

Circular migration, S&E Returnees, and the Advance of R&D in India and China

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Patterns of circular migration: from political history to R&D

Scholars of Asian history have become fond of the concept of “circular migration.” According to estimates for colonial India from 1830 to 1930, approximately 30 million people went abroad, but 24 million eventually returned to South Asia. In the early twenty-first century, an estimated 30 million Indians dwell abroad, but significant numbers are returning home from the Gulf region and the United States.¹ Indians are hardly unique in this pattern. With the notable exceptions of Irish and Eastern European Jews, 30 to 50 percent of immigrants to the United States between 1880 and 1924 eventually returned to their European homelands. For the period 1908-1923, historian Gabriel Kolko observes that “the equivalent of almost two-thirds of the Rumanian and Hungarian immigration for that period, 56 percent of southern Italians, 52 percent of the Russians, 46 percent of the Greeks, 40 percent of the Poles, and 21 percent of the English returned home.”²

Circular migration has left a mark on revolutionary cadres and generations of political leadership. Historian Sugata Bose points out that even Indian nationalism has a pronounced international dimension, with Gandhi spending two decades abroad in Britain and South Africa before coming back to mother India. The international experience of South Asian political leadership has received accentuated media coverage since the assassination of Harvard and Oxford-educated Benazir Bhutto, but there is also the current prime minister of India, Manmohan Singh, who earned a D.Phil at Oxford University’s Nuffield College, and the head of the Communist Party of India (Marxist) Prakash Karat, a graduate of the University of Edinburgh.

The Chinese Communist Party is commonly classified through five generations. Significant members of the first and second generation studied in France, although Mao was a notable exception to this Paris-Marseilles axis. Zhou Enlai and Deng Xiaoping

¹ Sugata Bose, *A Hundred Horizons: The Indian Ocean in the Age of Global Empire* (Cambridge: Harvard University Press, 2006), pp. 73-78.

² See Gabriel Kolko, *Main Currents in Modern American History* (New York: Harper & Row, 1976), p. 70. I have relied on Dan La Botz’s unpublished essay “Migration of Workers to the United States in Historical Perspective” for an efficient way of simplifying Kolko’s data on return rates from many European lands for the 1880-1924 period.

carried out formative work and studies in France, as did Vietnam's Ho Chi Minh and later Cambodia's Pol Pot. The third wave of Chinese Communist leadership spent significant years in the USSR such as Jiang Zemin, who trained at the Stalin Motor Works. The fourth generation can claim the occasional mixture of Central and Eastern European experience, though there have been a few latecomers to the USA. China's Minister of Education Zhou Ji (b. 1946) earned a PhD from SUNY Buffalo. Meanwhile, the fifth generation finds growing numbers with U.S. training and travel, as the chief planning officer in the Pudong district of Shanghai is Yue Wu, who holds a doctorate in design from Harvard. The Communist Party indicated in late 2002 that it was seeking to get more of the then 135,000 returnees with advanced degrees into high posts in the civil service.³

Meanwhile, global corporations are currently expanding major R&D centers in India and China, raising the question of whether these institutions are attracting returnees. A small team of researchers from Duke and Harvard universities visited India and China in late 2007 in hopes of getting insight into these developments. There are currently efforts at collecting data, and much of this survey work will be continued in 2008.

Pharmaceutical Findings

To start with India, leaders of the pharmaceutical industry, specifically Ranbaxy, Dr. Reddy's Laboratories, and Aurigene, indicated that a majority of the PhDs in drug discovery received their degrees in the USA. With several Big Pharma firms based in the USA slashing scientific jobs in recent years, Indian pharmaceutical firms marvel at the expanding talent pool, and they have been diligently recruiting South Asians with U.S. experience for work in India. The pharmaceutical companies are the highest spenders on R&D across all industry sectors in India. In 2008, Ranbaxy expects to spend \$100-\$150 million on R&D, which is significant for a company with \$1.3 billion in annual revenues. The company has 1300 scientists, with 300 holding PhDs.

Indian firms expressed great optimism that the new infusions of Indian talent from the USA would make a difference in helping Ranbaxy and Dr. Reddy's Laboratories grow from manufacturers of generics to leaders in discovering new drugs. In the United States, it takes over \$1 billion to develop a new drug, and Indian firms made the case that they could accomplish this for \$300 million. Along with lower labor and facility costs, there are far fewer obstacles to carrying out clinical trials in India.

In interviews with the Duke and Harvard team, several Indians with PhDs from the USA conceded that they had to relinquish a U.S. salary for a more modest Indian salary in making their return. However, they stressed several reasons for returning:

³ See Willy Wo-Lap Lam, "Hu's new deal," 3 December 2002 at <http://edition.cnn.com/2002/WORLD/asiapcf/east/12/03/willy.column/>

- New, stellar laboratories -- India now has state-of-the-art laboratories and corporate campuses. It is no longer the case that a researcher has to settle for second and third-tier assignments or the kind of repetitive mop-up work commonly offshored to the developing world. Ranbaxy explained that the firm is not doing work for U.S. companies, but instead collaborates with U.S. firms on major projects. Big Pharma does not tell Indian firms how to carry out the research, though the firms jointly set up targets and certain milestones. Indian firms seem to enjoy a better reputation for protecting intellectual property than China, and this has allowed for strong global collaborations.
- India at the center of global development -- Though trailing China in many measures, India is now moving to center stage in world economic development, and several returnees expressed excitement about becoming part of this great transformation.
- Red tape in the USA -- Though some scientists had obtained green cards in the USA and still eventually returned to India, others expressed frustration with all the red tape and gave up. The backlog may be enormous, as there is a maximum of 8,400 visas per country, which penalizes “The Giants” (India and China). The yearly quota of visas totals 120,000, and there may be over a million skilled immigrants waiting to be processed.
- Family reasons – There are Indians who express fear that raising children in the USA can be harrowing, as they seek to avert the specter of ambient decadence as exhibited by the likes of Britney Spears and Paris Hilton. Others like having an extended family in India that can help with child care and acquaint children with Indian traditions.

Engineering shortages

In contrast to the pharmaceutical executives who spoke of an enormous talent pool available for their field, manufacturing and engineering firms in India lamented an unusually tight market for engineers. Salaries were often spurting upward by 15-20 percent annually, and retention is a significant struggle. Firms that make washing machines said they had to work hard to convince engineers that there could be excitement in this field, as many young graduates prefer to work on jets, automobiles or flashy electronics.

There is a lot of talk about how the world is flat, “brain circulation” is the new paradigm, and “brain drain” is an outmoded concept. However, as Indian operations expand, firms are clearly frustrated by the limited supply of engineers at home. They point to shortcomings in India’s higher education system, which may have some good undergraduate engineering schools but little to offer at the graduate level. Professors at the celebrated Indian Institutes of Technology moan that their salaries are so low that they can earn quadruple tutoring students on how to gain entrance into an IIT. It was

also the case that many top-flight engineers gravitate into information technology, which one Indian engineering educator called “using a Rolls Royce for a Honda-level job.” This is a different type of brain drain. Indians previously explained how an excellent civil engineer might abandon the field in favor of IT. The country loses a superb civil engineer and gets a hastily trained, mediocre software developer.

Nonetheless, India has strengths in software, and this is significant because automobiles, washing machines, and other major manufactured goods rely on sophisticated electronics. Products also need to be tested through simulations that require advanced software. Many Indians conceded that China would continue to dominate global manufacturing, but that India would have a key role to play in design. They also stressed that Silicon Valley still has the system architects, and that was the key role in designing systems. But with so many returnees from the USA, Indians affirmed that they had the talent to carry out system architecture, even though they still have to develop the expertise.

One-third of GE India’s R&D staff have returned from the U.S., while IBM India identifies half of the company’s PhD researchers as returnees. Indians claimed that returnees tended to work for transnational companies, while in China many of the top-flight returnees are starting their own firms. In certain fields, such as biotech, China has governments taking care of so much of the lab space and infrastructure needs that it is a strong enticement for people to start their own firms. Nevertheless, many global firms worry that China lacks managerial talent.

In contrast to IBM India, IBM China hires almost all of its engineers with degrees from Chinese universities. Very few global firms in China were claiming to hire returnees from the USA. The R&D unit of GE China was a notable exception, however. It will take more surveys and pressure on firms to determine whether this pattern is truly holding up across many industry sectors. China is currently producing ten times as many PhD engineers as India, so there is certainly more local talent to hire.

Some transnational firms declared that it was harder to get Chinese families to return from the USA. In the first place, Indians can count on an enormous number of schools with English education for their children. In China, a returning family might have to send a child to an international school, and they would then be unable to master the very difficult university exam system. To get certain families to return, China would have to take the extraordinary and unlikely step of having some universities provide a special track for international students. Male managers from China expressed reasons why wives did not like to return from the USA. The wives worry that the children will suffer under the harsh academic competition of Chinese schools. Also they noted that India is a culture with many servants who can help middle-class families with children, while China does not have the same web of extended families ready to provide childcare. There is a Chinese phenomenon of frequent flyers known as “spacemen” or *taikongren* who hold

permanent U.S. visas but leave their wives and children behind in the USA, while they take care of business in the PRC.⁴

Global firms expressed strong admiration for engineers educated at Chinese universities, and thus they may not feel as driven to attract U.S.-educated talent back to the PRC. Chinese engineers were said to be extremely hardworking with excellent computer skills, though occasionally there were representatives of sectors who thought U.S. engineers typically had greater “street smarts” than the “book-smart” Chinese. For instance, a Cummins Engine executive said that a U.S. teenager is likely to have much more experience working on car engines growing up. However, many other managers in China implicitly faulted U.S. engineers by noting that 100 percent of Chinese engineers will take training programs offered by the company, while U.S. workers pursue these activities in puny single-digit percentages. IBM China specifically expressed disappointment about the low U.S. participation in company training, but other global companies in China soon confirmed this disparity. The research team will be partly returning to India to see how that nation performs in the pursuit of company training opportunities.

For all of India’s recent advances, Chinese executives argue that China has a scientific infrastructure superior to that of India, a land known for cascading power outages and roads riddled with potholes. Still India has succeeded in attracting significant scientific talent back home; and judging by certain enterprises, this circular migration can no longer be dismissed as a modest trickle. During the last decade, Germany has actively pushed German scientists overseas to return to their homeland. It remains to be seen whether India and China will take more active steps to bring talent home from Europe and North America.

⁴ Xiao-huang Yin, “China: People’s Republic of China” in Mary C. Waters and Reed Ueda, eds., *The New Americans: A Guide to Immigration since 1965* (Cambridge: Harvard University Press, 2007), p. 349. Yin spells the Chinese word for “spaceman” slightly differently from the most common Romanization of the word.