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TRANSNATIONALISM AND RETURN MIGRATION OF SCIENTISTS AND ENGINEERS FROM THE UNITED STATES TO INDIA

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Introduction

In 2015, more than half of all science and engineering (S&E) degree holders in the U.S. were from Asia, of which one-fifth (21%) belonged to India, followed by China (10%). However, China held the lead for S&E doctorate degrees (22.4%), followed by India at 16.2% (National Science Board 2018). This large proportion of foreign-born scientists and engineers in the U.S. shows that this nation is heavily dependent on their expertise and the scientific and technical capital amassed by foreign-born workers. Studies have shown the contributions made by foreign-born academics to the scientific output of the U.S. (Levin & Stephan 1999; Stephan & Levin 2001; Corley & Sabharwal 2007; No & Walsh 2010). They are filing patents, receiving grant funding, and publishing articles at a much higher rate than native-born faculty (Broad 2004; Corley & Sabharwal 2007).

Migration of people from developing nations to developed economies has often been considered a one-way phenomenon (Sabharwal & Varma 2017). The notion that one would return after studying and working in the U.S. to India was unheard of – given that migrants establish social, cultural, and economic ties in the host country. However, during the economic recession, a wave of mainstream newspaper articles in India highlighted return migration – challenging the attractiveness of living and working in the U.S. A few scholars examined this phenomenon and termed it as “reverse brain drain” (Mayr & Peri 2008; Wadhwa 2009). Meanwhile, the National Science Foundation (NSF) and the National Academy of Sciences (NAS) are addressing how the U.S. can maintain its international lead in S&E. Retaining the talent of foreign-born in S&E is an area of increasing concern in the U.S.

This paper sheds light on an understudied but important area of reverse migration among Indian academic scientists and engineers. It examines a group of scientists and engineers who, after receiving a PhD from the U.S. and working in the host country, decided to return to India, their country of origin. The returnees, having built networks in both countries, are considered circular transnational migrants – people who have circulated from their country of birth to another country and back to their home country – and they continue to participate in social and

economic relationships in both countries though they reside in one country. Basically, they have ties to countries other than their country of birth. This paper specifically examines their reasons for return and how they continue their social networks beyond Indian boundaries. The paper is based on a qualitative study conducted with 83 scientists and engineers who returned to India to take a faculty position, which is detailed in the methodology section.

Literature review

Return migration of scientists and engineers is an understudied area. It is challenging to pinpoint the exact reason for return; this concept was classified by King (2000) in several ways: occasional return, seasonal return, temporary return, permanent return, return due to retirement, return due to failure to assimilate in the host country, return due to problems with acculturation in the destination country, and return to innovate and serve as change agents — a trend more commonly referred to as circular migration. Several economic models and theories attempt to explain return migration. One of them is the *immigration market model* (Borjas 1989). The model suggests that migrants decide to emigrate to a host country in the hopes of amassing wealth and thus are “wealth maximizers.” In the case of Indian migrants it was argued that this was perhaps the most prevalent reason for individuals to leave India for the U.S. (Bhagwati 2003). The *circular migration theory* posits a great variety of movement, usually short term, repetitive, or cyclical in nature but having in common the lack of any declared intention of a permanent or long-lasting change of residence (Zelinsky 1971). These theories analyzed return migration from an economic standpoint; none have examined the concept from a social, cultural, and political standpoint, therefore failing to provide a complete picture of the phenomenon of return migration. Additionally, these theories do not incorporate the impact of personal and work attributes on decisions of migrants to return to their country of origin.

With the advent of globalization and the rapid development of transportation and communication systems, scholars have focused their attention on transnational migration, in which “immigrants forge and sustain simultaneous multi-stranded social relations that link together their societies of origin and settlement” (Schiller, Basch & Blanc 1995, p. 48). This framework signifies how migrants maintain, sustain, and forge relationships in more than one country. Thus the transnational framework is a fluid concept, and return migration is not limited to a geographic or political border; rather, the exchange of ideas happens irrespective of spatially bounded territories (Appadurai 1991; Levitt & Jaworsky 2007; Ley & Kobayashi 2005). This model goes beyond circular migration theory, which requires physical mobility of migrants in contrast to transnational migration.

Transnationalism also includes ties of people, networks, and organizations across borders (Faist 2000). Saxenian (2006) found Chinese, Indian, Israeli, and Taiwanese engineers used their transnational social ties in their home country to make investment and migration decisions. Further, since transnational social networks are becoming formalized (Patterson 2006), governments are realizing that expatriates do not have to physically return in order to contribute to economic growth — a growing trend among New Zealand migrants (Larner 2007). A study among UK migrants to Canada found that lifestyle was the most important factor when determining initial migration, but family ties and relationships remained crucial in an individual’s decision to return, while transnational social ties with businesses and governments did not appear as important in determining return (Harvey 2011).

Returnees are of great importance, as their decision to return strengthens loyalty and a sense of nationalism in a global world. Making sense of the experiences of return migrants serves as a powerful lens for understanding how these individuals redefine their relationships,

particularly within the institutional, societal, and transnational contexts. It is proposed that the decision to return is mostly value driven rather than economic (Waldorf 1995; Razum, et al. 2005). While there are several reasons for leaving a place (push factors) and moving into a place (pull factors) that may influence individuals' decision to return, we examine key push and pull dimensions highlighted in the scholarly literature.

Economic factors

Most literature on transnational migrants focuses on economic factors as stimuli for return migration. Return tends to signify push factors in the country in which the migrant is living, such as economic downturn or unemployment, or pull factors from the country of origin, such as economic development and higher wages. Though the U.S. has been offering better economic conditions, namely high wages and a higher standard of living compared to developing countries to attract migrants, many Asian countries, including China, India, South Korea, and Taiwan, have seen spectacular economic growth in the last two decades. Governments of these countries are devising policies to attract their graduates back from the U.S. (and elsewhere) by creating newer economic opportunities for their returnees and the nation (Saxenian 2002). The Taiwanese government established the National Youth Council in the early 1970s to track migrants in a database, advertise jobs overseas, and provide travel subsidies and job placement to returnees. The National Science Council and Ministry of Education in Taiwan have been recruiting migrants as professors and visiting lecturers for the country's growing universities. In 2009, China launched the Thousand Talents Programme that aims to offer top scientists grants of one million yuan (about \$146,000) along with generous lab funding (Engardio 2009). India, in contrast, has not been as aggressive as other Asian countries, but its booming economy (7% GDP growth rate in 2016) has become rather attractive to migrants living abroad (Wadhwa 2009). In 1991, India opened its doors to foreign investment in a series of economic reforms leading to economic liberalization, privatization, deregulation, increased foreign trade, and remittances (Aneesh 2006). It is trying to emerge as a "soft power," a term introduced by Nye (1990), by relying on information technology (IT) and other emerging technologies. The University Grant Commission, a government body that accredits and funds institutions of higher education in India, reported receiving hundreds of applications from PhDs of Indian origin for faculty positions (Chronicle of Higher Education 2009).

Most economic theories, however, have not examined return migration from the social, cultural and political standpoints and are thus limited. Since some immigrants do return to their home countries, differences in their behavior are a consequence of the different economic, social, and political situations they face in the host and home countries. Changes in global economies have given rise to a new form of migration that crosses borders, termed "flexible citizenship," a label made popular by Ong (1999). According to her, an understanding of the political, economic, and social factors is central to transnational migration.

Political factors

Political pushes behind return may range from limitations initiated by the host country (for example, non-renewal of visas from a given country), or even expulsion, to less direct restrictions, for example, on possibilities for changing jobs, bringing one's family, or enjoying other citizenship benefits. Examples of political pull factors are policies to encourage and facilitate return on the part of the home country, such as tax benefits, social assistance, and housing grants (King 2000). Foreign-born faculty on temporary H-1B visas express the greatest fears

about job security (Sabharwal 2011), making them the most likely group to return to their home country. In the U.S., the stay rates for temporary residents working in S&E fields decreased by 10% in just four years, from 91% in 2003 to 81% in 2007 (Finn 2010). Faculty members on temporary visas are most vulnerable and likely to leave within the first five years of being in the country (Gupta 2004). Furthermore, young males dominate the temporary visa category. Their spouses hold H-4 visas, which allow them to stay in the U.S. as dependents of H-1B visa holders; however, it does not allow them to work, even though they may be qualified to work in specialty occupations. This adds to the frustration, since spouses are unable to use their education and training in the U.S. (Varma & Rogers 2004) – a phenomenon recently termed as “brain waste” (Ozden 2006). Back home, female spouses can have a job and be independent.

To be able to stay permanently in the U.S., foreign nationals have to acquire LPR (legal permanent residence), adding to additional hurdles confronted by foreign-born scientists and engineers. Citizens of Indian and Chinese origin experience the longest delays in the processing of their permanent residency. An estimate suggests that there are more than a half-million skilled individuals waiting to get permanent residency in the U.S. (Wadhwa 2009). The massive backlog in acquiring permanent residency may be adding to the frustration faced by scientists and engineers. Challenges with acquiring LPR status can serve as deterrents for scientists and engineers who would like to stay in the U.S.

Social/cultural/family factors

Social motives for return may involve the push factors of racism or xenophobia or challenges assimilating in the host country (King 2000). Other push factors can be societal barriers such as stereotyping and prejudice and internal barriers such as lack of mentoring, biased rating and testing systems, lack of access to networks, counterproductive behavior by colleagues, and a working climate leading to isolation (Wu 1997; Fletcher 2000; Varma 2002, 2004, 2006). The related pull factors may be homesickness or the prospect of enhanced status when one has returned, for example, through being able to launch a business venture, build a new house, or contribute to the community (King 2000). Close family ties and cultural loss experienced by immigrants in the U.S. can play an important role in the decision to return to their home country (Chacko 2007; Haour-Knipe & Davies 2008). Strong cultural values serve as “pull” factors for return migrants who might feel culturally alienated in the U.S. Return migration may also involve family or life-cycle factors such as finding a spouse, having one’s children educated “at home” in their native language, extended family networks, parental ties, or retirement. Migrants may return home to look after aging or ailing parents (King 2000). Studies, however, have not established a link between family and immigration factors.

Methodology

Primary data were acquired through in-depth interviews of 83 return migrants in 2013. The returnees were academics who have doctoral degrees in science or engineering disciplines from a U.S. institution of higher education and had worked in the U.S. before deciding to return to their home country, India. The returnees held academic jobs in well-known institutions in India and had at least five years of post-return experience. We used the technique of in-depth interviews, as they provide the best methodological medium to uncover the attitudes, beliefs, and experiences (Erickson 1986) of return migrants. We were interested in meanings (tacit and explicit), beliefs, actions, and ideologies embedded in practice, particularly the interpretations of return migrants within a social context (Miles & Huberman 1994; Lincoln & Guha 1985).

The study was interpretive in nature, as it involved a process of deliberative inquiry with the goal of progressive problem-solving (Patton 2002).

The interviewees were employed at 14 institutions of higher education across seven Indian states with a good distribution of geographic locations. The sample was obtained by creating a master list of all U.S. trained PhDs who were teaching at well-known institutions of higher education in India. The list was created by combing through institutional websites and downloading resumes of individuals with a PhD in an S&E discipline from a university in the U.S. and a minimum of five years of work experience in the U.S. The returnees should have also worked in India for a minimum of five years to qualify for the study. A random stratified sample by geographic location was created, and emails were sent requesting participation in the study. We followed the Institutional Review Board (IRB) guidelines to conduct the research, to maintain the anonymity of the returnees. The names of the returnees and their institutions, therefore, are not revealed in the study. A semi-structured interview protocol was used to interview the returnees on a host of questions ranging from their decision to come to the U.S. to their decision to return to India, their research and teaching experiences both in the U.S. and India, and their engagement in international collaboration. Interviews ranged anywhere from an hour to two hours, and all interviews were recorded purely for transcription purposes.

The analysis was conducted in NVivo 10 software, and the responses were individually coded by two student workers who were trained prior to the research. The majority (75%) of the returnees were employed at public institutions in India, while the remaining worked at private institutions. Close to half of the sample (44.2%) were younger than 40 years of age, while 30% of them ranged between 40 and 49 years, close to one-fifth ranged from 50 to 59 years, and 6.5% were 60 years and beyond. A large proportion of the returnees were assistant professors (46%), about one-third were full professors (32%), and approximately one-fifth were associate professors (22%). More than half of the returnees (55%) were employed in engineering departments – aerospace, civil, computer, electrical, environmental, or mechanical – while the remaining worked in biology, chemistry, and physics departments. Almost all of them were married (96%), and about three-fourths (73%) had children. In the U.S., a large majority of the returnees (82%) had been on temporary visas, and the remaining had a permanent residency card, including one who was a U.S. citizen. On average, these returnees had spent 9.5 years in the U.S. before they decided to return and had been in India for an average of 9.3 years post-return. On average, these returnees had spent more than 13 years in academia. An overwhelming majority of them were male (84%) in the sample, thus the analyses are not broken down by gender.

Findings

The returnees were questioned about their decision to move back to India. The question elicited an interesting mix of primary reasons, which are grouped into four major themes: economic and career prospects in India; political factors, namely immigration challenges in the U.S.; social and cultural identity; and family obligations.

Economic factors: career prospects in India

Close to half (44%) of the returnees chose to return based on better economic and career prospects in India. The potential for research funding and compelling job offers from premier research institutions in India were attractive for most returnees. The job market in the U.S. was still recovering from the 2008 economic crash, and tenure-track jobs were hard to come by for some. Additionally, the research environment and the entire system of pursuing grants had

become too competitive in the U.S. for most returnees. The promise of guaranteed funds and research grants in India served as a great attraction for several returnees.

Returnees also felt that the research environment and available funding in India promoted risk taking, while in the U.S. one could not take risks, else they would not be able to fund their research and students, run labs, and conduct experiments. The ability to take risk in the U.S. is very low, owing to the competitive nature of the research funding. The research environment in India has drastically changed since the economic liberalization in the 1990s that opened India to the forces of globalization. However, the majority of India's growth has occurred in the last 10–15 years; India has made huge investments in higher education, starting and expanding several research institutions, building infrastructure, and attracting the best personnel. Additionally, faculty in the U.S. are under constant pressure to raise funds to conduct and sustain their research agenda. The returnees felt that in the U.S. they had been constantly working towards applying for funds from a limited number of federal agencies (e.g., NSF & NIH), whose budgets were always under the threat of shrinking. This left the faculty less time for teaching and working on innovative ideas. However, the returnees did recognize that the U.S. was the hub for cutting-edge research and that the critical mass available to them was lacking in India. The advantage of being a researcher and faculty in India was that they were not under incessant pressure to seek funding streams. Funding for graduate students, research labs, and conference travel is assured by universities in India. As one of the returnees indicated:

It is a much more cut throat environment [U.S.]. Which means that a certain class of ideas cannot be tested, they are just too risky. [India] is a place where you can do that as well as test the more . . . newer stuff, which requires our attention, which is more current in the world. So I think that the birth of ideas you see coming out of India is higher than the U.S., given of course that you are starting with a smaller base.

The ability to take risk also allowed for scholars in India to conduct theoretical research driven by curiosity rather than research that is industry driven and designed to result in patents. Given that theoretical research and funding associated with it is diminishing in the U.S., the Indian research environment appeared conducive to those who work on issues related to basic sciences. Furthermore, job security and the allure of tenure was promising for several returnees. The salary structure is also competitive; while the returnees indicated that comparing U.S. salaries to those in India is like comparing apples to oranges, the cost of living is lower in India.

Political factors: immigration problems in the U.S.

More than one-quarter (26%) of returnees cited immigration problems as a reason to return to India. A vast majority had been on an H-1B or employer visa, which is temporary in nature and is initially issued for three years, extendable for another three years. If one's immigration card, popularly known as green card, is not filed during the six-year period and one's I-140 petition (i.e., labor certification) not approved, the individual must return to their country of origin. When the study was conducted in 2013, dependents of H1-B visa holders were not allowed to work in the U.S.; in 2015, however, then-President Barack Obama passed an executive order that allowed select H-4 visa holders to seek employment in the U.S. As a result, more than 100,000 dependent spouses received work permits in the first three years (Natarajan, 2017). Prior to 2015, most spouses of H1-B visa holders who were on H-4 visa status could not work in the U.S. legally. This added to the frustrations of several returnees whose spouses, despite their qualifications, could not work in the country.

Furthermore, foreign workers are restricted to working with the employer who files the H1-B visa, i.e., they are not free to change jobs. As one returnee noted: “Because I was H-1B I could not apply to certain jobs.” If returnees on H-1B visa quit their job or are terminated from the job, they must secure a change of status from the immigration authorities, find another employer to sponsor them, or exit the U.S. It should be noted that when the study was conducted, there was little grace period for foreign workers on an H1-B visa to stay in the U.S. without a sponsoring employer. One returnee expressed his frustration: “I used to look at listings of jobs, but industry did not want non-citizens to apply.” The paperwork and wait time involved in getting a work visa can be additional irritants for these workers. Families of H1-B visa holders wishing to see their children and relatives have to apply for a tourist visa, which was often given for six months at a time. Parents who visit the U.S. need to purchase travel insurance, which is often not accepted by several health care providers in the U.S. and is a major challenge for aging parents.

Social and cultural factors: identity and patriotism

One-fifth (20%) of the returnees went back to India due to strong cultural affinity and a deep sense of patriotism for the country. Several returnees wanted to raise children in India, wanting to expose their children to the Indian heritage and education system. These returnees felt that they had to be close to their cultural roots; their social and cultural identities were deeply entrenched in their country of origin, India. In a few cases, the spouses of the returnees did not want to live in the U.S. and wanted to return home to India to be close to family.

National pride and a desire to give back to the country of origin also were reflected in a small percentage of responses (6%). These returnees showed an uncritical affection to India, their country of birth. They took pride in India and idealized its social and cultural environment, despite numerous problems which made them migrate in the first place. This was especially true of returnees who had been in the U.S. only for a short time period and who had achieved only some acculturation. As one returnee noted: “I think there was this desire to return, to do something for the country, to do something to contribute, I think there was a feeling that Indian society has done a lot to make me get where I am, in my studies, etc.” To some it was a way to give back to their country and contribute to the development of science in India.

Family factors

One-tenth of the returnees identified family obligations and responsibilities as a reason to return to India. It is a common expectation in India for the male child to take care of ailing and aging parents. As one returnee indicated:

My father fell quite ill in 2007. Initially the plan was to come to India for a short period of time that would allow us to resolve the financial issues, but then he passed away and by that time we had settled down in India.

The decision to return is not easy, but for some the norms and cultures that surround family caretaking responsibilities dictate these decisions. Nevertheless, not all of the returnees lived with their parents post-return. While most returnees lived and worked away from parents and family, several indicated a sense of security that emanated from being geographically close

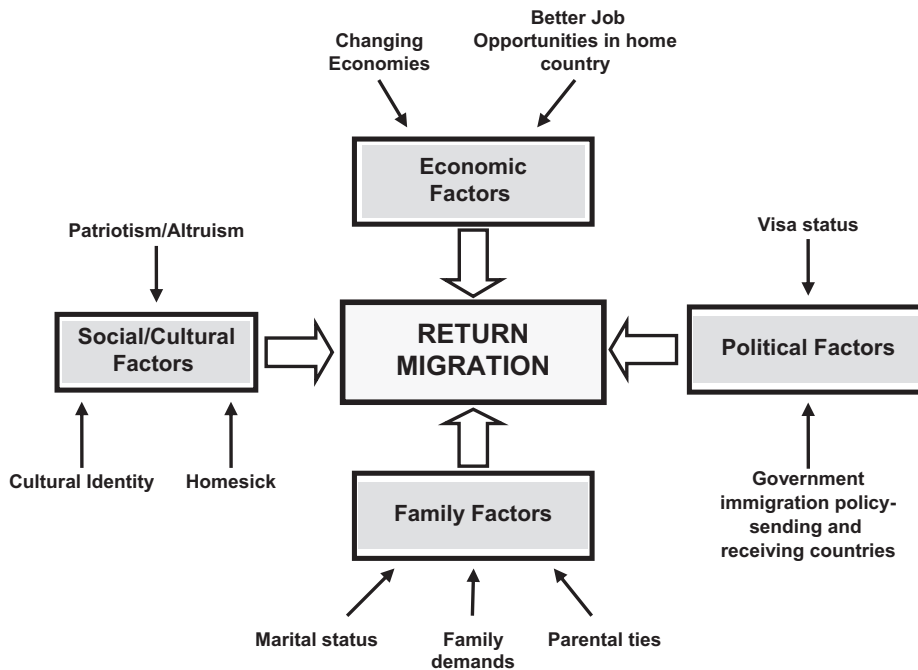


Figure 4.1 Conceptual framework of return migration

to their parents. The returnees felt that they could be a short plane ride away in an emergency situation, which is not the case when they were in the U.S. (it can take 36 hours of travel time from the U.S. to India). One of the returnees returned to India despite his wife's discontentment with the decision.

Conceptual framework

Based on the findings, we developed a conceptual framework of return migration which is depicted in Figure 1. The framework advances the current literature on return migration by including economic, political, social/cultural, and family factors and not solely relying on economic reasons for return. This approach is multidimensional rather than unidimensional and is thus holistic in its application of studying return migration. In a world where boundaries are becoming fluid and migration is anything but one-way, an inclusive structure to study return migration becomes imperative. This framework can be tested empirically in the future by researchers employing larger data samples.

Post-return transnationalism

Returnees in this study brought with them a wealth of ideas, connections, and networks that they had built during their time studying and working in the U.S. These connections were not just with U.S.-born faculty but also with researchers from various countries around the globe (Sabharwal & Varma, 2018). Returnees thus not only sought to use their scientific and technical know-how to continue past collaborations but also forged new ones with peers in India

and beyond. A majority (61%) of the returnees reported some form of international collaboration. On average, they had 2.4 international collaborative projects. It is interesting to note that there was a general willingness to build international collaborations among those who were not involved in one at the time of interview. Interestingly, of the returnees who collaborated internationally, a greater number of collaborations were with researchers in Europe (37%) as compared to the U.S. (24%); the remaining had international projects with the countries outside Europe and North America.

Returnees performed two sets of activities in international collaboration. Majority ways in which returnees collaborated included through grants, research projects, publishing papers, and laboratory work (67%); the remainder (33%) collaborated via student, post-doc, and faculty-exchange programs and workshops. While collaborating internationally, these returnees, including their students, traveled to the collaborators' institutions. In this process they built working partnerships with institutions outside of India. Most importantly, they set up a network of communication and exchange so that their students and they could work outside India. These collaborative activities were carried out despite numerous challenges which returnees faced, namely finding suitable collaborators, geographical distance between returnees and collaborators, securing funds for projects, agreeing on common scientific activities, and bureaucratic limitations. As one returnee explained:

In the U.S., they have high end technology whereas here we have to develop more cost effective or what is called more frugal work. I cannot try to repeat what is happening in the U.S. but definitely we have a scope to learn from there and they have opportunities to learn from us, the way we do our experiments.

Another said: "I started exchange program between my university here [India] and there [U.S.]. Under this program faculty and students exchange visits."

It should be noted that not all international research projects were formal, with funding, organizational support, task structure, and a well-established relationship wherein a set project is completed. Some returnees discussed informal international collaborative relationships with colleagues and institutions, although the terms upon which these informal relationships were based were not entirely certain. It appeared that informal collaboration involved general communication and an active attempt to remain open to the potential for a new collaborative project. Returnees continued the exchange of ideas both formally and informally.

An element characterizing the transnationalism of returned scientists and engineers is their temporary mobility for work outside their country of birth. Such travel is a transnational activity, as it solidifies ties with other countries on the one hand and revitalizes transnational identities that span borders on the other hand. It reflects the extent to which they belong to scientific work spaces that go beyond national borders. Most returnees (74%) were able to travel outside India for work, including for a sabbatical, without any issue, although the availability of funding and the frequency of travel varied. As one said, "In the past four years, I have never had to say I cannot go to an international conference because I do not have money." Not only there was a support for faculty to travel abroad; students were also encouraged to have international exposure. As one returnee said, "We have amazing travel funds. Government of India has set up special funds for students to travel abroad for conferences." Travel for the remaining returnees was restricted because of a lack of funding, a limit by their institution on how often they could travel, or other obligations such as lack of time and familial issues. Even most of this latter group acknowledged that the quality of conferences is better outside of India and that there are more networking opportunities available at international conferences.

Returnees who traveled abroad typically went once a year, though some went once every few years, and a few of them a couple of times a year.

Most of these returnees were traveling outside of India to work on collaborative projects or to attend conferences. A few stated they went abroad to give talks or presentations at a workshop or in a university. A few returnees who did not travel abroad stated that they send their students to present their own work so that they could take advantage of the opportunity. As one said, "I made it a policy to make it possible for my students to travel abroad instead of me." The areas to which the returnees traveled varied. It appeared mostly to be somewhere in Europe, followed by the U.S., or a combination of both. Their travel was consistent with their earlier statements that they had more collaborative projects with European countries than with the U.S. One returnee declared, "I went to Germany, then Netherlands, then France, then Malaysia. Too much travel over the past last year."

Since faculty's international mobility for a longer time period is an important aspect of transnationalism (as it expands their research and teaching profile and also creates professional development initiatives), we explored whether returnees would consider a visiting faculty position in the U.S. Many returnees (49%) stated that they would consider a position in the U.S. at the time of the interview, while another 29% said they would consider a position in the future, but not in the near future due to various reasons. These returnees discussed their commitments to the projects in India and the potential for disruption in their children's education which hindered their ability to travel for extended period of time. The remaining returnees were not open to taking a position in the U.S., mostly because they had already had one in the past; thus, they preferred to go elsewhere or favored Europe because it was easier to get a visa to Europe than to the U.S. There was general agreement that going outside India for a longer time period would expand their horizons to a greater degree, in addition to allowing them to meet potential collaborators. As one said, "It would be good for your own intellectual development, to keep a little bit of an open perspective, to get experience from various places." Sabbaticals (generally given once after six years) were seen as the best way to visit the U.S. or other countries.

Conclusion

This study has developed a theoretical framework for understanding factors that lead to reverse brain drain among scientists and engineers in academia. Additionally, this chapter also provided information on how return migrants maintain transnational connections post-return. India-born faculty members occupy a major proportion of the full-time positions in S&E at four-year colleges and universities in the U.S. These faculty members play an important role in the scientific, technological, and economic growth of this nation through their scholarly contributions. Losing them in the form of reverse migration can add to the challenges faced by the scientific enterprise in the U.S. Yet there is little scholarly work on return migration from developed to developing countries. It is mostly because immigration to the U.S. is viewed as a one-way process, where the immigrants come with the intention to permanently settle in the country, a process referred as "brain drain." Recently there is a growing concern about an increase in return migration rates among foreign-born scientists and engineers from the U.S. to India, a phenomenon termed as return migration/reverse migration/reverse brain drain. However, existing studies on return migration tend to be statistical, based on the U.S. Census, U.S. Immigration and Naturalization Services (INS), and other quantitative data rather than on the returnees' situation and experiences.

This study has expanded existing models of return migration, which overwhelmingly focus on the economic impacts and do not include political, cultural, social, and family factors that

contribute to the phenomenon of reverse brain drain. Future research can take the framework provided here and test it with larger samples of data to ensure external validity and generalizability. While this is not the goal of a qualitative study, the findings on post-return transnationalism show that the framework of return migration ought to expand to take transnationalism into account. Future research can expand the framework presented here by incorporating transnationalism.

Despite the fact that a large proportion of participants decided to return to India due to better economic prospects, political, social, cultural, and family reasons also contribute to the decision to return among academic scientists and engineers. The decision to return to one's home country after years of living, studying, and working in a host country is a complex phenomenon, one that is anything but linear (Sabharwal & Varma 2016, 2017). In fact, research suggests that the highest odds for return are among those who are strongly transnational (Carling & Pettersen 2014). It is evident through this study that return migrants continue to forge collaborations through transnational ties established across various regions around the globe, mainly with Europe and the U.S. Their return was not a result of failure of assimilation in the U.S. or due to retirement but can be considered what Cerase (1974, p. 251) has characterized as a "return of innovation" – as being "prepared to make use of all the means and new skills [returnees] have acquired during their migratory experiences." Return migrants in this study can be labeled as "cosmopolitan" (Bozeman & Corley 2004) in their approach to collaboration, i.e., they have cultivated ties and advanced their networks beyond India and the U.S. to Europe and other Asian countries. Technology has certainly made this transformation possible and has facilitated the idea of virtual borders. In an era of rapid technological growth and connectivity, return has a different meaning – despite the fact that borders do not seem to matter much for conducting scientific work, they do have a deeper social, cultural, and political significance.

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