



Australia India
Institute

Research Collaboration between Australian and Indian Universities: potential for growth

Confidential

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EXECUTIVE SUMMARY

The following report is a critical analysis of the level of research collaboration between Australian universities and their Indian counterparts. Based on research conducted by La Trobe University between November 2015 and May 2016, it provides a snapshot of the current research engagement between the two countries. We acknowledge that the picture remains imperfect. However, it does capture a substantial majority of the collaboration and in so doing brings into focus the barriers to international research collaboration, while identifying opportunities to broaden and extend bilateral cooperation.

The report evaluates the data collected to reveal the issues to be addressed in establishing a framework within which international research partnerships between Australia and India can flourish.

SUMMARY OF KEY FINDINGS

- ❖ Memoranda of Understanding (MOUs) for research projects between universities in both countries are numerous. Of the 397 reported collaborations, 253 (or 63.73%) are in some form of MOU. Yet, a further investigation of the agreements, reveals that the majority of MOUs are inactive.
- ❖ Research collaboration is widespread across the Australian tertiary sector. The Group of Eight (Go8) Australian universities are active in their collaborations with India. However, there are strong partnerships outside of that group as well. RMIT, Curtin and Deakin Universities are among other significant players.
- ❖ In India, of the top 14 universities by number of collaborations, 50% are Institutes of Technology (IITs). In addition, it should be noted that private institutions, such as Shiv Nadar, Ashoka and Jindal Global Universities, do have track records of international collaboration, but few of their partnerships are with Australia.
- ❖ Although the IITs and a number of private Indian institutions do show an emerging level of international research collaboration, it would be risky to use this data to try and pick 'winners'. Proscriptive modeling risks limiting successful partnerships rather than extending them. Identifying centres of excellence provides a much better starting point for establishing international research collaborations than university rankings.
- ❖ On paper, there is a strong alignment with the strategic research needs of both countries in existing collaborations but there is sometimes a gap in reaching outcomes of mutual benefit. This is particularly true where Australia's focus on commercial outcomes is paired with an Indian desire for research collaboration that leads to societal change. The Indian diaspora in Australia could play a larger bridging role in better aligning the research interests of the two countries.
- ❖ Demands for greater Commonwealth support for international research collaborations will always exist. However, it is likely that improvement could come in the short term by revising and broadening the means by which funds are allocated rather than increasing the overall pool of funding. Also, if Australian universities provided support to their Indian counterparts in their project proposals, access would be given to a pool of unspent Indian funding.
- ❖ For some Australian universities, research collaboration is part of a broader strategy related to recruitment of fee-paying students. In this sense it works as a 'loss leader' so any reform of policy settings needs to recognize this function.

- ❖ Researchers report being more affected by frequent and short notice changes to the 'rules of engagement' than by general bureaucratic impediments to establishing and maintaining collaborations.
- ❖ Calculating a return on investment from establishing international partnerships with India needs to reflect time expended as well as money.
- ❖ There is much scope for broadening the collaborative infrastructure in terms of language skills and air transportation links between the two countries. The current situation stands in sharp contrast to Australia's relationship with China, identified as another important higher education partner. However, the possibility for government action in this area is limited and is more likely to be driven by underlying commercial interests.
- ❖ The creation of a national research profile that identifies Australia's strengths and helps universities and business to develop international collaborations promoting Australia globally. This would mean identifying key areas of research deemed by the Commonwealth to be central to the country's future prosperity and where Australia sets the international benchmark. Individual universities, or institutional networks, could then present themselves as centres of excellence for collaborative projects in those key disciplines.

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INTRODUCTION

La Trobe University is a Foundation Partner of the Australia India Institute (All). Through this partnership, in October 2015, the university was engaged by the Commonwealth's Department of Education and Training (DET) to map and analyse the current level of research collaboration between universities in Australia and India. The brief was narrowly focused only on university research links. It did not include study tours, exchange programs or international student recruitment, except where these had a clear and specific reference to collaborative research.

In addition to the mapping, contained within the report was to be an evaluation of the obstacles to such partnerships, with a review of how these might be ameliorated, overcome or eliminated.

This report draws on data from Australia's public universities, funding bodies in both Australia and India, Elsevier and other publication databases. In addition, there were 29 interviews conducted in both countries. All the research is informed by existing key policy documents. To compare and contrast with the results of this research, the level of academic co-authorship between the two countries between 2012 and 2015 has been analysed critically.

The appendices at the end of the report include spreadsheets that provide the source material for graphs and a collection of case studies that illustrate the differing dimensions of successful research collaborations between the two countries.

WHAT THE DATA REVEALS

MAPPING THE LANDSCAPE

For the purposes of this report, and in the absence of a broadly accepted set of metrics, the authors have used self-identification by universities and institutions primarily to identify where research collaborations exist between India and Australia. Inevitably, this has been limited by the extent to which individual Australian universities have been willing to cooperate in supplying data. Where possible, mapping the level of research collaboration between Australian universities, their Indian counterparts, academics or commercial enterprises has been supplemented by mining the databases of grant funding bodies and those of Universities Australia, the Australia India Council (AIC) and the Australia India Education Council (AIEC).

There is a wide variation in the nature and breadth of the collaborations. Some Australian universities have a long-standing presence in India and have developed strategies at an institution-to-institution level. Others have focused on collaborations that are established between researchers in the two countries. By critically analysing the data, it is possible to assess a variety of collaborative models to determine if an individual and/or group of Australian universities may be best placed to further collaborate with individual and/or groups of Indian universities.

Within the limitations of the information provided, a snapshot of the research collaborations between the two countries reveals immediately a preponderance of STEM projects; hardly surprising given the priorities of the two countries. Certain Indian institutions feature more frequently than others but in exploring below the surface level data, it is clear that a number of collaborations exist in name only.

Of the 397 individual partnerships identified by our research,¹ only 40.5% can be confirmed as active research collaborations. A more detailed analysis of the remainder of the collaborative projects listed was made in direct communications with Australian university administrators and researchers. These discussions revealed that the majority of the MOUs are inactive or have no public status at all. While it was not possible to give a research-based figure to this inactivity, anecdotally more than 70% of MOUs were deemed not to have gone beyond an initial in-principle agreement.

Of the top 14 Indian universities by number of active collaborations, 50% are Indian Institutes of Technology (IITs). From a total of 229 institutions and commercial enterprises, 28.8% have two or more research collaborations with Australian institutions. A total of 17 individual partnership projects are listed for the Indian Institute of Technology Chennai, or 7.4% of the total. While the research does not of itself define this list as the best Indian universities with which to collaborate, it is interesting the frequent appearance of the Indian Institutes of Technology (IITs) in research partnerships and co-authored papers with Australia. Later in this document, we explore also the potential for collaboration with a number of India’s emerging private universities.

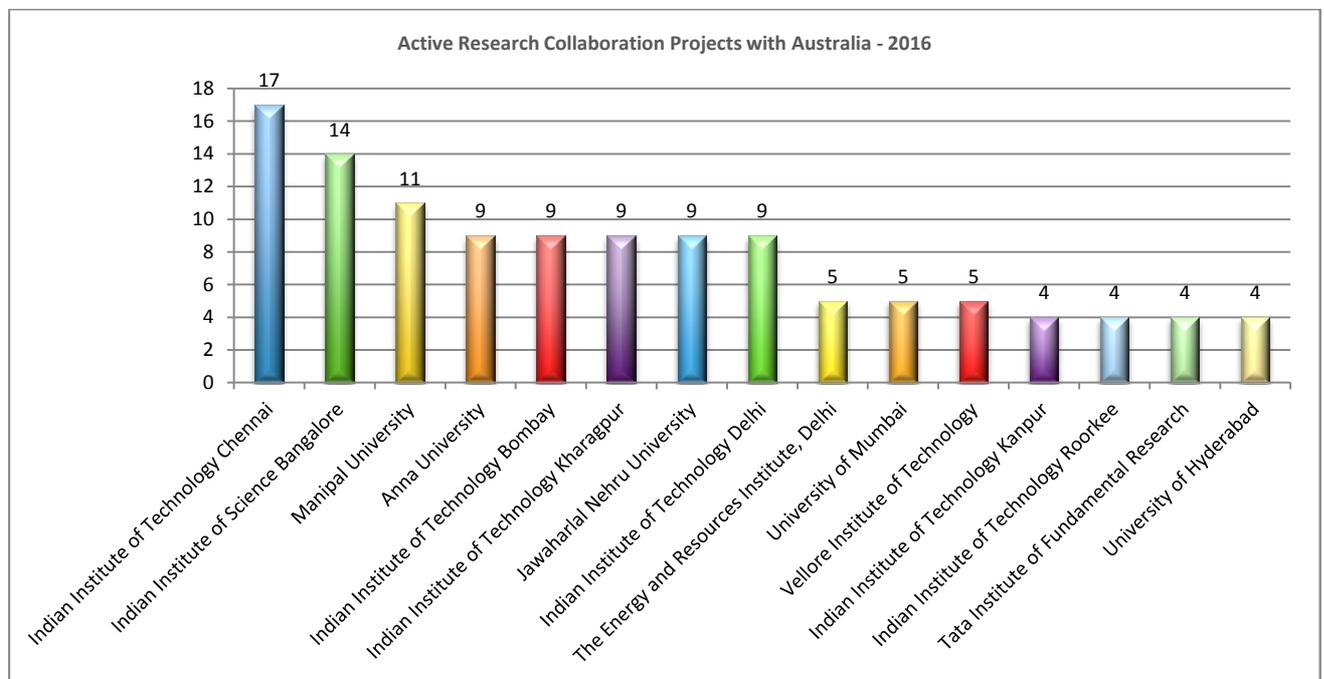


Table 1: Snapshot of active research collaboration projects by top 15 Indian universities with Australia - 2016.
 Data Source: La Trobe University Indian University Partners spreadsheet, 2016

While the Go8 universities dominate the data for active projects (Table 2), three universities outside that network feature in the top 10, with one of them (RMIT) heading up the list. Once again, this data needs to be viewed in context. A total of 13, or 32.5%, of the 40 Australian public universities did not respond to requests for information on their research collaborations with India. What details were received from the remainder were supplemented by mining the databases of funding bodies and those of Commonwealth government departments.

¹ Appendix 1: La Trobe University Australia-India Research Collaboration Master spreadsheet

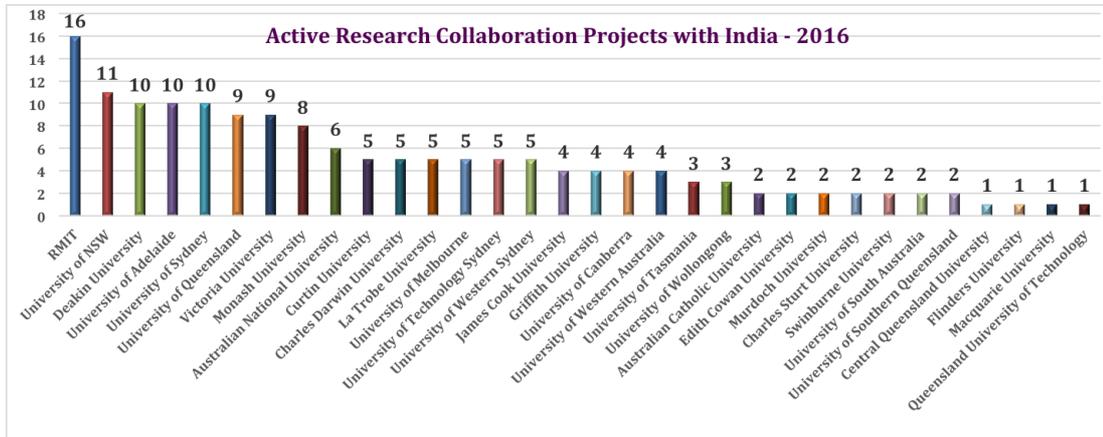


Table 2: Snapshot of active research collaboration projects by Australian universities with India - 2016.
 Data Source: La Trobe University Australian University Partners spreadsheet, 2016

While the majority of active projects documented in this study fall within the Go8 network, a significant number, 27%, are with universities outside of any formal grouping.

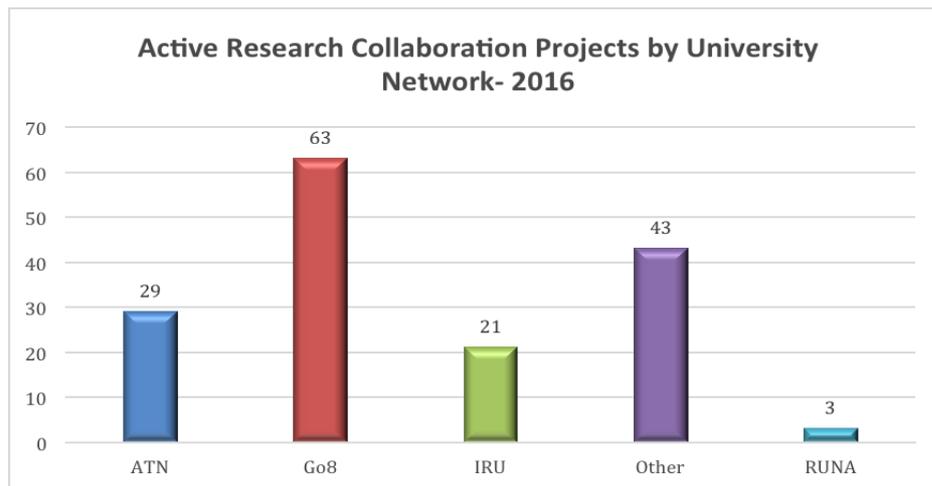


Table 3: Snapshot of active research collaboration projects with India by Australian university networks - 2016.
 Data Source: La Trobe University Australian University Partners spreadsheet, 2016

A more traditional method of mapping research collaboration has centred on measuring the number of co-authored papers in international journals. This is narrow in its definition and limited in terms of its ability to capture a broad picture of collaborative projects. One of the problems with this metric is that it does not take account of project partnerships between universities and the industrial sector where material may be considered commercially sensitive and thus not published in traditional academic venues. Another limitation is that the calculations are based on English-language articles and papers. A third consideration is that one internationally collaborative research project may generate multiple co-authored papers. There is distinct difference with the metrics of the La Trobe University research which was based on overall project numbers that exist in the public domain or were reported by universities.

According to the Australian Commonwealth’s Department of Industry Innovation and Science (DIIS), Australia contributed to 3.6% of the world’s research publications from 0.3% of the world’s population in 2012, placing it 9th in the Organisation of Economic Co-operation Development (OECD) rankings.²

Elsevier data show that the number of internationally co-authored papers in 2014 stood at 18.3% of the total percentage of such papers.³ Research-intensive universities have high levels of research collaboration in terms of co-authorship (Table 4). For Australia’s Go8 universities,⁴ the collective figure for collaboratively-produced papers stands at 48%, according to the most recent figures.⁵

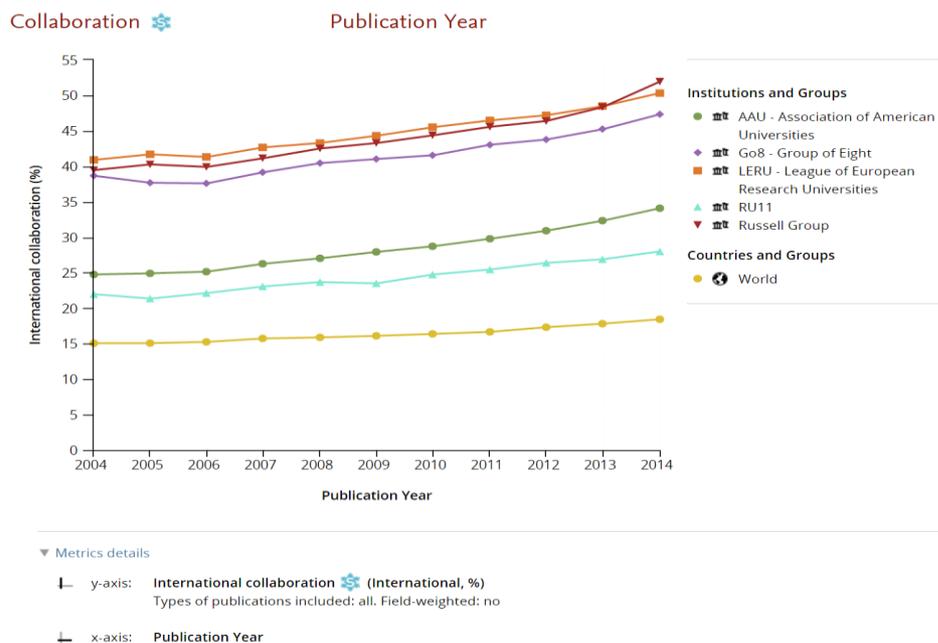


Table 4: Level of research collaboration of research-intensive universities in terms of co-authorship. Graphic and data sourced directly from Elsevier B.V., 08/02/2016. Used under license.

For the period 2012 – 2015, Australia ranked 7th for international co-authored papers with India (Table 5). While the output of 4,547 joint publications represented only 18.8% of those with the leading partner, the United States, it did represent a 29.8% increase over the four-year period.

² Website of the DIIS, <http://www.industry.gov.au/industry/IndustryInitiatives/Pages/Boosting-the-Commercial>Returns-from-Research.aspx>

³ Figures released on 02 October, 2015 at the World Academic Summit in Melbourne by Dr Nick Fowler, Managing Director – Research Management, Elsevier B.V.

⁴ Universities of Adelaide, Melbourne, Queensland, Sydney, Western Australian, New South Wales, Monash and the Australian National University

⁵ Elsevier B.V., part of the RELX Group

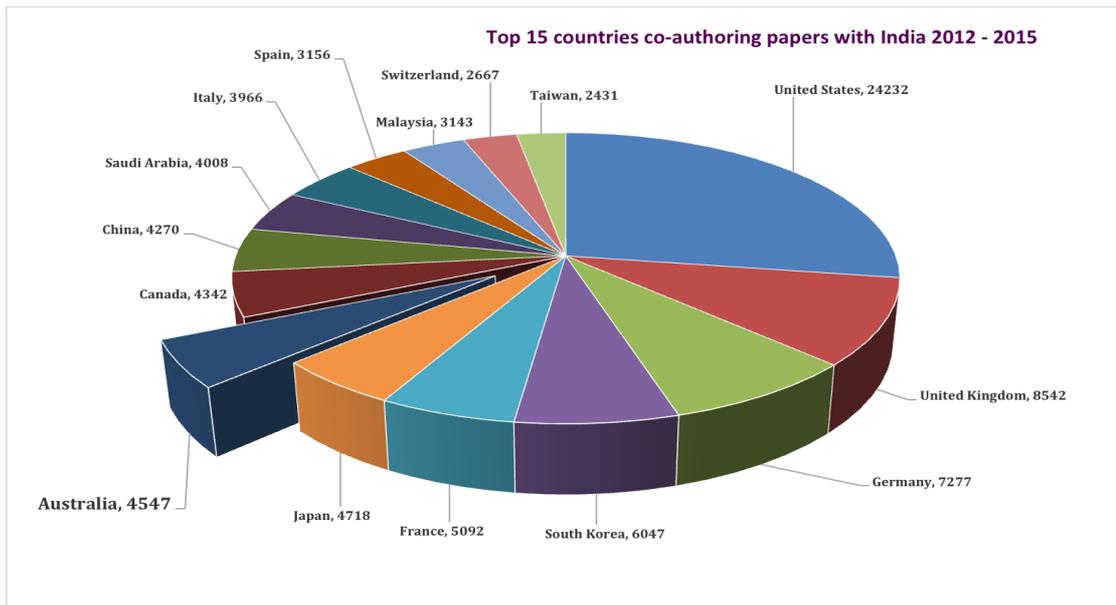


Table 5: Top 15 ranking of international co-authored papers with India for the period 2012 - 2015. Created with data sourced from: Elsevier B.V., 11/04/2016. Used under license.

For Australia, the U.S. is also the leading international co-authorship partner (Table 6). While India ranks 14th for the period between 2012 and 2015, it is worth noting that China stands in the third position. The level of Indo-Australian joint publications was only 17.8% of those from Sino-Australian partnerships.

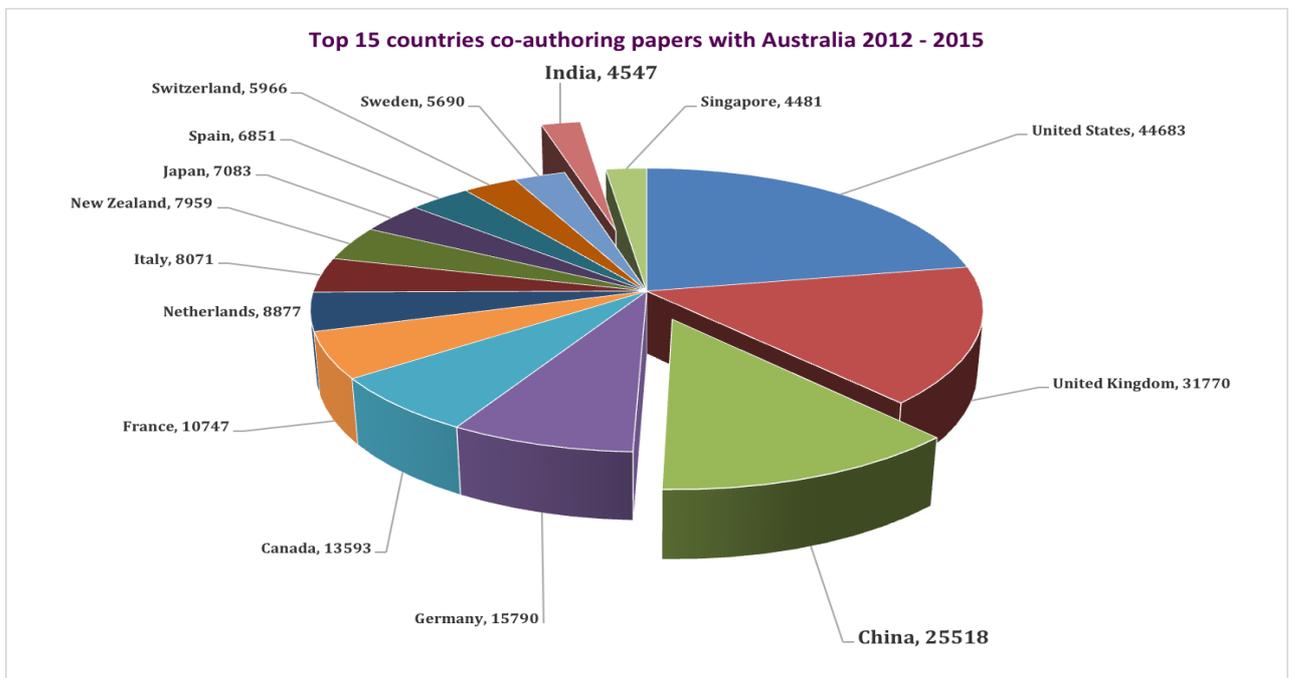


Table 6: Top 15 ranking of international co-authored papers with Australia for the period 2012 - 2015. Created with data sourced from: Elsevier B.V., 11/04/2016. Used under license.

The dominance of STEM topics in research collaboration between Australia and India is apparent in a breakdown of the co-authored papers by subject. These align strongly with the research priorities of both countries. The section identified

as ‘other’ in Table 7 comprises a spectrum of disciplines that include health, economics, finance, humanities, arts and a collection of subjects, like nursing, that are not listed elsewhere in the ranking.

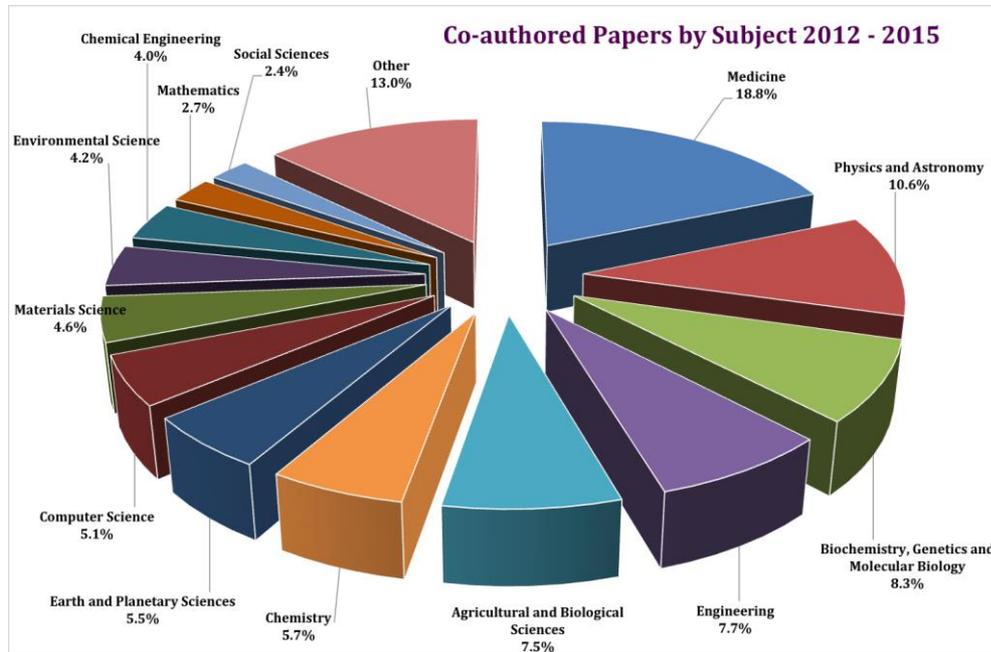


Table 7: Subject breakdown of co-authored papers between Australia and India for the period 2012 - 2015. Created with data sourced from: Elsevier B.V., 11/04/2016. Used under license.

Over the same period of time, two Australian universities, Federation and Torrens, had no co-authored papers with India; and while the Go8 dominated in terms of publications, Curtin University had a strong presence (Table 8).

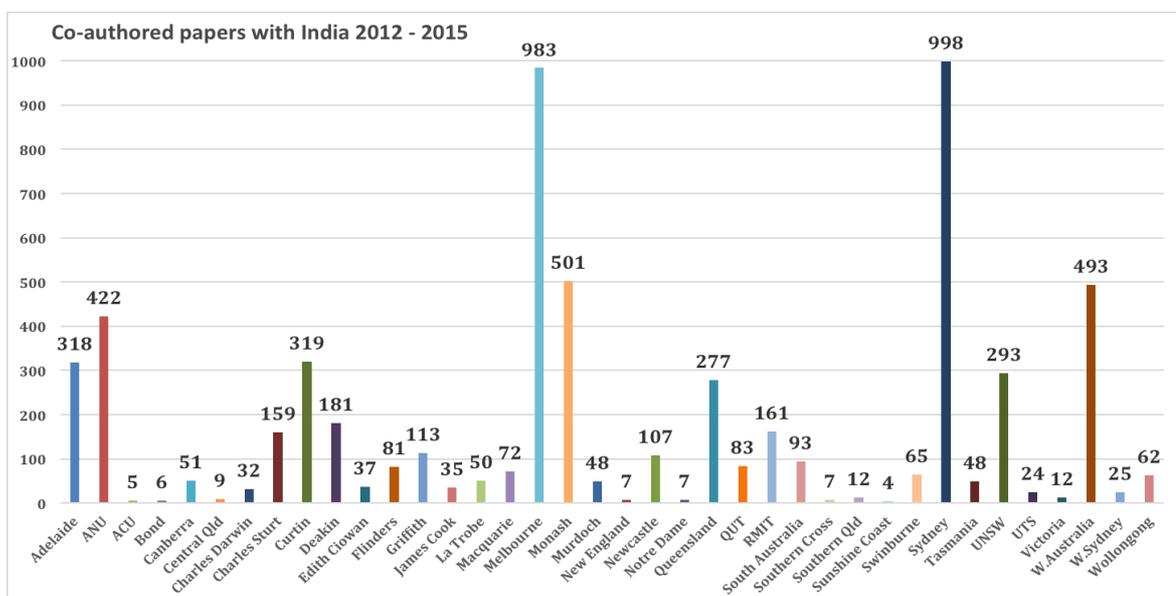


Table 8: Breakdown of co-authored papers by Australian university with India for the period 2012 - 2015. Created with data sourced from: Elsevier B.V., 11/04/2016. Used under license.

As with the La Trobe University research, the dominance of the Go8 network is clear in terms of co-authored papers with India.

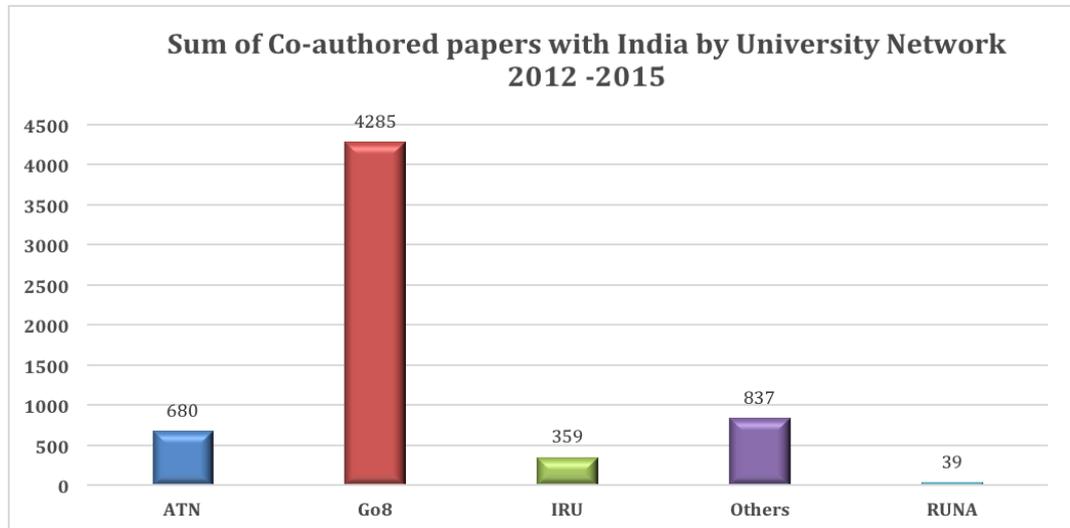


Table 9: Breakdown of co-authored papers with Indian universities by Australia networks for the period 2012 - 2015. Created with data sourced from: Elsevier B.V., 11/04/2016. Used under license.

India's output of internationally co-authored papers has to be seen in the context of the previously-mentioned English language limitations. Also, only papers published in certain international journals are used in calculating numbers. There is value though in looking at the Indian universities that featured as the most active at the top of the La Trobe University research and their comparative output of co-authored papers (Table 10).⁶ Once again it is the IITs that dominate, with a strong showing by the Indian Institute of Science in Bengaluru (Bangalore).

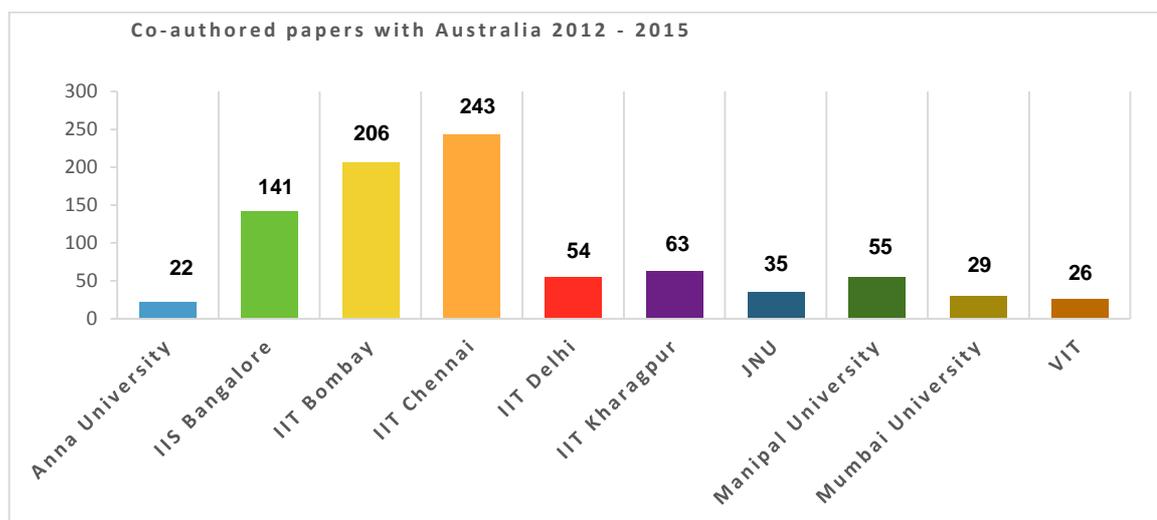


Table 10: Breakdown of co-authored papers by Indian university with Australia for the period 2012 - 2015. Created with data sourced from: Elsevier B.V., 11/04/2016. Used under license.

⁶ The Energy and Resources Institute in Delhi that ranked in joint 9th position in the La Trobe University research, does not appear in the Elsevier data of co-authored papers

There is not one model for successful partnership, nor a proscriptive set of models, that will suit all universities. In fact, there is an inherent risk in using the data to try and pick 'winners', because while the data in tables 1 and 10 can be taken as indicators, one cannot extrapolate that these are necessarily the best Indian institutions with which to forge research collaborations. This is because there is scope to go beyond project numbers and the output of collaborative academic papers to uncover where there is a convergence of research interests between universities in each country.

Identifying what could be termed centres of research excellence, where the expertise of an institution in one country complements and extends that of an institution in the other, provides a much better starting point for establishing international research collaborations than university rankings. As Rensburg, Motala and Arulraj David write, 'Knowledge interdependence has become crucial in addressing some of the most pressing global challenges'.⁷ Through partnerships that are based on complementary strengths, it is more likely that collaborations will be stronger and more robust. The key to success will be in pairing the complementary areas of research expertise and interest between specific disciplines or subjects, rather than top-down lining up of institutions.

Brown and Jeffrey have described a number of these Indian centres of excellence as 'the emerging hubs of international collaboration'.⁸ They cite the Jindal Global University (JGU) in Delhi as an institution that has been pro-active in fostering an international perspective for its students through course structures, curriculum and research collaborations. They say that JGU has a number of 'advanced collaborations' with universities in the United States while the only engagement with Australian institutions has been through MOUs to promote student exchanges with the law schools of the University of Sydney and the University of New England. Brown and Jeffrey name Shiv Nadar University in Uttar Pradesh and Ashoka University in Haryana as other emerging players with a track record of international engagement but lacking any Australian partnerships.

An analysis of the La Trobe data, and the interviews conducted in Australian and India, reveal a significant number of research partnerships that have been established on the basis of past contact during study or academic activity. This reinforces the long-held view that enduring collaborations are created and endure where personal professional relationships exist. These may be at a researcher or institutional level but are key to successful longer-term partnerships.

By looking at how many successful collaborations have been established in the past, an opportunity appears for developing future research cooperation. In supporting Indian early career researchers (ECRs), while encouraging their own to spend time studying in India, Australian universities are creating a dynamic cycle of growth and continuity for international partnerships. While some institutions acknowledge that they are very active in supporting ECRs, for others the risk is that an opportunity for longer-term benefits gets lost where universities are pursuing shorter-term collaborative goals.

⁷ Rensburg, I., Motala, S., Arulraj David, S., *Opportunities and challenges for research collaboration among BRICS nations*, Compare Vol. 45, No.5, Routledge, 2015

⁸ Brown, T., Jeffrey, C., *A Very Short Policy Brief – Engaging with India's Higher Education Sector: Pathways to Improved Market Access*, https://gallery.mailchimp.com/9302bae06250e2ad9d62de009/files/AVeryShortPolicyBriefV1_July2016.pdf

NEGOTIATING A PATH THROUGH THE OBSTACLES

FINDING A PARTNER

In seeking to establish international partnerships, Monash University has established an academy with the Indian Institute of Technology, Bombay (IITB) in a purpose-built facility on the Indian institute's Powai campus. The academy aims to be the research centre for between 250 and 300 PhD students at any given time. Supervision of their work is carried out by academics from IITB, Monash and the academy's industry partners. Monash describes this as a jointly-badged PhD program that seeks to develop research capacity in both India and Australia.

The process of identifying a potential collaborative partner by Monash University was long and involved a number of institutional Indian candidates initially.

"It sounds immature at one level, but if you want Australian academics to keep going there, not just one visit over five years but every year, it has to be in one of the key capitals. Otherwise they're not going to get into Delhi, travel 250 kilometres to somewhere else by road and then start doing their collaborations for two or three days. And then travel by road again to come back here. So geography had a big role to play in it. But that wasn't all." *Senior administrator at Monash University.*

A decision was made to use a broad range of criteria to identify a potential partner for this institution-level collaboration. Monash developed these criteria to act as a 'filter' for choice.

- potential partners had to be based in an Indian state capital city with easy access to an international airport,
- proximity to STEM industries was key,
- access to high-achieving students was essential; and
- the potential partner institution needed to show active engagement with the collaboration

Deakin University has championed a model where PhD students are jointly supervised by the collaborating institutions in both countries. Most of the students' study takes place in India with part of the work completed in Australia. All the parties involved have a share in the research outputs.

A third model has been developed around the collaboration of a university, industry and a state government. A joint initiative between RMIT, the ABB Group and the Victorian State Government led to the creation of the Australia-India Research Centre for Automation Software Engineering (AICAUSE). The centre is used to train a number of PhD and post-doctoral staff, with time spent in both ABB India and ABB Australia.

Most Australian universities have a lower level of engagement at an institutional level with India. For some, early enthusiasm and energy to establish bilateral partnerships has dissipated over time:

"We've found it hard to scale up. While we're happy to encourage individual micro collaborations with our partner universities, our international strategy envisages developing larger scale strategic engagement and we've found that easier in other countries". *Senior administrator, Australian Technology Network University*

The nature of the engagement varies. At one end of the scale is the Monash partnership while other universities have limited their in-country activity to a representative office in India. These are sometimes staffed by a number of their International Department staff or just a single coordinator as a contact point.

It is apparent that there is not one partnership model that suits all Australian institutions. The direction chosen by Monash has involved large commitments in terms of time, personnel and finances. Also, it was part of their initial agreement that neither Monash nor IITB would enter into a collaborative partnership with another institution in the other's country for seven years; a restriction that would not sit well with all Australian universities in their pursuit of international research collaborations.

Equally, the Deakin and RMIT models reflect a long-term and broad commitment.

THE CONTEXT OF COLLABORATION

Australian universities have a diverse set of reasons for engaging with India. Some are more strategic than others. Global economic realities set in motion in 2008 and the web of economic and cultural interdependencies created added incentives for universities to take a broader look at the world. Most Australian universities have established international departments. Internationalisation policies vary from institution to institution but in general have a focus on expanding research collaboration, are designed around having a transformational effect on international students and look at ways of building capacity for societal change.

However, there are inherent tensions. In the present economic climate, creating and sustaining new revenue streams is seen as the major priority in university engagement with Asian countries. This can lead to a dissonance where stimulating international student recruitment takes place at the expense of other goals like the internationalisation of research or curriculum. This raises questions as to what extent research becomes a loss leader that improves reputation or 'brand awareness' supporting other university objectives.

Part of the discourse surrounding university internationalisation centres on what is seen as the priority given sometimes to just one element of the strategy: namely, the income generated by inbound student. Anecdotally, it appears student recruitment is a very significant driver of Australian university engagement with India.

The internal incentive structures for research in the two countries' universities are not well aligned currently. One must consider these realities in any review of what each country is trying to do at the policy level, in terms of international research collaboration. They must be part of any critical assessment of how successful those policies can be. That said, there are some key areas where Australian universities can be identified for their core research excellence in key sectors. This positions them well for collaborations that meet the needs of India.

THE WAY AHEAD

OPPORTUNITIES FOR GROWTH

One of the rapidly growing sectors in India is sports science; a discipline at which a number of Australian universities excel. In early April 2016, Deakin University signed an agreement with the Pune Supergiants Indian Premier League (IPL) cricket team to provide research and master classes in critical areas of sport. This followed a pioneering agreement, reached in 2014 by La Trobe University with another IPL team, the Kings XI Punjab.

While cricket is the dominant sport in India, many others are followed enthusiastically; like badminton, hockey and soccer. The appointment of Adam Gilchrist as the Australia-India Education Ambassador will certainly help to open doors in the sports science sector, but Australian universities could play a far more active role in developing opportunities in this growth area.

Agriculture is another Indian sector where there is strong demand for international collaboration. The Government of India used its 2016-17 budget to announce that it would increase support for the nation's agricultural sector by 84%, over the level of assistance that it gave the previous year. This goes beyond price subsidies to include research projects in animal wellbeing, advanced breeding technology and an e-market portal for which Australian universities are well placed to collaborate.⁹

The Australian Centre for International Agricultural Research (ACIAR) has a history of supporting collaborative research projects with India over the past three decades. ACIAR acknowledges that Australia and India face common research challenges in agriculture and natural resource management.¹⁰ This area of research collaboration certainly has scope for further development.

Reflected in both the La Trobe University research and the analysis of internationally co-authored papers is a field of study where research collaboration between the two countries is already strong: medicine.¹¹ Yet there is room for an expanded level of cooperation that could be funded with an existing strong commitment from the Indian side. As one researcher from the Indian diaspora, working in an Australian university explains, "Funding is quite generous on research and R&D in India. It's certainly in health sciences as well as agriculture".

These are all areas that align with the research priorities laid out by both countries and underpin bilateral collaborations.

SUPPORTING DEVELOPMENT

The Australian Commonwealth has sought to reshape its industry policy so that research spending is more focused and helps to stimulate innovation and entrepreneurship, so as to improve competitiveness and create new jobs for Australians.¹² Government funding for research is now being seen in the context of commercial outcomes. International education plays a vital role in the Australian economy and has been identified by the Commonwealth as a global enterprise, where the accent has to be on quality and reputation. Within this context, Australia identifies India as a priority partner for bilateral collaboration.

Support funding for Australia-India collaborative research projects is available at a number of levels and through a number of different bodies. The Australia-India Strategic Research Fund (AISRF) was established in 2006 with an initial commitment by Australia to provide AUD 20-million in support over five years, increasing to AUD 64-million for the period up to 2015-16. The New Delhi government committed to meeting the participation costs of those Indian researchers supported through the AISRF.

⁹ Times of India article, February 29, 2016; Saddarlahq website: <https://www.saddahaq.com/record-farm-funding-up-84-crises-also-recordbreaking>

¹⁰ Australian Centre for International Agricultural Research website: <http://aciarc.gov.au/country/india>

¹¹ See Appendix 1 and Table 7.

¹² *Industry Innovation and Competitiveness Agenda – An action plan for a stronger Australia*, Commonwealth of Australia 2014

In 2014, it was estimated that Australian researchers spent the equivalent of 614 working years in hours of grant applications to the National Health and Medical Research Council (NHMRC).¹³ Calls have been made in the past for a more layered approach to the grants process where initial applications are brief and are a response to a list of narrowly-defined priorities, set by the funding body. Only successful applicants who pass through that round would be invited to respond with a more detailed submission. This has the potential to minimise the time commitment for the majority of researchers who make unsuccessful applications. However, many researchers perceive that the funding priorities of the AISRF are too sharply defined:

It would be of value to review whether funding bodies would benefit from a continuous application process. Researchers say a failed funding submission in one round means waiting a year before another attempt can be made. Then it can take two or three revised applications before success.

Beyond the AISRF, there is a spectrum of other bodies in Australia that support international research collaboration projects. It is this broad range of funding bodies that one administrator at a Queensland university says leads to missed opportunities. He says that there is a lack of awareness about funding possibilities, with a sense that opportunities exist but they are not consolidated and readily available.

Although not all exclusively focused on India-related projects, the AIC, ACIAR, NHMRC and the Australian Research Council (ARC) all provide support for Indo-Australian collaborations. Recently, the AIC introduced a small 'seed finding' program to promote India-focused research. There is a significant level of funding but not all of the bodies treat India as a strategic priority. In 2015, in its Discovery Project program, the ARC funded precisely one project on an India-related topic.

Among Australian researchers, funding levels are quoted frequently as a significant barrier to international collaborative projects. However, the question of government funding was seen less frequently among their Indian counterparts as being among the challenges. Like Australia, Indian grants are available across a broad range of levels from local to state and at the federal level from the Union Government.

According to a report by Lynne Heslop in 2014,¹⁴ there is no shortage of financial support for research in India's centrally-funded institutions: the institutes of technology, management and those of 'national importance'. However, Indian research budgets remain underspent because of what she describes as a lack of good quality project proposals. International collaboration would help to resolve this, she believes. She goes on to state that:

India is not producing enough PhDs. Very few students continue on to research degrees compared to other countries: only 140,000 (1%) students are enrolled as post-graduate researchers. The lack of enquiry-based learning and early researcher skills is limiting the capacity of Indian institutions to engage in vital research and innovation activity.

This Indian underspend gives weight to an argument for broadening the aperture of research funding, rather than looking at increasing the overall size of the pot. If Australian universities provide support to their Indian counterparts in their project proposals, access would be given to a pool of unspent funding. Meanwhile, in Australia, by expanding the number of qualifying fields for research funding and widening the range of grants that are awarded, a stronger environment will be created for deepening research collaborations with India.

¹³ Barnett, A., Graves, N., Clarke, P., Herbert, D., *The Impact of Streamlined Funding Application Process on Application Time: Two cross-sectional surveys of Australian researchers*, British Medical Journal, January 2015.

¹⁴ Heslop, L., *Understanding India: The Future of higher education and opportunities for international cooperation*, 2014, British Council

Once there has been a reassessment of funding models, there are four main areas that need to be addressed:

- Bureaucracy is a perennial issue in bilateral relations but of greater importance is the need for continuity in key policy settings.
- Increasingly, English is establishing itself as the dominant international language. Yet limitations are imposed if Australia sees it as the sole vehicle for communicating with a country where it is not spoken by at least 70% of the population.
- Defining clear outcomes of mutual benefit is vital for successful and expanding research collaborations.
- Creating a national strategy that identifies Australia as the reference point against which other countries are measured in terms of international research in key areas.

REGULATIONS RULE

Bureaucracy features high on the list of obstacles when researchers and institutions are exploring the possibility of research collaborations between India and Australia. Visa application processes, in both directions, are frequently cited, along with differing approval procedures for research partnerships and varying legal requirements in the two countries. A change of regulations by the Union government in 2015 changed the nature of partnerships with agricultural institutions. It is important for both India and Australia, when looking at regulatory changes, to ensure their introduction in such a way as to minimise sudden adjustments that could affect planned bilateral cooperation.

In the area of medical research, meeting the regulations of ethics committees is both time-consuming and potentially complex for international projects and where there is not necessarily an alignment in Australia and India in those regulations. While not solely an issue for Indo-Australian collaborations, reviews of ethical guidelines that are common in international medical research projects, can be exacerbated by Indian bureaucratic processes.

It is time and patience that Indian researchers and administrators claim are frequently absent within Australian institutions when it comes to establishing partnerships. They argue that a short-term approach is adopted in establishing a relationship with Indian universities. There is a perception among some academics in India that Australian universities tend to send high-level delegations but that there is little follow-through after such meetings.

This perspective is contradicted by some of those interviewed in Australian universities who claim that the push for MOUs comes from the Indian side and that, once signed, there is little follow-up, contact or engagement. As one Australian university administrator said, “the last thing I want is more pieces of paper in that filing cabinet over there”.

The reality appears to sit somewhere in the middle. While direct contact with Indian universities has resulted in a desire for MOUs to be signed, there is not always an understanding on the Australian side that actions will not flow automatically from those agreements. There needs to be an ongoing level of engagement and a commitment of time. Monash, Deakin and all those other universities who can point to success in their research collaborations, all acknowledge that those relationships in India have been forged over many years. Not surprisingly though, a common element in establishing those relationships has been the English language.

THE DOMINATION OF ENGLISH

English may be viewed as the lingua franca of the sub-continent, and of international research, but only a small proportion of Indians have English as their first language. A broad and strong proficiency in English is not something that can be assumed.

Australia does not hold a strong position in the teaching of Indian languages at higher education levels. Only three Australian universities provide Hindi lessons at undergraduate level, while just one offers Sanskrit.¹⁵

The question of Asian language skills is a subject that is being much better addressed in Australia's relations with China, identified as another important higher education partner. While English does not have the same level of penetration in China as it does in India, perhaps with the exception of Hong Kong, Australia has recognised that it cannot rely solely on English as the internationally-accepted language for collaboration.

It is informative that Mandarin is offered in 33 of Australia's public universities. In terms of bilateral relations, it is interesting also to consider the level of international air links between countries. At the time of this report's writing, there are 13 non-stop flights from a number of Australian cities to centres in China that fly at least several times a week. However, there is only one daily non-stop flight to India, departing from either Sydney or Melbourne. All other carriers between the two countries have at least one interchange somewhere in Asia.

It is not clear to what extent this is a strong disincentive to international collaboration between Australia and India. However, as Monash University has set out, facilitating transport connections between the two countries is a factor for institutions and researchers alike, when exploring the potential for enduring collaborations.

When analysing the importance of language skills, cultural knowledge and social networks in establishing international partnerships with Asia, Ang, Tambiah and Mar¹⁶ stress the role to be played by diasporas. They accept that this is only one element in what they term 'smart engagement' with Asia but identify a bridging role for diasporas. Certainly the data gathered for this report shows, there is a significant representation of the Indian diaspora in Australia in successful research collaborations at both the institutional and researcher level.

DEFINING A GENUINE PARTNERSHIP

This leads into what some Indian researchers see as another obstacle to enduring international partnerships: asymmetric collaborations where all the benefits of research are deemed to be flowing to the Australian partner. There is also the more tenuous issue of perceived researcher status. By their nature, international research agreements are not equal in a simple analysis of what each party is 'bringing to the table'. Indeed, the best collaborations are ones where the skills are complementary rather than mirrored. The benefits of access to overseas expertise or the opportunity to publish in high-profile international journals are readily acknowledged.

Yet by unpicking the claims of perceived asymmetry, what is revealed often is a lack of clarity about the outcomes that the respective collaborators are seeking. The danger is of creating a perception that all the benefits will flow in one direction; a view that Australian funding bodies can enhance unwittingly through a poor choice of words:

¹⁵ La Trobe University, Melbourne (Hindi); Australian National University, Canberra (Hindi & Sanskrit); University of Sydney (Hindi but not a full-time faculty position)

¹⁶ Ang, I., Tambiah, Y., Mar, P., *Smart Engagement with Asia: leveraging language, research and culture*, Australian Council of Learned Academies, March 2015

Given the large capacity of the Indian agricultural research system, there would be significant benefits from long-term Australia–India science partnerships to deliver technologies for the future farmers of Australia.¹⁷

At the initial proposal stage, not enough time is spent in determining what the researchers in each country are hoping to achieve by working together. That may seem surprising, especially in the STEM disciplines, but research needs to be seen in the broader cultural context. This report has stated already that Australia has set commercial outcomes as a priority in both its domestic and international research collaborations. While not averse to such results, and certainly encouraged by the present Union government, government references in India to academic research are made in the context of societal change. This has been recognised by some Australian universities in their strategies for Indian partnerships that stress the benefits of mutual outcomes:

“We’re here to do good research. To create impact, societal outcomes; not only for India but for Australia too. But we’re in India because we want to create impact in India in such a way that it’s win-win for you.”
Deputy Vice-Chancellor of an Australian university

CREATING A NATIONAL RESEARCH PROFILE

Systemic barriers to research collaboration with India will take time and a great deal of effort to overcome. The Commonwealth Government has put strategies in place, including support funding, that reflect its identification of India as being at the forefront of its international partnerships.

However, while being supportive generally of what the government has done at a federal level, a number of senior administrators have said that the element that is missing is a national research strategy, such as those in place in countries like the United States, the UK and Germany. They feel that Commonwealth government programs like the ‘Global Innovation Strategy’, ‘Building Brand Australia’ and ‘Future Unlimited’, while helpful, are not sufficiently targeted when it comes to identifying Australia as a research centre of excellence. They argue that the lack of such a strategy, not only in terms of relations with India, is an impediment and they maintain that laying down a set of research priorities is not sufficient:

“In not articulating a detailed enough strategy, the research priorities don’t get you there. And so the money therefore doesn’t know where to go either. And therefore there’s no top-down directive and what you find is every institution, and now we’re talking about the big building blocks like the Go8, they build their own.” *Deputy Vice-Chancellor of an Australian university*

It would mean identifying key areas of research that are deemed by the Commonwealth to be central to the country’s future prosperity and where Australia sets the international benchmark. Individual universities, or institutional networks, could then present themselves as centres of excellence for collaborative projects in those key disciplines. Developing such a national research profile would create a tool for universities and the commercial world alike to use in promoting Australia globally as the research partner of choice in areas deemed of strategic importance by the Commonwealth.

¹⁷ Website of the Australian Centre for International Agricultural Research: <http://aci-ar.gov.au/region/south-and-west-asia>

LOOKING TO A BROADER FUTURE

BUILDING CAPACITY FOR DEEPER ENGAGEMENT

This report has used data collected from universities and funding bodies to provide a snapshot of the current university level research engagement between Australia and India. Through extensive interviews in both countries, the raw data has been built upon to explore the environment in which researchers and institutions have sought to establish collaborative partnerships and to identify what barriers they have faced.

Building research capacity has more to do with structural adjustments and an awareness of the time needed to establish deeper bilateral relations at the institutional and researcher levels, than it has with higher levels of funding to stimulate and support international collaborations. Government has an important role to play in establishing a framework within which international research partnerships can flourish. The role for universities is to see how best they can use that support to achieve their own objectives while aligning themselves with the broader priorities of the Commonwealth.

In the appendices that follow, the full data upon which the conclusions for this report were based, and from which the tables were created, are available in a series of spreadsheets. Case studies are appended also, highlighting some of the critical factors necessary for successful collaborations.

APPENDICES

APPENDIX 1 – AUSTRALIA-INDIA RESEARCH COLLABORATION MASTER DATA FOR TABLES 1, 2 & 3



Appendix
1_Australia-India Re

(NB: THE TABLE 4 GRAPHIC WAS CREATED AND SUPPLIED TO LA TROBE UNIVERSITY BY ELSEVIER B.V.)

APPENDIX 2 – TABLE 5 SOURCE DATA



Table 5
Data_Countries co-a

APPENDIX 3 – TABLE 6 SOURCE DATA



Table 6
Data_Countries co-a

APPENDIX 4 – TABLE 7 SOURCE DATA



Table 7
Data_Aus_India 1 Cc

APPENDIX 5 – TABLES 8 & 9 SOURCE DATA



Table 8 & 9
Data_Co-authored t

APPENDIX 6 – TABLE 10 SOURCE DATA



Table 10
Data_Co-authored t

APPENDIX 7

CASE STUDY 1: PLAYING THE LONG GAME – PROFESSOR MICHELLE SIMMONS, UNSW

With its ancient colleges and traversed by a gently ambling river, Cambridge is seen as an icon in the United Kingdom's venerable academic history. It was there that Michelle Simmons' spent most of the 1990s pursuing her post-doctoral studies in quantum electronics at Cambridge University's Cavendish Laboratory.

It was during her time in Cambridge that Simmons crossed academic paths briefly with Arindam Ghosh, just as she was leaving the university and he was starting. There was no more direct contact between them until, in 2006, the Australia-India Strategic Research Fund (AISRF) was launched. By now a professor of physics at the University of New South Wales (UNSW), Simmons' thoughts turned to collaborative possibilities and she saw from international publications by Ghosh that he'd gone back to India. He was working at the Indian Institute for Science in Bangalore (IISB) where he had a focus on noise measurements. She recalls:

“At that time, we were looking at making devices that nobody else could make in the world. And noise is one of the key parameters. In fact, it was quite a new field”.

When Simmons contacted Ghosh about collaborating on the research, he was interested immediately. More discussions followed at an international conference that they both attended and, Simmons says, soon the research teams in the two countries had established a partnership.

“We realised pretty quickly that he had a very unique expertise. We could have replicated that here but my view has always been, do what you're really good at and go to the experts for the things you don't know; the things you'd have to re-do from the beginning”.

Ghosh is keen to point out that the collaborative work has provided enormous opportunities for Early Career Researchers (ECRs) and is very grateful that funding bodies in both countries have understood the long-term nature of what the partnership is trying to achieve:

“Our aim has been to address very difficult problems which promise great return. We have been fortunate that the participating funding agencies from both India and Australia have been patient with us, and allowed a second phase”.

The combined team has now been successful with two rounds of AISRF funding. The collaborative work in nanotechnology that has flowed from their partnership has achieved global recognition. The Ghosh group in Bangalore specializes in the measurement of very small electrical signals, while Simmons' group pioneers the fabrication of quantum structures. The scientific results of the collaboration have been presented at international seminars and in several co-authored papers.

Simmons became the Director of the Centre for Quantum Computation and Communication Technology within UNSW's School of Physics. She has gone on to establish a 170-strong research group that is globally unique in producing the nanotechnology to make atomically precise devices in silicon. It is this development that puts Australia at the forefront of the worldwide challenge to be the first country to develop a practical and commercially-viable quantum computer.

APPENDIX 8

CASE STUDY 2: CUTTING THE RED TAPE – PROFESSOR DAVID MACDOUGALL, ANU

It all began with a conference on anthropological film-making in Jodhpur 30 years ago. Among several hundred participants were Professor David MacDougall and his wife Judith, both researchers at ANU. They had just been given a grant in Australia to make a film about vernacular photography but they had yet to decide the location for the project. Attending the Rajasthan conference became the tipping point in deciding that their film should be made in India.

The first project was a study of local photographers in a hill town in northern India. It ended up running for several years of sporadic video shooting and then post-production. A subsequent meeting with Indian anthropologist, Sanjay Srivastava, led to a collaborative research project that centred on three elite schools: Mayo College in Rajasthan, Doon School near Dehradun in Uttar Pradesh and Lawrence School in Sanawar, Himachal Pradesh. MacDougall says the project with Srivastava lasted for five years:

“He published a book. I went on to make five films about the school. He was looking at the more public aspects of the school and how it functioned as a training ground for future leadership in Indian government and other parts of the Indian elite. And my interest was more on the interactions among the students and what their experience was like within an institution of that kind; where there are all sorts of social precedents and pressures”.

The projects gave MacDougall his first experience of dealing with Indian bureaucratic processes. Deciding on the scope of the research work was comparatively straightforward. Getting video production equipment into India was another challenge altogether. Fortunately, he employed the services of a shipping agent to have a Tourist Baggage Re-Export (TBRE) form issued by Customs. It became a multi-layered process of procedures and bureaucratic channels:

“Each channel is separate from the others, like railway lines spreading out into the countryside. The officials of each must be satisfied. But somewhere the lines are interconnected; you can't move from one to the next unless someone throws the switch.”

Currently, MacDougall is conducting an ARC-supported project that involves holding video workshops with various groups of children around India, in which they use video cameras to study topics related to their own families and communities. This is being carried out in collaboration with the Delhi School of Economics, part of the University of Delhi. Dr Radhika Chopra, who received an ARC International Collaboration Award, was a partner on the project with MacDougall for its first year. She had to take a step back due to the pressure of other work but has remained a valuable adviser to the project.

Professor MacDougall says that in the time that he has spent working in India over the past three decades, he has certainly experienced a considerable amount of red tape; but has always managed to negotiate a pathway through it, given sufficient time and patience. He has found that enlisting the support of principals and staff of collaborating institutions has been key:

“I have generally found them very supportive and helpful. Perhaps more so than their counterparts in Australia would be”.

APPENDIX 9

CASE STUDY 3: BRIDGING THE GAP PROFESSOR GURJEET GILL, UNIVERSITY OF ADELAIDE

The North Indian River Plain is a vast and fertile region, stretching across three countries in the north and eastern parts of the sub-continent. In India alone, an agricultural system of wheat and rice crop rotation covers 10.5 million hectares of land and has been estimated to contribute as much as 40% of the country's total food grain needs.

Yet by the 1990s, traditional agricultural practices, were seen to be failing as new strains of herbicide-resistant weeds began to damage the output of crops. Farmers, no longer able to use weed-infested wheat for human consumption, began feeding it to cattle as forage.

Faced with these problems, Haryana Agricultural University (HAU) and Punjab Agricultural University (PAU), both well recognised for their research strengths, turned to Australia. With its own strong history of agricultural development, and recognised as a centre of excellence for pest and crop-weed control by Indian researchers, it seemed an obvious partner for collaboration.

Professor Gurjeet Gill had migrated to Australia from India in 1981 but maintained his research contacts in the country of his birth. Working at the University of Adelaide, and with support funding from the Australian Centre for International Agricultural Research (ACIAR), he was to become the lead in a project looking at how changes in agricultural practices in Punjab and Haryana might resolve the wheat crop problems there.

Gill says that establishing a relationship with the Indian researchers was straight forward because of his strong links with the two universities. He faced hurdles though when it came to contacts with officials from the Indian Council for Agricultural Research (ICAR). They insisted on creating a position within the project for themselves before giving sign-off for the international collaboration to go ahead:

“I felt we should be dealing directly with the universities because they were the people who were working on the problem; whereas the bureaucracy was just going to be there because they didn't want to be left out. So that created a little bit of stress”.

Gill explained that the Australian government's cash funding had to be used for the researchers who were actually working on the project rather than for officials who were based in New Delhi:

“In the end, they came round to it. They signed off but they wasted a month or two”.

The eventual success of the collaboration, with the introduction of new weed-resistant herbicides and systems of non-tillage, led to a follow-up project in rice production. Research was undertaken to establish best practices around crop sowing, density and variety. Soon, resource-poor Indian farmers were developing alternative agricultural production systems that increased yields, were more efficient and sustainable.

Having an understanding of clear outcomes from the start, says Gill, was vital to the eventual success of the two collaborative projects:

“Both parties need to have confidence in each other in their ability to deliver something useful at the end of it; especially when you’re proposing a complete re-think or major changes”.