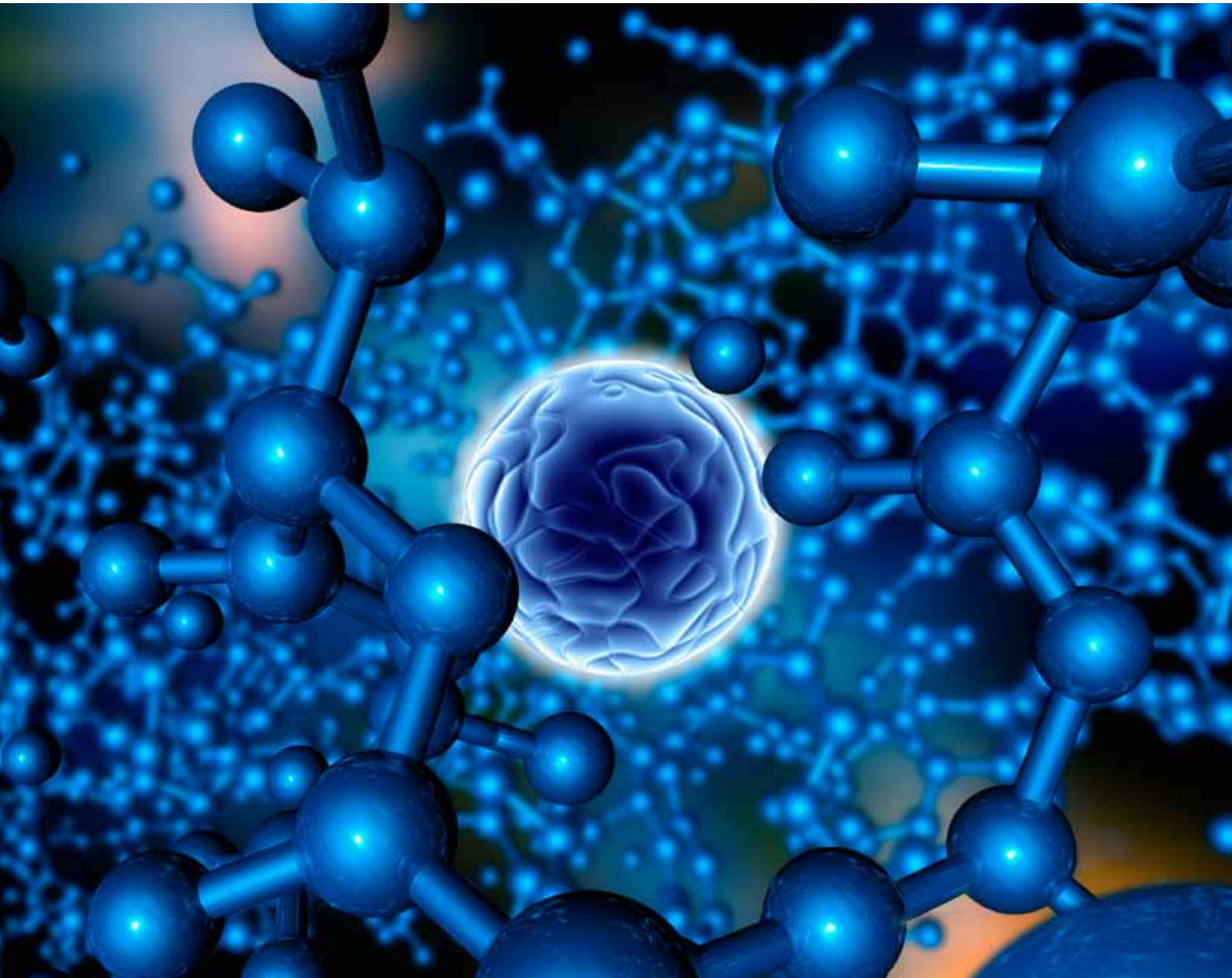


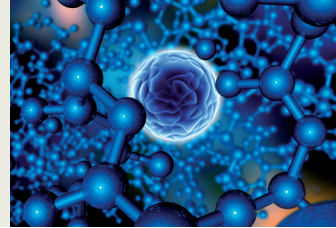
## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

A custom research report for the British Council

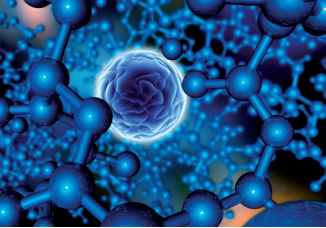
May 2014





# Contents

|   |           |
|---|-----------|
| <b>Executive summary</b>                                  | <b>2</b>  |
| <b>Chapter One: Research networks and their potential</b> | <b>4</b>  |
| <b>Chapter Two: Policy support for research networks</b>  | <b>8</b>  |
| <b>Chapter Three: Research networks in South Asia</b>     | <b>14</b> |
| <b>Conclusion</b>   | <b>22</b> |



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

# Executive summary

**Research networks are working to alter the economic paradigm in South Asian countries**, away from a low-value production and export model, towards indigenous capacity-building, innovation and productivity as economic drivers. This change in mind-set is in part being driven by government initiatives, and in part being transmitted from advanced country research councils, inter-governmental organisations and non-governmental organisations (NGOs).

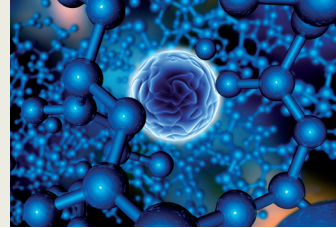
**The main policy driver of research networks in South Asia is capacity-building, owing to a shortage of research skills even among university faculty.** International links form the cornerstone of this strategy, and the partnerships formed as a result will accelerate the shift towards collaborative, impact-focused research.

**In South Asia, science and high-tech research collaboration with industry tends to be driven by governments.** Unlike in the developed world, neither academia nor the private sector have a strong tradition of applied research, and companies are risk-averse when it comes to investing in capital-intensive research and development (R&D). Governments select focus areas, invest in infrastructure and facilities, employ government researchers and offer incentives for entrepreneurs—in the hope of creating more employment opportunities for the many young people entering the job market each year.

**Researchers from developed countries and inter-governmental organisations primarily conduct development-focused research in South Asia.** Driven by the UN's Millennium Development Goals, most current research addresses South Asia's challenges in the fields of poverty alleviation, development, health, environmental science and peace-building. India stands out in that it also attracts significant interest from developed countries hoping to commercialise their innovations for India's large and growing pool of consumers.

**In science and technology, research networks are highly reliant on public funding, but this is expected to change.** Flagship innovation-focused collaborations between researchers and industry in South Asia are, for now, mostly government-funded, yet they aim to become more self-sufficient in future. They hope to attract more domestic and international private-sector funding as they prove their value, and also to generate revenue through consultancy, training, patents and spin-off enterprises.

**Funding for social sciences and the arts tend to rely heavily on volatile international funds**, despite the potential for these disciplines to improve policy-making, promote social cohesion and build innovative societies. Applied research in social sciences and the arts is harder to convert into a revenue stream. However, social sciences have a strong role to play in moving South Asian countries towards more evidence-based policy-making and effective policy implementation in order to address their myriad development challenges, while the arts can contribute to peacebuilding, social cohesion and literacy—as well as promoting local cultural goods. The excessive reliance on fickle overseas funding sources puts these disciplines at risk of neglect.



**Women and younger researchers find better opportunities for career progression in informal research networks involving participants in the developed world.** Working outside the hierarchical, male-dominated local research organisations, women-led grassroots research networks expand through interpersonal links and by use of the Internet to seek out the most motivated people in the field. International donors also sometimes require a gender-balanced core research team.

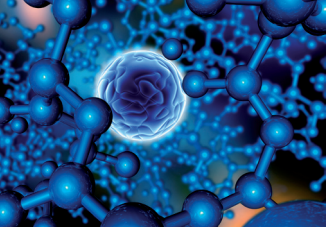
**Private-sector investment in collaborative research is desirable in some cases, but is not a panacea.** Private-sector investors need to ensure a return on their outlay by means of intellectual property rights. This can work well for commercialisation of certain new products and techniques, but is less desirable in the context of socially- and development-oriented research. Many research networks aim to produce and disseminate knowledge as a public good, whereas a private investor would want a monopoly on the output, thereby limiting its potential benefit to society. In the social sciences, private sector funding for policy research compromises the autonomy and objectivity of analysis.

**Due to limited human resources, funding for collaborative research becomes concentrated among a small academic elite, usually foreign-trained.** This group, as a result, can end up over-burdened. Meanwhile, higher education institutions beyond the top tier are neglected. Developed country research project leaders, when seeking partners in South Asia, need to weigh up their mandate to undertake capacity-building against their more pressing mandate to produce excellent research. This restricts their ability to reach out to universities beyond the main academic centres. One potential solution would be for research councils to separate out capacity-building as a stand-alone performance indicator with equal weight to publications.

**Geopolitics constrain collaborative research between countries in South Asia.** Research partners from outside the region can act as a neutral party, bringing together participants from countries which have thorny relationships. While purely South Asian research networks do exist, academics note the many hurdles slowing down such initiatives.

**Security concern is a major challenge to those trying to run research networks involving Afghanistan and Pakistan.** Not only have years of insecurity held back the development of the tertiary education sector and led to a continued 'brain-drain', but ongoing security threats limit the willingness or ability of overseas researchers to visit.

**Corruption and poor governance can make it difficult to carry out research in compliance with international funders' auditing requirements, and limit the impact of policy research.** Research networks operating in South Asia may need to seek the support of multiple levels of government and other stakeholders. Unless local authorities accept the need for transparent accounting in internationally-funded projects, it can be difficult to make any progress. In addition, where there is poor governance, it is hard for policy research institutes to gain the ears of policy-makers.



# Chapter One: Research networks and their potential

Governments, top universities and NGOs in South Asia are increasingly trying to promote collaborative research, which holds the promise of applying the best academic methods at home and overseas to solving the myriad economic, social and environmental challenges facing the region. By linking experts from around the world and involving stakeholders from wider society, research networks can more easily identify problems, adopt a multi-disciplinary approach to solving them and monitor the impact of solutions.

This report investigates research collaboration in six South Asian countries—Afghanistan, Bangladesh, India, Nepal, Pakistan and Sri Lanka—in order to map out the range of activities taking place so far, identify successful frameworks, potential impacts, challenges, and future trends.

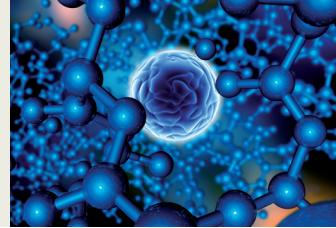
## What is a research network?

The term ‘research network’ can refer to a wide variety of collaborative initiatives, both in the higher education sector and beyond, so it is necessary to first set out what is, and is not. As a working definition, 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’. These may be private companies, governments, NGOs, farmers or simply communities. A network may be formally organised by institutions, or may form more organically among researchers and end-users. It may be led by academics or by other stakeholders—commonly governments and NGOs.

This report will look at both international and domestic research networks. It will cover a range of disciplines, from science and high-tech hubs, to policy research networks and even literature festivals. These are all linked by two characteristics in common: first, they aim to amplify the impact of research on South Asian societies. Second, they play a role in strengthening research capacity in the region.

This report does not cover the following types of research network:

- Initiatives for domestic, regional or international integration of education standards and systems.
- Researcher exchange, visit or scholarship initiatives which are not tied to a collaborative (issue-based) programme.
- University internationalisation initiatives, such as Western universities opening campuses in Asia.
- National Research and Education Networks (NRENs): the underlying ICT infrastructure which enables collaborative research.



## Collaboration: an output of the shift to applied research

The US and UK, as important global Anglophone research centres and major funding sources for South Asian researchers, have had a particularly strong influence on the shift towards collaborative and applied research in the region. The rise in collaborative research came hand in hand with the shift to applied, problem-oriented research from the 1980s on. Under Margaret Thatcher's government in the UK, publicly-funded research was expected to produce tangible benefits for the economy and society, according to Dr Puay Tang, Senior Lecturer at SPRU Science & Technology Policy Research, University of Sussex. Under Tony Blair's New Labour government, the emphasis turned to commercialisation of research output. Under these circumstances, said Dr Tang: "Research collaboration becomes key. You have to work with industry; engage policy actors, because it helps to know what the key policy issues are; it also helps stakeholders to know what the cutting-edge developments [in academia] are".

This concept of feedback loops between researchers and end-users is already being adopted in networks in South Asia. For example, Dr Swaminathan Sivaram, former director of the CSIR-National Chemical Laboratory, Pune and present National Coordinator of the Indian government's TAPSUN research network on solar energy, overseen by the Council for Scientific and Industrial Research (CSIR), described how TAPSUN's researchers deploy technological solutions in rural communities. By working closely with stakeholders on the ground such as NGOs and government organisations, they receive feedback on what is needed and what is working best in the local context, and this generates ideas for more relevant solar energy products.

### The value of collaborative research

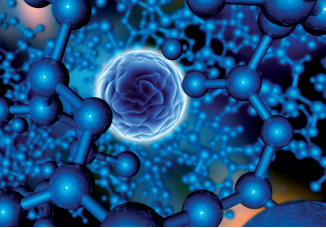
Philosophy of science professor, K. Brad Wray, offered an explanation in 2002 for why collaborative research is more effective than individual research, based on a variety of studies<sup>1</sup>:

- Collaboration increases the quality of research.
- It expands the scope of enquiries which are possible, by combining disciplines.
- It increases the chance that useful knowledge will be taken forward, rather than forgotten.
- Studies indicate that the move towards collaborative research has accelerated the growth of new knowledge, and that there is a correlation between collaboration and productivity.
- Collaboration plays an important role in training new generations of researchers.

## Making research matter

The main argument for a collaborative approach is that it makes research more relevant to society's needs, by involving end-users. It is therefore unsurprising that research networks are widely used in South Asia in the context of addressing the UN's Millennium Development Goals: to solve the problems of the world's poorest communities, those communities and organisations working directly with them need to be included in the research process. That aside, there are a number of important advantages to a collaborative approach. As noted in the box above, there is evidence that networking increases productivity. This results not just from combining multiple minds to solving one problem, but more specifically from bringing together people from differing academic disciplines and different walks

<sup>1</sup> Wray, K B (2002), 'The Epistemic Significance of Collaborative Research' in *Philosophy of Science*, (69/1, Mar 2002), pp. 150-168. Published by The University of Chicago Press on behalf of the Philosophy of Science Association.



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

of life. For example, the TAPSUN network leverages the expertise of chemists, physicists, material scientists and engineers from 15 Indian national laboratories, as well as forming links with local and grassroots organisations, to develop and test new knowledge and applications of solar energy.

If collaborative research is more productive and more relevant, it follows that its economic and social impact will be greater. Assessing the impact of research is a very complex affair, given that both causation and effect can involve multiple stakeholders in more than one country. It can also take decades for the impact to be felt; while some benefits, such as improved quality of life or environment, cannot be quantified. Nonetheless, a number of large-scale econometric studies have been done to assess economic impact of publicly-funded R&D—finding rates of return on investment between 20% and 50%.<sup>2</sup>

In certain fields, engagement with stakeholders is essential for effective fieldwork and testing, notably health, agriculture, poverty alleviation and environmental protection. In these areas, it makes sense to share ideas or conduct coordinated projects across multiple countries which have similarities in their geographical features, cultures and socio-economic conditions.

Another major benefit of research networks, particularly in South Asia's case, is the opportunities they provide for training, mentoring and institutional capacity-building. Whether this involves developed-country academics mentoring their South Asian counterparts, or South Asian experts passing on research skills and other expertise within their own countries, this helps to broaden South Asia's skill base and reduce regional disparities. Naturally, the benefits flow in both directions: Western researchers also have much to learn from their South Asian partners.

### India's top research partners

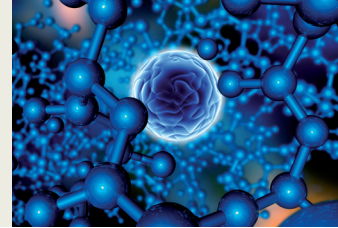
| Country     | Number of papers with country, 2004-08 | Share (%) of India's total |
|-------------|--|----------------------------|
| USA         | 10,728                                 | 6.7                        |
| Germany     | 4,284                                  | 2.7                        |
| UK          | 3,646                                  | 2.3                        |
| Japan       | 3,017                                  | 1.9                        |
| France      | 2,402                                  | 1.5                        |
| South Korea | 2,074                                  | 1.3                        |
| China       | 1,665                                  | 1.0                        |
| Canada      | 1,590                                  | 0.98                       |
| Australia   | 1,338                                  | 0.83                       |
| Italy       | 1,309                                  | 0.81                       |
| Switzerland | 1,067                                  | 0.66                       |

Source: Global Research Output, India, Thomson Reuters.

<sup>2</sup> Martin, B R and Tang, P (2006), 'The benefits from publicly funded research', Independent report commissioned by University of Manchester Intellectual Property Ltd (UMIP) for the UK Office of Science and Innovation, pp. 3-6. The authors reviewed previous econometric studies going back over 30 years.

## A lasting impact needs stable funding, a coordinated framework and strong relationships

Sustainable funding is the most obvious challenge for research networks in the long-term. South Asian governments spend a relatively low percentage of GDP on R&D, compared not just to developed



### Source of R&D expenditure

| Country   | R&D expenditure as percentage of GDP | Percentage of domestic R&D financed by government, latest available year |
|-----------|--------------------------------------|--|
| India     | 0.76%                                | 66.1%  |
| Nepal     | 0.30%                                | na   |
| Pakistan  | 0.33%                                | 83.8%  |
| Sri Lanka | 0.16%                                | 55.9%  |
| China     | 1.84%                                | 21.7%  |
| USA       | 2.77%                                | 33.4%  |
| UK        | 1.77%                                | 32.2%  |

Source: UNESCO

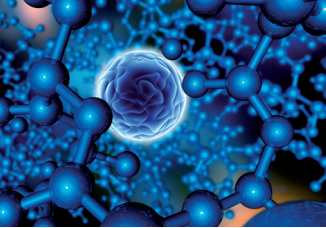
countries but also to some emerging-markets such as China; and yet other dependable sources of funding are lacking. Funding options for South Asian networks will be discussed in Chapter Three. Government-driven science and technology initiatives, particularly in India and Sri Lanka, are well-funded and can attract and retain the best talent, but these are a minority and the majority of research groups rely on relatively short-term, fickle and usually overseas sources of funding.

The experience of developed countries shows that in order to move the culture towards problem-oriented research, a sound national (or sub-national) framework is required. In the UK, for instance, this takes the form of research councils and the Research Excellence Framework. These serve to channel funding towards national priorities and to increase the accountability of publicly-funded research.

Above all, the message from the researchers interviewed for this paper is that interpersonal links and trust represent the other key to long-term success. This is why formal institutional frameworks are not always necessary; which implies that where a network is established by a government or other organisation, it is generally best to simply facilitate relationship-building among stakeholders, rather than directing with a heavy hand.

*“Research collaboration relies strongly on relationships between scholars. Institutionally-mandated projects do happen, but they are not generally those which are sustained over time.” - Richard J Edelstein, Research Associate in the Center for Studies in Higher Education, University of California at Berkeley.*





## Chapter Two: Policy support for research networks

In word at least, most governments in South Asia now encourage researchers to develop links with potential end-users—to learn about the problems which need solving, to extend the benefits of research to society, and to stimulate the economy. However, this represents a major shift in the research culture, and will need considerably more time to take root. In India and Sri Lanka, for example, applied and collaborative research as a concept has only really taken hold in flagship government research initiatives, and Dr Sivaram predicts that Indian universities will not start to feel the same pressure for societal and industrial impact for another five years or so.

### National innovation systems

Policy support for research collaboration in South Asia has roots not just in the problem-oriented ideology of Anglo-Saxon academia, but also in the 'national innovation system' (NIS) concept. This was developed from the 1980s on by academics such as Christopher Freeman and Bengt-Åke Lundvall, primarily with a view to increasing the international competitiveness of developing countries through indigenous innovation—defying the prevalent view that the only way to gain a competitive edge was to drop the prices of exports. With

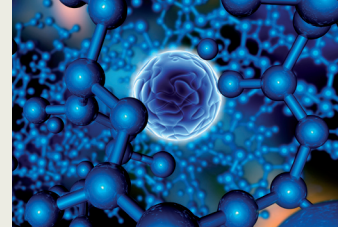
its emphasis on feedback loops between academia with other stakeholders, it has shaped the policies of both developed and developing countries. Lundvall credits it as having “moved the attention in policy circles in charge of research, innovation and industrial development from linear to interactive thinking of innovation. ... This has extended the traditional set of policy instruments with more attention to building linkages and strengthening the absorptive capacity of users.”<sup>3</sup>

### Policy transmission

Through their engagement in aid and development work in poorer South Asian countries, inter-governmental organisations, international NGOs and aid agencies are influential in transmitting policy stances on collaborative research. In addition, the multitude of informal networks between South Asia and the developed world, as well as the many returned South Asians with overseas research experience, are also transmitting this mind-set into the region. The policy research networks which have sprung up in Afghanistan are a case in point. The Afghanistan Research and Evaluation Unit (AREU) was set up to inform and evaluate the work of aid agencies, as well as to fill a gap in literature on Afghanistan, but as its director, Nader Nadery explained, it now employs the same methods to engage with government stakeholders, encouraging an evidence-based approach to policy. Similarly, the CIMMYT Global Wheat Program has been working closely with Pakistan's government agencies on agricultural research for many years now, advocating a more joined-up approach to research. As Dr Rick Ward, Principal Scientist in the CIMMYT Global Wheat Program bluntly stated, in a situation where “there's up to US\$50m available if you can connect it to economic growth. Does the donor drive the framework, the philosophy? Absolutely.”

Also contributing to the evolution of policy approaches to research in South Asia is a growing trend of bilateral and multilateral government-driven initiatives to foster multi-stakeholder research

<sup>3</sup> Lundvall, B (2004), 'National innovation systems: Analytical concept and development tool', paper presented at the DRUID Tenth Anniversary Summer Conference 2005 on 'Dynamics of industry and innovation: Organizations, networks and systems', pp. 3-6.



collaboration. One prominent example is the UK-India Education and Research Initiative (UKIERI), which facilitates not only joint funding for impact-oriented and sustainable research but also policy dialogue.

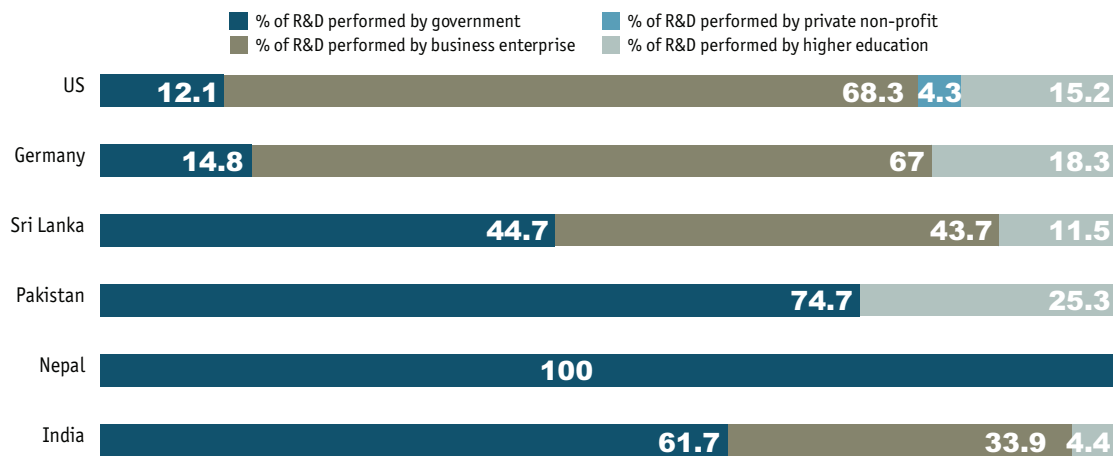
### Bottom-up vs top-down

Broadly speaking, there are two types of research networks commonly found in South Asia. The first is a grassroots model, driven primarily by the researchers and other stakeholders—although the scope of their work is still circumscribed by the topics which research councils or international donors are willing to fund. Typically, such networks are funded through individual or group grants originating from an international source, and extend into or across South Asia by means of personal networks and partnerships between institutions. In the arts and humanities, researchers often have no option but to adopt an informal approach to networking, as formal group funding is almost non-existent.

The second is a model best illustrated by science parks and other R&D hubs, notably but by no means exclusively in East Asia, which are a direct implementation of a government strategy. These ‘top-down’ networks are usually aimed at integrating academic research with industrial R&D and commercialisation, in order to achieve rapid progress in industries targeted by the government. UNESCO lists 80 such science parks in China,<sup>4</sup> and indeed this approach tends to appeal to developing countries in which the state plays a strong, directive role in the economy. Both India and Sri Lanka have such top-down initiatives underway, for example the above-mentioned TAPSUN programme in India, and Sri Lanka’s new Nanotechnology and Science Park. As the chart below shows, governments play a much greater role in running research projects in South Asia than in the West.

### Governments drive R&D in South Asia

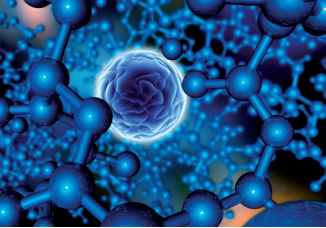
(%)



Source: UNESCO.

There is an argument that top-down, government-directed research networks are more suited to the conditions of South Asian countries, where private companies do not have a strong R&D tradition and tend to be risk-averse when it comes to investing. This case is made by Dr Nilwala Kottegoda, Senior Research Scientist at SLINTEC, a private company within Sri Lanka’s Nanotechnology and Science

<sup>4</sup> ‘Science Parks in Asia’, UNESCO. Available at: <http://www.unesco.org/new/en/natural-sciences/science-technology/university-industry-partnerships/science-parks-around-the-world/science-parks-in-asia/#c99670>, accessed 15 Apr 2014.



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

Park: “Taking the SLINTEC model as an example, if the government had not led it, I don’t think the Sri Lankan industry would have taken the risk to invest in it.” Dr Satish Ogale, Chief Scientist of Physical and Materials Chemistry in India’s National Chemical Laboratory, and a participant in the TAPSUN solar energy research network, takes the view that such collaborative structures are necessary in India to facilitate government funding.

### The impact controversy

The focus on measurable impact is a feature of both grassroots and top-down research networks. There is an inherent risk in this, as noted by Dr Ward, Principal Scientist in the CIMMYT Global Wheat Program: “There is a debate that research for the sake of research has often been at the basis of fundamental transformations.” Many academics are resistant to a shift towards applied research, worrying that the focus on impact will lead to many incremental innovations, but few breakthrough innovations. Dr Sivaram was optimistic about this: “Good science and good applications are not contradictory, in that you can balance both”. At present in South Asia, the traditional approach of basic research still prevails in most of those universities which have a research capacity, though there is a sense that the younger generation of researchers are more persuaded of academia’s obligation to exert a positive impact on society.

There is also concern that in an impact-focused environment, the arts and humanities will suffer due to the indirect nature of their influence on society. This is true to some extent, but there are ways in which researchers in the arts can generate a more immediate impact. According to Dr Claire Chambers, Lecturer in Global Literatures at the University of York, literature festivals are playing an increasingly important role in this respect, particularly in Pakistan. Firstly, as networking events which can launch new research collaborations: They can be “a real hub for academics, authors and political activists getting together”. Secondly, they provide an opportunity for academics, authors and other participants to discuss crucial issues such as social cohesion, and can even form a platform for inter-community dialogue. Thirdly, if an inclusive approach is taken, they can promote literacy. Finally, as a direct economic impact they serve to promote book sales for local authors and publishers.

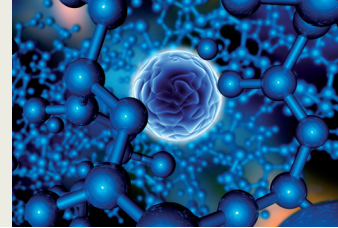
### Policy support for research networks in South Asia

There are two key elements to enabling research networks, according to Mr Edelstein. “It is about

#### Researchers in R&D, selected countries

| Country   | Number of researchers engaged in R&D per million population, latest available year | Researchers in higher education per million population, latest available year |
|-----------|--|---|
| India     | 137  | 18  |
| Nepal     | 59   | na  |
| Pakistan  | 152  | 96  |
| Sri Lanka | 93   | 27  |
| USA       | 4,673  | 593   |
| UK        | 4,202  | 2,590   |

Sources: UNESCO, Economist Intelligence Unit.



institution building, which doesn't have to be a university but has to be some kind of centre dedicated to research; and changing the culture so that people are more motivated to go into research. Young people should see it as a worthwhile profession." Both of these points represent challenges for South Asia: not only do too few universities have research capacity, but those interviewed for this report attest that academics also tend to command considerably lower salaries than graduates of similar levels of education who take jobs in business.

South Asian governments have already begun, in their strategic planning, to address the need for supporting institutions and a cultural shift to encourage collaborative research—not just among academics, but extending to public- and private-sector stakeholders. This demonstrates that they recognise the benefits which applied research can bring to national economies and societies, and, in some cases, to the governments' own policy-making capacity. But in most cases they face an up-hill struggle.

All South Asian countries face high levels of illiteracy, and expanding access to basic education is still a policy focus for most. Given that overall public spending on education as a proportion of gross national product (GNP) already tends to be lower than in developed countries: (the US and UK spend 5.3% and 5.5% of GNP on education, respectively, compared to South Asian countries that spend between 2% and 3.5%), not a great deal is left for higher education. In Nepal, for instance, there have been repeated protests by university staff over low wages, which contributes to an ongoing brain-drain. Outside of a few elite institutions, universities in South Asia tend to focus on teaching rather than research and teachers holding PhDs are in short supply. "Nowadays, our universities are producing just clerks to the market", lamented Abdul Waheed Wafa, Executive Director of the Afghanistan Centre at Kabul University (ACKU). As the table below shows, under 30% of higher education teaching staff in India, and around 2% in Afghanistan, have published articles in peer-reviewed journals.

### An inhospitable environment for research

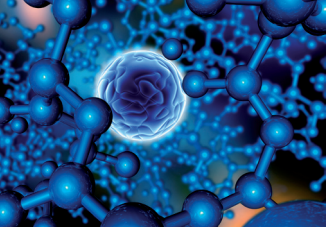
(Latest available year)

| Country     | Public spending on education as % of GNP* | Approximate % of university faculty holding a PhD or MPhil | Authors* published in peer-reviewed journals per 1,000 teaching staff |
|-------------|---|--|---|
| Afghanistan | na  | 5.5  | 23  |
| Bangladesh  | na  | 32 (public universities)                                   | 65  |
| India       | 3.4                                       | 55   | 284   |
| Nepal       | na  | na   | 118   |
| Pakistan    | 2.5                                       | 25   | 179   |
| Sri Lanka   | 2.7                                       | 20 (% of senior lecturers)                                 | 263   |

\* Authors may not be academic teaching staff.

Sources: Scopus; EIU analysis; Afghanistan Ministry of Higher Education; SAARC Journal of Human Resource Development; Sri Lanka Sunday Times; University Grants Commission, New Delhi.

As a result, for most South Asian countries the current policy focus is on capacity building. International links have so far formed the cornerstone of this strategy, and as will be seen in Chapter Three, such collaborations are not only improving the research capacity of South Asian universities but also further disseminating the problem-oriented approach to research.



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

When it comes to institution building, specific government initiatives include science-industry hubs, seen as a way of showcasing collaborative research and developing entrepreneurial economies, and thereby creating jobs for some of the multitudes of young people who join South Asia's job market each year. Great expectations are attached to the potential of public-private partnerships to stimulate innovation, with Bangladesh hoping that this approach will lead to 20% of its GDP being generated through productivity increases by 2021.<sup>5</sup>

### India's Universities for Research and Innovation: creating an elite research stratum

So far, innovation-focused research in India has predominantly been carried out by government research institutes—meaning that R&D and higher education have been segregated. As part of a series of proposed reforms to India's higher education system, the Universities for Research and Innovation Bill (2012), if passed, would create a new category of elite institutions with a focus on problem-oriented research and innovation. The bill, put forward by the Human Resources and Development Ministry, would allow for public, private and PPP investment models. Controversially, it would also open up the sector to foreign universities, non-profit organisations, societies and trusts—if they can prove their track-record in promoting innovation.

The bill is championed by those who believe that more competition is needed in order to bring research and innovation in India up to world-leading standards. Ernst and Young along with the Federation of Indian Chambers of Commerce and Industry (FICCI) recently offered a vision of what India's higher education system could look like in 2030, if this bill and other reforms succeed:

"[A] differentiated academic system with a three-tiered structure comprising highly selective elite research universities at the top, comprehensive universities and specialized institutions in the middle, and an array of highly-accessible and high-quality colleges at the bottom."<sup>6</sup>

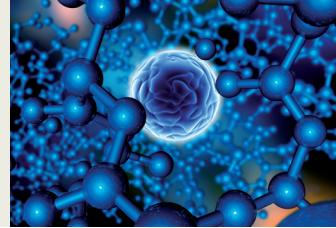
The Universities for Research and Innovation would create new opportunities for Indian scholars to lead domestic and international research collaborations. However, not everyone is convinced that this bill represents the best course of action. There is opposition on the grounds that resources should be directed at existing institutions rather than creating new ones; while there also remain concerns about the increasing role of the private sector in education, and about the potential damage to social mobility in a more stratified system. The challenge would be not simply to create networks of elite global scholars and big business, but to ensure that the benefits extend to the wider society and economy—which means capacity-building beyond the elite, and including grassroots stakeholders in research value chains.

Flagship government projects aside, there is little domestic financial support for collaborative research. The policy focus is instead often on facilitating links with overseas funding sources. The reliance on external funding means that the selection of research areas tends to flow out of the Millennium Development Goals, as well as other priorities of developed-country research councils. Although domestic priorities are set in national planning documents, South Asian countries lack comprehensive national or sub-national systems similar to Western research councils to channel research funding into priority areas and track impact, and this would in any case require more financial backing in order to be effective. However, due to the reporting requirements of internationally-funded projects as well as government-led research initiatives, South Asian researchers are gaining experience in assessing impact—and an industry developed in the West for this purpose is already waiting in the wings to assist them.

Where priorities are set in national plans, particular attention is usually afforded to research collaboration in agriculture and health, partly inspired by high profile successes in these areas: polio was notoriously eradicated in India by 2011 through a highly-successful collaboration between

<sup>5</sup> 'Outline Perspective Plan of Bangladesh, 2010-2021', Planning Commission, Government of the People's Republic of Bangladesh.

<sup>6</sup> 'Higher education in India: Vision 2030', Ernst and Young LLP, paper produced for the FICCI Higher Education Summit 2013.



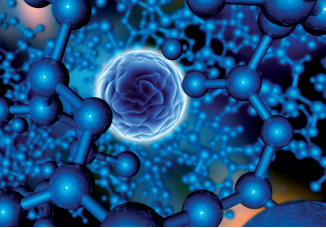
researchers, inter-governmental organisations, health practitioners and communities;<sup>7</sup> while 99% of wheat in Pakistan is produced using more productive varieties developed and introduced through CIMMYT Global Wheat Program's in-country research network. A 2003 study estimated that CIMMYT's research investments in disease-resistant wheat varieties produce an internal rate of return of 41%, which most investors could only dream of.<sup>8</sup>

Both India and Pakistan are currently planning to devolve authority and budgets for higher education to state or provincial level. This could hinder future attempts to introduce nationally-coordinated research systems, and in Pakistan there are concerns among academics that the current coordinating body, the Higher Education Commission, will become irrelevant—with negative impacts for international partnerships.<sup>9</sup> With greater devolution, existing regional disparities may well intensify as international partners focus their attention on the best-managed and most proactive areas.

<sup>7</sup> Chhabra, E (Summer 2012), 'The End of Polio in India', Stanford Social Innovation Review. Available at: [http://www.ssireview.org/articles/entry/the\\_end\\_of\\_polio\\_in\\_india](http://www.ssireview.org/articles/entry/the_end_of_polio_in_india), accessed 16 April 2014.

<sup>8</sup> From email correspondence with Dr Rick Ward, Principal Scientist, CIMMYT Global Wheat Program; and Marasas, Smale and Singh (2003), 'The economic impact of productivity maintenance research: breeding for leaf rust resistance in modern wheat.' In *Agricultural Economics* 29(2003), pp. 253-263.

<sup>9</sup> <http://www.dawn.com/news/1041386>, accessed 1 May 2014.



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

# Chapter Three: Research networks in South Asia

The EIU interviewed 18 participants in research networks involving South Asia, including researchers from academia, government institutes and NGOs, from developed countries and from South Asia, working in disciplines ranging from nanotechnology to policy research and literature. The aims were to identify which approaches to collaborative research work well in the region; to assess the impact of research networks on economies, societies and the research culture; and to understand the challenges faced by those seeking to establish and sustain networks.

## Capacity to lead research networks is unevenly distributed, regionally and domestically

Looking at the overall South Asian research landscape, two disparities stand out. First, India is well ahead of the rest of the region in terms of its ability to lead science and technology research networks. Its elite higher education institutions produce strong scientists and engineers, and many foreign-trained researchers also return to India, so there is less of a reliance on foreign expertise. With its network of 37 national R&D laboratories under the CSIR, India has relatively strong government financial and organisational support for research. Owing to its large potential market, many overseas researchers and investors approach India's national laboratories seeking ways to commercialise their innovations for Indian consumers.

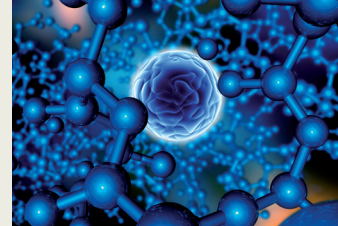
### India leads the pack in scientific and technical research capacity

| Country     | Number of teaching staff <sup>^</sup> in tertiary institutions, latest available year | Number of scientific and technical journal articles, 2011 |
|-------------|---|---|
| Afghanistan | 3,342   | 8   |
| Bangladesh  | 77,373  | 291   |
| India       | 538,769   | 22,481  |
| Nepal       | 9,932   | 64  |
| Pakistan    | 81,732  | 1,268   |
| Sri Lanka   | 5,358   | 130   |

\* Teaching staff defined as lecturers to professors teaching at part-time and full-time programmes at tertiary institutions.

Sources: UNESCO, World Development Indicators (WDI).

Second, across the rest of the region, research networks are still led out of just a few economic and academic centres. The distribution of research institutes capable of directing complex collaborative research is uneven across the region, with little capacity outside of the top one or two cities in most cases.



## Patent disparities

The statistics on domestic patent applications and grants tell a story of great variation across the South Asian region in domestic innovative capacity in science and technology. India is the regional leader in terms of absolute numbers, reflecting its relatively large collaborative and applied research scene—but once the size of its population is taken into account, it is clear that innovation is only taking place among a small elite. Scientific and technological innovations play a negligible role at present in the other countries in this study, though Sri Lanka has shown a promising rise in successful patent applications in recent years.<sup>1</sup>

### Domestic patent applications by residents, 2012

| Country     | Population | Patent applications | Patents granted | Patents granted per 1m population |
|-------------|------------|---------------------|-----------------|-----------------------------------|
| Afghanistan | 29.82      | 0                   | 0               | 0                                 |
| Bangladesh  | 154.7      | 67                  | 6*              | <1                                |
| India       | 1236.69    | 9,553               | 722             | <1                                |
| Nepal       | 27.47      | 0                   | 2               | <1                                |
| Pakistan    | 179.16     | 96                  | 13              | <1                                |
| Sri Lanka   | 20.33      | 194*                | 45*             | 2                                 |
| US          | 313.91     | 268,782             | 121,026         | 386                               |
| UK          | 63.23      | 20,108              | 4,996           | 79                                |

\* Latest available data, from 2011.

Source: WIPO Statistics Database.

There is a significant jump between India’s innovative output and that of developed countries such as the US and UK. The need for increased research capacity, hand in hand with a shift in the research culture in both academia and the private sector, applies to the entire South Asian region.

## South Asians with overseas research experience facilitate networks

South Asian researchers who have studied overseas and either remained or returned play an important role in facilitating research networks. These scholars form professional friendships which are often sustained after their return, and they facilitate relationship-building as well as being conduits of expertise and financial resources into the region.

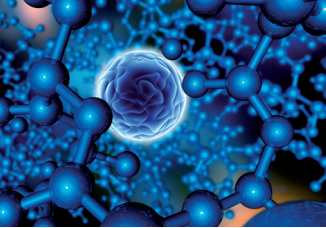
Asked why he chose to remain in the UK rather than returning to Bangladesh, Dr Manoj Roy, lead researcher for a recently-completed collaborative project at the University of Manchester, ClimUrb: Poverty and Climate Change in Urban Bangladesh, and Lecturer in Sustainability Science at the University of Lancaster, explained: “I could be more intellectually employed here, with more intellectual freedom and access to resources. I wanted to bring international money and experience for the benefit of the [Bangladeshi] people.”

## Altering the economic paradigm: indigenous innovation

South Asian governments are increasingly forming advanced science and technology research clusters in order to kick-start new strategic industries—providing well-paid jobs and infrastructure, including business incubation facilities. But more than this, such research networks are consciously working

<sup>1</sup> [http://www.wipo.int/ip-stats/en/statistics/country\\_profile/countries/lk.html](http://www.wipo.int/ip-stats/en/statistics/country_profile/countries/lk.html), accessed 15 April 2014..





## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

### Case study: Maternal and child health in South Asia

The South Asia Infant Feeding Research Network (SAIFRN) was established when Dr Upul Senarath, a Sri Lankan researcher from the University of Colombo, having completed a project on infant feeding in Australia, decided to return home. He suggested that the research team should conduct similar work in South Asia, and so—thanks to his strong links with the Sydney team—SAIFRN was born.

The research team discovered that an enormous amount of data on child and maternal health was being generated in South Asia, but few people had the analytical skills to make it useful. They successfully applied for AusAID funding for the first in what was to be a series of projects, involving core team members in Sri Lanka, India and Bangladesh. “We didn’t try to analyse which institutions would be appropriate to use, but looked for people who were interested and active”, said Dr Michael Dibley from the Sydney School of Public Health, an Australian mentor and founding partner of the network. This approach also led to the inclusion of more women in the team: “From the start we wanted to have a good gender mix. If you just went to the leaders of all the organisations, you’d end up with some entirely male network.”

A large part of SAIFRN’s early work was on capacity-building in research methodologies and analytical techniques, to enable South Asians to pursue the research with minimal support and mentoring (often via video-conference) from the Sydney participants. Over time, the network expanded to Nepal and Pakistan. Within two years, the team had achieved results which they were able to convert into policy recommendations—and this was very motivating for all involved. Again, mentoring by the Australian experts was necessary, owing to the fact that academics in South Asia do not tend to be trained or experienced in policy research and influence.

One benefit of developing a South Asia-wide network is that a success story from elsewhere holds more weight if it has taken place in similar cultural and socio-economic

conditions. The researchers discovered that breastfeeding indicators were much better in Sri Lanka than the rest of the region, which demonstrated that improvements were possible and enabled Sri Lankan network members to carry out advocacy work on the topic.

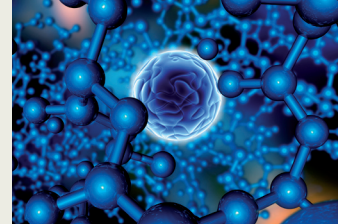
South Asian researchers brought solutions to the table which their Australian partners would never have thought of. For instance, an India-based research partner, Professor Archana Patel, alerted the team to the idea of using mobile phones to extend mentoring—and even potentially transfer welfare payments—to millions of women.

This case study illustrates well the benefits in both directions of forming networks between developed-country universities and researchers in South Asia. There is little doubt that the research findings would have generated far less impact, had any one of the participants simply been working alone. Scale aside, the productivity of the research team was amplified thanks to sharing experiences and ideas across countries, and pairing up expertise in research methodologies and policy influence on the Australian side with knowledge of local conditions and in-country presence on the part of the South Asians. The Australians involved also felt they were able to act as “fair brokers”, overcoming regional political tensions.

Nonetheless, the hope is that in future, SAIFRN can evolve into an entirely South Asia-led research network. This may be forced upon it, as significant cuts to its AusAID funding are in the pipeline. Private-sector investment to plug the gap is not an option in this case, given the sensitivity to private involvement in child nutrition following major scandals in the twentieth century; but SAIFRN’s South Asian researchers will be well-equipped to apply for other international grants. Dr Dibley believes the network will survive, particularly as it has always employed a strategy of maximising the impact of minimal resources—and the point when the Sydney researchers are no longer needed is probably the definition of success.

to alter the economic paradigm in South Asian countries, away from a colonial-era model in which competitiveness is based on low-value production and exports, towards indigenous capacity-building, innovation and productivity growth as economic drivers. This change in mind-set is in part being driven by government initiatives, and in part being transmitted from advanced country research councils, inter-governmental organisations and NGOs.

Indian government researchers in the field of science and technology hope to encourage the private sector to move away from distribution of foreign technologies, and instead to participate in developing



and manufacturing indigenous products—which requires companies to first recognise the value of research. Dr Ogale, Chief Scientist of Physical and Materials Chemistry in India’s National Chemical Laboratory, and a participant in the TAPSUN programme, believes that TAPSUN’s outreach work to industry is already sowing the seeds of change: “More of them are distributors rather than large-scale manufacturers. But some are trying to develop modules and applications on a small scale now.”

A similar approach is being taken in Sri Lanka’s Nanotechnology Park, the first of its kind in the country. Dr Kottegoda of SLINTEC, which was formed with public and private funding to commercialise research findings, also feels that government initiatives are having an impact on the wider R&D culture: “Most of the private sector companies have their own R&D, but for day-to-day problem solving and development, not for innovation. SLINTEC has multiplied their interest [in R&D for innovation].”

However, those involved acknowledge that there is a long way to go. “Industry interactions with science need to grow. We are only at 1% of what is required”, says Dr Ogale.

### Changing the research culture

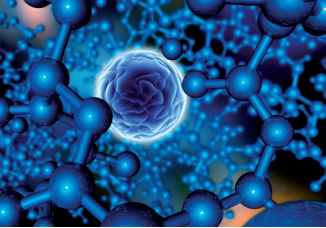
Research networks are also changing the research culture in universities and beyond. Dr Ward described how CIMMYT is working in Pakistan towards two paradigm shifts. Firstly, to link up the work of academics, federal and provincial government researchers, and those running extension activities—each of which has traditionally been entirely separate. Secondly, to involve the private sector—in this case farmers and agricultural suppliers—as stakeholders in the research process. “If you have [an agricultural] research community that doesn’t see the farmer as part of the value chain, you can be sure that the research community is not having much impact.”

In Afghanistan’s case, a more fundamental shift is taking place: moving from an oral tradition to a recorded tradition through the introduction of primary research methods. This is a focus of the Afghanistan Center at Kabul University, which was set up to develop resources on modern Afghan history and culture, as well as policy research institutes such as the Afghanistan Research and Evaluation Unit (AREU) and the National Center for Policy Research (NCPR).

### Contributing to skills development and job creation

As a result of the shortage of skills in research methodology, researchers running networks in South Asia see capacity-building as a responsibility or even a necessity, and this can have a multiplier effect. Of the 20 young researchers in Bangladesh trained by Dr Roy’s ClimUrb team, many have moved on to influential roles, winning further funding on their own account and passing on their expertise. In the current funding environment, knowing how to apply for international grants is a vital skill, and one in which academics trained in developed-country universities tend to have an edge. In general, academics in the West are now encouraged to take on responsibilities which are not purely academic, such as organising community engagement events or working to influence policy, and are therefore in a position to train their South Asian partners in these additional professional skills. South Asian universities still do not tend to emphasise skill diversification for faculty.

South Asian governments hope that top-down research networks can empower the private sector to become more entrepreneurial, by supporting young people with the knowledge and resources



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

they need to start up new businesses. This includes efforts to attract back postdoctoral researchers from abroad—returnees to India are provided with a start-up grant and laboratory space—as well as domestically-focused initiatives. Dr Iftikhar Ahmad, Chairman of the Pakistan Agricultural Research Council (PARC) wants young people from rural communities to “see agriculture as a business for the future.” He believes that linking small-scale farmers and suppliers to research networks, who in turn can reach out to policy-makers and parliamentarians, is the route to a supportive regulatory environment for job creation.

### Reducing regional disparities

Just as Western partners build the research capacity of developing country partners by means of networks, so do some of the top research institutes within South Asia serve a training and mentoring function for other domestic institutes. In India, the federal government deliberately distributed its national laboratories around the country, and according to Dr Ogale, these each play a role in reaching out beyond the top government institutes: “Researchers from less-developed regions come to national laboratories and then return to their own labs, knowing what equipment they need and how to apply for international funding.” Similarly, ACKU works to increase the research capacity of universities across Afghanistan, by providing training sessions in methodologies and inviting students to lectures by visiting academics.

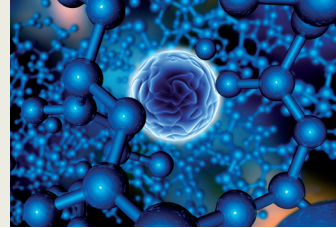
### Improving social mobility and the gender balance

Women and younger researchers in South Asia often have better opportunities for career progression through their work in research networks linked to developed countries, than in the more hierarchical, male-dominated local research organisations. As demonstrated in the SAIFRN case study above, such grassroots research networks expand through interpersonal links and by using the Internet to seek out the most motivated people in the field, thereby bypassing formal structures which tend to be male-dominated in the South Asian region.

“Often, just by virtue of you being a women, your contacts are women, especially in a culture like Pakistan, where it is respectful for men not to interact with women so much”, observed Dr Chambers. This demonstrates how the relatively more equal gender balance among Western research partners can organically increase opportunities for South Asian women to gain valuable experience, particularly in the context of informal networking.

Given that many research networks in South Asia deal with development issues such as health and poverty relief, when it comes to involving local communities it often makes most sense to reach out to women. This means that women are given more of a voice in the process of solving their societies’ problems, and that issues affecting women in particular gain more attention. In the view of Mr Wafa of ACKU, “to bring changes in women’s rights, women should participate [in society]. And not only elite women.”

In the South Asian context, an increased focus on conducting primary research among women is resulting in a need to employ more female researchers. Mr Nadery of AREU noted that “one of our major thematic areas of research is gender studies, it makes sense for women to lead this.” Around a third of



AREU's researchers are women.

In Sri Lanka's Nanotechnology and Science Park, there is no shortage of female scientists—around 70% of science undergraduates in state universities are women. On the other hand, men dominate in the field of business and entrepreneurship. Dr Kottegoda of SLINTEC pointed out that, by encouraging scientists to commercialise their innovations and start up new companies, in the long term this government initiative is likely to see more women going into high-value businesses.

### **Social, cultural and political impact**

By engaging end-users and monitoring impact, collaborative research can be of more benefit to society—for instance, TAPSUN is employing a consultative approach to developing solar technology solutions for villages which are off the grid. Dr Ward sees a socially-inclusive approach, taking into consideration the needs of disadvantaged members of the research value chain, as key to the sustained adoption of new agricultural techniques.

In countries with low levels of literacy such as Pakistan and Afghanistan, some research networks are finding creative ways of engaging disenfranchised communities. Abdul Waheed Wafa, Executive Director of ACKU, explained how the ACKU Box Library Extension (ABLE) programme disseminates knowledge to remote areas of Afghanistan: "We are going to the communities asking people what kind of information they need. Some may ask questions like 'I want to make honey', 'Why do earthquakes happen?', 'What is democracy?' We produce easy-read books and distribute them across the country, to schools and provincial councils, so enhancing reading culture beyond ... the cities."

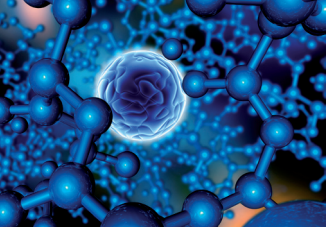
Literature festivals also serve to promote reading, but the potential impact of the arts goes much further. By engaging in a national cultural discourse through books, the media, exhibitions and events such as festivals, those in the arts foster a creative culture, increasingly seen as essential to an innovative economy. The arts can build bridges across communities, including across national boundaries.

Governments also recognise the value of international research links to improving diplomatic relations. Dr Shailja Vaidya Gupta, Director of International Cooperation in the Department of Biotechnology at India's Ministry of Science and Technology, believes that "science diplomacy can go a long way to developing relationships between two countries."

Policy research networks have an important role to play in improving governance in South Asia, encouraging an evidence-based approach to policy-making and monitoring. This can lead to better representation of marginalised societal groups, as well as more effective solutions to economic and social challenges.

### **The funding challenge**

Public funding for research in South Asia is low, in comparison not just to developed countries but also to other parts of Asia. Dr Ogale says, of India, that "the level of funding has to be elevated substantially in order to come into line with international standards, if you look at how much funding China and other Asian countries are putting into R&D." As can be seen from the table in Chapter Two,



## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

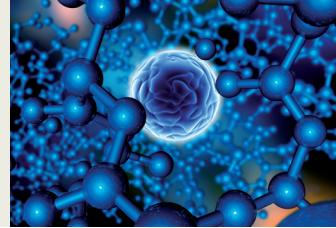
India actually spends more than Pakistan or Sri Lanka on research; while least-developed nations such as Afghanistan, Bangladesh and Nepal have very few resources to draw on. Funding for collaborative research tends to be provided project by project, and future resourcing is a common concern. Many networks aim to move towards greater self-sufficiency, but the options as well as the implications of different funding models vary greatly by discipline.

In **science and technology**, there is a strong expectation that research networks will eventually become less dependent on public funding—although there remains a high reliance on government support at present. Organisers hope to attract more domestic and international private-sector investment as they prove their value, and also to generate revenue through consultancy, training, patents and spin-off enterprises. According to Dr Gupta, in the last five years the emphasis of India's Ministry of Science and Technology has shifted toward encouraging public-private partnerships, an approach Bangladesh also intends to adopt. India's TAPSUN programme, C-CAMP in the Bangalore Bio-cluster and Sri Lanka's Nanotechnology and Science Park all host business incubators to encourage entrepreneurship; while Dr Kottegoda from Sri Lanka's Nanotechnology and Science Park and Dr Ogale of TAPSUN both noted that researchers within the initiative have started applying to register more patents.

In **social sciences and the arts**, there is little or no funding from South Asian governments, and research networks rely heavily on developed country research councils, inter-governmental organisations and NGOs. Revenue generation is less likely, although not always impossible—consultancy is one option, but this eats into the time available for core work. The excessive reliance on fickle overseas funding sources means that research networks cannot guarantee long-term job security to members. Some major donors such as AusAID have begun scaling back their international development funding in the wake of the global financial crisis of 2008-9, and aid recipients in Afghanistan are also seeing funds withdrawn as the Western presence in the country is being reduced. As a consequence of poor long-term career prospects, many talented researchers take up positions in the private sector or overseas. Given the importance of interpersonal relationships to sustaining research networks, this is one reason why so many networks fizzle out after a relatively short time.

Private sector investment in collaborative research is desirable in some cases, notably in the commercialisation of new products. Yet in other cases, it would compromise the aims of the research. As Mr Edelstein warns, private funding is often "very self-interested and narrow in focus", and this is a particular problem in developing countries, as there are fewer checks in place to prevent abuses.

Private sector investors need to ensure a return on their outlay by means of sole rights to the research output, and this is not always desirable in the context of socially- and development-oriented research. Many research networks aim to produce and disseminate knowledge as a public good, such as the seed varieties developed by CIMMYT, whereas if a private investor monopolises the innovation, this limits its potential use to benefit poorer parts of society. In the social sciences, private sector funding for policy research is likely to compromise the autonomy and objectivity of analysis. Therefore governments need to weigh up the advantages and disadvantages, to assess where private sector funding is appropriate—it is not a cure-all.



## More challenges ahead: talent missing

Most South Asian countries suffer from a shortage of good researchers. Although the quantity of tertiary education places has gone up significantly in some cases, quality has not kept pace. Due to limited human resources, funding for collaborative research becomes concentrated among a small academic elite, usually foreign-trained—who, as a result, can end up over-burdened or complacent. Dr Roy notes that overseas funding bodies often require that local partners lead research networks, yet, in the case of Bangladesh: “because there are fewer people who can work intellectually, they are overburdened with projects”, and cannot give each one due attention.

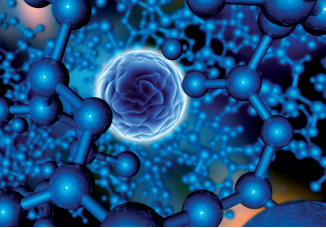
Meanwhile, higher education institutions beyond the top tier are neglected. Research project leaders, when seeking partners in South Asia, need to weigh up their mandate to undertake capacity-building against their more pressing mandate to produce excellent research. This restricts their ability to reach out to second-tier universities. One potential solution, according to Dr Roy, would be for research councils to separate out capacity-building as a stand-alone performance indicator with equal weight to ‘research excellence’ and publications.

**Geopolitics** form a constraint on collaborative research between countries in South Asia, particularly when it comes to relations between India and Pakistan. As noted in the case study on SAIFRN, above, partners from outside the region can act as a neutral party, bringing together participants from countries which have thorny political relationships. While purely South Asian research networks do exist, academics note the many hurdles limiting or slowing down such initiatives—India researchers, for example, need various clearances in order to conduct some types of joint scientific research with their Pakistan counterparts. Informal networks can therefore be easier to get off the ground.

**The security situation** is a major challenge to those trying to run research networks involving Afghanistan and Pakistan. Not only has this held back the development of the tertiary education sector in these countries and led to a continued ‘brain-drain’, but ongoing security threats limit the willingness or ability of overseas researchers to visit. For example, during Afghanistan’s elections in spring 2014, Mr Wafa of ACKU was concerned that two Western researchers scheduled to come and conduct training would be denied permission by their employers to travel to Afghanistan—such cancellations are common.

**Corruption** can make it difficult to carry out research in compliance with international funders’ requirements. Research networks operating in South Asia may need to seek the support of multiple levels of government and other stakeholders. In Pakistan, according to Dr Ward of CIMMYT, unless local authorities accept the need for transparent and above-board accounting in the work of internationally-funded NGOs it can be difficult to make any progress.

**Poor governance** also limits the impact of policy research. Dr Hari Dhungana, Member of the Nepal Policy Research Network, spoke of the difficulty in opening up the policy-making process to evidence-based input, where merit does not always match political influence. As Dr Roy notes with regard to Bangladesh, for real impact in conditions of rising political patronage, “You need to work with the politicians.”



## Conclusion

**Research networks play an important role in training and capacity-building, and sometimes in reversing the 'brain-drain'.** Often these aims are built into a project's mandate. While ideas, resources and subject expertise are shared in both directions, researchers in developing countries play a particularly important role in training South Asian partners in research methodologies and how to apply for international funding—making it possible for more people to develop careers in research without leaving the region. Government-driven science and technology networks, particularly in India, offer various incentives to attract talent back to South Asia, as well as to promote youth entrepreneurship.

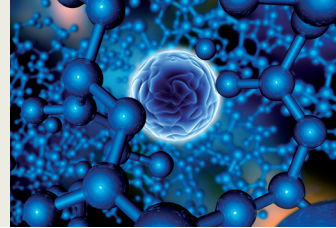
**In South Asia, research networks contribute to economic development by kick-starting strategic industries and, in a broader sense, altering the culture to be more innovation-focused.** There is a strong argument in favour of government leadership in research networks to develop new industries, particularly in science and technology. The private sector tends to be risk-averse when it comes to investing in R&D, while academia is focused on basic rather than applied research. Governments can enable academia-industry links by organising networks, offering incentives and reducing risks.

Research networks are also altering the economic paradigm in South Asian countries, away from a colonial-era model in which competitiveness is based on low-value production and export, towards indigenous capacity-building, innovation and productivity growth as economic drivers.

**International research networks contribute to social mobility for South Asian researchers.** Younger and female researchers are able to take on more responsibilities and progress their careers through participation in international networks. This is partly because higher-education institutions in the developed world tend to have a more egalitarian working culture than their counterparts in South Asia, with many project teams deliberately seeking a gender balance; and partly because informal networking using personal contacts and the Internet can bypass hierarchical structures to seek out the most motivated researchers or practitioners, whoever they may be.

**While East-West research networks are common (and sometimes essential), intra-regional networks also play an important role.** In South Asia's least-developed countries such as Afghanistan and Nepal, there is near-total dependence on overseas funding sources and heavy reliance on outside expertise, which provides strong motivation to develop international networks. Nonetheless, there are great advantages to cross-regional research collaboration, given the similar conditions and challenges faced across South Asia. They can also foster improved diplomatic relations. Whether purely South Asian, or enabled by external facilitators, regional cooperative efforts are increasingly being encouraged in government planning—particularly in the fields of agriculture and health.

**Capacity to lead research networks is unevenly distributed, and is inadequate overall.** The distribution of research institutes and higher education centres capable of complex collaborative research is uneven across the region, with little capacity outside of the top one or two cities in most cases. India is well ahead of the rest of the region in terms of its ability to lead science and technology



research networks; yet per head of population, it still lags far behind developed countries in innovative output (measured in terms of patents granted). Overall, the level of funding for research and the pool of world-class talent are both very low, compared to developed countries and even some emerging economies, such as China. As a result, the best researchers can be overwhelmed with requests from overseas partners; while researchers from second-tier universities lack access to international networks.

## Looking ahead

The chief concern facing nearly every researcher interviewed for this report was the long-term sustainability of funding. For researchers based in South Asia, there is a very strong temptation to take more lucrative or stable positions in the private sector or at an overseas university. This is especially the case in smaller, less-developed South Asian countries such as Nepal, where researchers often have to spend more of their time doing consultancy work than their core research in order to make ends meet. For those trying to build a research network, the ability to guarantee long-term funding is essential to attracting the necessary talent and to successfully implementing projects.

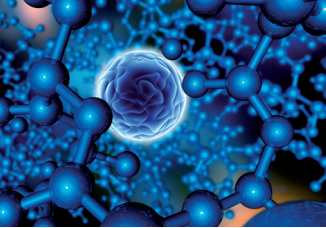
This is one major advantage of government-driven research networks, particularly in countries such as India where a stable bureaucracy ensures that initiatives are sheltered from changes of political leadership. Where salaries are sufficient and ensured for the long-term, researchers feel able to commit, and may even bring their families back from overseas in order to take part. However, few expatriate South Asian researchers will be persuaded to abandon a job and relocate their families back to their home country unless there is the prospect of long-term job security—and where research jobs are only sustained from grant to grant by international funding bodies or charities, shown in the aftermath of the 2008-9 Global Financial Crisis to be volatile, this security is simply not there.

Research networks linking scientists and engineers with industry have good potential to attract private sector investment, generate revenue and become more self-sustaining in the future. However, for more socially-focused research networks there is little prospect of generating revenue; and in fact there are good reasons not to invite in private sector investment in some cases. Many research networks in social science and especially the arts are therefore particularly dependent on donors, and vulnerable as a result.

Governments everywhere are wont to look for short-term economic returns on public-sector investments, and the more so in developing countries where funds are in short supply. Although UNESCO describes the importance to social cohesion, innovation and economic vibrance of research in the arts and humanities, governments find it harder to justify funding these areas. This is unfortunate in South Asia, where the arts and social sciences have much to contribute to governance, literacy, peacebuilding efforts and building the basis of innovative societies.

In an ideal world, South Asian governments would provide sustained funding for collaborative research in all disciplines. Living in the current reality of endemic funding shortages and varying government priorities, research networks need to think strategically about how to make the most of limited resources. One point raised by researchers involved in grassroots networks was the fact that





## Research networks in South Asia

Analysing international research collaborations in Afghanistan, Bangladesh, India, Pakistan, Nepal and Sri Lanka

ICT can greatly reduce the overheads of running a collaborative project. For instance, with video-conferencing facilities, travel budgets become less necessary. Also, by sharing ideas and findings from the developed world and from country to country across the region, more impact can be produced with less effort. Collaborative networks have the potential to enable researchers in South Asia to make the most of scarce resources, while also building capacity. The hope is that this will generate more economic growth, which in turn should enable a more thriving research environment in the future.

While every effort has been taken to verify the accuracy of this information, The Economist Intelligence Unit Ltd. cannot accept any responsibility or liability for reliance by any person on this report or any of the information, opinions or conclusions set out in this report.

LONDON

20 Cabot Square

London

E14 4QW

United Kingdom

Tel: (44.20) 7576 8000

Fax: (44.20) 7576 8500

E-mail: [london@eiu.com](mailto: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](mailto: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](mailto: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](mailto:geneva@eiu.com)