010	
UK annual spend portfolio on projects and programmes related to India	£1,992,552
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Atomic Energy	
<i>Key UK partners</i>	
Economic & Social Research Council (ESRC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Energy; Food Security and Agricultural Technologies; Manufacturing and Economy; Social Change	
2011	
UK annual spend portfolio on projects and programmes related to India	£4,401,912
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Atomic Energy	
<i>Key UK partners</i>	
Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Energy; Food Security and Agricultural Technologies; Manufacturing and Economy; Social Change	
2012	
UK annual spend portfolio on projects and programmes related to India	£6,727,402
<i>Key Indian partners</i>	
Department of Science and Technology; Indian Council of Social Science Research	
<i>Key UK partners</i>	
Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Energy; Food Security and Agricultural Technologies; Health and Well-being; Social Change; Manufacturing and Economy; Water and Climate	

2013	
UK annual spend portfolio on projects and programmes related to India	£8,319,570
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Biotechnology; Indian Council of Historical Research; Indian Council of Medical Research; Indian Council of Social Science Research; Ministry of Earth Sciences	
<i>Key UK partners</i>	
Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Energy; Food Security and Agricultural Technologies; Health and Well-being; Manufacturing and Economy; Social Change; Water and Climate	
2014	
UK annual spend portfolio on projects and programmes related to India	£13,325,507
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Atomic Energy; Department of Biotechnology; Indian Council of Medical Research; Indian Council of Social Science Research; Ministry of Earth Sciences	
<i>Key UK partners</i>	
Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Energy; Food Security and Agricultural Technologies; Health and Well-being; Manufacturing and Economy; Social Change; Water and Climate	
2015	
UK annual spend portfolio on projects and programmes related to India	£16,467,922
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Atomic Energy; Department of Biotechnology; Indian Council of Medical Research; Indian Council of Social Science Research; Ministry of Earth Sciences	
<i>Key UK partners</i>	
Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); RCUK; RCUK Digital Economy	
<i>Key research themes</i>	
Energy; Food Security and Agricultural Technologies; Health and Well-being; Manufacturing and Economy; Social Change; Water and Climate	

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2016	
UK annual spend portfolio on projects and programmes related to India	£22,388,692
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Atomic Energy; Department of Biotechnology; Indian Council of Historical Research; Indian Council of Medical Research; Indian Council of Social Science Research; Ministry of Earth Sciences; National Institute of Urban Affairs	
<i>Key UK partners</i>	
Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); RCUK; RCUK Digital Economy; Science & Technology Facilities Council (STFC)	
<i>Key research themes</i>	
Access to Large Facilities; Energy; Food Security and Agricultural Technologies; Health and Well-being; Manufacturing and Economy; Social Change; Water and Climate	
2017	
UK annual spend portfolio on projects and programmes related to India	£21,705,620
<i>Key Indian partners</i>	
Department of Science and Technology; Department of Biotechnology; Indian Council of Medical Research; Indian Council of Social Science Research; National Institute of Urban Affairs	
<i>Key UK partners</i>	
Arts & Humanities Research Council (AHRC); Biotechnology & Biological Sciences Research Council (BBSRC); Economic & Social Research Council (ESRC); Engineering & Physical Sciences Research Council (EPSRC); Medical Research Council (MRC); Natural Environment Research Council (NERC); RCUK; RCUK Digital Economy; Science & Technology Facilities Council (STFC)	
<i>Key research themes</i>	
Access to Large Facilities; Energy; Food Security and Agricultural Technologies; Health and Well-being; Manufacturing and Economy; Social Change; Water and Climate	

Capturing the impact of RCUK India

Survey

To capture the impact of participation in RCUK funded activities, an Online survey was administered in March 2018. The lead principal investigators for research grants funded jointly by RCUK and their research partners in India were invited to participate. The period of funding covered research projects with a start date between December 2008 and March 2017. It is worth noting that many of the research projects, which were awarded in the past few years, are still ongoing. This study covers research projects which were produced mainly in collaboration with researchers at UK and Indian higher education institutions (HEIs) and research organisations (ROs). This covers the period before the creation of UK Research and Innovation and reflects Innovate UK activities only where they were also in partnership with a Research Council.

Respondent profile

The survey was sent to 117 Indian and 132 UK researchers. The survey generated a 39 per cent response rate. Almost half of the UK researchers (46 per cent, sixty-one participants) completed the survey. This was significantly higher than the 27 per cent response rate from Indian researchers³⁹.

Country of domicile

In total, ninety-eight respondents from India and the UK completed the survey which equates to a 39.4 per cent response rate. 65.6 per cent of survey respondents participated from the UK. 34.4 per cent of respondents participated from India.

Gender

In terms of gender, 77.6 per cent of respondents were male, 21.4 per cent of respondents were female.

Source of funding

Most of the research was co-funded by RCUK and their Indian counterparts. Just under a third (31.6 per cent) of the research was co-funded by the Indian Department for Biotechnology (DBT), followed by the UK Biotechnology and Biological Sciences Research Council (BBSRC, 29.6 per cent), and the UK Engineering and Physical Sciences Research Council (EPSRC) with 28.6 per cent. BBSRC is one of the UK's Research Councils with the longest tradition of collaborative research in India. The Council signed its first memorandum of understanding (MoU) with India's Department of Biotechnology (DBT) and the Council of Scientific and Industrial Research (CSIR) in 1996-98⁴⁰.

The UK Natural Environment Research Council was also represented with a sizable share (15.3 per cent), while all other UK councils were represented by less than 10 per cent.

Impact on human knowledge

This section considers the overall impact of the grant. The answers of the Indian and UK respondents are considered together.

Most respondents acknowledged that the grant had a high (40.8 per cent) or very high (48 per cent) impact on their UK-India relationship. Very few (3.1 per cent) reported a low impact. This echoes the findings for both UK and Indian respondents and it is evidenced by the very high impact of the partnerships at institutional and individual level. The two research groups scored the strategic importance of research collaboration with India and the UK highly.

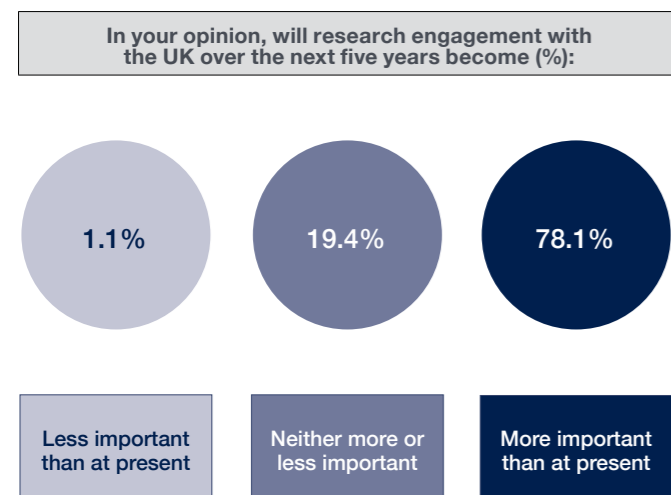
More than half of the respondents (55.9 per cent) stated that the UK-India grant was the only research funding source they could access, which further signifies the importance of the UK-India funding support. There is an almost equal split between the remaining two groups of the surveyed population: those who had already received the UK-India research grant (21.5 per cent), and those who said that the grant had enabled them to access further financial support for their UK-India partnerships (22.6 per cent).

³⁹ Please note a few survey respondents did not specify their domicile. As such, the response rates for the UK and Indian researchers were based on the numbers of respondents who answered the question about their country of residence.

⁴⁰ BBSRC (2016) UK-India: 20 years of research collaboration. Available at: <https://bbsrc.ukri.org/news/policy/2016/161104-f-uk-india-20-years-of-research-collaboration/> (Accessed: 18 April 2018).

Finally, the respondents were asked to give their perception regarding the development of research engagement between India and the UK over the next five years. A clear majority (79.6 per cent) expect that the engagement will become be more important than at present. Only a small group (19.4 per cent) thought that there would be no real development.

Figure 1 - Development of the research engagement between India and the UK (n=93)



Impact on economy, society & culture

Type of impact of the research

The analysis of the impact of the UK-India grant on research, industry and society shows an interesting pattern. Most of the respondents (43 per cent) felt that the grant had a high or very high societal impact, which included local farming and agricultural communities, NGO's and other similar stakeholders.

The second most pronounced impact of the partnerships was in policy impact which included government and public-sector bodies such as health and education (38.7 per cent).

Business-led innovation was perceived to be the area with the lowest impact: only 11.8 per cent of the respondents scored it high or very high. However, Indian respondents reported substantially higher impact than UK respondents in all areas. In the course of the survey, respondents commented that the core contribution of the UK-India grant is enabling fundamental research to take place. This explains to some degree the low score attributed to business-led innovation. Quite a few respondents noted that they could access smaller grants for applied research. However, this research would have most likely happened without the involvement of their Indian research partners.

Figure 2 - Research/industry/societal impacts of the UK-India grant (n=93)

What is the research / industry / societal impacts of the UK-India grant of your UK-India research grant (%)		
Societal impact- Knowledge exchange with other community (e.g farming communities), NGOs, or other stakeholders	High to very high impact	43%
	Somewhat impactful	32.3%
	No or low impact	24.7%
Policy impact- knowledge exchange with government or public sector bodies	High to very high impact	38.7%
	Somewhat impactful	34.4%
	No or low impact	26.9%
Business-led innovation	High to very high impact	11.8%
	Somewhat impactful	34.4%
	No or low impact	53.8%

Level of impact

Almost three-quarters of the respondents (73.1 per cent) agreed or strongly agreed with the statement “the strongest effect of the UK-India grant was in the immediate communities surrounding the partner institutions and organisations in both countries”.

More than half of the respondents (59.1 per cent) agreed or strongly agreed the research funding had a nation-wide effect on the two countries (national level impact).

Over half of the respondents (51.6 per cent) attributed a global-level impact of the UK-India partnerships. Only a minority (8.6-9.7 per cent) disagreed or strongly disagreed with these effects. In all three instances, the Indian respondents reported higher impact than their UK counterparts.

Figure 3 - Global, national, and local Impact of the UK-India grant (n=93), [see next page, top-left].

Research funded by the UK-India grant, impact (%):		
Beyond India/UK (Global Impact)	Strongly agree / agree	51.6%
	Uncertain	38.7%
	Strongly disagree / disagree	9.7%
Nationwide in India/UK	Strongly agree / agree	59.1%
	Uncertain	31.2%
	Strongly disagree / disagree	9.7%
On the immediate community surrounding the partnering institutions and organisations (in UK and India)	Strongly agree / agree	73.1%
	Uncertain	18.3%
	Strongly disagree / disagree	8.6%

Defining the benefit

The respondents felt that the statement “the joint funded UK-Indian grants provide opportunities to carry out research which would not be possible otherwise” captures the impact of the UK-India grant best, followed by “the culture of UK-India co-designed and match-funded research programmes support mutually beneficial research engagement”. This was closely followed by the statement that “it enabled access to research funders and research partners in India/UK”. All three statements were rather close together regarding their average rating values, whereas the fourth statement, “it supported my institution’s research and wider engagement with key stakeholders in India/UK” was considered substantially less fitting. The option “other” appeared to be considered irrelevant as no ample alternatives were mentioned.

Figure 4 - Ranking of statements to capture the impact of the UK-India grant (n=93)

Rank	Statement
1	The joint funded UK Indian grants provide opportunities to carry out research which would otherwise not be possible.
2	The culture of UK-India co-designed and match funded research programmes supports mutually beneficial research engagement.
3	It enabled access to research funders and research partners in India/UK.
4	It supported my institution’s research and wider engagement with key stakeholders in India/UK.
5	Other.

Impact on individuals

This section attempts to capture the impact of the UK-India grant on individual researchers. It shows the perspectives of UK and Indian recipients.

The impact for individual UK researchers

Impact on participant’s research and career

A significant majority of the surveyed UK academics stated the UK-India grant had a high or very high impact on their research. Only a few respondents (3.3 per cent) reported low impact.

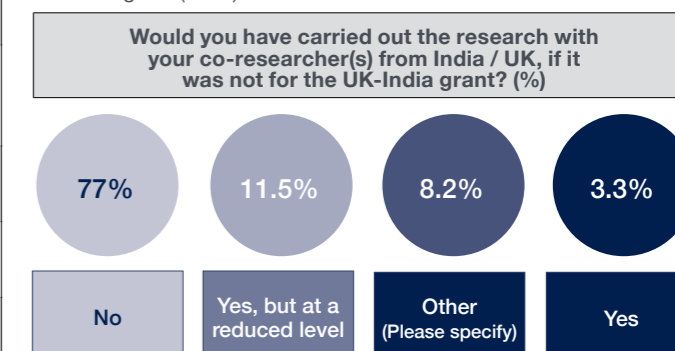
The academics who took part in the study were somewhat more cautious about the perceived impact of the grant on their research career. Almost half of the respondents (47.5 per cent) perceived high or very high impact. Since the grant covers a comparatively short period of their entire career, it is possible that they recognise the impact to be commensurate to the duration and the amount of the funding. As such, the respective research project is one step in their career development among others.

Enabling role of the grant

The grant had a substantial impact on the research partnership. Around three-quarter of the respondents (77 per cent) claimed that the joint research only took place because of the UK-India grant and a further 11.5 per cent would have conducted the joint research but at a reduced level.

A few respondents elaborated that the research might have taken place in some shape without the grant, but it would have most likely happened without the participation of their Indian counterparts. The researchers’ comments clarified that “the fundamental research would not have happened” without the grant.

Figure 5 - Research with co-researcher from India/UK without the UK-India grant (n=61)



Research engagement with India

Over two-thirds of the UK respondents (67.2 per cent) were already involved in research projects with India before the UK-India grant. Almost a third (32.8 per cent) said that it was their first research activity with India.

Publication output

The research output reported in this study is impressive. Nearly two-thirds of the UK participants have produced two or more publications. From these, over a quarter of the researchers (27.9 per cent) said they had produced more than five publications; 16.4 per cent produced between four and five publications and further 23 per cent stated they had produced two to three research publications. A substantial proportion (24.6 per cent) claimed that they generated “other” results. In most of these “other” cases, respondents answered that the project was at an early stage at the time of the survey, but they were hopeful that they would produce several publications.

Figure 6 - Research output due to the UK-India grant (n=61)



Use as evidence

More than a third of the respondents (36.1 per cent) expect the output from the UK-India grant to be used in the Research Excellence Framework 2021. However, nearly as many (31.1 per cent) said that it was not used in the context of any research evaluation, and a small percentage (3.3 per cent) confirmed that it had already been submitted to the past Research Excellence Framework 2014 and further 3.3 per cent indicated

another evaluation. Just over a quarter of the respondents (26.2 per cent) said that it would be used in other ways. Respondents from both the UK and India stated they had submitted their research output for other subject-specific research evaluations, further funding and grants.

Status of the research project

Most respondents claimed that the RCUK funded research project was still active, either with the same (42.6 per cent) or additional partners (27.9 per cent), or with more funding (8.2 per cent). However, the partnership appears to have ended for about a third of the surveyed respondents (34.4 per cent).

Impact of the UK-India grant on participant's research careers

The most significant reported effect on individuals' research careers was the expansion of international collaborators (72.1 per cent). This was followed closely (70.5 per cent) by those who felt that the grant had supported their reputation as experts in their field. About a third of the UK researchers (32.8 per cent) stated that the grant had supported their research career progression. A few UK participants (6.6 per cent), however, could not account any impact on their research career.

Qualitative feedback from survey respondents identified further benefits for participants including project management experience and development of a new research capability.

The UK-India grant is perceived as highly influential for young researchers. A significant majority of the UK researchers (75.5 per cent) attributed a high or very high impact of the grant on the development of young researchers. A minority (4.9 per cent) conceded a low impact, and the same proportion stated young career researchers did not participate in the UK-India funded project.

The impact for individual Indian researchers

This section details the impact of the UK-India research grant on Indian researchers, with comparisons to the UK participants.

Impact on participant's research and career

The results for the Indian respondents are similar to their counterparts in the UK. However, more researchers perceived a high or very high impact on their research (84.4 per cent) than on their career (59.4 per cent). The proportions of Indian respondents who reported that the UK-

India grant had no impact on their research (6.3 per cent), or their career (12.5 per cent) were similar to those of the UK respondents.

Enabling role of the grant

The percentage of Indian respondents who said that they would not have carried out the research without the UK-India grant (37.5 per cent) is substantially lower than that of the UK respondents (77 per cent). Half of the respondents said that they would have done so at a reduced level (50 per cent), which is more than four times higher than the UK respondents (11.5 per cent). The percentage of those who would have carried out the research to the same extent outside the grant (12.5 per cent) is nearly four times that of the UK group.

Research engagement with the UK

There is a notable difference between Indian researchers' prior involvement in research projects and those in the UK. More than half of the Indian respondents (59.4 per cent) had already been involved in similar research projects with the UK before the grant, which compares to 67.2 per cent as reported by their UK counterparts. Still, this was the first experience in a joint research project with the UK for a large group of the Indian respondents (40.6 per cent), which compares to 32.8 per cent of the UK researchers. The funding generated a significant proportion of new ties between UK and Indian researchers.

Publication output

Indian researchers generated even more scholarly output from the grant than their UK counterparts with half of attributing more than five publications to the grant compared with 27.9 per cent of the UK researchers. One explanation for the high productivity of the UK-India funded research is the prevalence of science-related research: biotechnology research accounted for 39.5 per cent of the respondents; followed by 18.4 per cent EPSRC funded research with further 4.6 per cent from the Indian Department for Science and Technology.

Overall, 84.4 per cent of the grant recipients published research output due to the grant. The answers under “other” (15.6 per cent) indicated mainly cases of still undecided publications.

Use as evidence

34.4 per cent of Indian respondents expected that the output from the UK-Indian grant would be used in the 2021 REF. A few researchers mentioned the grant was recently awarded and it was too early to

know how the outputs will be utilised. Just under a third of the respondents stated the outputs were not a part of research evaluations (31.3 per cent), which is comparable to the UK group. Just over a fifth of the respondents (21.9 per cent) said that the research output is used in other evaluations and indicated they have or are planning to use the outputs to apply for further research bids.

Status of the research project

Most of the Indian respondents (71.9 per cent) said that the research partnership was still active at the time of the survey. More than a half (56.3 per cent) have an active research partnership with the same partners. The partnership was active with additional partners for just under a fifth of the respondents (18.8 per cent), followed by those who reported the partnership continues with more funding (12.5 per cent).

Impact of the UK-India grant on participant's research careers

There are many similarities between the impact of the grant on the research career of the UK and Indian researchers. A large proportion (87.5 per cent) benefited from an expanded network of international collaborators, and a similar percentage (84.4 per cent) acknowledged the support the grant gave them as reputable experts in their field. For a much smaller group, which is similar to the UK participants, the grant also supported their general career progression (28.1 per cent).

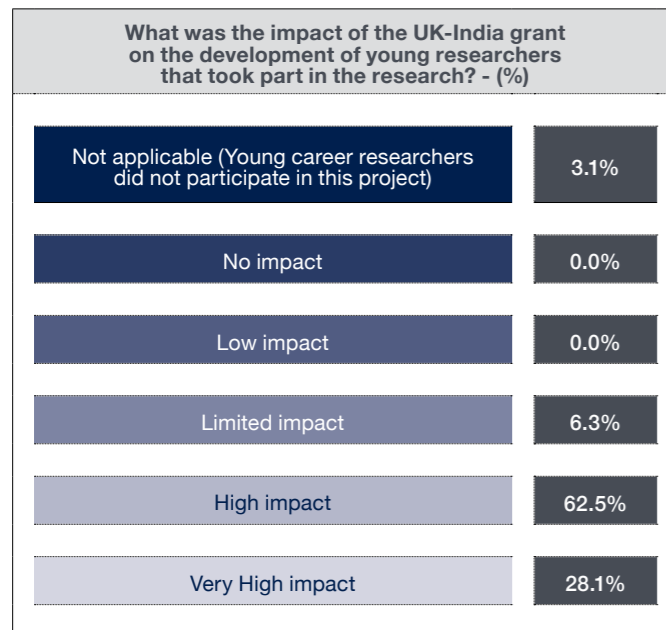
The participants highlighted that the UK-India grant enabled their students to gain “a great deal of international exposure, which would not have been possible otherwise” and “... the collaboration did inspire some of our young researchers to do better work”.

Indian respondents are slightly more optimistic about the impact of the grant on the development of young researchers and research assistants than their UK counterparts. A clear majority (62.5 per cent) perceived a high or very high impact (28.1 per cent).

Figure 7 - Impact of UK-India grant on research career (n=32, multiple answers are possible) [see next page, top-left].



Figure 8 - Impact of the UK-India grant on the development of participating young researchers (n=32)



The impact on institutions

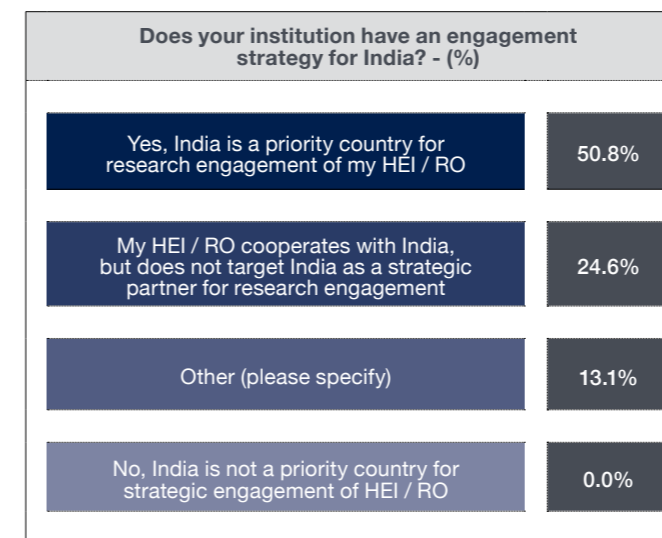
This section details the survey findings of the Indian researchers and the perceived benefits for their institution.

The impact for UK Institutions

Strategic engagement

More than half of the respondents acknowledged that India is a strategic priority for their institution for research engagement (50.8 per cent). A quarter of the respondents stated that their institution collaborates with India; however, India is not a strategic partner. A relatively small proportion of the sample (11.5 per cent) stated India was not a strategic priority for their organisation/institution.

Figure 9 - Institutional engagement strategy for India (n=61)



Ability to access alternative forms of funding support

The UK-India grant was the only funding option for almost half of the respondents (49.2 per cent). However, nearly a quarter (24.6 per cent) were able to find other funding sources for their research collaboration. The home institution of 14.8 per cent of the respondents has supported the research collaborations with India.

Consequently, while India is a strategic priority for almost half of the UK institutions represented, most of the respondents heavily rely on the RCUK grant

to fund their research collaborations with India.

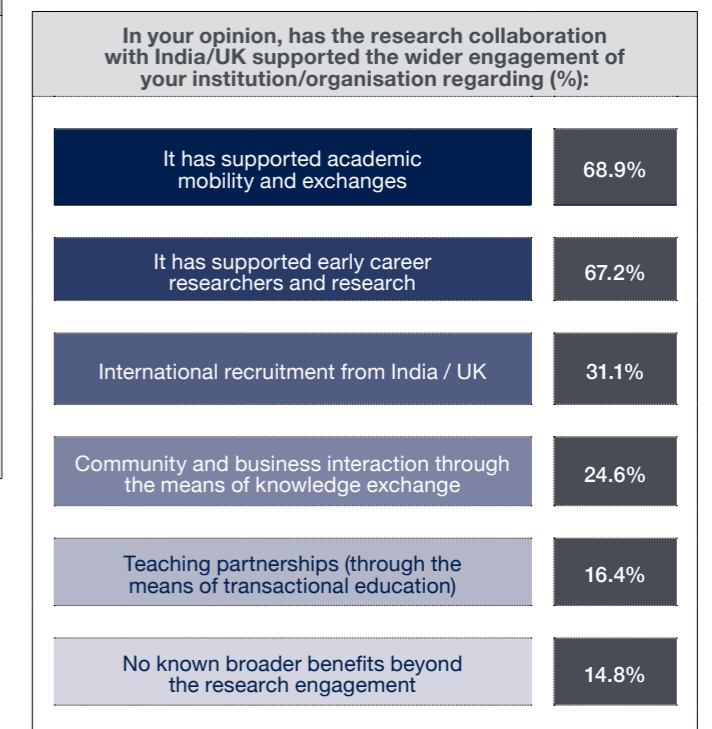
Wider benefits of participation

UK respondents thought that the UK-India grant has had wider benefits, supporting a broader engagement with India across the institution. Identified benefits included support for academic mobility and exchanges (68.9 per cent) and support for early career researchers (67.2 per cent). A possible explanation for the close proportions is the participation of early career researchers in mobility between the UK and the Indian institutions.

31.1 per cent of the respondents also felt that participation had strengthened international recruitment of Indian students to the UK, many of whom are enrolled in postgraduate programmes.

About a fifth (24.6 per cent) of respondents, felt that research collaboration with India had supported their institution's community and business interaction through knowledge exchange.

Figure 10 - Support of the wider engagement of the institution/organisation through the research collaboration with India (n=61, multiple answers possible)



Prior engagement with India

The UK-India funding appears to attract academics with and without ties to India equally. About half of the respondents (49.2 per cent) had already visited India (before their collaborative research programme), and a slightly smaller proportion (47.5

per cent) reported they had not visited India.

Overall impact

The UK-India research grant was perceived to have a high or a very high impact on the home institution by 42.6 per cent of the UK respondents. 39 per cent thought that the grant has had a limited impact on their institution and 18 per cent claimed that the impact was low. One interpretation of this result is that these institutions may engage in research with other international partners and so the capacity of a single grant to have a marked impact at the institutional level is limited. For context, bibliometric studies carried out in the past show that more than half of the UK research output is the product of international collaboration⁴¹.

This presents an interesting contrast with the perceived career benefits of the grant where the impact, as perceived by the participating researchers, was felt to be significantly greater than the one on the institution. This is discussed in detail in the latter section, Assessing the impact of the UK- India grant on researchers.

The impact for Indian institutions

This section details the survey findings of the Indian researchers and the perceived benefits for their institution.

Strategic engagement

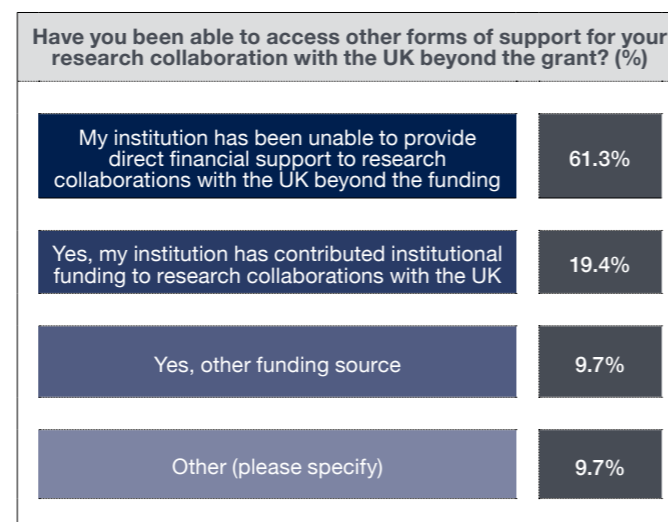
Nearly two-thirds of the respondents (64.5 per cent) stated the UK is a strategic priority for research engagement for their institution. This compares to 50.8 per cent of the UK respondents who identified India as a priority for their HEI. The rest of the sample identifies the UK as an important research partner, without it being a strategic priority for their institution.

Ability to access alternative forms of funding support

The UK-India funding appears to be more important for the Indian respondents – it is the sole funding source for cooperative research with the UK. Nearly two-thirds of whom (61.3 per cent) did not have any direct support from their HEI/RO, which compares to just under half of their UK counterparts (49.3 per

cent) and about a fifth (19.4 per cent) had received funds from their HEI/RO resources.

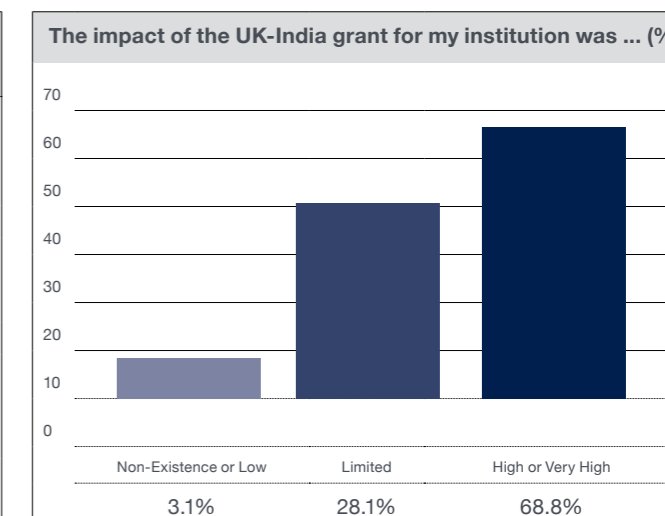
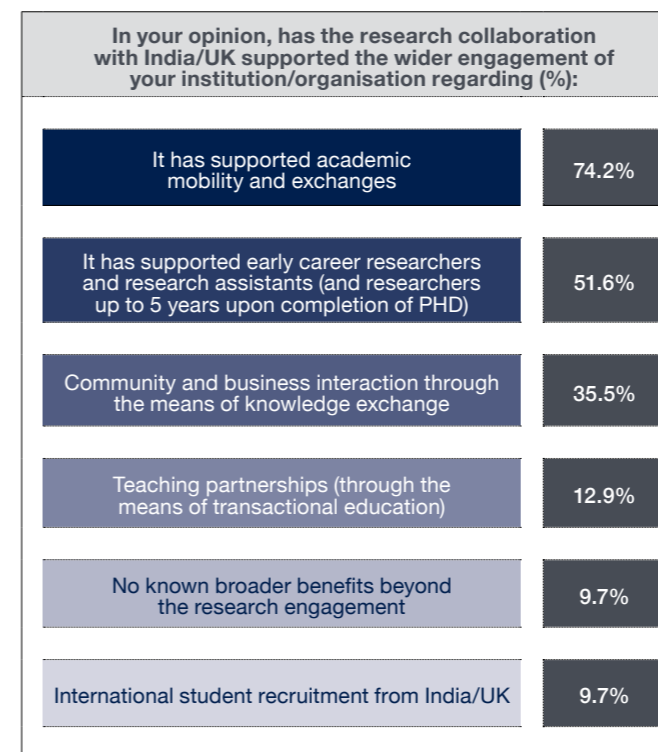
Figure 11 - Ability to access other forms of support for research collaboration with the UK beyond the grant (n=31)



Wider benefits of participation

Like the UK sample, the funding has generated wider benefits for the Indian institution beyond the research. While the UK sample showed almost equal proportions for academic mobility and support for early career researchers (just under 70 per cent for each group), the largest proportion of the sample of Indian researchers (74.2 per cent) identifies academic mobility and exchanges as an area which has benefited the most. Over a half (51.6 per cent) perceive that the grant has had a positive impact on early career researchers and research assistants. Benefits of interactions with business and communities through knowledge exchange rank third (35.5 per cent). While mobility of Indian students to the UK featured prominently in the UK responses, student mobility to India is the lowest rated activity (9.7 per cent).

Figure 12 - Support of the wider engagement of the institution/ organisation through the research collaboration with UK (n=31, multiple answers possible)- [see next page, top-left]



Prior engagement with the UK

Like the UK sample, almost half of the Indian respondents (51.6 per cent) had already travelled to the UK professionally before receiving the UK - India funding. Therefore, the funding, on the one hand, supports those who already have research links with academics in the UK, and on the other, it has enabled those without prior experiences of UK collaborations to forge research relationships.

Ability to access alternative forms of funding support

The impact of the grant on the Indian institution/ organisation also seems to be significantly greater than for their UK partners. More than two-thirds of the Indian respondents (68.8 per cent) observe a high or very high impact. This compares to 42.6 per cent of the UK respondents who perceived a high impact of the UK – India grant on their HEI. A very small proportion of the Indian researchers (3.1 per cent) thought the grant impact had low importance for their institution, which is significantly smaller compared to 18 per cent of the UK respondents.

Figure 13 - Impact of the UK-India grant on the institution/ organisation (n=32) - [see adjacent column, top-right]

⁴¹ Elsevier (2016) International Comparative Performance of the UK Research Base 2016, London: Department for Business, Energy & Industrial Strategy.

Looking forward

The research landscape in 2018

The period of RCUK India's operation has not coincided with uninterrupted economic growth. The global financial crisis caused a contraction in the world economy in 2009 from which countries have not recovered uniformly. Despite this variation, the world economy still increased by over twenty per cent in real terms between 2008 and 2016 (the latest year for which World Bank data is currently available)⁴². Over this period, there was also a general increase in expenditure on research and development as a percentage of GDP. In 2015, the world spent over US\$1.6 trillion on research and development in current values⁴³.

The trends identified in 2008, toward increased internationalisation of research and the progress of new research nations have borne out. Countries like India, that were still emerging in 2008 are now central to the global research landscape.

Over the past ten years, India's economy has grown by seventy-five per cent⁴⁴ in real terms. In 2008, it was the twelfth largest economy in the world. In 2016, it was the seventh largest⁴⁵, in excess of US\$ 2.26 trillion. By 2028, India is predicted to have overtaken the UK and others to become the third largest economy in the world⁴⁶. This expansion in the economy has already brought with it an increase in spending on research and development which has been reflected in a massive increase in the countries scholarly output since 2008. In

2017, the figure stood at 149,195 published articles compared to 60,125 in 2008⁴⁷. Over this same period the proportion of international collaboration has remained flat at around seventeen per cent⁴⁸.

By contrast, during the same period the UK economy grew by around ten per cent in real terms⁴⁹. In 2016, it was the world's fifth largest economy with a GDP of just under US\$2.65 trillion. Expenditure on research and development has remained flat at around 1.7 per cent. Scholarly output has grown by just over twenty-five per cent, from 157,613 published articles in 2008 to 199,168 in 2017⁵⁰, though the rate of growth in output has slowed over this period from 4.02 per cent in 2009 to approximately 1.15 per cent. The proportion of international collaborative research has increased from 37.8 per cent in 2008 to 53.7 per cent in 2017. There was been a slight increase in the average field-weighted citation impact from 1.52 to 1.57.

The decade of RCUK India's operation has seen a dramatic increase in the amount of collaborative output, from 1,096 published articles in 2007 to 3,096 in 2017. In 2007, the average field-weighted citation impact (FWCI) of UK-India output was 1.59. In 2017 it was 2.67. At the subject level, environmental science and medicine performed particularly strongly. In 2007, the average FWCI of collaborative environmental science articles was 1.58, in 2017, it was 2.90. Annual output increased from 66 published articles in 2007 to 185 in 2017. For medicine, the average FWCI was 1.99 in 2007. In 2017 it was 4.11. The annual output has more than tripled from 303 articles in 2007 to 921 in 2017.

The Government of India has acknowledged that innovation is, 'integral to the long-term growth

and dynamism of any nation' and has stated a 'doubling of R&D spending is necessary.'⁵¹ The following priority themes are to be the subject of national research 'missions': agriculture, cyber physical systems, energy storage systems, dark matter, genomics, and mathematics⁵².

Within the UK, the Government's Industrial Strategy sets out an ambition to become the *world's most innovative economy*⁵³. This is to be achieved in part by raising total investment in research and development expenditure to 2.4 per cent of GDP by 2027. The Strategy also sets out four grand challenges related to the industries of the future. These are ageing society, artificial intelligence and data economy, clean growth, and future mobility⁵⁴.

The role for UKRI India

The survey participants were invited to share their thoughts on how they see the UK-India partnership unfolding over the next ten years and the role for UKRI India.

UK-India research engagement in the next ten years

The scale of the future relationship

Both UK and Indian researchers are enthusiastic about the future of research engagement between the two countries. When asked an open question about what research engagement will look like in the next ten years the most frequent comment from respondents was that there would have been a significant increase and strengthening. Within this, it is expected that the collaboration shall continue to focus on addressing global challenges.

Priority research themes for the future

The Indian respondents identified water shortage, heat stress, infectious diseases, resource

efficiency and molecular genetics as priority areas. Sustainable agriculture development for food security and food safety was also mentioned as being a growing priority area for the country. There will be a continued increase in the importance of multidisciplinary research.

The UK respondents, a larger group, provided a broader perspective of the next ten years of the research engagement. Agricultural themes continued to feature prominently, such as crop science; monsoon, weather and climate predictions, alongside veterinary research; infectious diseases and stronger engagement of nuclear engineers. Recommendations included a sustained focus on "... major areas linked to industrial and societal priorities such as the Internet of Things, Smart Connected Cities, 5G wireless and digital connectivity to bridge the urban and rural [communities]". The importance of working in the South Asia region and stimulating stronger regional development was highlighted.

Priority activities for the future

Respondents felt that there was a clear role for the UK to play in the training students and researchers in India to the highest international standards. Collaborative initiatives, mainly aimed at sustainable PhD programmes, such as the Indian Institute of Technology (Bombay) IITB – Monash Research Academy⁵⁵ were mentioned as models worth replicating with the UK. Additionally, it was felt that there is an opportunity for the UK to facilitate the training of Indian students at UK HEIs and research organisations.

There was repeated mention of special visa categories which need to be introduced for Indian researchers and those on exchange programmes with the UK. Greater flexibility in UK visa policy was identified by some as a precondition for stronger links between the two countries. The survey was prior to the announcement of new 'UKRI Science, Research and Academia' visa

⁴² World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2016&start=1996> (Accessed: 18 April 2018).

⁴³ World Bank (2016) GDP (current US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2007&start=1996>(Accessed: 18 April 2018).

⁴⁴ World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2016&start=1996> (Accessed: 18 April 2018).

⁴⁵ World Bank (2017) Gross domestic product, Washington, D.C.: World Bank.

⁴⁶ Masashi Uehara; Kengo Tahara (2017) India's economy to be world's No.3 by 2028: forecast, Available at: <https://asia.nikkei.com/Politics-Economy/Economy/India-s-economy-to-be-world-s-No.3-by-2028-Forecast> (Accessed: 18 April 2018).

⁴⁷ SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

⁴⁸ SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

⁴⁹ World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2016&start=1996> (Accessed: 18 April 2018).

⁵⁰ SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

⁵¹ Government of India (2018) Economic Survey 2017 -18, New Delhi: Government of India.

⁵² Government of India (2018) Economic Survey 2017 -18, New Delhi: Government of India.

⁵³ HM Government (2017) Industrial Strategy: Building a Britain fit for the future, London: Department for Business, Energy & Industrial Strategy.

⁵⁴ HM Government (2017) Industrial Strategy: Building a Britain fit for the future, London: Department for Business, Energy & Industrial Strategy.

⁵⁵ IITB-Monash Research Academy (2015) IITB-Monash Research Academy, Available at: <http://www.iitbmonash.org/> (Accessed: 18 April 2018).

⁵⁶ UKRI Science, Research and Academia visa scheme announced : <https://www.gov.uk/government/news/new-scheme-for-overseas-researchers-to-come-to-the-uk> (Accessed: 6 July 2018)

scheme⁵⁶. While there was mention of opportunities for research around post-Brexit trade agreements with India, caution was expressed regarding a perception that the UK was turning inward, which “may reverse the progress made recently.”

UKRI India activities to support research engagement

Models to consider

Respondents to the survey sought future UKRI support in the form of short term academic mobility initiatives, alongside large-scale strategic programmes.

UK and Indian researchers both see utility in further funding which encourages student and researcher exchanges, reciprocal and short-term visits. These initiatives require small amounts of funding but their impact is high and long-lasting.

In parallel, respondents saw a role for funding support for longer term projects aligned to shared strategic research interests. For example, it was noted that long-term projects are more suitable for fields such as crop research. Currently, initiatives are set up with a long-term vision but the funding tends to be short-term limiting their sustainability.

Indian researchers noted the importance of support for early career researchers and opportunities for them to participate in conferences. The significance of local capacity building and knowledge exchange was highlighted. Indian researchers expressed a strong desire for more travel grants beyond the UK and India and funding to allow the “formation of priority research consortia.”

UK respondents felt that future funding should prioritise enabling Indian PhD students to undertake their studies in the UK and create bespoke opportunities for postdocs and Indian scientists to spend some time in the UK.

The NERC-MoES project, ‘Drivers of variability in the South Asian Monsoon’ and the DBT-BBSRC ‘Farmed Animal Disease and Health Research’ project were perceived as examples of best practice by the UK respondents.

There was also an appetite for future initiatives with dedicated non-ODA funding to support engagement with stakeholders outside academia.

More pragmatic suggestions from the UK included: the opportunity to reapply for funding on the basis of project progress, even if just a medium-term extension, to help ensure long-term impact; funding pipelines from small-scale, short-term mobility to large-scale project grants; mechanisms to support effective international project teams; and create for multilateral cooperation between UK, India and other European or international partners.

Looking forward to 2028

RCUK India was launched in 2008 to develop positive, sustainable and influential relationships with key stakeholders; support the facilitation of high quality research collaboration between India and the UK; and build the profile of the RCUK office to influence and deliver valuable, high impact outputs. It has delivered against all three, working with a range of key Government of India partners to deliver over £300 million of funding. During this period the collaborative output of both countries has nearly tripled, its impact has increased, and the UK has moved from India’s fourth largest partner in the production of collaboration research to her second, and the first in Europe.

RCUK India has helped to facilitate the creation of high-performing collaborative research base. UK Research and Innovation India has an opportunity to build on this foundation utilising the expected increases in funding for research in both countries in order to ensure that the UK remains a key partner as India expands, supporting both countries to achieve their domestic research objectives and continue to address further local and global challenges.

Appendices

Appendix one – Survey methodology

The quantitative part of the study is based on an online survey. The questionnaire for this survey was developed in cooperation with RCUK India. It contained four sections: general information on the participant, information regarding the impact on the institution, data with respect to the impact on the individual level and data regarding the broader impact of the programme.

The questions were designed to either allow one answer, in such cases using Likert Scales such as “strongly disagree, disagree, uncertain, agree, strongly agree” or of a yes/no type. Other questions allowed for multiple answers.

The survey was open between Friday 2 March and Sunday 25 March 2018. One invitation and two reminders to those who had not answered so far were sent. The survey closed on Sunday 25 March 2018 and the data was then extracted and analysed. Given the fact that no pre-to-post assessment was possible, any effect sizes could not be calculated. Significance tests were conducted for those questions which had hierarchical scales (such as “strongly disagree ... strongly agree”; “yes...no”). For these, we applied two-tailed t-tests assuming unequal variances to allow for the most critical assessment at an Alpha level of .05. There is a debate on the use of t-tests for non-parametric data but it has been shown that the results are as useful as non-parametric tests such as Wilcoxon ranked tests for sample sizes above ten (de Winter / Dodou 2010)⁵⁷. We therefore applied both types of tests (two-tailed t-tests assuming unequal variances and Mann-Whitney) using Realstatistics for Excel, since the significance tests in Excel are firstly only t-tests and secondly considered not highly reliable. We only consider a difference significant if the two-tailed tests (not only the one-tailed, since we cannot assume a direction of the difference) proved significance in both tests (t-test and Wilcoxon). The results shown below prove once again de Winter/Dodou 2010 right, since only in some one-tailed results differences (significance yes/no) appeared between a t-test and a Mann-Whitney (MW). For two-tailed tests, both approaches always showed the same results, usually with also extremely similar p-values.

For the other questions, the comparison of frequencies and ranking of these differences were used. Given the in mostly clear results, this method – also considering the extremely tight timeline for the analysis – was considered sufficient for the task.

Appendix two – Summarised survey data

Complete summary quantitative data from the survey responses is contained below.

Respondent profile

Gender

Response	Number of responses	Percentage of responses
Female	21	21.4
Male	76	77.6
Other	0	0.0
I do not want to state my gender	1	1.0
Total	98	100

⁵⁶ UKRI Science, Research and Academia visa scheme announced: <https://www.gov.uk/government/news/new-scheme-for-overseas-researchers-to-come-to-the-uk> (Accessed: 6 July 2018)

⁵⁷ de Winter, Joost C. F.; Dodou, Dimitra (2010) ‘Five-Point Likert Items: t Test versus Mann-Whitney-Wilcoxon’, Practical Assessment, Research & Evaluation, 15(11), pp. 1.

Location

Response	Number of responses	Percentage of responses
Participant from India	32	34.4
Participant from the UK	61	65.6
Total	93	100

Please select the research council that funded your grant (multiple answers possible):

Response	Number of responses	Percentage of responses
UK Arts and Humanities Research Council	6	3.9
UK Biotechnology and Biological Sciences Research Council	29	19.1
UK Economic and Social Research Council	8	5.3
UK Engineering and Physical Sciences Research Council	28	18.4
UK Medical Research Council	8	5.3
UK Natural Environment Research Council	15	9.9
UK Science and Technology Facilities Council	1	0.7
Innovate UK	4	2.6
Indian Department for Biotechnology (DBT)	31	20.4
Indian Department for Science and Technology (DST)	7	4.6
Indian Ministry of Earth Sciences (MoES)	6	3.9
UK Department for International Development (DfID)	6	3.9
Indian Council for Social Science Research	3	2.0
Other (Please Specify)	0	0.0
Total	152	100

Engagement with India (UK respondents)

Prior to the funding, had you visited India in your role at the HEI/RO?

Response	Number of responses	Percentage of responses
Yes	30	49.2
No	29	47.5
Other (Please Specify)	2	3.3
Total	61	100

Does your institution have an engagement strategy for India?

Response	Number of responses	Percentage of responses
Yes, India is a priority country for research engagement of my HEI/RO	31	50.8
My HEI/RO cooperates with India but does not target India as a strategic partner for research engagement	15	24.6
No, India is not a priority country for strategic engagement of my HEI/RO	7	11.5
Other (Please Specify)	8	13.1
Total	61	100

In your opinion, has the research collaboration with India supported the wider engagement of your institution/organisation regarding:

Response	Number of responses	Percentage of responses
International student recruitment from India/UK	19	14.0
It has supported early career researchers and research assistants (and researchers up to 5 years upon completion of PhD)	41	30.1
It has supported academic mobility and exchanges	42	30.9
Teaching partnerships (through the means of transnational education)	10	7.4
Community and business interactions through the means of knowledge exchange	15	11.0
No known broader benefits beyond the research engagement	9	6.6
Total	136	100

Have you been able to access other forms of support for your research collaboration with India beyond the grant?

Response	Number of responses	Percentage of responses
Yes, my institution has contributed institutional funding to research collaborations with India.	9	14.8
Yes, other funding source.	15	24.6
No, my institution has been unable to provide direct financial support to research collaborations with India beyond the funding provided by RCUK and other funders of research for India.	30	49.2
Other (Please Specify)	7	11.5
Total	61	100

Engagement with the UK (Indian respondents)

Prior to the funding, had you visited the UK in your role at the HEI/RO?

Response	Number of responses	Percentage of responses
Yes	30	49.2
No	29	47.5
Other (Please Specify)	2	3.3
Total	61	100

Does your institution have an engagement strategy for the UK?

Response	Number of responses	Percentage of responses
Yes, the UK is a priority country for research engagement of my HEI/RO	20	64.5
My HEI/RO cooperates with the UK but does not target India as a strategic partner for research engagement	11	35.5
No, the UK is not a priority country for strategic engagement of my HEI/RO	0	0.0
Other (Please Specify)	0	0.0
Total	31	100

In your opinion, has the research collaboration with the UK supported the wider engagement of your institution/organisation regarding:

Response	Number of responses	Percentage of responses
International student recruitment from India/UK	3	5.0
It has supported early career researchers and research assistants (and researchers up to 5 years upon completion of PhD)	16	26.7
It has supported academic mobility and exchanges	23	38.3
Teaching partnerships (through the means of transnational education)	4	6.7
No known broader benefits beyond the research engagement	3	5.0
Total	60	100

Have you been able to access other forms of support for your research collaboration with the UK beyond the grant?

Response	Number of responses	Percentage of responses
Yes, my institution has contributed institutional funding to research collaborations with the UK.	6	19.4
Yes, other funding source.	3	9.7
No, my institution has been unable to provide direct financial support to research collaborations with India beyond the funding provided by RCUK and other funders of research for the UK.	19	61.3
Other (Please Specify)	3	9.7
Total	31	100

Impact of the UK-India grant

Would you have carried out the research with your co-researcher(s) from India/UK if it was not for the UK-India grant?

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
Yes	6	6.1	2	3.3	4	12.5
Yes, but at a reduced level	25	25.5	7	11.5	16	50.0
No	62	63.3	47	77.0	12	37.5
Other (Please Specify)	5	5.1	5	8.2	0	0.0
Total	98	100	61	100	32	100

Were you involved in similar research projects in India/UK prior to the UK-India grant?

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
Yes	41	41.8	20	32.8	19	59.4
No	57	58.2	41	67.2	13	40.6
Total	98	100	61	100	32	100

What was the impact of the grant on the following?

Overall								
Response	Number of responses				Percentage of responses			
	Your career	Your research	Your UK-India partnership	Your institution	Your career	Your research	Your UK-India partnership	Your institution
Non-existent	6	0	0	2	6.1	0.0	0.0	2.0
Low	5	4	3	10	5.1	4.1	3.1	10.2
Limited	35	13	8	33	35.7	13.3	8.2	33.7
High	37	53	40	39	37.8	54.1	40.8	39.8
very high	15	28	47	14	15.3	28.6	48.0	14.3
Total	98	98	98	98	100.0	100.0	100.0	100.0
UK								
Response	Number of responses				Percentage of responses			
	Your career	Your research	Your UK-India partnership	Your institution	Your career	Your research	Your UK-India partnership	Your institution
Non-existent	3	0	0	1	4.9	0.0	0.0	1.6
Low	4	2	2	10	6.6	3.3	3.3	16.4
Limited	25	10	7	24	41.0	16.4	11.5	39.3
High	22	36	26	20	36.1	59.0	42.6	32.8
Very high	7	13	26	6	11.5	21.3	42.6	9.8
Total	61	61	61	61	100.0	100.0	100.0	100.0

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India								
Response	Number of responses				Percentage of responses			
	Your career	Your research	Your UK-India partnership	Your institution	Your career	Your research	Your UK-India partnership	Your institution
Non-existent	3	0	0	1	9.4	0.0	0.0	3.1
Low	1	2	1	0	3.1	6.3	3.1	0.0
Limited	9	3	1	9	28.1	9.4	3.1	28.1
High	14	14	12	15	43.8	43.8	37.5	46.9
Very high	5	13	18	7	15.6	40.6	56.3	21.9
Total	32	32	32	32	100.0	100.0	100.0	100.0

Can you give us an indication of the research outputs produced because of the UK-India grant? How many publications (this can be papers, books, book chapters or monographs) were you able to publish which directly relate to the grant?

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
One research publication	6	6.1	4	6.6	2	6.3
2-3 research publications	19	19.4	14	23.0	5	15.6
4 - 5 research publications	16	16.3	10	16.4	4	12.5
More than 5 research publications	24	24.5	17	27.9	5	15.6
Not applicable	1	1.0	1	1.6	0	0.0
Other (Please Specify)	32	32.7	15	24.6	16	50.0
Total	98	100	61	100.0	32	100.0

Is the research partnership with India/UK funded by RCUK still active? Tick all that apply.

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
Yes, with the same research partners	47	42.3	26	42.6	18	56.3
Yes with additional research partners	23	20.7	17	27.9	6	18.8
Yes with more funding	9	8.1	5	8.2	4	12.5
No.	32	28.8	21	34.4	9	28.1
Total	111	100	69	113.1147541	37	115.625

How did the UK-India grant impact your career as a researcher (select all that apply)?

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
The grant supported my reputation as an expert in the field	74	39.4	43	38.7	28	43.8
The grant supported my career progression	30	16.0	20	18.0	9	14.1
The grant expanded my network of international collaborators in my field	74	39.4	44	39.6	27	42.2
The grant had no impact on my career	4	2.1	4	3.6	0	0.0
The grant had a negative impact on my career	0	0.0	0	0.0	0	0.0
Other (Please Specify)	6	3.2	0	0.0	0	0.0
Total	188	100	111	100	64	100

In your opinion, what was the impact of the UK-India grant on the development of young researchers that took part in the research?

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
No impact	0	0.0	0	0.0	0	0.0
Low impact	3	3.1	3	4.9	0	0.0
Limited impact	11	11.2	9	14.8	2	6.3
High impact	55	56.1	32	52.5	20	62.5
Very high impact	25	25.5	14	23.0	9	28.1
Not applicable (young career researchers did not participate in this project)	4	4.1	3	4.9	1	3.1
Total	98	100	61	100	32	100

Have you been able to access other research grants which specifically target collaborations with UK/India?

Response	Number of responses	Percentage of responses	Only UK absolute	Only UK percentage	Only India absolute	Only India percentage
Yes, I already had a UK/India research grant.	20	21.5	13	21.3	7	21.9
Yes, I have been able to access more UK-India funding after this grant.	21	22.6	13	21.3	8	25.0
No	52	55.9	35	57.4	17	53.1
Total	93	100	61	100	32	100

In your opinion, on a scale from “no impact” to “very high impact”, what is the research/industry/ societal impacts of the UK-India grant on the advancement of your UK/India research grant?

Overall						
Response	Number of responses			Percentage of responses		
	Business-led innovation	Policy impact - knowledge exchange with government or public-sector bodies	Societal Impact -knowledge exchange other with the local community (e.g. farming communities), NGOs or other stakeholders	Business-led innovation	Policy impact - knowledge exchange with government or public-sector bodies	Societal Impact -knowledge exchange other with the local community (e.g. farming communities), NGOs or other stakeholders
No impact	27	13	9	29.0	14.0	9.7
Low impact	23	12	14	24.7	12.9	15.1
Somewhat impactful	32	32	30	34.4	34.4	32.3
High impact	4	27	29	4.3	29.0	31.2
Very high impact	7	9	11	7.5	9.7	11.8
Total	93	93	93	100	100	100

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UK						
Response	Number of responses			Percentage of responses		
	Business-led innovation	Policy impact - knowledge exchange with government or public-sector bodies	Societal Impact -knowledge exchange other with the local community (e.g. farming communities), NGOs or other stakeholders	Business-led innovation	Policy impact - knowledge exchange with government or public-sector bodies	Societal Impact -knowledge exchange other with the local community (e.g. farming communities), NGOs or other stakeholders
No impact	19	12	7	31.1	19.7	11.5
Low impact	17	9	10	27.9	14.8	16.4
Somewhat impactful	20	20	22	32.8	32.8	36.1
High impact	1	15	18	1.6	24.6	29.5
Very high impact	4	5	4	6.6	8.2	6.6
Total	61	61	61	100	100	100

India						
Response	Number of responses			Percentage of responses		
	Business-led innovation	Policy impact - knowledge exchange with government or public-sector bodies	Societal Impact -knowledge exchange other with the local community (e.g. farming communities), NGOs or other stakeholders	Business-led innovation	Policy impact - knowledge exchange with government or public-sector bodies	Societal Impact -knowledge exchange other with the local community (e.g. farming communities), NGOs or other stakeholders
No impact	8	1	2	25.0	3.1	6.3
Low impact	6	3	4	18.8	9.4	12.5
Somewhat impactful	12	12	8	37.5	37.5	25.0
High impact	3	12	11	9.4	37.5	34.4
Very high impact	3	4	7	9.4	12.5	21.9
Total	32	32	32	100	100	100

Please rank the statements below according to which best captures the impact of the UK-India research programme:

Response	Number of responses			Percentage of responses						
	The culture of UK-India co-designed and match funded research programmes supports mutually beneficial research engagement.	It enabled access to research funders and research partners in India/UK.	The joint funded UK Indian grants provide opportunities to carry out research which would not otherwise be possible.	It supported my institution's research and wider engagement with key stakeholders in India/UK.	Other	The culture of UK-India co-designed and match funded research programmes supports mutually beneficial research engagement.	It enabled access to research funders and research partners in India/UK.	The joint funded UK Indian grants provide opportunities to carry out research which would not otherwise be possible.	It supported my institution's research and wider engagement with key stakeholders in India/UK.	Other
1	31	22	32	6	2	33.3	23.7	34.4	6.5	2.2
2	26	29	28	10	0	28.0	31.2	30.1	10.8	0.0
3	21	28	19	22	3	22.6	30.1	20.4	23.7	3.2
4	11	12	12	52	6	11.8	12.9	12.9	55.9	6.5
5	4	2	2	3	82	4.3	2.2	2.2	3.2	88.2
Total	93	93	93	93	93	100	100	100	100	100

In your opinion, will research engagement with the UK over the next five years become:

Response	Number of responses	Percentage of responses
More important than at present	74	79.6
Neither more nor less important	18	19.4
Less important than at present	1	1.1
Total	93	100

References

Journal

de Winter, Joost C. F.; Dodou, Dimitra (2010) 'Five-Point Likert Items: t Test versus Mann-Whitney-Wilcoxon', *Practical Assessment, Research & Evaluation*, 15 (11), pp. 1.

News article

BBC (2008) BBC NEWS| Politics| Brown announces India aid package, Available at: http://news.bbc.co.uk/1/hi/uk_politics/7198546.stm (Accessed: 18 April 2018).

BBSRC (2016) UK-India: 20 years of research collaboration, Available at: <https://bbsrc.ukri.org/news/policy/2016/161104-f-uk-india-20-years-of-research-collaboration/> (Accessed: 18 April 2018).

Masashi Uehara; Kengo Tahara (2017) India's economy to be world's No.3 by 2028: forecast, Available at: <https://asia.nikkei.com/Politics-Economy/Economy/India-s-economy-to-be-world-s-No.3-by-2028-Forecast> (Accessed: 18 April 2018).

Research Assessment Exercise (2008) RAE 2008: News: 2008: RAE2008 confirms UK's dominant position in international research, Available at: <http://www.rae.ac.uk/news/2008/results.asp> (Accessed: 18 April 2018).

Research Council UK (2008) Prime Minister's seal of approval for new Research Councils UK Office in India, Available at: <http://webarchive.nationalarchives.gov.uk/20090605094505/http://www.rcuk.ac.uk/news/081020.htm> (Accessed: 18 April 2018).

Report

Elsevier (2011) International Comparative Performance of the UK Research Base - 2011, London: The National Archives.

Elsevier (2016) International Comparative Performance of the UK Research Base 2016, London: Department for Business, Energy & Industrial Strategy.

Evidence Ltd (2007) Report to the UK Foreign and Commonwealth Office: India's national research performance and international collaboration (1996-2005): A bibliometric study, Leeds: Evidence Ltd.

Government of India (2018) Economic Survey 2017 -18, New Delhi: Government of India.

HM Government (2017) Industrial Strategy: Building a Britain fit for the future, London: Department for Business, Energy & Industrial Strategy.

HM Treasury; Department of Trade & Investment; Department for Education and Skills (2004) Science & innovation investment framework 2004 - 2014, London: The Stationary Office.

House of Parliament (2007) House of Commons - Science and Technology - Seventh Special Report, Available at: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS> (Accessed: 18 April 2018).

OECD (2008) OECD Science, Technology & Industry Outlook 2008, Available at: <http://www.oecd.org/sti/inno/oecdsciencetechnologyandindustryoutlook2008.htm> (Accessed: 18 April 2018).

Planning Commission, Government of India (2008) Eleventh Five Year Plan (2007-2012): Inclusive Growth, New Delhi: Oxford University Press.

Research Council UK (2008) Prime Minister's seal of approval for new Research Councils UK Office in India, Available at: <http://webarchive.nationalarchives.gov.uk/20090605094505/http://www.rcuk.ac.uk/news/081020.htm> (Accessed: 18 April 2018).

Research Council UK India (2013) Research Councils UK: Engaging with India, New Delhi: Research Council UK.

Website

Scimago Lab (2017) SJR - International Science Ranking, Available at: <http://www.scimagojr.com/countryrank.php?year=1996> (Accessed: 18 April 2018).

Scimago Lab (2017) SJR - International Science Ranking, Available at: <http://www.scimagojr.com/countryrank.php?year=2008> (Accessed: 18 April 2018).

SciVal® database, Elsevier B.V., <http://www.scival.com> (downloaded on 18 April 2018).

World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2007&start=1996> (Accessed: 18 April 2018).

World Bank (2016) GDP (constant 2010 US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2016&start=1996> (Accessed: 18 April 2018).

World Bank (2016) GDP (current US\$), Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2007&start=1996> (Accessed: 18 April 2018).

World Bank (2017) Gross domestic product, Washington, D.C.: World Bank.

World Bank (2018) Research and development expenditure (% of GDP), Available at: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS> (Accessed: 18 April 2018).