

Knowledge Transfer through Migration of Scientists and Engineers to India

Dr Dinar Kale

“Brain drain” is often viewed as a curse for developing countries such as India and China but recent analysis suggests that, in the current global competitive environment, “brain drain” may provide a crucial advantage to these countries through return migration. Returnees could play an important role in building innovative capabilities in these countries by filling knowledge gaps in critical areas of R&D. This policy brief is based on an ESRC Science in Society Programme funded project¹ located in the ESRC Innogen Centre that explored the issues involved in diffusion of knowledge through migration of scientific labour in India. Empirical evidence from this research shows the key role of technology in attracting returned migration and diffusion of knowledge. For this reason it is recommended that the government and firms might design sector-specific as well as more general technology policies to improve the successful integration of returned migrants and make more effective use of their knowledge.

DIASPORA AND KNOWLEDGE TRANSFER

Over the years, Indian and China have been treated as low-cost production sites for multinational companies, but the “reverse brain drain” of engineers and scientists educated and trained in the US or Europe can accelerate technological upgrading of these regional economies. Communities of foreign educated scientists and engineers can provide the skill and know-how needed to help local firms shift to higher value added activities. Saxenian (2006)² calls these returnees new age Argonauts – like the Greeks who sailed in search of the Golden Fleece. She details the significance of reverse migration, “the reverse migration of US educated innovators heralds a new phase of globalisation, one in which ideas and innovation will flow from many more sources”.

Among those countries that have witnessed their best and brightest students move to US, China and India have only recently started benefiting from “reverse brain drain”. The Indian case is quite distinctive as over the decades, the pursuit of better academic and economic opportunities has resulted in massive “brain drain”, mostly in the form of migration of scientists and engineers from elite Indian engineering and scientific institutes to technologically advanced countries like the UK and USA. In the 1970s and 1980s, Indians were second only to the Taiwanese as recipients of US PhDs in engineering and science. These emigrants have often achieved impressive professional and economic success abroad. In 1998 Indian engineers were running more than 775 technology companies in California’s Silicon Valley that accounted for \$3.6 billion in sales and 16,600 jobs. Similarly, according to the American Association of Indian Pharmaceutical Scientists (AAiPS), around 15-20 % scientists working in US pharmaceutical R&D had Indian origin. There are an estimated 20m Indians living abroad, generating an annual income equal to 35% of India’s gross domestic product. With 20 million Indians overseas, including 200,000 millionaires in the US alone, the diaspora is emerging as a critical force for India to catch up with advanced countries. The emergence of diaspora as a key resource has challenged existing models of economic development and forced a new way of looking at the dominant policy agendas and corporate strategies of the last century.

This research project studied returned migration of scientists in five Indian pharmaceutical firms. Empirical evidence shows that differences in technology, working cultures and government policies towards returnees play a key role in effective assimilation of knowledge. These findings contribute to new insights in the area of emerging knowledge flows in developing countries.

EMPIRICAL EVIDENCE

In recent years Indian pharmaceutical firms have been trying to fill knowledge gaps in innovative R&D by hiring Indian scientists based in US/UK and working in the R&D laboratories of major pharmaceutical firms or universities. These scientists not only constitute a valuable source of knowledge but also provide firms with entry into technology networks in advanced countries. Around 15% of the R&D workforce in major Indian firms is made up of returnees or scientists with extensive overseas working experience. In major Indian firms such as Ranbaxy, Nicholas Piramal, Dr. Reddy's Laboratories and Lupin Laboratories, senior R&D management includes many scientists with experience of working overseas in MNC pharmaceutical firms. Indian scientists who studied or worked overseas form an important constituent in firm strategies to build competencies in innovative R&D. However, Indian firms face an enormous challenge in attracting, retaining and assimilating returned scientists.

Our empirical research shows the key role of technological specificity. In software, professionals can be more hands off and can manage work by travelling between India and US. Many Indians working in Silicon Valley contributed to the growth and knowledge of the Indian software industry by setting up units in India whilst working in the US. They were based in the US but could utilise Indian skill sets and thus contribute towards the development of Indian industry. But that is not really possible in the case of pharmaceutical R&D. In the case of pharmaceuticals, scientists working overseas cannot operate hands-off. The nature of technology and work requires relocation. The technological differences include the need for investment in wet labs with consequent need for hands-on experimentation. Thus, in software, Indian professionals could maintain their links overseas by avoiding complete relocation and at same time contribute to the growth of Indian industry by providing needed skills and access. However, in the case of the pharmaceutical industry such an arrangement is difficult to embed and complete relocation will result in loss of links and movement of family.

Findings also show that there are differences in working culture in Indian firms and western firms. Indian firms are family owned businesses and have mainly grown on the basis of reverse engineering R&D capabilities. Indian firms have grown up on the basis of the generics business and have been used to fast returns on R&D investment. However, innovative R&D requires a longer period to provide investment returns and Indian firms are still learning the processes of innovative R&D. These adjustments are difficult to make and result in pressure on overseas scientists to deliver performance in a very short time.

Finally, our study of the Indian pharmaceutical industry shows that the major effort to attract skilled returnees is done by private firms with little aid from government policies. This creates hurdles in attracting overseas skilled Indians.

POLICY IMPLICATIONS

The emergence of the "global Indian" has become a key resource for Indian firms and businesses. They not only provide leadership and management skills but also, and more importantly, they bring sticky knowledge in the area of science and engineering. However, our empirical findings suggest that the transfer of knowledge is not a straightforward process and requires deliberate government policies and firm strategies for successful utilisation of returnees' resources.

In order to achieve the expressed objectives, firms and public policy makers need to come up with specific measures to tackle problems such as the following:

- the working culture in Indian pharma firms, which is still influenced by protectionist mindsets
- a lack of an "innovation eco-system" based on collaborations between firms, universities, R&D institutes and financial institutions
- the lack of social infrastructure such as world-class schools and other facilities affecting settlement and assimilation of returnees
- absence of government policy specifically focused on attracting and retaining skilled returnees

POLICY RECOMMENDATIONS

On the basis of our empirical research findings, the following policies might be recommended at national and international level:

1. formulation of sector- and technology- specific policies to encourage returned migration of the skilled work force in high-technology areas
2. supporting Indian firms to attract and retain returned engineers and scientists by improving social infrastructure and conditions so that returnees find it easier to adjust life in new places of work
3. establishing professional networks connecting Indian firms with national and international networks
4. building a forum to encourage social networking of managers of Indian firms with overseas skilled Indian work force.

NOTES

1. This research project is based on in depth interviews with a range of public and private actors (including senior R&D managers of Indian firms and industry stakeholders, policy makers and returned Indian scientists and Indian scientists based in the US) and documentary analysis (including analysis of academic journal articles, news reports, business magazines, analysts' presentations and annual reports)
2. Saxenian, A. (2006) *The New Argonauts: Regional Advantage in a Global Economy* Cambridge, MA: Harvard University Press

EGN research ranges across the whole field of genomics, covering areas as diverse as plant and animal genetics, embryonic stem cell research, and associated health applications.

The Network ranges across five of the UK's leading universities, and involves over a hundred researchers, from professors to PhD students, as well as administrative and support staff and an international cast of visiting research fellows. It is one of the largest social science investments in the ESRC's current portfolio, and is growing into the largest concentration of social scientific research on genomics in the world.

Dr Dinar Kale is based at the ESRC Innogen Centre, Technology Faculty, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK Tel: +44 (0)1908 654782; Email: d.kale@open.ac.uk