

A mighty web: How research collaborations can foster growth in South Asia

Analysing the potential in Afghanistan, Bangladesh, India, Nepal, Pakistan and Sri Lanka

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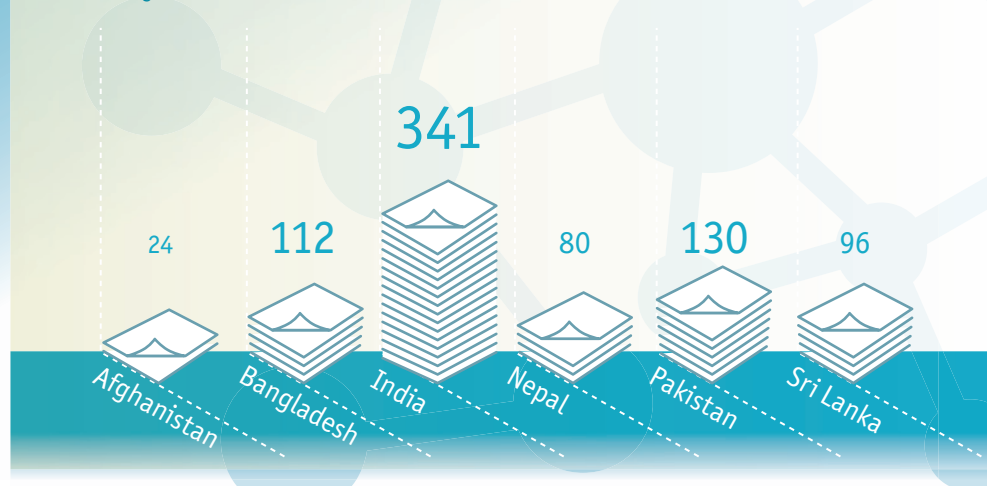
Research networks: In numbers

A research network is a collaborative association among researchers and other stakeholders to address a common problem. Increasingly, networks involve the users or beneficiaries of the research—those who are further down the ‘research value chain’.

South Asia’s research capacity has been increasing but international collaborations between authors still have much to grow. The H-index is a measure of scientific productivity and a common measure of strength of research output. The US, for example, has a H-index of 934. India, the most advanced of South Asian countries, has a H-index of 341.

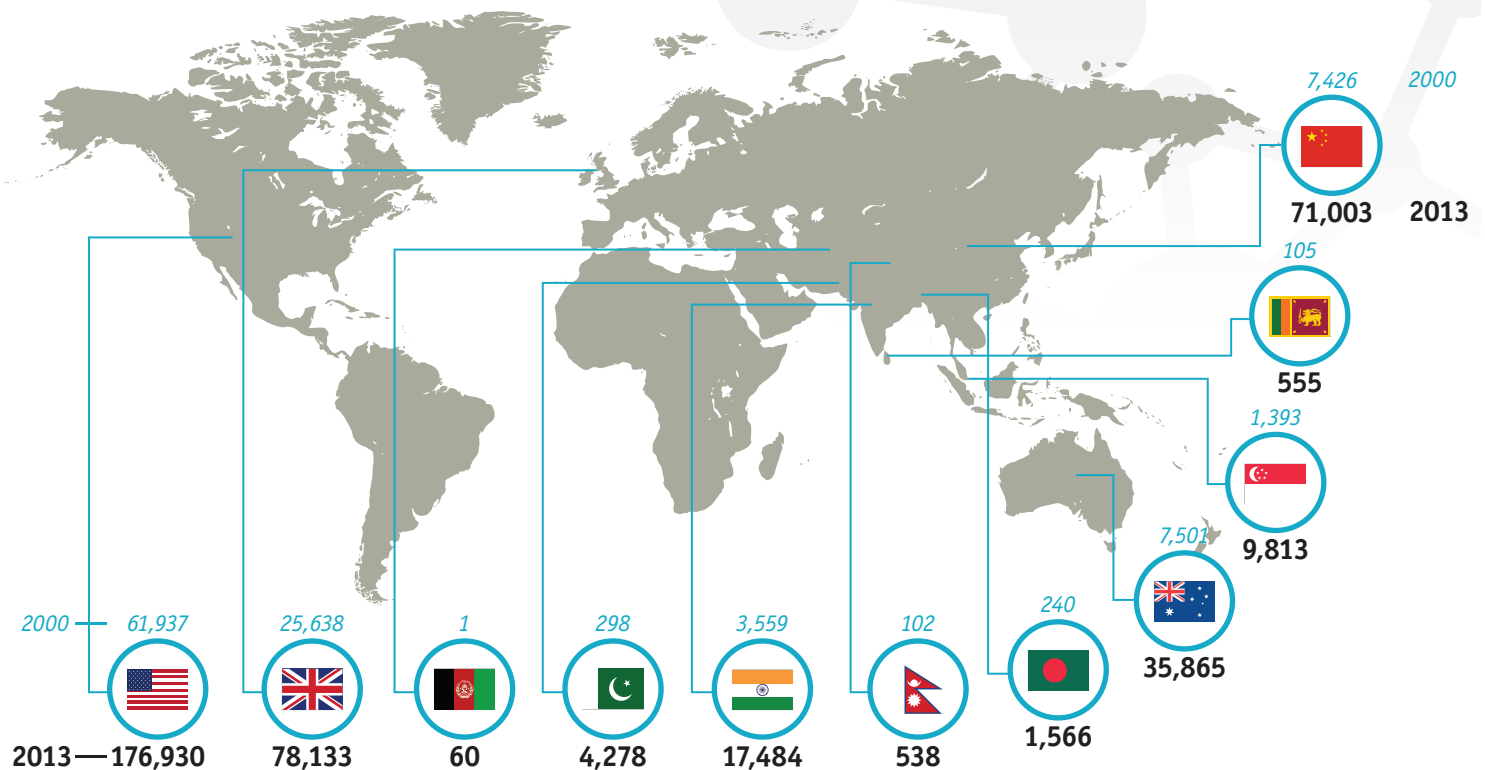
H-Index in South Asian countries 2013

Source: Scimago



International research collaborations

Total number of documents with international collaborations



Source: Scimago



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Summary

South Asian countries need to take serious steps to enhance their technological readiness and innovation. Universities, institutes and local research and development (R&D) agencies in the region lag behind their counterparts in the rest of Asia in terms of R&D and technological enhancement activities, confirming the need for governments and firms to rethink their policies and strategies in this regard.

This new research report examines the barriers that prevent South Asian experts from linking up with research colleagues across the globe to create opportunities for collaborative research, and recommends action to address them. Based on a series of interviews conducted with global experts in 2014, the paper aims to be a guide for researchers and policy makers interested in unlocking the region's collaborative research potential.

Possible solutions include creating opportunities for greater engagement and connectivity between the business world and universities, better funding of higher education provision to match research skills shortages, and increasing tax incentives or legal mandates to engage in R&D.

There is great potential for foreign providers to help fill the gap between capacity and demand. However, in some countries such as India this potential has been hampered by bureaucratic obstacles and long delays in gaining approval to operate. Nevertheless, the potential remains very strong and South Asia continues to represent an exciting 'frontier market' for international research institutions.



Mapping the context

A strong research base is essential to the economic growth and prosperity of any country. Not only can it foster innovations, it can shed light on the social issues that hamper growth.

In Asia, the research landscape is dynamic and burgeoning, with its researchers making significant contributions in R&D, manufacturing and exports, science, mathematics, technology, social science, and arts and design. In 2013, Asia was the second largest contributor of total global R&D spending, behind the United States (US). China accounted for 16.5% of the total global investment here, with Japan providing 10.5%.¹

South Asia, however, is lagging behind the status quo, with a relatively low emphasis on R&D. India, for example, has the world's fourth-largest gross domestic product (GDP) and is one of the few countries in the region with the academic infrastructure and talent to support innovation-based growth. But even so, the country contributes less than 1% of its GDP to R&D.²

The value of collaborative research

Collaborative research across borders and disciplines can help drive economic development and productivity in developing countries through the discovery of scientific breakthroughs and innovations linked to health, agriculture, chemistry and engineering, as well as raise awareness of social issues such as poverty, urbanisation and environmental security.

For example, 60 researchers from prestigious institutes and universities in India and Japan—countries often afflicted by natural disasters—recently created a portable communication system that aids rescue operations, and can be installed within an hour of a catastrophic event.³

According to Asadul Islam, development economist for Monash University's South Asia Research Network, bringing together researchers from different backgrounds and with diverse areas of expertise can add an important depth and richness to the research outcome. "We have in Australia a relatively small market of researchers compared to Europe or America. So any collaboration between researchers and organisations here or outside is actually important to our findings," he said.

Information sharing among researchers is also crucial to acquiring essential knowledge and skills, and drawing on different perspectives to solve a shared problem. In turn, it can lead to capacity building in developing countries. This is especially important for South Asia, which has significantly fewer high-quality universities compared with countries such as the US, Australia and the UK.

Further to this, international research collaborations offer cost-saving benefits. For example, when countries can pool resources, labour, equipment and facilities, researchers are less reliant on funding from governments and overseas bodies. Being connected to the 'right' people within an extensive network also gives academics better access to funding for their projects.

Collaboration also has a role to play in improving diplomatic relations. For instance, health sector research between Bangladesh and India has been on the rise, particularly in the area of infectious

¹ Battelle, '2014 Global R&D Funding Forecast', 2013.

² World Bank data, 'Research and development expenditure (% of GDP)'.

³ Digital Learning, 'Indian-Japan researchers to build Disaster Information Network', 2014. Available at: <http://digitallearning.eletsonline.com/2014/08/indian-and-japanese-researchers-collaborate-to-mitigate-natural-disaster/#sthash.bwTzNZtU.dpuf><http://digitallearning.eletsonline.com/2014/08/indian-and-japanese-researchers-collaborate-to-mitigate-natural-disaster/>, accessed 30 Nov 2014.



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Research output by country, 1996–2013

Rank	Country	Documents
1	United States	7,846,972
2	China	3,129,719
3	United Kingdom	2,141,375
4	Germany	1,983,270
5	Japan	1,929,402
6	France	1,421,190
7	Canada	1,110,886
8	Italy	1,083,546
9	India	868,719
10	Spain	857,158
46	Pakistan	70,208
62	Bangladesh	23,028
79	Sri Lanka	9,637
93	Nepal	7,007
158	Afghanistan	586

Source: Scimago.

diseases. In 2004, researchers from the National Institute of Cholera and Enteric Diseases in India and the International Centre for Diarrhoeal Diseases Research in Bangladesh formed a partnership to develop technology that could quickly detect a common bacteria causes stomach infections. The new technology enables doctors to identify the disease-causing bugs and remove them quickly and efficiently.⁴

The South Asian landscape

An obvious way to measure the impact of scientific research is to look at the number of papers published in each country. According to Dr Vivek Kumar Singh, assistant professor of Computer Science at South Asian University in New Delhi, the proportion of South Asia's research output compared to the rest of the world is extremely low.

"If you consider the last 50 years, the total research output from South Asian Association for Regional Cooperation (SAARC) countries is about 2.86% of the total global output," Dr Singh said.

While there has been an increase in scientific output across South Asia over the past five decades, the region's share as a whole is almost insignificant when set against the exponential growth of its population. India is the only exception—it ranks among the top 10 countries in the world in terms of its research output. This momentum is expected to continue as a result of the Modi government's renewed focus on funding for education and research, and the establishment of new facilities such as the Indian Institutes of Science Education and Research.⁵

⁴ SciDev.net, 'Rise in India-Bangladesh health research and collaboration', 2011. Available at: <http://www.scidev.net/global/health/news/rise-in-india-bangladesh-health-research-collaboration-.html>, accessed 22 Nov 2014.

⁵ The New Indian Express, 'Modi Government's HRD Agenda a Breath of Fresh Air', 2014.



“There’s a positive environment within the country [India] and there’s a positive environment even within educational institutions and people involved in research, with Prime Minister Modi coming into power,” said Dr Singh.

International collaboration and South Asia

An estimated one-fifth of the world’s scientific papers are co-authored internationally⁶, reflecting how much researchers value being able to partner with experts in other countries.

According to Professor Wahiddin Mahmud, chairman of the South Asian Network of Economic Research Institutes, South Asia has a “huge reservoir of data” and much of it is underutilised. “This is where the academics and top universities have an interest; they want to collaborate with institutions in India, Pakistan and Bangladesh because we have so much accumulated data here,” he said. But there is also a lack of coordination of information in the region, with a lot of overlap and replication of research data.

Yet these countries tend to collaborate more often with researchers from countries outside South Asia than with those in their own region.⁷ Take India, for example, which is well connected to Germany, Japan, the UK and the US. According to Professor Tarun Khanna, director of the South Asia Institute at Harvard, Japan is responding to changes in the region’s power balance—including the rise of China—by investing extraordinary amounts of money in research, in particular in relation to understanding South Asia.

But in South Asia, just 2.2% of all international collaborations involve countries within the region—like India and Sri Lanka, for instance. There are a number of reasons for the lack of collaborative research in South Asian nations, such as language and literacy barriers, geopolitics and other cultural issues.

Professor Tan Tai Yong, director at The Institute of South Asian Studies (ISAS) at the National University of Singapore (NUS), says that creating opportunities for discussion and collaboration among these nations is a step in the right direction. Through the South Asian Diaspora Convention (SADC)—the largest non-partisan business and networking meeting in the world for the various sub-groups of the South Asian diaspora—ISAS is bringing researchers from different South Asian cultures to Singapore, to speak at ease about the issues affecting the region.

Most of the countries in South Asia face similar kinds of challenges, so collaborative research would be the ideal way to transfer insights and information about dealing with these challenges from one country to the next. The Ecosystem Services of Poverty Alleviation Delta project is one such example. A successful collaboration between India, Bangladesh and the UK, it has built partnerships with government, educational institutes and NGOs across a range of disciplines to assess the health and improve the livelihoods of people living along the Bangladesh coastal fringe of the Ganges-Brahmaputra-Meghna Delta. The project is also using methods that are transferable across other populous deltas. Dr Nafees Meah, director of Research Councils UK in India, said this is the sort of example where countries can put their political differences aside to work together on a common problem.

⁶ Jayasuriya, MCN; Journal of the National Science Foundation of Sri Lanka, ‘Research collaboration’, 2012.

⁷ Uddin, A & Singh, VK; Current Science, ‘Measuring research output and collaboration in South Asian countries’, 2014.



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Further barriers

Funding is another major challenge. Professor Raghbendr Jha, Head of the Arndt-Corden Department of Economics at Australian National University and Executive Director of the Australia South Asia Research Centre, describes private and public spending on research and education in South Asia as “extremely low”.

“This is ironic, because these countries have such high percentages of young people, but they are being denied proper education and job opportunities,” Professor Jha said. “It should be compulsory for governments to match, dollar for dollar, any contribution coming from abroad for research projects.”

Where funding does come from the government, researchers are often hampered because they need to justify their spending, not only through reporting but by proving that the research is relevant to taxpayers in their home country.

Education is another barrier to setting up successful research networks with South Asia. The Indian Institutes of Technology (IITs) are recognised globally as top engineering schools; Pakistan’s Lahore University of Management Sciences is considered world-class.⁸ However, enrolment in tertiary education is still extremely low, especially when compared with Australia, the UK and the US, contributing to the lack of talent in South Asia.

The ‘brain drain’ is also a significant issue within the region, as governments struggle to stem

the movement of educated men and women searching for higher salaries and advanced technologies in developed countries.

Finally, there’s the issue of security.

Afghanistan and Pakistan, for example, have suffered as a result of decades of political instability. This has made it harder for overseas universities and research institutions to establish a presence on the ground, because researchers are so unwilling to visit. This impacts academic studies because in some cities—like Kabul, for example—it is extremely difficult to gain a comprehensive understanding of the issues there without physically being there.

Enrolment in higher education, 2011

Country	Gross enrolment in higher education, 2011 (% of the population of the five-year age group following on from secondary school)
Afghanistan	4
Australia	83
Bangladesh	13
India	23
Nepal	14
Pakistan	8
UK	61
US	95
Sri Lanka	15

Source: World Bank data, available at: <http://data.worldbank.org/indicator/SE.TER.ENRR>

⁸ Barber, M, Katelyn, D & Rizvi, S; Institute for Public Policy Research; ‘An Avalanche is Coming: Higher education and the revolution ahead’, 2013.



The industry challenge

Above all, the message from the researchers we interviewed is that industry is relatively underrepresented within South Asian international research collaborations. Just as multidisciplinary research combines different perspectives and methodologies to solve a problem, industry participation is crucial to gaining a complete understanding of issues—then driving innovation and breakthroughs.

There are various reasons why industries might be reluctant to get involved in research collaborations. For example, funding is a concern for companies that already have internal R&D functions. Ownership of new innovations and intellectual property rights is another issue. And there is often a huge divide between the objectives of industry players and researchers when they each engage in research programmes—most South Asian companies are still maturing and looking for solutions to solve today's problems; they may not be quite as focused on long-term projects.

That aside, Professor Khanna said that for many companies, it's not a lack of interest or wanting to get involved; it's a question of knowing how to do it. "In fact, if anything, industry is quite hungry to get involved. It just doesn't know how. And the researchers on the other hand, don't know where to start either," he said.

Developed countries such as the US, UK and Germany already put a lot of emphasis on industry and academic interaction to generate new ideas for commercial practice. But Professor Khanna said in the networks he was involved in in South Asia, there was little participation from industry representatives. One action he suggests may resolve the issue is to encourage governments worldwide to fund or facilitate forums where industry, academia and regulators can come together and come up with ideas for sustainable economic growth.

Greater collaboration at forums

For example, on 4–5 September 2014, Harvard University brought together academics and industry from the US, Europe, Norway and South Asia who were interested in using mobile phones to spur social change in developing countries. The 'Using Cellphones to Change Societies' seminar was attended by leading telecommunications providers in Afghanistan and Pakistan and a mobile financial services provider in Bangladesh, as well as IBM, the World Bank, university professors, and others. "At the end of the two-day seminar, everyone was hungry for a longer-term project, which I'm now in the process of architecting," said Professor Khanna.



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Government incentives

Another way to get industry involved in research collaborations could be through tax incentives or legal mandates. For example, India is the first country to implement corporate social responsibility (CSR) legislation that directs companies to invest 2% of their profits in CSR. In Pakistan, too, the government offers tax deductions to encourage private R&D, involving tax credits and the expensing of R&D. While R&D budgets cannot be accounted for under the legislation, companies can develop partnerships with NGOs and establish social enterprises to develop innovative programmes that reach the needy.

Recommendations: fit for the future

Over the past few decades there has been a noticeable increase in the amount of research coming out of South Asia—especially since the advent of digital technology, with its explosion of opportunities for Web-based collaboration and diversity of tools for supporting collaboration. This is particularly the case in India, an emerging economy with a rising middle class, which has made concerted efforts to invest in education over the past decade and continues to put research at the top of its agenda.

However, South Asia still lags behind the rest of the world in terms of R&D activity, particularly regarding collaboration on international and multidisciplinary research projects. As our interviewees pointed out, India shares common challenges with Bangladesh, Nepal and Pakistan in this regard. As a result, they recommend that a greater degree of international collaboration is fostered to deal with such issues as water scarcity, food safety, urbanisation and poverty. Industry members participating in research projects to drive innovations and provide a different perspective may make it easier to alleviate these issues.

Where countries in South Asia want to achieve sustainable economic growth, governments and industry representatives need to pay greater attention to education and invest greater amounts of funding into R&D. There's also a role for the international community to play in facilitating conferences and forums that bring governments, academics and industries together to network and build the basis for potential collaborations.

A range of government tax incentives and legal mandates need to also increase to help companies increase their involvement in research outcomes. South Asia has a substantial proportion of the world's population, and greater efforts within the private and public sectors to meet the demands of its people for the sake of better education and research will help these countries advance.



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LONDON
20 Cabot Square
London
E14 4QW
United Kingdom
Tel: (44.20) 7576 8000
Fax: (44.20) 7576 8500
E-mail: london@eiu.com

NEW YORK
750 Third Avenue
5th Floor
New York, NY 10017, US
Tel: (1.212) 554 0600
Fax: (1.212) 586 0248
E-mail: newyork@eiu.com

HONG KONG
6001, Central Plaza
18 Harbour Road
Wanchai
Hong Kong
Tel: (852) 2585 3888
Fax: (852) 2802 7638
E-mail: hongkong@eiu.com

GENEVA
Rue de l'Athénée 32
1206 Geneva
Switzerland
Tel: (41) 22 566 2470
Fax: (41) 22 346 9347
E-mail: geneva@eiu.com

