CHAPITRE 9

Case-Study of the Indian Scientific Diaspora

Binod Khadria

Introduction

The Indian Diaspora – Necessary Condition for the Emergence of Indian *Scientific* Diaspora Networks: The Size of the Base

In a forty-seven-country ranking of brain drain arrived at on the basis of a survey whether "well-educated people emigrate or do not emigrate abroad", and presented in the *World Competitiveness Yearbook 2000*, India was placed at position forty-second from the top, and sixth from bottom (See Statistical Appendix III, Table 1; see also Table 2 on major source institutions of brain drain in India). India has also been assigned a significance score of 3.291 calculated on a ten-point scale between 0 and 10, using a special standard deviation method (SDM) to assign each country a standardized (STD) value or score[1]. The low ranking and score both mean that India has a high degree of brain drain in terms of well-educated people emigrating abroad. The Indian diaspora networks (See Appendix I for a listing and description of some examples) are believed to have played a significant role in this by way of providing the nexus between supply of and the demand for the highly skilled Indians involved in the process. What has not been adequately highlighted is perhaps the fact that the Indian *scientific/professional* networks have themselves been the result of large physical presence of expatriates in various parts of the world. Given this proposition, it is important to have some snapshots from the broader canvas of the Indian Diaspora formed over a period of more than one-and-a-half century.

It may be said that migration overseas by Indian nationals first acquired significant dimension, in terms of numbers, in the 19th century. Most of this migration was driven by the economic compulsions of colonialism. In a uniquely diverse pattern that has not been replicated by any other Diaspora, except perhaps the Chinese, Indians initially migrated to countries of Africa, Southeast Asia, Fiji, and the Caribbean[2]. This wave was mainly a "brawn drain" – forming a non-scientific diaspora in response to the enormous demand for cheap manual labour that arose immediately after the British abolished slavery in 1833-1834. About one and a quarter century later, it was succeeded, in the second half of the 20th century, by the "brain drain" – a steady outflow of some of India's cream of high-skill professionals and the highly-educated – the "knowledge workers" – to the developed countries of the West, mainly to the United States. This eventually led to the formation of an Indian "*scientific* diaspora". Today, the 20 million strong "Indiaspora", as some would describe the overseas population of Indian expatriates, incorporates its smaller subset of Indian *scientific* diaspora, spread across various countries and regions of the world, reflecting the multiplicity and variety of the social, ethnic, religious and cultural diversity of the country[3]. The Indian *scientific* diaspora *per se* is, however, concentrated in a few selected countries/regions of the world.

Around 1.7 million Indian expatriates are in the US, occupying a small 0.6 per cent of the total US population space of 280 million, but enjoying the distinction of being one of the highest-earning, best-educated and fastest-growing ethnic groups. Their high levels of literacy, economic success, knowledge of English, and experience with democracy in their home country has eased their transition in the country of their abode and adoption. *Indian Americans are found in the high profile occupations and sectors of medicine, engineering, law, Information Technology, international finance, management, higher education, mainstream and ethnic journalism, writing, film, and music* (Tables 3 to 7 provide the broad dimensions of various selected aspects of this Indian Scientific Diaspora in the US). In the Information Technology sector, several Indian IT graduates have emerged as important entrepreneurs in the Silicon

[1] Table 8.13 (IMD, 2000, p.500): Labor Force Characteristics. For methodology of arriving at the rankings and the scores, see chapter on Data Processing Methodology.

[2] KHADRIA, 1999a, provides some maps on these migrations.

[3] See Report of HLC on Indian Diaspora (ICWA, 2001) for its geographical distribution across various countries/regions of the world.

Valley. The success and achievements of Indian Americans have also attracted the attention of major multinationals to India's potential in the IT sector. Thus, India is today one of the few, if not the only, leading developing country which has attracted investment in scores of R & D centres wholly funded and established by reputed multinationals like GE, CISCO, Sun Microsystems, Microsoft, IBM, Hughes Software, Intel, Oracle, Lucent Technologies, Microsoft Sun Microsystems and Texas Instruments, and so on.

In the fifteen-member European Union (EU) – the largest economic entity in the world – two-thirds of the entire Indian community reside in the UK. The Indian community has risen to become one of the highest earning and *best-educated groups* in the UK, achieving *eminence in business, information technology, the health sector, the media and entertainment industries*. It has formed a number of social, cultural and political organisations in the UK, and almost all wealthy PIOs have individual trusts or charities for projects pertaining to health, education or other infrastructure back in their home states and villages in India. During times of national crises, like natural calamities in India, the community organisations raise generous contributions for relief and rehabilitation of the victims. Today the Indian community in the UK occupies a unique position, enriching the British culture, society and politics, and contributing to making the UK a genuinely multicultural society. Indians are considered a disciplined and model community with the lowest crime rates amongst all immigrant groups.

In Canada, with just three percent share in a population of 30 million, Indo-Canadians have recorded high achievements in the fields of medicine, academia, management and engineering. The Indian immigrants' average annual income is nearly 20 per cent higher than the national average, and their educational levels are also higher. In Australia, of the 30,000 Indian citizens, about 10,000 are enrolled as students in Australian Universities. There are PIO/NRI (Person of Indian Origin/ Non-Resident Indian) associations of Indians in almost all the major cities of Australia[4]. New Zealand also witnessed a rise in the entry of Indian immigrants, who are engaged in domestic retail trade, medical, hospitality, engineering, and Information Technology sectors.

Amongst other countries/regions of the world, there is an estimated population of 9,000 NRIs in the Maldives, out of the island population of 269,000 recorded in the Census 2000. The Indian Diaspora in the Maldives comprises doctors, teachers, engineers, accountants, managers, and other highly qualified professionals, some employed in projects funded and assisted by India. In Kazakhstan the success of Ispat International in turning a Soviet-era steel plant around has positively influenced the image of the Indian community. Besides, there are leading Indian pharmaceutical companies too, like Ajant Pharma, Dr. Reddy's labs, Ranbaxy, Core, Lupin, IPCA, and USV. The Indian Cultural Centre in Almaty is active in propagating Indian culture. There are many NRIs employed by Indian companies and multinationals in Uzbekistan also. The oil boom combined with acute labour shortages in the countries of the Gulf and West Asia/ North Africa created a huge and continuing demand for short-term Indian immigrant labour since the 1970s. Estimated at more than 3 million, with more than half coming from the single south Indian state of Kerala, 70 per cent of the Indian population in the region consists of semi-skilled and unskilled workers; only *20-30 per cent consists of Indian professionals and white-collar workers (doctors, engineers, architects, chartered accountants and bankers)*[5]. After 1920, PIOs in Reunion were granted French citizenship and full civic and political rights and thus the Indian community there too occupies a prominent position in civic and political life. Mauritius' current importance to Indians stems from its geographical proximity and strategic location. Mauritius ranks amongst India's largest foreign investments following a bilateral Agreement on the Avoidance of Double Taxation. In South Africa, the size of the Indian Diaspora is around one million. Under the new regime, more opportunities for economic prosperity opened up for the Indian community, thus widening the gulf between it and the indigenous African community, despite the long history of Indian philanthropy in South Africa.

[4] These have not been listed in this study due to the constraint of space.

[5] Remittances to India from the Gulf, long recognised as a significant contribution to India's balance of payments, are mostly made by Indian workers in the former category. For the size of remittances *vis-à-vis* bank-deposits in India by the expatriates, see Table 8.

The challenge before the Indian community there is of removing the misconceptions about it and joining the mainstream in nation building. From the 1970s-80s onwards, Indian professionals had also been heading towards other prosperous African countries like Botswana and Nigeria. A large number of Surinamese Indians and other PIOs in the Caribbean have emigrated to Canada, the US, and the Netherlands where they have better opportunities[6].

The Indian Diaspora *Networks* – Being "Developmental" *sans* Sufficient Condition?

The formation of Indian networks has thus been the function of the physical presence of a minimum number of Indian expatriates in various parts of the world as a necessary condition, particularly the highly educated "knowledge workers". Their solidarity can be seen to have fructified at two levels – one national, at the professional level in terms of the occupational specialization they belong to; and the other sub-national, at the culturo-linguistic or administrative province level in terms of the state (from amongst the Indian provinces) in which they have their family roots (Table 9 of Statistical Appendix provides a classification of the US-based Indian Diaspora Networks into more than two possible categories). From the diaspora *option* point of view, the latter may look bereft of the sufficient condition – that of exclusively being within the gambit of *"higher education or research"* so as to unambiguously form part of a well-defined *scientific diaspora* – as defined for the present exercise of the *collegial expertise.* On the contrary, it could be perhaps emphasized that whereas the professional diasporas are primarily self-serving, it is the latter – the sub-national diasporas – that cater to the interest of development back in the home country – mainly starting with the home state of the members. Some individual expatriates within the professional diasporas have, though, contributed to the development of their *alma mater* back home (See Appendix II, for specific examples of initiatives and contributions made by the members of the Indian scientific diaspora). However, this trend has not been institutionalized at the network level yet, it may be said. In fact, there is no exhaustive information available on the workings of the Indian diaspora networks as such from the secondary sources, though a few sample examples downloaded from the Internet, and presented in Appendix I, are indicative of their broad categories and operational activities.

View from the Host Countries

The General Emerging Scenario

Traditionally, the U.K. has been the main recipient of Indian migrants – both skilled and unskilled until the end of the 1960s. This was mainly due to the colonial ties between the two countries and the advantage of the English language as medium of education in India particularly at the higher, professional and technical levels[7]. Later on, over the 1970s, the U.K. was overtaken first by Canada but eventually by the U.S.A., the latter continuing to be the destination country for the largest number of skilled people from India and many other developing countries during the rest of the twentieth century. An interesting feature of the shift in direction has also been the Indian women's participation in the American labour market, which normally goes unnoticed. In the 1980 US Census[8], 87.2 per cent of foreign-born Indian female immigrants aged 25-34 years were found having completed high school – the highest

[6] For example, PIOs like Basdeo Panday, currently Prime Minister for a second term in Trinidad & Tobago, Cheddi Jagan, the first Indo-Guyanese President, Bharrat Jagdeo who succeeded him, and Jaggernath Lachmon in Surinam are some of the prominent political personalities in the region. Other distinguished PIO personalities are Nobel laureate V.S. Naipaul, and former Commonwealth Secretary-General Sridath Ramphal.

[7] Partly, this was also because for some time Britain did not face any competition from the US for import of skilled labour from India. It was after the U.S. Immigration and Nationality Act Amendments of 1965, that gradually, over the 1970s onwards, large numbers of them in various categories of knowledge occupations and skills (doctors, engineers, architects, scientists, teachers, nurses, etc.) were absorbed into the U.S. labour market.

[8] U.S. Bureau of the Census, as cited in KHADRIA, 1999a, p. 104-107.

amongst all Asian ethnic immigrants in the U.S., excepting for the Japanese women at 92.6 per cent. In terms of female median incomes, however, Indian women occupied an unchallenged top ranking with US$ 13,138 for full-time workers. With the sex ratio of Indian immigrants in the U.S. stabilizing at 50:50 and median age of women at 28.8 years (against 29.4 of male) in the late 1980s, this was an indication of the emancipation of Indian women in host countries due to emigration. Perhaps a large proportion of them – whether skilled or unskilled – would not have participated in the labour market in India had they stayed back home. The change may definitely be attributed to the diaspora-option because members of each Indian network in the US remain connected with each other, share information, and inspire each other to work for the better.

As part of the paradigm shift in the twenty-first century, not only the U.K., but also some other developed countries like Germany and France in the EU, Japan closely followed by Australia, and New Zealand too in the Asia-Pacific, have opened up their labour markets to India's human capital– embodied both in students and the qualified information technology (IT) professionals, and the U.S.A. has increased the intake. The Indian diaspora networks have played a significant role in this upswing by way of providing the nexus as an important input in matching the supply-side response to the enhanced demand in the developed countries for the highly skilled Indians.

India has been thus an important player for long amongst the main *brain drained* countries, *supplying* skilled professionals and students to the world market of research and higher education respectively – the two variables identified by the collegial expertise as the prime-mover behind the *scientific* diaspora networks in the developed countries[9]. Nevertheless, presently in fact, it has emerged as *the most sought-after source country* in this regard as seen by the main *receiving countries* in these last two years of transition from one century to another. This has led to a major paradigm shift – the scale tilting away from brain drain being looked at as an outright loss and therefore *painful*, to diaspora as a potential option for turning the compulsive phenomenon into an opportunity and therefore *gainful.* It may be mentioned here that this option is now being explored around the world, and I should therefore include in this country case-study some of the debates originating in some of the host countries, e.g., the US, the UK, and the EU generally as well as in the context of the Indian diaspora:

Some researchers in the United States have focused on immigrant professionals there. For example, Saxenian (2000) concludes her paper on Silicon Valley entrepreneurs by saying that her research, "underscores important changes in the relationship between immigration, trade, and economic development in the 1990s. In the past, the primary economic linkages created by immigrants to their countries of origin were remittances sent to families left behind. Today, however, a growing number of skilled immigrants return to their home countries after studying and working abroad". In the case of Indian immigrants though, Saxenian says, "However, few Indian engineers choose to live and work permanently in India. Unlike the Taiwanese, Indian engineers – if they return at all – typically do so on a temporary basis. This is due in part to the differences in standards of living, but most observers agree that the frustrations associated with doing business in India are equally important". They thus stop at being the ambassadors of their employer companies in India rather than the catalysts for integrating the Indian economy with the developed economies where they reside permanently, it is being said.

Britain has of course come a long way since the days of Enoch Powell and his "rivers of blood". It is being argued that "this change in values has little to do with politicians or their policies. It is immigrants themselves that Britain has to thank". For, the generic "foreign person" whom Powell envisaged draining Britain dry has defied expectations by rising to unforeseeable economic prosperity – and bringing an "ungrateful" Britain too with it. Today,

[9] The National Science Foundation (NSF) provides data on foreign-born professional scientists, engineers, doctors in the US, as well as on the number of foreign-born Ph.D. students in the US universities and those receiving degrees, by nationality, and the number of Indians in both categories are substantial. In 1996, of 1,276 doctoral degree recipient Indian students of science and engineering in the US universities, 85 per cent had plans to stay in the US, and 59 per cent had firm plans to stay on in the US. See Tables 4, 6, and 7 in the Statistical Appendix.

Britain is an endless repository of success stories of the Afro-Asian.[10] Whereas Barbara Roche wished to attract skilled professionals – nurses, doctors, IT experts, customer and financial personnel – into Britain, Haider wanted to keep society's scapegoats – gypsies, refugees, the poor and dispossessed of the low-GDP Eastern Europe – out of Austria. The reason why it is important to compare and contrast Roche's enthusiasm against Haider's fears is that, given the appropriate help, resources, and local support, one type of immigrant – the social parasite – can become the other – the social boon. It is this transcendence in the host-country view about the developing country diasporas that some of the middle Europe fears the most[11].

It has been estimated that Britain will need half a million IT experts by the end of the decade. The country is also facing a reduction in the number of important public utility employees – especially teachers and nurses. Consequently, 28 per cent of nurses registering in Britain in 1999 were foreign, some amongst them from India. Like many economically developed European countries, with their declining mortality and birth rates, and aging population, Britain cannot do without imported labour. However, at the moment, the first choice destination of IT immigrants is not the UK but the US, a country founded on the immigration ethic, and apparently more willing than old-fashioned Europe to realize the benefits immigration brings. It is being said that President Bill Clinton simply knew where America's best interests lied: "...and where the US leads, Europe will follow". Soon enough, the immigrant Roche prizes and immigrant Haider fears will be one and the same – the West's most highly prized commodity. Fortress Europe's great *off-white* hope (Alibinia, 2000).

Not only in Britain, but all over the continent, there are shortages of qualified workers drawing political and media attention[12]. Romano Prodi, President of the EC, identified a growing skills-gap as a priority facing the European Council. The EU, he argued urgently needed to ease restrictions on labour mobility, particularly in the technology sector, which faced a shortage of up to 1.7 million qualified workers by 2003. However, ministers chose largely to ignore Mr. Prodi's warning. To judge by the efforts that companies were making in solving the problem on their own, the shortage was being seen as more severe than the EC President would have thought. Most obviously, Europe had too few qualified computer engineers, which sent wages spiraling in that business, and governments to intervene. Germany attracted much criticism and public strife last August when it announced a special immigration programme for

[10] The example of Lord Swraj Paul, the leading London-based businessman of Indian descent is a case in point. Paul is reported to have exhorted NRI entrepreneurs in the US recently to invest in Britain, saying Europe with 400 million people offered them an enormous market and Britain could be the hub. For Indian companies, he said Britain would be the natural choice. Paul, whom British ambassador to the US Christopher Meyer had described as "the roving ambassador for British business", said, "We are especially interested in NRI investment because Britain has seen the contribution of NRIs to the British economy". He further added, "I keep reminding people that 18 million Indians abroad have the same GNP as the whole of India and growing faster than India's" (HT, "Swraj Paul calls for US-based Indian investments in UK", IANS in Washington D.C., *The Hindustan Times,* New Delhi 15 April).

Interestingly, the success stories of Indians in Britain had gone to the extent that emigration of expatriate Indian luminaries residing in Britain, to the US was, in the recent past, considered *Britain's* brain drain, and subsequently their return to Britain at substantial salary cuts as return of the prodigal sons. One significant example is the migration of economics professor Amartya Sen from Oxford to Harvard and his subsequent return to Cambridge as the Master of the Trinity College. Amartya Sen was later conferred the Nobel Prize in economics after his return to Britain, a case of Britain's brain gain! Notwithstanding this, Sen as an Indian passport holder is still, for the Australian High Commission in London, "a developing-country mortal not eligible for electronic visa that an American, British, Canadian, or a developed-country citizen is". Sen would have to wait for the time-consuming conventional visa before travelling to Melbourne for delivering the Alfred Deakin Lecture on "Global doubts and global certainties" on May 15, 2001. Sen believed that while international barriers to facilitate easy trade were coming down, the barriers that prevent free human movement were going up. Sen's reaction was partly reflected in his reply to an Australian newspaper questionnaire on globalization: "The existence of these barriers is a constant reminder that the great champions of globalization cannot mean what they say when they claim to be great removers of global barriers to the movement of goods and services, yes, but of people, even of mere tourists definitely not." (*The Economic Times*, "No quick Australian visa for Amartya Sen as he is an Indian", by Paritosh PARASHAR in Sydney, May 16, 2001, New Delhi)

[11] As the German neo-Nazi backlash against the prospective influx of Indian IT professionals proved in 2000, Europe now has to face up to the fact that the 'Asian immigrant' no longer slots neatly into the "silent, low-paid, toilet-cleaning category" (ALIBINIA, 2000).

[12] *The Economist*, March 31-April 6, 2001, "Migration".

30,000 computer engineers from India. Consequently the scale was reduced; by the end of January 2001, fewer than 5,000 signed on. Most went from Eastern Europe, not India. This whole episode of the brain drain drama keeps being referred to repeatedly in the public debates in Europe as well as India.

It is also thought that Europe's problem has been caused partly by prosperity. Healthy economies, e.g., Ireland, with fast growing hi-tech industries, have outstripped the local market's ability to furnish qualified workers. People have become less willing to work and to acquire education for that. In France, the introduction of 35-hours working week means that more workers are needed to produce same economic output which is aggravating skilled labour shortages. There are also some structural reasons behind Europe's problems over skilled labour. In many countries barring Britain, education and training have struggled to adapt to the needs of a changing economy[13]. For example, Germany's very demanding and lengthy training courses mean that only a limited number of qualified workers emerge each year. Demand for more flexible courses is growing, but progress has been slow. In addition, a technology-curriculum lag makes ongoing education redundant quickly. Jean-Paul Vermes, author of a recent report by the Paris Chamber of Commerce on the recruitment crisis in France, recommended, amidst others, revamping of technical and professional training systems, and allowing skilled retirees to re-enter the workforce without losing their pension rights. A recent report on migration by the OECD noted that there has been a decisive shift towards temporary migration, particularly related to work: "All over Europe there are examples of specific exemptions to tough immigration laws being allowed for professions where there are shortages", said Jean-Pierre Garson, author of this report. He said that Britain had the most innovative approach. For example, it became prepared to drop eligibility criteria and replace them with "fast-track work permits" for workers in areas that suffered the worst shortages.

In the US, Indians have occupied 5 per cent to 6 per cent of space amongst all immigrants coming every year from different countries of the world from 1996 onwards. In terms of very broadly rounded figures, the number of Indians being given immigrant visas (i.e., permanent residency) can be said to have ranged between a minimum 35,000, and a maximum 45,000 per year between 1996 and 1998, but it has been growing steadily. With this, India's ranking has varied within the first seven leading suppliers of immigrants to the US, but if one considered only the "principal" employment-based immigrants (i.e., not counting the spouses, children and other dependants), India could be said to be holding the first position since 1993 continuously[14]. In terms of numbers, the share of employment-based permanent immigration from India has been roughly one-fourth in 1998. On the other hand, India's share amongst temporary foreign worker admissions into the US has been very large and growing. Out of 372,000 "nonimmigrants", as the temporary entrants are called, in the US Fiscal Year 1998 (FY98), India was at the top with 69,000; followed by Mexico's 51,000 (mostly unskilled), UK's 39,000, and Canada's 20,000. Similarly, amongst the H-1B workers, there were 62,544 admissions from India, followed by 38,190 from the UK, 10,000 each from Germany, France, and Mexico, and 9,000 from Japan, 7,800 from China, and 7600 from Canada[15]. As per the 1990 US Census, Indians were the most highly educated ethnic lot amongst the Asian communities in the US (58 per cent with college and higher education).

In September 2000, there were 461,000 H-1B foreign professionals in the US. Half of them were in computer-related occupations. The leading countries of origin for H-1B visas issued in FY99 were India 55,047, UK 6,665, China 5,779, Japan 3,339, and Philippines 3,065

[13] Britain conferred autonomous university status to its Polytechnics a few years back as a matter of reform in the higher education sector, and made them self-financing.

[14] In terms of number of immigrants, India ranked seventh after Mexico, China, Philippines, Vietnam, Soviet Union, and Dominican Republic. But, *purely* from the labor market point of view, India may be called the largest contributor, because all other countries seemed to have some other considerations too for the movement of their people to the US: Mexico, a poor neighbour to the US was not a competitor of India because it sent mainly the unskilled and semi-skilled labour; China received a priority for student immigration due to the Tiananmen Square massacre; Philippines had been a former American military base; Vietnam was receiving war reparations from the US; Soviet Union was given importance because of the fall of socialism; and Dominican Republic has been a dominion of the US (KHADRIA, 1999a).

[15] MARTIN, 2001.

(Martin, 2001). In 1999, the median pay of H-1B workers in the US was $45,000, median age was 28, *half were born in India,* and 40 per cent were already in another status before being employed as H-1Bs. So, one can talk primarily in terms of India vis-a-vis USA, particularly when data too from other host countries are either scanty or not easily available.

For the UK, the number of "British Work Permits Issued to Immigrants from India" has risen steadily from 1,997 in 1995; 2,679 in 1996; 4,013 in 1997; 5,678 in 1998; to 5,663 in 1999[16]. Of the total work permits granted in 1999 by the UK, 51.4 per cent were granted for work in the computer industry. Having gone up since, at least two-thirds of all software professionals entering Britain now are from India, thanks to amendments to work permit rules in year 2000 to invite more information technology-trained foreigners. The amendments opened the floodgates for Indian IT professionals, and with Britain facing a massive skills shortage in IT, they were pouring in[17]. Government figures were reported to be showing 18,257 foreign IT professionals coming to Britain in 2000. Of this, 11,474 were from India – three times the number in 1999. In 2001, the numbers were rising faster, according to official estimates[18]. In 2000, the second highest number of IT professionals (2,034) came from the US. Of these, many were of Indian origin. Many of the 748 professionals who came from South Africa and the 708 who came from Australia too were also reportedly of Indian origin. Amongst the Asians, Indian professionals clearly took a substantial lead over others in taking up IT jobs in Britain: Only 132 came from Pakistan, 69 from Sri Lanka, and 15 from Bangladesh. Though the scope in IT has been huge, a report from European Information Technology Observatory (EITO), an independent group that monitors the IT situation in Europe, said Britain will be short by 620,000 IT professionals in 2003. The work permit rules were relaxed lest Britain became uncompetitive in many businesses due to shortage of IT skills. The fears of many that the whites would become an ethnic minority in their own native country were kept aside[19]. Under the new laws, Britain will allow 100,000 skilled workers from abroad to settle in UK annually – one of the most significant changes in 30 years[20]. This was like going back to pre-1971 days, when there was a consistent flow of people from India (and from other developing countries too) coming to Britain for economic reasons. The Labour Government has now felt that it was time to resume economic immigration. *The search for new recruits would focus on those skilled in health services (doctors and nurses), in information technology, engineering, and teaching.* Under the old rules, skilled workers were given temporary leave to enter for work purpose after they had shown proof of a job in Britain (unlike in the US where it is the responsibility of the employer). It did not confer on them an automatic right to remain in the UK. Under the new rules, foreigners would be allowed entry on points awarded by age, education, language skills, and family ties[21].

The fact that emigration of skilled labour to the US comprises a significant proportion from the UK – a country which also receives emigrants from developing countries including India – makes Britain's emigration more of a "brain exchange" than "brain drain", if one were

[16] Overseas Labour Service, UK.

[17] "Indian IT workers flooding UK", by Sanjay SURI in London, *The Hindustan Times,* New Delhi, 1 May 2001.

[18] "We succeeded in persuading the British authorities to alter and simplify the work permit system for IT professionals." Deputy High Commissioner Hardeep Puri is reported to have said: "The scope in the IT sector is enormous. The Indian government is looking to IT to bring the next quantum jump in business relations between India and Britain. India is looking to an increase in business in trade and services from current $7.5 billion to about $12 billion." ("Indian IT workers flooding UK", by Sajay SURI in London, *The Hindustan Times,* 1 May 2001.)

[19] "Britain to relax immigration laws", by Vijay DUTT in London, *The Hindustan Times*, New Delhi, 4 Sept., 2000.

[20] In 1971, a blanket ban on immigration had followed racial disturbances and Enoch Powell's infamous speech that "rivers of blood" will flow if immigrants were allowed to settle in Britain. Only asylum seekers and those claiming relatives there were allowed to seek immigration.

[21] British Home Minister Barbara Roche outlined the proposals at the Public Policy Research Institute in September 2000, focusing on future shortages of skills in Britain and the development of British immigration policy in future. In the British Parliament, Tories, the opposition, dissented, saying this was to stem illegal immigration, but the changes took place.

to make use of a specific distinction[22] Keeping this view of the host countries of Indian immigrants, it may be said that not only to UK, Indian migration of skilled labour to other developed countries like Canada, Australia, New Zealand, Western Europe (mainly Germany, and France in the EU), and now also Japan, and Singapore (relatively substantially more developed than India, though small in size and economy) too is largely a function of some kind of "derived demand" for skilled labour from the United States. Given that the emigrating Indians' preferences and priorities too are in favour of the United States as compared to each of these countries, the migration to these countries may perhaps be described as a stopover "intermediate" supply rather than a terminal one. This kind of "hopping migration" has a negative effect on formation of the diaspora network which is necessarily a function of retention of migrants in the labour markets of Europe, particularly the recipient countries in the EU. Therefore, countries such as Italy and Ireland, which once benefited by exporting their burgeoning populations, now urgently need immigrants to fill jobs at home. France finds it difficult to recruit enough qualified persons from the local population to maintain its public buildings. In Germany, the employers' union has said that 1.5 million more workers that are skilled are needed there. Australia already relies on foreign labour for a quarter of its workforce, Switzerland for nearly a fifth, and the US about a sixth. A British Government report released in January 2001 has been cited as having stressed that "migrants were not a drag on welfare, but contribute to its economy and culture"[23].

Indian Students in Host Countries – Intake of "semi-finished human capital" from India

Professionals holding post-graduate degree or diploma from Indian institutions of higher education are not the only ones who are considered of value in host countries. Many of the Indian immigrants in the United States who fuelled Silicon Valley were educated in America at the post-graduate level after they emigrated with a first engineering degree (B.Tech/B.E.) from the Indian Institutes of Technology (IITs)/Regional Engineering Colleges/ Banaras Hindu University – all institutions of excellence. Similarly, scientists with M.Sc/M.Tech from universities like the Jawaharlal Nehru University, or the University of Delhi; doctors with MBBS from the All India Institute of Medical Sciences; and managers with Post-Graduate Diploma in Business Management (PGDBM) from the Indian Institutes of Management (IIMs) have emigrated for the purpose of pursuing higher studies abroad and then entering into the labour market there[24]. These have, later on, catered to the formation of the Alumni Associations abroad, as diaspora networks.

Apart from being considered the hinterland for recruiting fully trained and educated IT professionals for the MNCs, India continues to be considered a "must destination for internationally renowned educational institutions shopping for *knowledge capital* – i.e., to woo the Indian student" (*Hindu*, 2000). In October 2000 alone, four countries mounted education "fairs" in Delhi and other Indian cities, followed by two in November. Most diplomatic missions project these as ways "to facilitate the search of a foreign education to Indian citizens", but the countries also compete against each other for the generic Indian "semi-finished human capital" – the student. As the Education Counsellor at United States Educational Foundation in

[22] What is required is hard data on how many and what proportions of British/EU skilled professionals, and as what proportion of Britain's/EU's output of tertiary education, by matrices of levels/fields/degrees, emigrate to the US in comparison to how many and what proportions of Britain's/EU's employed professional workforce received from the sending countries, country-wise. Similarly, data should be generated on how Britain's/EU's ratios of domestic students *vis-à-vis* overseas students change over time because the British/EU students leave for higher studies in the US (and to other countries within the EU). In addition, data on return migration to Britain/EU countries – of their own professionals, and of second-stage migration – of third-country professionals from other countries should be collected for the purpose of deriving "net flows" of the brain drain.

[23] *The Economist*, Mar/April 2001.

[24] There are a number of studies on Brain Drain from IIT Madras, IIT Bombay, IIT Delhi, and the All India Institute of Medical Sciences. For references, see KHADRIA, 1999a, Bibliography. One study on brain drain from the Banaras Hindu University is ongoing and the author of this case study had, as an adviser, helped the research team there in redesigning of the questionnaire.

India (USEFI) had put it, this was also because "Indian students are rated the highest in international student community". Host to an annual fair since 1994, USEFI exercise was in keeping with the priority accorded to international students by American Universities: "Indian students are in demand because of their merit and hard work. This makes them high achievers, thereby raising the performance level of their universities", the Education Counsellor was reported to have said. This apart, there is also the economies-of-scale angle for the recruiting universities because of the dwindling enrolments of the relevant age group in the native population. USEFI source had also confirmed Indian student arrivals in the US to have outstripped the number of Korean student arrivals in the year 2000 – positioning India at third position after China and Japan at the first two. Before this, India (with little over 15 thousand students, and 3 thousand as members of student-families in 1996) has been consistently maintaining the fourth rank – only the other three countries interchanging positions amongst themselves[25].

Recognizing the American hold over the global knowledge, the British are going all out to "retrieve a situation that has slipped from our hands" (*Hindu,* 2000). This is how the Education Counselling Service officer of the British Council Division in New Delhi voiced, immediately after the biggest ever British Education Fair in India, the ambitions of doubling the number of Indian student departures to the UK from the 4,000 per annum till the year 2000, over the next four years. To woo the outward-bound Indian students, the British launched a fresh scholarship scheme to be available for the next three years. The estimated additional cost to Britain was reported to be 700,000 pounds per year.

The Canadian initiative was reported to have already led to a steady increase in the number of student arrivals from India. The Canadians have a well-known and established yearly exchange programme for students and faculty of the Indian universities under the administration of the Shastri Indo-Canadian Institute established for bilateral relations with India. However, the Canadians have now allegedly lost some ground to the newly emerging player, New Zealand[26].

Lamenting an Anglo-Saxon domination over the Indian community of students seeking overseas education, the Germans in turn used the 40th anniversary of the presence of the German Academic Exchange Service (DAAD) in India to step up their efforts in marketing Germany as an educational destination for Indian students. With plans to double the number of student arrivals from India in five years after 2000, Germany relaxed visa rules and was even trying to amend legislation for allowing foreign students to work there on completion of their studies. In addition, Germany has also offered tuition-free education to Indian students, though students would have to arrange for the living costs themselves, which could be a drag on them.

In France, the stock of Indian students rose threefold from about 150 to more than 1,000 in 2001, as per the rough estimate of the Director, French Cultural Centre of the French Embassy in New Delhi. Most of the Indian students going to France go for post-graduate level study and very few for undergraduate studies. The preferred subjects in rank order are business management, engineering, travel and tourism management, followed by science and social science. France has of course been traditionally a preferred destination for Indian students pursuing their interests in fine arts. The stated aim of French education for Indian students is to establish a cultural and political bond between the two countries, and not to look at education as a product for international trade: "The purpose behind giving priority to India is not to induct Indian students into the French labour market and thereby cause a brain drain for India, nor is it to sell French education as part of international trade." In fact, it is mandatory for students to return to India on completion of their education, and this is made clear before a student leaves the Indian shore for studies in France. They are, however, inducted by French companies based

[25] See US, INS, *Statistical Yearbook 1996*, and various previous years. INS provides the flow data on foreign students entering the US every year. UNESCO Statistical Yearbook provides the stock figures of foreign students in various countries.

[26] 'The Foreign Degree Rush, "The study-abroad market gets a further boost as more countries start wooing Indian students", Report by Soni SANGWAN, *The Hindustan Times*, New Delhi, Sept 2, 2001.

in India or elsewhere in the world once they complete their courses in France, and subsequently they may get a posting in France, added the Director on being probed further[27].

New Zealand staked its maiden claim in India in the year 2000, and sought to beat the others with citizenship opportunities for successful students, besides, of course, the promise of quality education backed by all the trappings of a developed country. Jim Sutton, the visiting trade minister, touring India to promote his country's IT and educational opportunities, held his county's view of Indian professionals as "good potential migrants"[28]. Deputy High Commissioner in New Delhi, Haike Manning said the new policy represented a "philosophical shift" regarding migration. Rather than "controlling" immigration, the New Zealand Government was promoting the movement of qualified people to the island. In particular this meant "both Indian professionals and students". Wellington was ahead of other western countries in trying to remove obstacles. It followed a generic point system to grade would-be IT migrants. Unlike most other countries, however, New Zealand was awarding points for professional work experience rather than for higher education. New Zealand was also "peddling" itself as a cheap place to get quality education. "University tuition rates are one-third to one-fourth the cost of institutions in the US", said Mr. Manning. Added to this, there was a "potential prize", as Mr. Sutton called it: "Finish degree in New Zealand, land a job, move on to residency and then citizenship." With changing attitude, Mr. Manning boasted that New Delhi visa office trailed only Beijing in the volume of New Zealand visas it issued. The Kiwis were "selling" their country as "English-speaking, cricket-playing, with a record of tolerance and multiculturalism, and magnificent scenery".

Australia strongly believes in internationalization of education through trade, and considers it important for the country's international relations, cultural understanding between countries and for Australia's own education and training sector. Many Australian universities are proactive in enrolling Indian students for study in Australia. In June 1999, The Australian Vice Chancellors Committee signed a memorandum of Agreement with its counterpart in India, The Association of Indian Universities (AIU). The Agreement provided a framework for student and teacher exchange programs, information sharing, joint programmes and research collaboration (AEI-India, 1999). Australian Universities charge full fee from Indian students. The number of Indian students in Australia, according to Australian Education International (AEI) sources in the Australian High Commission at New Delhi, has grown rapidly over the last few years. In 1998, there were nearly 8,000 Indian students in Australia, which increased to 9,362 in 1999, and was further expected to touch 11,280 in 2000. Of 1998 enrollments, 60 per cent were in vocational education streams and training sector, and this proportion rose to about 65 per cent in 1999; in 2000 it is expected to remain the same. The rest were in for higher education. Within higher education, approximately 70 per cent students were at the post-graduate level. The number of student visas issued has been 4,886 in 1998; 4,372 in 1999; and 3,949 in 2000, cutting across all subjects and levels. However, of late, Australia has tightened the issuing of student visas to Indians because some of them are reported to be entering the labour market in Australia without completing their courses, sometimes immediately after arrival there[29].

[27] The Director of the French Cultural Centre in New Delhi also provided a broad picture of the distribution of Indian students stock worldwide in year 1997. According to him, the US topped the list with a share of 89 per cent, followed by Canada with 5 per cent, Australia 3 per cent, Europe 0.6 per cent, and the remaining the rest of the countries. These shares have changed in the last three years, he said. He, however, cautioned that country-wise student numbers could be quite misleading because mostly these are based on number of visas issued, and sometimes there may be double or multiple counting because the students already pursuing studies abroad get counted again and again when they return after visiting India for field work or meeting relatives etc.

[28] "New Zealand passport via IT expertise", by P. P CHAUDHURI, *The Hindustan Times*, 2000, New Delhi, Nov. 17.

[29] "Oz university protest", *The Hindustan Times*, Report by IANS, Sydney, New Delhi, Sept. 2, 2001.

View from India as a Home Country

The State of Expectations from the Indian Diaspora

Since India achieved Independence in 1947, Indian expatriates have been interacting with the country not merely to seek their roots but also explore new avenues and sectors for mutual benefits – ranging from investment, to transfer of skills and technology, to outright philanthropy and charitable works. This trend has become more marked in the last decade as the Indian economy has been opened up, giving rise to a new range of opportunities for joint-ventures between the resident and the non-resident Indians. However, barring some individual high profile names in the IT, business, and entertainment sectors abroad, the Indian Diaspora has remained largely out of public sight and awareness. To make a beginning towards tapping this potential source of mutual development systematically, A High Level Committee (HLC) on Indian Diaspora was set up by the Indian government to recommend policy options, organizational frameworks, strategies, and programs to involve the Non Resident Indian citizens (NRIs) as well as the foreign People of Indian Origin (PIOs) in accelerating social, economic and technological development of India. The Report, submitted to the Prime Minister of India in January 2002, documents strong evidence, in the Indian Diaspora, of deep and abiding ties with and commitment to India's welfare. It says: "The reserves of goodwill amongst the Indian Diaspora are deeply entrenched and waiting to be tapped if the right policy framework and initiatives are taken by India." Perhaps the work of the *collegial expertise* would show the specific ways the diaspora networks could contribute in this – not through the random individual initiatives of the expatriates, but by institutionalizing the diaspora option as an antidote to the negative effects of brain drain. The Report also confirms that the majority of Indians leave and did leave the country because of economic reasons, or in search of better *employment* prospects, and not because of political, social or ethnic factors – a fact not necessarily applicable to many of the other diasporas. Those who left India would have rather stayed back if the opportunities for utilisation of their talent were available within the country, the report observes. It is important in this context to look at the "home scenario" in India.

According to the World Competitiveness Yearbook 2000 referred to at the beginning of this case-study, "hard data" reveal that of a total Indian population of 987.0 million in 1999, the labour force constituted 48.03 per cent, following a cumulative average growth (CAG) rate of 9.93 per cent per annum during 1994-99 – the highest in the world[30]. The survey data (rather than "hard data") about the domestic availability, in 1999, of skilled labour "relevant to the economy" found India at rank 12th with a high ten-point-scale score of 7.367 whereas the US stood one place below at rank 13th with score 7.216, and the UK at rank 26th with a score of 6.360. Sectoral distribution of total employment in India in 1999 was 60.1 per cent in agriculture (USA 2.6%; UK 1.7%), 18.1 per cent in industry (USA 23.2%; UK 26.6%), and 21.8 per cent in services (USA 74.3%; UK 71.7%). As for employment prospects in terms of the ratio of growth in employment to growth in active population in 1999, India's rank was 38th amongst 46 countries, with a ratio of 1.0000 (USA 23rd, 1.0117; UK 32nd, 1.0070). Unemployment, as a percentage of labour force in 1999, was reported at 5.80 per cent for India at rank 17th (USA 4.25%, 12th; UK 6.10%, 19th). According to a more recent reporting in the media, there were 8.8 million unemployed people in India in 1999-2000, up from 7.3 million in 1993-94. In other words, out of those looking for jobs, 2.2 per cent were unemployed in 1999-2000 compared to 1.9 per cent in 1993-94[31]. This broad scenario about the status of India's population and the labour market provides the backdrop against which the migration of the

[30] As per the latest Census carried out in February 2001, India's population is 1.027 billion – 531 million males and 496 females. 15.42 per cent of the population is in the age group of 0-6; of the rest, 65.4 per cent persons are literate – 75.9 per cent males and 54.2 per cent females. Detailed results are awaited.

[31] *The Economic Times*, "8.8m jobless in 1999-00", April 30, 2001. Statewise, Kerala tops among the major states, with 8.7 per cent unemployment. It is also higher than national average in Assam 4.6 per cent and West Bengal 3.8 per cent. Orissa. Maharashtra, Tamil Nadu, Bihar, and Punjab have unemployment rates between 2 per cent and 3 per cent. Rajasthan and Gujarat have a very marginal unemployment rate of 0.7 per cent and 0.8 per cent. Madhya Pradesh, Haryana, Uttar Pradesh, and Karnataka also have low of 1-1.5 per cent. These rates will be higher with stricter definition of unemployment.

highly skilled from India to developed countries takes place. Although there is no hard evidence available from the Indian sources of data, most indirect estimates, and speculations by researchers and the media put 80-90 per cent of this exodus of India's "brains" to be US-bound today. In this context, it may be of interest to also look at how some of the evidences of impact of emigration of the highly skilled *on India* – both positive and negative – are being viewed.

One of the major positive impacts of skill migration has been the remittance of foreign exchange to India, termed as "Private Transfer Payments" in India's Balance of Payments Accounts. Beginning in the mid-1970s, there was rapid increase in remittances coming from the US, Canada, the UK, present EU countries in Western Europe, Australia, but in significantly larger proportions from the semi-skilled and low-skilled labour migrants to West Asia. From all countries of the world, it reached a level of US$ 2,083 million in 1990-91, further rising to US$ 8,112 million in 1994-95, and US$ 11,875 million in 1997-98, and finally to US$ 12,290 million in 1999-2000 (See Table 8 of Statistical Appendix). In terms of share of GDP at market prices, these constituted 0.7 per cent in 1990-91, 2.5 per cent in 1994-95, 3.1 per cent in 1996-97, and 3.0 per cent in 1999-2000. As a percentage of private consumer expenditure in the domestic market for the first three of these four financial years, these remittances contributed 1.3 per cent, 3.3 per cent, and 6.0 per cent respectively[32]. Thus, remittances sent by expatriate Indians have supposedly contributed positively to the Indian economy. However, in terms of the share contributed by the highly skilled professionals settled in the developed countries, it all depends on whether entire families have moved with the principal workers[33]. If so, then there is a tendency for the flow of remittances to dry up from those sources as it had happened in many a pocket in the state of Punjab in India. The host country's immigration policy has a great bearing on this. For example, it was the US immigration law's priority to "family-reunification" over "employment-based" immigration in the period during mid-1970s to mid-1980s that had brought the share of remittances arising from the skilled migrants to the US down as compared to those from West-Asian oil-exporting countries. It hardly needs to be mentioned that with reforms beginning in the 1990s and globalization setting in firmly from the mid-1990s onwards, the priorities of not only the US, but other host countries too have shifted from "family and relatives" immigration to "economic need" of the labour market in the developed countries. In fact, the radical change in the British immigration law in favour of issuing the work permits/visas to skilled migrants is a case in point. Remittances too are, therefore, expected to rise again from these countries to India. However, I have also conjectured in this regard that a large proportion of such remittances would flow back to the developed countries in the form of overseas fees paid by Indian students migrating for study abroad[34].

Apart from remittances, the NRIs – particularly those residing in the developed countries and whose entire families have gradually shifted abroad – find it attractive to put their surplus money in various NRI deposit schemes, particularly the repatriable bank accounts in India. These offer them higher rates of interest than what resident Indians get on their deposits, apart from the flexibility of withdrawals in foreign exchange. The Indian Government floated these deposit schemes for building up India's foreign exchange reserves[35]. The NRIs have in the past preferred deposits to investments for research or education in India. However, there are arguments to suggest that the Indian government could have borrowed similar amounts of funds commercially at equivalent if not lower costs. Two special schemes, the India Resurgence Bonds (IRBs) of 1997, and the India Millennium Deposits (IMDs) of 2000 mobilized US$ 10 billion, thus doubling the NRI deposit base to about US$ 20 billion during the decade. However, both have been considered expensive for India also because such schemes have encouraged NRIs to borrow in Europe at lower rates of interest for investing in bank deposits in India with

[32] Reserve Bank of India, *Report on Currency and Finance*, various years.

[33] For example, if a part of a joint Indian family moved to the UK or US, and settled down in Southall in London, or Queens in New York, the emigrants may get integrated with the local Indian community in such a way that links with friends and family back home in India may not remain strong enough over time. This may cause remittances to flow to India at a rate lower than what it would be if they did not live in these localities and integrate. Over time, they would tend to send occasional gifts to relatives in India rather than regular remittances.

[34] See Module 3 Chapter on Policy in this report.

[35] See KHADRIA, 2001a.

the purpose of drawing the substantial interest differential[36]. Secondly, India's experience has been the large-scale flight of these deposits at the slightest instability in the country, whether political or economic. It is in this sphere that the Diaspora Networks and Associations would have the scope to divert remittances from bank deposits to development investments.

On the technology front, the Indian software industry employed some 160,000 skilled people in 1996-97. This went up to 340,000 in 1999-2000 and is projected to be growing in future[37]. India produces about 70,000 to 85,000 software engineers, and about 45,000 other IT graduates. All this determines the nation's capability to undertake research and to facilitate international transfer of technology to India. The Indian Government planned to double the intake of IT graduates in 2001 and treble it in the year 2002. However, even this might not be sufficient to meet the projected growth of Indian software industry. According to industry projections, the demand would rise ten-fold by 2008 and India would need about 2.2 million IT graduates. To this may be added the overseas demand of 0.8 million, going by the announced intakes of the United States, Germany, and the UK only. Against these figures on the demand side, the supply side scenario is such that India's present combined enrollment in all streams of higher education (i.e., science, arts, commerce, engineering, medicine etc.) and subjects (e.g., physics, chemistry, information technology etc. in "Science and Engineering") totals only up to a maximum of 0.4 million per year (IAMR, 2000)[38]. Besides increasing the intake over the next couple of years, there are no tangible plans available with the Government of India for meeting the increasing demand for IT professionals. The Indian Institutes of Technology (IITs) are also under pressure to increase intake, but do not have the necessary infrastructure to back it up. New institutions like the Indian Institutes of Information Technology (IIITs) have just started. There will be a major shortage of high-quality technology professionals, e.g., the IIT type of graduates who can work on innovative software technologies. The official patronage being extended by the Ministry of Information Technology (MIT) to the flight of IT professionals to lucrative foreign destinations would, it has been feared by the media, spell disaster for the Indian industry: "Firstly it would lead to a shortage of quality professional at home, restricting the growth of Indian companies. Secondly, it will reduce Indian institutions like IITs and in future IIITs to hunting grounds for foreign companies. In effect, it means Indian resources (including huge public subsidies) will be spent to fulfil manpower requirements of foreign companies."[39] This too is an area where the Indian Diaspora Networks would have uncharted possibilities to explore.

Return migration, which has received the maximum attention lately as a panacea for brain drain, needs to be assessed in terms of engagement of the returnees in India[40]. Business media (mainly some weekly and fortnightly magazines in India) had given lot of focus on young NRI professionals returning to India as "angels" of venture capital and financial sector MNC executives. However, what is important is the continuity of the flow of NRIs returning to India, and then engaging themselves in ground level or "alternative" development work rather than in promoting Indian or foreign interests of the private capital. There is evidence of some "returning NRIs giving more than their due" in this respect: "There was a time when, for almost all NRIs a trip to India meant visits to relatives, shopping and sightseeing. Today… many India students in the US are making time for village India."[41]. Then there are other kind of initiatives like *Action*

[36] See *The Economic Times*, "NRIs still have a yen for rupee", and "For NRIs, it is Re that matters", May 14, 2001.

[37] *The Hindustan Times*, 17 Sept. 2000.

[38] In-depth study of the supply side (vacancies for admissions in educational institutions, enrollments, dropout rates etc.) in relation to projected/anticipated changes in demand for skilled labour in the world labour market is now being seen as an area of research worth pursuing in this context. This would turn out to be an important field also because of the opening up of international trade in "educational services" under the WTO regime.

[39] "Back to Body Shopping", by Dinesh C SHARMA, *The Hindustan Times,* New Delhi 17 Sept. 2000.

[40] See UNESCO, 1998.

[41] This is partly because of the work of a Diaspora Network like Association for India's Development (AID) which an Indian student helped to create in 1991, while working for his Ph.D. at the University of Maryland, USA. Today, AID has networking Chapters in 25 universities all over the US… *The Hindu*, "Returning NRIs give more than their due", Sunday, Feb 6, 2000, New Delhi. AID now has a fellowship programme that supports young NRIs who want to work with movements and NGOs in India. Many are doing this as all-purpose volunteers. But,

India – a brain-child of Sam Pitroda and several other Chicago based Indians who are keen to pool together their energies with resident Indians to hasten the development of India. Some of these residents are returned-NRIs, similar to members of an association called *Returned NRIs Association (RNRIA) of India* based in Bangalore and having the motto, "Back to Serve". Such diaspora groups, comprising mainly the accomplished professionals rather than students, favour a change of mindset but are not as much inclined to challenge the existing development paradigms.

Notwithstanding the apprehensions about remittances from the West drying up, or the shortages of IT professionals (quantitative and qualitative) being overwhelming in India, or the perspective of the returnees being unclear or conflicting between groups, the state of expectations in India about prospects of migration have depressed with the most recent recession in the IT industry setting in firmly in the United States over the last one year since 9/11. Layoff announcements in America reached levels not seen since the downsizing epidemic of the late 1980s. It was the first big redundancy wave to affect mainly "knowledge workers" rather than manufacturing employees. Some diaspora networks have, by exposing the controversial practices followed by bigger firms, taken the important initiative of stalling the slide the state of expectations in India were heading for[42].

Public Opinion in India on the Issue of Brain Drain

The Ministry of External Affairs (MEA) would cite recently estimated figures of 38 per cent of doctors, 12 per cent of scientists, 36 per cent of NASA employees, 36 per cent of Microsoft employees, 28 per cent IBM employees, and 17 per cent of Intel employees in the US to be Indian as the sign of success of Indians abroad. UK and some other EU/non-EU countries are also identified as the destination countries where Indians have excelled. Technology firms in the Silicon Valley with Indians as head of the organization supposedly comprise 7 per cent of all technology firms[43]. The MEA officials feel that the real success of the India Diaspora lies mainly in the acquisition of immense wealth by Indians in the Silicon Valley. These are mainly

---

some have returned to stay and concentrate on working out actual viable, equitable alternatives. For example, Venkatesh Iyer, a material scientist from Penn State University, has returned to work on the problem of energy, and wants to preserve the variety of energy systems in India towards maximizing India's bio-mass wealth, by joining forces with veteran engineer-activist K. R. Dattye. The main purpose is to create a dispersed industrial base which will make optimum use of local resources and generate livelihood for all – giving them the opportunity to tap their potentials for contributing to the generation of India's GDP – as I would like to put it. Similarly, R. Sastry has returned from a job in Silicon Valley to explore how the IT revolution can be made a tool for social justice and equity. He had moved all over India to understand what was happening in different spheres, and in building a database by making effective use of computers and the Internet.

[42] In fact, there was resentment among the NRIs in the US about the abuse of the H-1B visa clauses by the employers. The *Immigrant Support Network (ISN)*, a non-profit organization representing immigrant workers from over a hundred countries, but dominated by Indian professionals planned to canvass with Congressmen in Washington for support against the H-1B visa regime in force. "Free choice and fair competition are basic to the American way of life, but these are totally negated by the rules that attach to the grant of H-1B visas", said an ISN spokesperson. Since this visa is issued for a specific position in a specific company, the holder cannot look for other job opportunities, nor can the person expect to move to higher positions in the same company. Many employers take advantage of these rules and deny even annual raises to an employee coming on an H-1B visa, alleged ISN. "Imagine what it does to the career of a young person doing the same job while new technologies are appearing in the IT sector all the time", members voiced their concern. Change of status to that of a Green Card holder "offers the only hope, but the procedure takes years" (*The Hindustan Times*, May 4, 2001, "Indians call H-1B un-American", by M. K. Tikku in San Francisco). The US Superior Court in San Mateo had, however, ruled that any contract with H-1B visa holder for binding the person for 18 months of service in the firm is "void and unenforceable" because it violated state competition statutes. The court in fact ordered the company Compubahn to pay the plaintiff Dipen Joshi hailing from the state of Gujarat in India some US $215,000 in legal fees and other expenses, rather than upholding the company's claim of US $77,000 in fees and penalty it asked Joshi to pay because he left the company to join software giant Oracle before his contract period of 18 months was over. The ruling was a victory for the hundreds and thousands of H-1B professionals in the US (*The Economic Times*, "Court Rules Contract As Violating State Competition Laws – Indian wins H1B battle against US co", by Reuters, 3 May, 2001).

[43] There is, however, evidence that highly skilled Indian professionals in any field of specialization are given high professional position in the American/non-Indian owned organizations, but very rarely the top managerial positions that are superior to professional positions in terms of authority and control. See AACI, 1993 as cited in SAXENIAN (2000).

the skilled and qualified professionals. However, counting the unskilled labour as well, the 20 million strong Indian Diaspora is considered the third largest, after the British and the Chinese, in the world today. Of this, the "Asian Indians", as the NRIs and PIOs are categorized in the US Census, have numbered close to two million, as per rough findings of the US Census 2000. One weakness of the Indian Diaspora, unlike the Chinese Diaspora, however, arises from its fragmentation on sub-culture, ethnic, regional and linguistic basis, making it difficult for Indian overseas networks to take any uniform position on issues of concern to India. This factor also explains the innumerable number of associations and groups of NRI networks in the United States itself. Efforts to unify these groups or associations have not yet met with success, though what binds them together is a common cultural heritage called "Indian". The government is eager to establish strong cultural and emotional bonds with the Diaspora that will assist them in their efforts to maintain and enrich their cultural identity and create better mutual understanding between the Indian Networks. The Indian government is, however, also conscious that certain sections of the well-to-do and established professionals of Indian origin (PIOs) are also supporters and sponsors of separatist activities in the Punjab, Jammu & Kashmir, and even the North-East.

Officials in the Ministry of Home Affairs (MHA) have been cautious about conferring the dual nationality/Indian citizenship to the PIOs, and the right to make financial transfers to India for charity and philanthropy. They felt that the grant of political right by virtue of dual citizenship shall be resented in India not only by the middle class and the rich, but also the poor because of the significant affluence of the PIOs vis-a-vis the Indian citizens – leading to creation of another privileged class and undesirable social divide in India[44]. It would also put the security of India to risk because of the possibility of some such persons being recruited by foreign intelligence agencies, their entry into the police and the army, and their possible role in large-scale inflow of undesirable foreign funds. Some senior officials in the MHA are believed to think that the flow of funds from PIOs for charity and philanthropy in India should continue to pass through existing scrutiny to keep the possibility of large scale money laundering at the minimum.

Indian industry's perception about migration of skilled professionals from India, however, started to thither under the ensuing American recession in the IT industry. The industry, which is already showing signs of taking its own toll in terms of freeze on fresh recruitment on the one hand, and layoff of the old on the other, has precipitated the return of many US-based IT professionals back to India[45]. *Western European countries in the EU, including the UK, are being looked at as a more sustainable destination for the Indian professionals*, and East/South East Asia is being looked at as an emerging destination for the "brain bank" for India to shift its "branches" to from the Unites States. One has to be, however, cautious and remember about these destinations as sources, also of the "derived demand" (originating in the US) for highly qualified manpower from India, because these countries themselves are facing their own problems of brain drain to the United States. If so, the derived demand will also tend to dry up when the brain drain to the USA slows down globally. Industry is also speculating on the possibility of reverse or return migration of the Indian IT professionals to India for working in companies that are being outsourced or would be outsourced by the developed-country-based MNCs for software development. There is, however, a great deal of uncertainty in the private sector on the issue.

While industry's concern is mainly with the numbers, Indian media perceives the real problem in brain drain to be that of quality of the residual manpower left behind in the rush for going abroad: "We may end up with a huge army of people doing second class, labour intensive software-development work and operations like managing call-centres and customer-services for foreign companies", churning out what is being called the "techno-coolies". India shall be reduced to rolling out graduates and specialists for multinational corporations of the world,

[44] It might also trigger naturalization into foreign citizenship by large sections of those NRIs who would otherwise not like to give up their Indian citizenship.

[45] Although many in the pipeline of migration have cancelled or put on hold their plans to go, there were however reports that there was no slowing down in the issuing of H-1B visas by the US Consulate-General at Chennai in South India (*The Economic Times*, "No slump in issue of H1B in Chennai", May 3,2001, New Delhi).

burning scarce resources that go into India's higher education system. Unfortunately, according to the media, the newly created Ministry of Information Technology (MIT) does not see anything wrong in this: "We have an open policy", MIT Secretary P V Jayakrishna is reported to have declared recently. True, in a democratic system, all citizens have freedom of movement and freedom of employment, but such an open encouragement to flight of highly skilled human capital by an agency that is supposed to promote IT within the country could be fraught with dangerous consequences, the media warns. To the question, "What does India gain as a nation?", the MIT would argue: "They will bring back technology, experience of working in a global environment and they also come back. Look, so many NRIs are coming back today." The media would counter strongly: "Yes, they will bring technology and experience, but on the terms decided by the MNCs that employ them."

There are few researchers in India working on the issue of brain drain specifically. Those interested in the broader field of international migration represent a whole range of specialization in terms of being economists, sociologists, political scientists, linguists, and so on. The focus of attention amongst them is on the various cultural, spiritual, linguistic, and religious aspects of the Indian Diaspora in terms of its interaction and integration with the Indian society, rather than brain drain or the brain gain through the Diaspora Networks. Brain drain does not seem to bother them much; and even if it did, there are few hard data, e.g., on educational subsidies lost etc., to sustain their interest in exploring the possibilities of recouping them through the diaspora networks. A few engineering and medical faculty, and even scientists have, under the sponsorship of the Department of Science and Technology of the Indian Government, taken up specific institution-based studies of the brain drain by contacting the alumni of IITs, AIIMS, BHU etc. working in India and as part of the Indian diaspora abroad. One common conclusion of these studies has been that the dimensions of brain drain from these institutions have been substantial enough for the government to initiate policy interventions.[46] However, it needs to be emphasized that the diaspora option *for development* has not been given a serious thought as yet, although there is a lot of hue and cry about the politics of it, arising in the context of the scheduled first ever celebration of an "Expatriates Day" on 9th January 2003, as announced by the Indian government on the day the Report of the HLC on Indian Diaspora was formally handed over to the Prime Minister. While genuine efforts of Indian diaspora members to make a "payback to their mother country" are still being stalled because of an unresponsive policy and bureaucratic environment, scarce public resources are being spent on huge fan-fares.

Opinions on Student Emigration

The tradition of going abroad for higher studies has not been recent in India. What is new is the phenomenon of "fledglings" leaving the nest, younger and still younger. "Barely 15, they plan…. The desire to be part of a more stimulating system of education is one of the factors that force the youngsters and their parents to seek alternatives outside the country." The US, followed by Britain and Australia, are favoured destinations for study abroad. Unthinkable it might have been for the *daughters* until few years ago; this is no longer so. The information explosion has ushered in the concept of "a global village" and played a major part in opening the windows of opportunity and influencing attitudes. The "going-away-abroad-at-16" trend, as can be expected, is, however, restricted to the elite and the upper middle class, which have the financial resources and exposure to the western style of thinking and living. This is the assessment of study abroad craze by the media in India[47]. In effect, however, it was perhaps the

[46] These studies, based on sample surveys of the respective alumni, estimate the brain drain of engineers from a low of 22 per cent from IIT Delhi (1980-90), and a medium of 28 per cent from IIT Madras (1964-87), to a high of 33 per cent from IIT Bombay (1973-77); and an extremely alarming rate of 56.2 per cent doctors from the AIIMS (1956-80). See DESHMUKH *et al*. (1997) for IIT Delhi, ANANTH *et al*. (1989) for IIT Madras, SUKHATME and MAHADEVAN (1987) for IIT Bombay, and KALRA *et al*. (1992) for AIIMs – as referred to in KHADRIA (1999a). The BHU study is still ongoing.

[47] *The Hindu Folio*, Mar. 10, 1998, "The Great Exodus", by SANTHANAM, K. p. 14-17.

generic "semi-finished human capital of India" *a la* Tapas Majumdar (1994) that was being drained away under a distinguished brand name of "study abroad"!

Many Universities in India like the Jawaharlal Nehru University (JNU) are now signing Memorandum of Understanding (MoU) with foreign universities for exchange of students and teachers, and for this purpose deliberating upon mechanisms of credit transfer, credit exchange etc. It may also be noted that "Educational Services" are now coming under the fold of General Agreement on Trade in Services (GATS) of the WTO regime[48]. Although New Delhi is opposed to complete opening up of its education sector to foreign competition, in case India succumbed to the multilateral manipulation of events, there is every possibility that foreign universities will eventually have direct "market access" to Indian student clientele on the Indian soil. Foreign educational entities would then be selling their education in India through "physical presence" at five levels: Primary Education Services, Secondary Education Services, Higher Education Services, Adult Education, Other Education Services (WTO, 1998a, 2000a, 2000b). Whereas a large number of institutions and universities abroad have set their eyes upon India as a large and growing market, it is mainly the universities in UK and US that have greater acceptability. These are followed closely by Australia and Canada. One important factor behind this is the advantage of the medium of English language in higher education of these countries, which is conveniently acceptable to the majority of Indian students.

International trade in higher education under the WTO regime should in principle, for the purpose, bring down the overseas traffic of Indian students going out of India, at great social cost (private plus public cost), for higher studies abroad. This would happen provided the multilateral negotiations are guided by the interest of the poorer countries in letter and spirit (through properly evaluated "Economic Needs Test", in short, ENT), rather than by self-interest of the economically more powerful developed member countries in the WTO. The Ministry of Human Resource Development in New Delhi, in association with the University Grants Commission, has chalked out a Guiding Framework of Policy for both Indian and foreign universities[49].

Measures Experimented with in India

Some exogenous restorative policies, as opposed to endogenous restorative policies, have been aimed at encouraging return migration to India, either permanently or temporarily on specific assignments, but not at formation or consolidation of human capital from *within* India so far. Amongst the most well known schemes, one is the Pool Officers Scheme for temporary employment to permanent returnees launched by the Council for Scientific and Industrial Research (CSIR) of Government of India, and another is the TOKTEN-INRIST[50] scheme for temporarily returning scientists, launched by the CSIR in collaboration with the UNDP.[51] Both the schemes have been quite ineffective – due to poor offers and poor implementation respectively. TOKTEN-INRIST had in fact the scope for encouraging even the private-sector industrial establishments by providing placements to the returning/visiting NRIs in their R&D units. The private firms were, however, frustrated and disillusioned with the bureaucratic handling of the TOKTEN scheme by the CSIR[52]. The University Grants Commission too had started a scheme of Research Scientist primarily to attract Indians abroad on offers of placements in Indian universities at levels parallel to lecturer, reader, and professor in the early

[48] See the Module 3 Chapter of this report.

[49] In fact, at least a few official documents in various stages of implementation, preparation and presentation indicate sensitivity to the growing importance of globalization for higher education in India: UGC (1996, 2001), Government of India (2000a). One related concern of the developing countries has been the separation of temporary migration under the WTO from permanent migration which, it is being argued by the developed countries, belongs to the sovereign domain of immigration laws of countries concerned and, therefore out of the purview of the multilateral domain (WTO, 2000).

[50] Transfer of Knowledge and Technology through Expatriate Nationals – Interface for Non-Resident Indian Scientists & Technologists (TOKTEN-INRIST).

[51] UNDP has sponsored the TOKTEN programme in many developing countries experiencing the brain drain.

[52] See KHADRIA, 1999a, Chapter 6: The Silverstreaks: Voices of Experience, Expectations and Desires.

1980s, with substantial research grants apart from salaries. The scheme took-off well, but ran into rough weather due to dilution of standards for accommodating unemployed scholars from within India in all disciplines, including humanities and social sciences, apart from engineering and natural sciences. It also led to dichotomies in the universities, where the Research Scientists were treated as "second-class citizens" by the permanent faculty. To get over this, the UGC turned the appointments, initially made for five yearly renewable tenures, into permanent ones. However, the subsequent batches were not given the same deal; rather the placements were turned into non-renewable dead-end jobs after the first tenure of five years. In the original scheme, there were provisions for promotion too from one level to another after every five years, subject to evaluation of progress of work. The UGC finally ran into budget crunch, and the scheme was withdrawn some time in the mid-nineties.

Recently, the Government of India has, through official notification, introduced what is called the PIO-Card for those persons of Indian origin who have obtained foreign citizenships by surrendering their Indian citizenship[53]. The PIO scheme was notified by the Ministry of Home Affairs in the Gazette of India dated 30 March, 1999[54]. The main features of the scheme are: Excepting for those who now hold citizenship of Pakistan, Bangladesh, and other countries that may be specified from time to time, anytime holders of Indian passports in the past; the children, grandchildren, and great-grandchildren of those who were born in India and were permanently resident in India as defined in the Government of India Act, 1935 and other territories that became part of India thereafter; and spouse of citizen of India or PIO as per the criteria of the PIO Card scheme, are all entitled to apply, by paying a fee of US$ 1000 (inclusive of non-refundable processing fee of US $250), and get the PIO Card with validity of 20 years, terminable prematurely along with the passport. The card extends the facility of visa waiver for entering India; exemption from the requirement of registration for stays in India up to 180 days; parity with NRIs in respect of all facilities available to the latter in the economic, financial, and educational fields excepting acquisition of agricultural/plantation properties, and none in the sphere of political rights. The PIO Card scheme was designed to strengthen the link of the expatriates of Indian descent, including Indian-born naturalized American citizens, with India. A large number of PIOs had, in fact, been asking for dual citizenship from India so that they could keep their contacts with the home country with ease. The PIO Card was the second-best offer Indian Government could offer, because the proposal for dual citizenship was not acceptable for reasons of national security, and other possible abuses by anti-national and anti-social elements. The PIO Card scheme, however, failed to evoke an enthusiastic response[55].

[53] Indian citizens are not eligible for dual citizenship.

[54] *The Gazette of India*, Regd. No.D.L.33004/98, Extraordinary, No.63: PIO Card Scheme, New Delhi, March 30, 1999.

[55] As per the Interim Report (mimeo) of the High Level Committee (HLC) on the Indian Diaspora (set up by the Indian Parliament), on the PIO Card Scheme, and placed with the Ministry of External Affairs of Government of India, only about 1100 PIOs applied for the Card in the one and a half years since 2000. The HLC analysed the poor response, and suggested changes on the validity period of the Card (making it two or three tier, rather than for a single option of 20 years – for various age-groups, regional/country-groups of people), lowering of the fee (in general, as well as according to the validity options, and making it discriminatory on the basis of a classification of countries of residence of PIOs according to the Human Development Index (HDI) rankings of the UNDP. In fact, the HLC has already recommended a framework of fee structure, linkages with financial deposit bonds issued by the government from time to time (e.g., the India Resurgent Bond, The Millennium Deposit Bond) for extending extra facilities, provision for Gratis Cards to eminent PIOs, and as "keys" to the country. The specific facilitating suggestions of the Interim report are: Separate counters at international airports in India, Indian rates for entrance fee in monuments of India, issuing of driving license in India without asking for any other proof of residence – like the "ration card", opening of bank accounts without any other identity card, and a special provision for senior PIO-Card holders, as former citizens of India – under section 5 of the Indian Citizenship Act – the re-acquisition of Indian citizenship, without the prescribed requirement of residence in India In the case of the last of these suggestion, the HLC feels that this would facilitate transfer of their pension funds to India with ease from countries that do not allow outflow of such funds unless a person acquired citizenship of another country.

Conclusion

The Stock of Policy Recommendations: Are these one too many?

One comes across too many recommendations being made in the context of the possible involvement that the Indian diaspora can have in India's development pursuits. For example, even the HLC's latest sectoral survey has "revealed" at least ten main areas where the Indian Diaspora has either sought changes, or has potential to make a contribution in. The Report of the HLC has outlined the nature of the policy changes that are required in these ten different fields, viz., Culture, Education, Media, Economic Development (in particular Investment, International Trade, Industrial Development and Tourism), Health, Science and Technology, Philanthropy, Consular and other Issues, Dual Citizenship, and Organisational Structure. It may be said that all these are important, but it is primarily the state of education and health that has led to the creation of "two worlds in India", making it difficult to get a true picture of India. While the World Bank had ranked India among the top 15 countries in terms of Gross National Product (GNP), the IMF's *World Economic Outlook 2000* had focused on the "uneven pace" of economic reforms evident in the increase of rural poverty. Even Indian National Sample Survey Organization's 55th Round (NSSO, 2000) on employment and unemployment in India had shown that rural poverty had gone up though urban poverty had marginally declined. Clearly two worlds exist in India with huge difference in the standard of living between the two. According to the *World Competitiveness Yearbook 2000*, India ranked at the bottom in the list of 47 countries in 1999 (See Table 1 of Statistical Appendix), in terms of Purchasing Power Parity (PPP) GDP per person employed, at US$ 4,849 (USA 3rd, $62,454; UK 21st, $44,854,), although the nominal (non-PPP) GDP per person employed was much less at US$ 824 (USA $69,538; UK $51,950). Similarly, in terms of GDP (PPP) per employee per hour, India was again at the bottom of the list with US$ 2.15 (US 3rd, $32.60; UK 20th, $24.39), and with nominal GDP per employee per hour of US$ 0.37 (USA $36.29; UK $28.25)[56]. Such pervasive underachievement, of what Leibenstein (1978) would call "the X-efficiency", can be reversed only by sustained efforts in enhancing the average labour productivity in India. I have argued elsewhere that it is possible to accomplish this in a sustainable manner if the resources of the Indian diaspora are tapped and consciously directed towards long term endogenous initiatives in education and health for self-sustaining growth, and not in a plethora of development interventions for exogenous growth[57]. The Indian diaspora networks can adopt this as a strategy of their contribution to long term development of India. The EU too can help in institutionalising this strategy by directing its development aid to a developing country like India largely into the fields of education and health.

The Role of Diaspora Networks in Holistic Development of India – A dichotomy

The dichotomy between the professional and national/sub-national networks of Indian Diaspora mentioned earlier becomes important when it comes to their role in education and health sector development in India. Counter-intuitively it is the latter category of Indian diaspora networks, which is trying to play the bigger role of the catalyst, whereas the former has remained more or less subservient to the profession and its members in the host country concerned. The *scientific* Indian diaspora has in this sense remained only a marginal source of energy for India's potential development in general. For example, it is being said of other diasporas in the world that "transnational entrepreneurs – the US-educated immigrant *engineers* whose activities span national borders – are creating new economic opportunities for formerly peripheral economies around the world… They are building technical communities that link their home countries to the world center of technology… [and they may become] as important

[56] In terms of remuneration levels for skilled professionals and managerial level personnel, including CEOs, Engineers, Director (Manufacturing), Director (Human resource development), India has been practically found at the bottom because only the former socialist countries were below India, if at all.

[57] See KHADRIA, 2001b.

as more commonly recognized actors – states and multinational corporations – in the growth of new centers of technology entrepreneurship" (Saxenian, 2000). Contrary to this proposition, however, *Indian engineers*, "in spite of a record of successful entrepreneurship in the US… have been slow to build a cross-regional technical community" with counterpart Indians (Saxenian, 2000). "As a result, most economic relations between Silicon Valley and regions like Bangalore are still conducted primarily by *individuals* within the large American or Indian corporations", rather than the institution of professional diaspora networks. There are very few US-educated Indian engineers "who have their feet sufficiently in both worlds to transfer the information and know-how about new markets and technologies or to build the long-term relationships that would contribute to the upgrading of India's technological infrastructure. And there are no institutional mechanisms – either public or private – that would facilitate and reinforce the creation of more broad-based interactions between the two regions" – the host and the home countries of the Indian diaspora. The diaspora option is thus an uncharted and uncertain territory as far as sustainable development in a developing "home country" like India is concerned. However, it can still be said that a silver lining is provided by the sub-national, or even national level non-professional networks of the Indian diaspora in terms of their contribution to development in the home state, region, or the country. The question that needs to be asked is whether the kind of contributions that are made is holistic enough to make the development impact sustainable. Gathering of some empirical information through an exhaustive comparative survey of the activity profiles of professional and non-professional networks of the Indian diaspora would perhaps help answer this question in "yes" or "no". But, in the end, the concept of a development-centric paradigm would emerge only from policies that focus on average-productivity enhancing generic targets like education and health rather than on a multitude of specific development indicators, an issue further elaborated upon in the Module 3 Chapter on Policy. The recommendations indicated there are, however, contingent upon the adoption of this paradigm of development, and the success would depend on a strong commitment to stick to it through a long and uncertain period of testing experience.

References

AEI-INDIA, 1999 - *Internationalisation of Higher Education and Operation of Foreign Universities in India: An Australian Perspective*. 26 Nov., New Delhi, Australian Education International.

ALIBINIA A., 2000 - The Great Off-White Hope. *The Hindustan Times,* New Delhi, 26 Sept.

GARELLI S. (ed.), 2000 - *The World Competitiveness Yearbook 2000*. Lausanne, Institute of Management Development, 551 p.

GOVERNMENT OF INDIA, 2001 - *IT manpower challenge and response : interim report of the Task Force on HRD in IT.* Ministry of Human Resource Development, New Delhi, 71 p.

ICWA, 2001 - *Report of the High Level Committee on the Indian Diaspora*. Indian Council of World Affairs, New Delhi, 570 p.

INTERNATIONAL MONETARY FUND, 2001 - *World Economic Outlook 2000.* International Monetary Fund, Washington DC., 211 p.

KHADRIA B., 1998 - The Brain Drain/Gain Dimension in International Education. *NORRAG News*, Special theme: International Development Cooperation, 22 : 27-28

KHADRIA B., 1999 - *The Migration of Knowledge Workers : Second Generation Effects of India's Brain Drain*. Sage Publications, New Delhi., 240 p.

KHADRIA B., 2001 - *Shifting Paradigms of Globalization: The Twenty-first Century Transition Towards Generics in Skilled Migration from India*. International Migration, 39(5) : 45-71

KHADRIA B., 1990 - Migration of Human Capital to United States. *Economic and Political Weekly*, 25 (32) : 784-794

KHADRIA B., 1990 - Patents, Brain Drain and Higher Education: International Barriers to the Diffusion of Knowledge, Information and Technology. *Social Scientist*, 18(204) : 3-18

KHADRIA B., 1991 - Contemporary Indian Immigration to the United States – Is the Brain Drain Over? *Revue Europeenne Des Migrations Internationales*, 7(1) : 65-96

KHADRIA B., 1999 - Of Dreams, Drain, and Dams – Metaphors in the Indian Emigration of Talent. *India International Centre Quarterly*, 26 (3) : 79-90.

KHADRIA B., 2001 - *Skilled Labour Migration from Developing Countries : Study on India.* DFID/ILO seminar at the Institute for Public Policy Research, London, June, Geneva, ILO, 81 p.

LEIBENSTEIN H., 1978 - *General X-efficiency theory and economic development*. Harvey Leibenstein. New York : Oxford University Press, 189 p.

MAJUMDAR T., 1994 - Old World is the New World. *The Telegraph*, Calcutta, 8 August.

MARTIN P., 2001 - *Economic Trends and Professional Labour Migration: US Experience and Implications for Asia*. Report presented at the Workshop on International Migration and Labour markets in Asia, February 1-2, Tokyo.

MEYER J., BROWN M., 1999 - Scientific Diasporas: A new Approach to the Brain Drain. *Management of Social Transformations* Discussion Paper Series, No. 41, 14 p.

NATIONAL PRODUCTIVITY COUNCIL, 1991 - Productivity Levels in Asian Countries, *Productivity*, 32(2) : 353-355.

NATIONAL SAMPLE SURVEY ORGANISATION , 2000 - *Employment and unemployment in India, 1999-2000 : key results.* NSS 55th round, July 1999-June 2000. [New Delhi] : National Sample Survey Organisation, Ministry of Statistics & Programme Implementation, Govt. of India, 1 v. (pagination multipl.)

SAXENIAN A., 2000 - Silicon Valley's New Immigrant Entrepreneurs. *CCIS Working Paper* 15, 30 p.

SEN A., 1986 – « Economic Distance and the Living Standard ». *In* AHOOJA-PATEL K., DRABEK A. G. and NERFIN M., (eds.) : *World economy in transition : essays presented to Surendra Patel on his sixtieth birthday,* Oxford, New-York, Pergamon Press : 63-74.

WTO, 2000 - *Communication from India – Proposed Liberalisation of Movement of Professionals under General Agreement on Trade in Services (GATS)*. World Trade Organization, S/CSS/W/12, (00-5077), 10 p.

Website Search:

Most Diaspora Profiles in Appendix I are based on search made for "Asian Indian Associations in the US", "Professional Associations in the US". Useful links were available through: www.garamchai.com

APPENDIX I

Profiles of Indian Diaspora Networks in the US.

Profiles of Selected Networks – Two Types of Indian Diaspora
National – professional, scientific; Sub-national – linguistic, provincial

Binod Khadria

American Association of Physicians of Indian Origin (AAPI)

AAPI is a Charitable Foundation and its goals are to

- Establish basic medical care clinics for the poor and needy in remote areas of India, (and underserved areas of the United States).
- Facilitate donations of medical equipment and supplies to India. Recipients will be government/municipal run or privately run charity hospitals. Urgently needed equipment includes: pacemakers, heart valves, catheters, microscopes, surgical instruments, dialysis machines and supplies and incubators, Raise funds and establish a physician fellowship program, and
- Raise funds and establish scholarship funds for Indian American Medical Students.

Donations to AAPI have helped existing medical and charitable activities in India, including:

- Two recent fellows from India
- The Arpana Charitable Trust in Haryana
- Swallows in India in Tamil Nadu
- The Rotary Hospital connected with the Kasturba Medical College in Manipal
- The Eye Hospital in Vyara, Gujarat
- Eye camps in cooperation with Volunteer Eye Surgeons International
- Latur Hospital Medical Center, Maharastra
- B.J. Medical College, Poona, and Children's Health and Welfare Foundation, Uttar Pradesh.

A Profile of AAPI: Before India's Independence, Indian physicians considered England to be the apt place for higher education in medicine. However, after the Independence in 1947, many turned to the United States to pursue their education. The East Coast was the destination for many young Indian doctors who sought education and success. Moreover, they were willing to brave the cultural differences of their newly adopted country to achieve these goals. In the 1970s, many international medical graduates (IMG) were actively recruited to meet the physician deficit in the United States.

AAPI's Origin: With the increase in ethnic and cultural diversity and the radical changes in health care in the United States, a group of concerned medical professionals founded the American Association of Physicians of Indian Origin (AAPI) in 1984. The formation of the organization started as a fireside discussion in Detroit, Michigan in 1982 with a simple goal to work for a level playing field for the international medical graduates.

A Description of its Current Projects and Activities: AAPI was forged in the midst of challenges that physicians of Indian origin have faced due to cultural barriers and bias against international medical graduates. Those barriers created obstacles for immigration and licensing opportunities. Today, the organization is a dynamic body, spearheading legislative agendas on health care and influencing the advancement of ethnic medical organizations.

APPI Membership: AAPI Headquarter is in Chicago, Illinois. AAPI represents the interests of 32,000 physicians of Indian heritage in the United States and serves as an umbrella organization for 100 professional associations. It is the largest ethnic medical organization in the nation. AAPI members have been practicing in urban areas, inner cities, rural areas, and peripheral communities around the country for the past 25 years. To assist its 9,000 plus members, AAPI is constantly recreating its multiple facets to accommodate the changing needs of its membership.

Medical Students: Although Asian Indians constitute less than 1 percent of the population in the United States, they constitute 10-12 percent of the student body in medical schools in the U.S. This dynamic, bright, and enthusiastic group is our future. Their membership in AAPI is growing faster than any other group.

Legislative role: One of AAPI's most important goals has been to stay involved in shaping the healthcare policies in the United States. With this in view, a full-time Legislative Office was established in Washington, D.C. in 996. The Legislative Office has created a database, which identifies 23,000 AAPI physicians by their congressional district. Developing a political infrastructure within the organization paves the way for increased political awareness and exposure on Capitol Hill. AAPI's policy statement on managed care was used as the basis of an important piece of legislation that would establish a "Patient's Bill of Rights". Policies affecting graduate medical education and the physician workforce have been issues that have received AAPI's major focus in the last few years. The organization believes that the criteria for eligibility of Graduate Medical Education should be based on an individual candidate's merits, and market forces should determine the number of physicians.

Clerkship Program: Since 10-12 percent of the freshman medical students in the United States are of Indian heritage, AAPI is creating a Clerkship Program in alliance with the Indian Ministry of Health and the medical schools in India. This program is designed to help Indian American freshman medical students in the U.S. learn medicine as it is practiced in India while enjoying their cultural heritage. Rotations are developed through collaborative efforts with the Medical Council of India. Several medical students have already availed of this opportunity and have enriched their experience.

AAPI's Mission: AAPI is a forum to facilitate and enable Indian American Physicians to excel in patient care, teaching and research, and to pursue their aspirations in professional and community affairs. Motto is Unity of purpose, Collegiality, in Action, Commitment to Excellence and Compassion towards Fellow-Beings.

Vision: Promote professional solidarity in the pursuit of excellence in patient care, teaching and research. Bring to American medicine the distinctive contributions from India. Advance the American creed of one nation under God, indivisible and with liberty and justice for all.

Values:

- Respect for human dignity.
- Commitment to collegiality and ethical conduct.
- Promote the professional advancement of colleagues.
- Pursuit of excellence.
- Commitment to community service.

Goals enable members of AAPI to:

- 1) Provide the best patient care with compassion.
- 2) Maintain the highest standards of ethics and professionalism.
- 3) Help patients to become fully informed and empowered partners.
- 4) Maintain their professional pride in the practice of medicine.
- 5) Advocate for professional freedom.
- 6) Advance their knowledge through continuing medical education.
- 7) Pursue careers in academia, research, and administrative cadres.
- 8) Remain current and knowledgeable in contemporary and anticipated legislative and regulatory changes affecting the practice of medicine.
- 9) Assert equal protection in all their professional pursuits through collective advocacy.
- 10) Promote vibrancy of the AAPI by facilitating it to embrace change and teamwork, and subordinate personal interest in the pursuit of a shared vision.

The organization's meteoric rise from a basement twenty years ago to become one of today's premier ethnic medical associations is a tribute to its past leaders, a network of hardworking committees, and a constituency of 35,000 physicians and almost 10,000 medical students and residents. Its membership has had a long-standing record with philanthropic activities and we firmly believe in giving back to the community through the AAPI Charitable Foundation. This commitment extends back to India, as well as to a variety of local projects led by member associations in the United States. So that the AAPI website can become an even more valuable resource, it encourages visitors for comments, suggestions, and questions. Although financial support is always appreciated by AAPI, it prefers direct and active involvement of practicing physicians. The MSR (Medical Student and Resident section) along with the YPS (Young Physician Section) are beginning an intensive campaign to recruit practicing physicians to act as mentors to help young physicians. It accommodates any level of involvement from simply reviewing abstracts in our research contest to active speaking and networking.

Shadowing:

- Geared towards 3rd and 4th year medical students, who are rarely exposed to many medical specialties
- Provides students with the opportunity to learn more about a specific fields

Internships/externships:

- As medical students graduate from foreign medical schools, their opportunities to practice in the US are becoming more limited each year.

AAPI looks for opportunities to help foreign graduates obtain experience.

Housing:

- Students and residents routinely travel across the country for a variety of reasons ranging from away electives to residency program interviews.

AAPI coordinates help in providing inexpensive housing options, which can vary from one night to an entire month.

AAPI, as a non-profit organization, represents over 30,000 Indian American Physicians. The Medical student/resident section (MSR) addresses issues geared more towards medical students and physicians in training. Its focus includes:

1. Networking – To bring together present and future physicians, AAPI has a mentorship program that is Internet based so that people find others in places or specialties of interest. This 1800 members programme is growing rapidly.

2. Events – Two interim and one main conferences are hosted every year in areas of interest to Indian physicians. It also holds CME conferences and collaborates with other national organizations like NETIP & NETSAP.

3. Service – AAPI has 13 primary care centers that provide free medical care all over India. The MSR section is developing a service project that will allow physicians in training to

lecture on pertinent health issues and develop useful solutions while putting them into practice in clinics in India. It also collaborates with various organizations in the US that are currently serving those in need. AAPI-MSR is expanding quickly and is working towards continuing to address the needs of Indian American physicians in the US and providing services to those less fortunate both here and in India.

Enterprising Pharmaceutical Professionals from the Indian Subcontinent (EPPIC)

Mission Statement:

- To provide an environment that promotes networking and entrepreneurial mentoring for professionals from the Indian subcontinent (ISC) in the Pharmaceutical, Biotechnology and Related Industries (PBRI), and to create opportunities of mutual benefit and be a resource for PBRI, educational institutions and students in the ISC.

EPPIC Overview

- EPPIC was formed in March 1998 and registered as a non-profit organization in September 1998. Currently there are over 70 registered members, and 6 charter members of EPPIC. In addition, over 275 individuals are on a distribution list representing over 65 companies. EPPIC's nine meetings to date have each attracted an attendance of 50-90 persons.

EPPIC's primary goals are as follows :

- To provide a forum for networking and expanding professional opportunities.
- To provide a forum for developing entrepreneurial opportunities for professionals from the Indian sub-continent in the PBRI.
- To provide a forum for establishing ties with, and to act as a liaison for, PBRIs and educational institutions in the Indian sub-continent, and creating opportunities for mutual benefit.
- To be a resource for students aspiring for careers in PBRIs in the U.S.

Activities:

- To date, EPPIC has organized twenty meetings. In addition, EPPIC has hosted Mr. Chandrababu Naidu, Chief Minister of Andhra Pradesh, on September 21. EPPIC proposed to act as the Liaison Organization in the U.S. for Andhra Pradesh's Biotech Park and Knowledge Park Project.

EPPIC Organization: Board of Directors, Executive Committee, Charter Members.

Membership

Eligibility:

- Any person from the Indian Subcontinent (originating, either directly or indirectly, from the Indian Subcontinent, or having some substantial social, business, or familial connection with the Subcontinent, i.e., encompassing the modern states of India, Pakistan, Bangladesh, Sri Lanka, and Nepal) dedicated to the purpose of this organization as outlined below shall be eligible for membership upon recommendation by the Membership Committee:
- a) Foster networking between entrepreneurs, industry leaders, and executives within the pharmaceutical industry, biotechnology, and related industries, and the members of the Corporation.
- b) Encourage, support, and nurture entrepreneurship among professionals from the Indian subcontinent by providing education and mentoring assistance for such professionals.
- c) Build business, research, and networking bridges between corporations, professionals, educational and research institutions and individuals in the U.S. and the Indian subcontinent.

Conditions:

- Member must observe the principles and ethics outlined in the EPPIC by-laws that are established from time to time by the Board of Directors.
- Email registration: e-mail:mailto: eppic2001@hotmail.com and a cheque for $35 to:
- Eppic Global Network PMB #402 4546 El Camino Real, Suite B-10, Los Altos, CA 94022-1069.
- Online registration is also available.
- Copy of the EPPIC Bylaws can be requested by e-mail enona@jaws.com

Network of Indian Professionals (NetIP)

It is a not for profit organization dedicated to the professional and cultural development, community service, philanthropy and the overall advancement of South Asian-Americans and the communities in which we work and live. NetIP North America is creating and fostering the growth of highly talented, socially responsible and dynamic South Asian professionals through an organization striving to: (a) Foster a stimulating and interactive environment for our members to establish and grow their professional relationships, and (b) Provide a variety of opportunities to lend time and support to community service organizations across North America and overseas. The professions it covers include Financial Services, Accounting, Law, Medicine, Commercial and Investment Banking, Systems/Information Technology, Engineering, Management Consulting, Marketing, Public Relations, Advertising, Government, Education, Fine Arts, and more.

Quarterly Themes for NetIP-affiliated Chapters are operationalized through email questions on Community Relations, Development, Cultural Awareness, Political Awareness, Community Service. NetIP North America consists of chapters of the following organizations: NetIP (Network of Indian Professionals), NetSAP (Network of South Asian Professionals), SAPNA (South Asian Professionals Network Association). All chapters are to meet certain Chapter Requirements to stay affiliated with NetIP North America. All future chapters shall henceforth fall under either the names of NetIP or NetSAP. NetIP North America chapter is a continental not for profit organization of South Asian professionals, dedicated to the professional and cultural development, community service, philanthropy and the overall advancement of South Asian-Americans and the communities in which we work and live. In order to fulfill this mission, NetIP does the following:

- Enhances professional development via speaking engagements and seminars
- Assists the disadvantaged through philanthropic and fund raising activities
- Provides a forum for networking and developing bonds
- Provide a variety of opportunities to lend time and support to community service organizations across North America and overseas.
- Address the professional, political, cultural and social issues that affect South Asian professionals today.

NetIP was started as a single chapter in Chicago in 1990. Since then, it has expanded to the West Coast, the East Coast, the South, Central, and the North, with almost 6,000 members. The growth of the organization has been amazing and interest is spreading across North America, as well as worldwide. In order to become a chapter member of NetIP North America, start-up chapters must broadly follow the mission of the national organization. After submitting a letter of intent, a start-up chapter becomes a full voting chapter after a six-month probationary period during which time the chapter has the opportunity to become an established organization. After the six-month period, the chapter becomes a full voting member of NetIP North America. Each local chapter is independently run, and local chapters meet on an annual basis to exchange ideas and coordinate efforts. The need to unify the goals and aims of the various organizations has been a chief concern of the founding members. Therefore, in April 1994, established NetIP organizations and interested individuals gathered in Las Vegas, Nevada for a Nationwide Network of Indian Professionals Conference. Since then, there have been three other conferences in Chicago, Dallas, and Seattle to establish a foundation for a parent chapter.

At the Seattle conference in September 1995, a National Board of Directors was created to determine national policy and implement national goals. Each local chapter is represented on the National Board by a local chapter liaison. The goals of the National Board include the following: assisting new start-up chapters, enhancing communications between chapters, assisting in national conferences and increasing national awareness. Two Co-Chairs of the National Board have been elected to ensure implementation of national tasks. Since then, there have been three conferences, in New York, Atlanta, and Los Angeles. These annual conferences bring together a range of experience, culture, and knowledge, to help solidify the goals of the national organization, to determine the steps to take for the future, and to bring together the local members to network, grow professionally and meet new friends.

NetIP North America Chapters provide a forum for individuals to come together and help not only the community in which they live, but also the community abroad. From Cry Walks/Runs, Junior Achievement programs, Meals on Wheels, Habitat for Humanity, to Celebration of Cultures, Heart and Strokes Bike Event, Educational Scholarships, and fund raising for various causes such as Leukemia, the American Cancer Society, AIDS, education and assistance to poor children in India, and many more, NetIP does make a difference, its members are the difference. Contact person for these activities is the Public Relations/Community Relations Co-Chair.

There are Community Links too like Sakhi for South Asian Women, which is a New York city based organization committed to ending violence against women of South Asian origin, viz., Bangladeshi, Bhutanese, Indian, Nepal, Pakistani, Sri Lankan. “Child Relief and You” (CRY) is an organization for the benefit of disadvantaged children in India.

Association of Indians in America (AIA)

It is the oldest national association of Asian Indians in America. It was founded on August 20, 1967 and incorporated in 1971. AIA was granted the *IRS tax-exempt status* in January 1973. A non-profit organization, Association of Indians in America (AIA), was formed to provide a forum of common action to all whose *Indian heritage* and *American commitment* offer a bond of unity. AIA is the grassroots national organization of Asian Indian Immigrants (and their descendants) in the United States, fostered on the democratic principle of “one member one vote”, with chapters and membership spread across the United States of America. AIA represents the hopes and aspirations of those immigrants who are united by their common bond of Indian heritage and American commitment. The Objectives of the Association are threefold:

- To concern itself with the social welfare of the Asian Indians who have decided to live in the United States, and to help them become a part of the mainstream of American life.
- To facilitate participation by the members of AIA and others in the development and progress of India, and
- To facilitate involvement of the members of the Asian Indian Community in American Community life through charitable, cultural, and educational activities.

National Federation of Indian-American Associations (NFIA)

Serving the Indian-American Community since 1980, the NFIA urges the community to fight discrimination, break “glass ceiling”, get involved in the political process, and build a better community here and work for the welfare of the people of USA and India. Its motto is “Teamwork is Unity and Unity is Strength, Teamwork with Unity is Success”. With headquarters at 319 Summit Hall Road Gaithersburg, MD 20877 Ph. 301-948-8069, NFIA is the largest Indian-American organization in the U.S.

NFIA’s mission is to promote and foster goodwill between the people of Indian origin and all other Americans, provide a forum for fellowship, exchange of ideas, and strategic planning for community activists. It also aims to provide resources for educational and humanitarian causes in the U.S. and India, cultivate and encourage cooperation among Indian-American organizations, protect basic rights and privileges for all Indian-Americans as citizens

of this country, influence public policy by interacting with Congress and the White House, promote mutually beneficial relations between the U.S. and India, ease assimilation of newly arrived immigrants from India, and train Second Generation Indian-Americans.

NFIA Profile: National Federation of Indian-American Associations (NFIA) was founded in New York City on May 24, 1980 by 100 area associations. NFIA was known earlier as National Federation of Asian Indian Organization in America (NFAIO). The membership of NFIA is open to all non-profit, Indian-American associations in the U.S. NFIA provides a common platform for its member organizations to coordinate civic, cultural, educational, social, economic, and community affairs. NFIA takes up important issues relating to Indo-U.S. relations, and legislative issues of interest to the Indian-Americans. NFIA is an umbrella organization of over 250 member Indian-American organizations in the U.S.

NFIA Membership: NFIA membership includes several large umbrella organizations with hundreds of member organizations of their own, like Federation of Indian Associations (FIA) National Capital, FICA Cleveland, FIA Chicago, FIA Los Angeles, FIA San Diego, FIA Bay Area, IANT Dallas, Brihan Maharastra Mandal, FOKANA, India League of America, Leuva Patidar Samaj, and FOGANA Mid-Atlantic.

NFIA Regional Offices: Capital (MD, VA, WV, DC), Central (IL, IA, MN, MO, WI). Great Lakes (IN, MI, OH), Mid-Atlantic (DE, NJ, PA), Mountain (CO, ID, KS, MO, NE, ND, SD, UT, WY), New England (CT, ME, MA, NH, RI, VT), New York (NY), Pacific (N) (AK, HI, OR, WA), Pacific (S) (CA, NV), South (AL, AR, KY, LA, MS, TN), Southeast (FL, GA, NC, SC) and Southwest (AZ, NM, OK, TX).

NFIA Activities: National Biennial Convention, Annual/Biennial National Conference, Regional Conference, Conference on Family & Seniors, Congressional Luncheon/White House Briefing, Youth Leadership Conference, Asian Pacific American Heritage Month Celebration, U.S.-India Business Conference, U.S.-India Relations-Status Report.

Contact Information

President: Dr. Parthasarthy Pillai, 9000 Acredale Court, College Park, Maryland 20740 USA. Phone (301) 935-5321, Fax (301) 935-2627, e-mail: mailto:PPillai1@aol.com

NFIA Website: http://www.nationalfederation.org/www.nfia.indianet.org

General Information: mailto:info@nationalfederation.org/info@nfia.indianet.org

NFIA believes the fundamental problems in India are, amongst others:

Infrastructure: Lack of infrastructure is impeding foreign investments in India and is hampering India's progress. India needs to create an atmosphere conducive to attract foreign and domestic investments. Foreign investments will be tempered by long-simmering frustrations over government policy, shortage of desirable assets, and investment loans. India must massively tackle the problems and provide basic amenities like decent housing, broad network of roads, enough electricity, good sewer and sanitation systems, excellent standardized schools, best health clinics, and honest political systems. India should encourage projects like the NRI investment in the Cochin International Airport.

Educational Opportunity: Facilitate admission of NRI children to colleges and universities and institutions of higher learning in India. Establish a Center in India where Nurses desiring to work in the United States could take qualifying examinations offered by the Commission on Graduates of Foreign Nursing Schools (CGFNS) in the U.S.

Corruption: Corruption, both political and bureaucratic, has spread to all levels of government as well as private sector in India. Because of corruption, which impede, delay, and frustrate businesses, many countries are afraid to do business with India.

Red Tape: Facilitate and encourage regular visits of scholars, businesspersons, doctors and engineers by prompt issuance of visas and simplifying the regulation.

Educational System: Improve and strengthen educational system by providing equal opportunities for all students, irrespective of caste, political considerations, or religion. Provide jobs to all qualified applicants.

Healthcare: Affordable Quality Healthcare is a necessity and should be provided to every Indian. Government should provide clean water, clean air, nutrition, and immunization, hospitals, outpatient clinics, etc. These are building blocks for prosperous and healthy nation.

Population: India's population is growing at the rate of 50,000 new births per day and this growth should be contained through sex education and birth control.

Global Organization of People of Indian Origin (GOPIO)

It is a federation of associations all over the world. It welcomes Indians to GOPIO's international network of People of Indian origin (PIO). GOPIO was founded at the First Global Convention of People of Indian Origin in New York in 1989. The initial thrust of GOPIO was fighting human rights violation of people of Indian origin. This has been improved in the last one decade. GOPIO has now set its priorities in pooling its resources, both financial and professional, for the benefit of PIOs, the countries they come from and India. Towards this goal, it welcomes them to join in its international effort. GOPIO is accredited by the United Nations as an NGO to participate in the World Conference against Racism. Its motto is "Global Indian Communities: Time is now for Unity".

Other Networks

Some other national (professional) and sub-national (provincial, linguistic, religious, etc.) associations of the Indian Diaspora in the US are listed below:

A. Professional National Associations

- American Society of Engineers of Indian Origin (ASEI)
- Asian American Hotel Owners Association
- Indian Professionals Network – Open to all areas for Indian American professionals and friends
- Indian Business and Professional Women
- Network of Indian Professionals
- Network of South Asian Professionals
- Silicon Valley Indian Professional Association
- TiE- The Indus Entrepreneurs, which has now been reported to be opening its doors to the Chinese in Asia, apart from earlier entry of Pakistan from South Asia[1].

World Wide Web site of the IIT Bombay Heritage Fund is a non-profit alumni organization. IIT Bombay alumni are invited to register in order to receive regular news updates and all other benefits of membership. No formal dues are charged, but you are encouraged to make tax-deductible donations to help IIT Bombay's "Tryst with Excellence". Apart from the various cities in the USA, it has chapters in Bangalore, Chennai, London, Mumbai, New Delhi, Pune (India), and Singapore.

B. Provincial Sub-national Associations

- Assam Association of North America (AANA): Indian expatriates connected with the north-eastern state of Assam and residing in the US or Canada are members of this culturo-linguistic organisation. It holds its Annual Convention every year on the first weekend after the American Independence Day of 4th July, in a different city in the US, and this tradition has continued for the last twenty-three years. Development issues of particular concern to the state of Assam and its people, and new methods of interaction with the "home state" and the "home country" deliberated upon seriously.
- Bengali Associations: Bengali Association of Greater Rochester, Bay Area Prabasi Inc., Bichitra – non-profit Bengali cultural and religious organization located in Metro Detroit area.
- Gujarati Associations: Gujarati Association Dedicated to Promote and Preserve the Heritage of the Gujarati People of Southern California, Gujarati Cultural Association of Bay Area, Gujarati Kshatriya Association of Texas – a non-profit social and cultural group, News and Information for all Gujaratis, Gujarati Samaj of New York, etc.

[1] "TiE to open doors to Chinese", report by Mohan K. Tikku in San Francisco, *The Hindustan Times*, New Delhi, 12 June, 2002.

Kannada Associations: Kannada Koota of Northern California – Cultural oriented organization cultivating social, recreational, and cultural activities for the Kannada community of Northern California, Kannada Organization of New England, Kaveri – Cultural organization representing the Kannada-speaking people from Karnataka state in India, who have settled in the Maryland-Washington D.C.-Virginia area, New York Kannada Koota – Cultural organization representing the Kannada-speaking people from Karnataka state in India, who have settled in the New York area.

- Malayalee Associations: Colorado Malayalee Association, Federation of Kerala Associations of North America –Fremont, CA – Conducts youth leadership conferences, workshops, and seminars to develop, sharpen, and enhance leadership skills, political awareness, and civic responsibilities among the Kerala youth, India American Malayalee Chamber of Commerce, NY, etc.

Marathi Associations: DFW Maharashtra Mandal – Non-profit organization serving the Maharashtrian community in the Dallas-Fort Worth area. Brihan Maharashtra Mandal, Maharashtra Mandal, New York etc.

- Punjabi Associations: Punjabi Cultural Society of Chicago is a cultural oriented organization cultivating social, recreational, and cultural activities for the Punjabi community, etc.
- Tamil Sangams: Austin Tamil Sangam, Arizona Tamil Sangam(AZTS), Bay Area Tamil Manram, etc.
- Telugu Associations: Bay Area Telugu Association, Tri-State Telugu Association – Chicago ,IL, Telugu Association of Greater Chicago, American Telugu Association, etc.

C. Miscellaneous Indian Associations in the US

- Arizona India (AZ India.com) – Information on events, news, etc in Arizona.
- Charotar Patidar Samaj – Information on events, news, families, scholarships and more.
- Cultural Association of India – Alaska – Information on the active and friendly Indo-Pak community.
- Indo-American Chamber of Commerce of Greater Houston – to foster a better relationship between various businesses and help to create a better understanding between USA and India through businesses and joint ventures.
- India Association Tallahassee, Florida.
- Jain Center of Northern California.
- Mahdavia Publications Mahdavia Publications a not for profit organization mainly engaged in publication and distribution of Mahdavia Islamic Literature in English language for the benefit of the youth.
- India Club of Greater Seattle – informal social meeting place activity center for kids, youth, adults and seniors.
- India Association of Greater Charleston India Association of Greater Charleston is a cultural organisation in Charleston, SC. Key words for search engines: India, Association, Charleston, South Carolina, Culture.
- Indo-American Association (IAA) – Information regarding upcoming events, tickets, membership and newsletters.
- Indo-American Golf Association – serving the advancement of the Indo-American community through the game of golf.
- Indo-American Democratic Organization, Inc. – lobbies on behalf of the Indian-American community on issues such as immigration, affirmative action, education, social security, Medicare, and welfare reform.
- India Abroad Center for Political Awareness (IACPA) – Advocacy organization for Indo-Americans. Information on demographics, history, politics, and civil rights.
- India Community Center of Austin – yellow pages, community news, events calendar, and more.

- Mahdavia Publications a not for profit organisation mainly engaged in publication and distribution of Mahdavia Islamic Literature for the benefit of the youth with Indian origin, and also engaged in inter-faith dialogue to promote freedom of religion and to promote harmony among the Indian people.
- Michigan Indian Community.
- Sangeet Sargam promotes cultural programs from the Indian subcontinent in Hampton Roads of Virginia. Its goal has been to organize programs each year from a variety of cultural arts including music, both popular, classical, semi-classical, dance and drama.
- Southern California Indian Americans.
- Uttranchal Association represents the newly formed state Uttaranchal in India.

APPENDIX II

Some Specific Contributions of the Indian Diaspora in the field of Science and Technology in India[1]

Binod Khadria

At the behest of the High Level Committee (HLC) on Indian Diaspora, a Science & Technology (S&T) Expert Group on Role of Non Resident Indians (NRIs) and Persons of Indian Origin (PIOs) was constituted under the auspices of the Department of Science & Technology, Government of India in May, 2001. The Expert Group, of which the author of this case study was a member, (i) reviewed the contributions by Indians abroad to the Indian S&T programs; (ii) scanned the existing mechanisms and schemes that Indians abroad can avail of; and (iii) recommended new avenues and framework to network with S&T professionals of Indian Origin abroad (NRI and PIOs) for accelerating India's excellence in science and technology. It also looked at the Chinese & Israeli system for channelizing their immigrants for national S&T programs. The S&T Expert Group report reflects not only the views of the members of the Expert Group, but also the perceptions offered by the Indian Scientific Ministries, Departments and Agencies (MIT, MNES, DRDO, DBT, DOD, CSIR, ICMR, ICAR, NIC), technical education institutions, professional bodies and associations (MRSI Bangalore and CII Delhi), select national R&D laboratories, eminent scientists of international repute in India, Indian Missions in UK, USA and Israel, and distinguished scientists of Indian origin abroad.

The Scientists & Technologists of Indian Origin (STIOs) abroad have received international recognition for their calibre in fields including Information Technologies & Computer Sciences, Chemical Science & Engineering, High Energy Physics, Meteorological Sciences, Biotechnology, Materials Science & Engineering, and Medical Sciences and Health. An illustration of their contributions to Indian S&T is as follows.

The Scientists & Technologists of Indian Origin (STIOs) abroad have received international recognition for their contributions in various fields:

- Setting up of Advanced Network Laboratory & IBM Research Centre at IIT Delhi; Kanwal Rekhi School of Information Technology, and Bhupat and Jyoti Mehta Biosciences and Bio-engineering School at IIT Mumbai; G.S. Sanyal School of Communications, Vinod Gupta School of Business Management and Advanced VLSI Design Laboratory at IIT, Kharagpur; Chairs on Data Flow Computing at IIT Kanpur; Centre for Theoretical Physics at IISc Bangalore; Centre for Atmosphere & Ocean Sciences

[1] These are excerpted from the Report of the S&T Expert Group (of which the author of this case-study has been a member) to the HLC on Indian Diaspora.

at University of Allahabad, Allahabad; Installing numerical model for medium range weather forecasting & long-term prediction of monsoons; feasibility of setting up Neutrino Observatory in India; setting up of LV Prasad Eye Institute at Hyderabad.

- Access of Indian scientists to research facilities like Cancer Cell Lines at National Cancer Institute, Bethedsa, Maryland for testing anti-cancer and anti-AIDS compounds; Facilities at John Hopkins University to test *neem* extracts for their activity against malarial parasite; Cancer Cell Lines at Harvard Medical School to test HCG Vaccine & antibodies for treating /preventing lung cancer.
- Participation of Indian scientists from NPL(Delhi), ISRO (Trivandrum), PRL(Ahemedabad), IITM(Pune), IISc (Bangalore) in a major international program, the Indian Ocean Experiment (INDODEX).
- Successful negotiations for placement of Indian post-doctorate fellows in premier academic-cum- research institutions abroad for advanced research internships and training attachments in cutting edge fields such as (i) Interfacial science & colloidal phenomena, lipids research, hydrocarbon chemistry; (ii) Distributed computing & verification, quantum computing, VLSI, graphics & automatic reasoning systems; (iii) Prediction & long-term variability of monsoons, climate change and impact on Indian-sub-continent, prediction of tropical cyclones; (iv) RF/RHD vaccine development, functional genomics, viral hepatitis, interferon research; (v) thin films, nanomaterials, neutron scattering of materials, ceramic materials, semi-conductor physics.
- Mobilizing Indian professionals abroad for CME for Indian Pathologists under the aegis of Indian Association of Pathologists & Microbiologists; Asian Schools on High Energy Physics; Meetings under the aegis of Oil Technologists Association of India etc.
- Production of affordable Hepatitis Vaccine in India by Shantha Biotech, Hyderabad, a venture spearheaded by an Indian expatriate who returned to India; complete genome sequencing of Indian isolate of Hepatitis-C virus that causes chronic hepatitis. In collaboration with US-based Indian scientist.
- Award of contract research assignments by American Pharmaceutical Companies to Indian R&D laboratories on development of new drug molecules.

Apart from these general contributions, some illustrations of inputs in select specific fields of specialisation are given below.

Information Technology and Computer Sciences

Dynamic Indian Diaspora, particularly in Silicon Valley, and its networking with professionals and institutions in Bangalore in information technology sector has been instrumental in elevating Bangalore from India as one of the 46 locations of "Technology Hub" in the world; Hyderabad is yet another fast emerging hub. Availability of education and research facilities to train skilled professionals, population with entrepreneurial and innovative drive, presence of production, R&D and consultancy centers of companies and MNC and increased inflow of venture capital for start-up high tech companies have been the other favorable elements for Bangalore to be endowed with the enormous capacity to innovate and get recognized as a Technology Hub in the world.

Mr. Kanwal Rekhi, an IIT Mumbai alumnus, migrated to US and is popularly hailed as the godfather of Indian entrepreneurs in Silicon Valley. He launched the Indus Entrepreneurs (TiE) as a non-profit conglomerate of NRIs in 1992, which is dedicated to advancement of entrepreneurship with some of the local chapters in India (Hyderabad, Delhi, Chennai, and Mumbai). This company has been instrumental in mobilizing venture capital in the IT sector. Eminent Indian professionals abroad in the area of Computer Science and Information Technology are based in institutions like Cisco Systems, Department of Electrical Engineering and Computer Science of MIT, Bell Labs, John Hopkins University, Verity Corporation, SRI International, University of Maryland, Georgia Institute of Technology and the universities of Princeton, Texas, Illinois and New Mexico. These Indians have established strong research links in disciplines such as Data Flow Computing, Distributed Computing and Verification,

Algorithms, Quantum Computing, Hardware Verification, VLSI, Graphics and Automatic Reasoning Verification with Indian institutions like IITs, IISc, TIFR, MAT Science, TRD, etc. These Indian professionals abroad have been instrumental in influencing companies like CISCO to set up CISCO R&D Center in Bangalore and Advanced Network Lab at IIT, Delhi with equipment and manpower training fellowships funded by CISCO and setting up of IBM Research Center at IIT, Delhi. They are willing to create new centers of excellence in fields such as Formal Methods, VLSI, and Quantum Computing relevant to Cryptography. Some of these have been holding Chairs at Indian institutions in the areas of Theory of Computation, Data Flow Computing.

Chemical Sciences and Engineering

Distinguished Indian chemical engineers and scientists abroad have been instrumental in providing interface with India in several ways. These include:

- (i) Award of contract research assignments by American pharmaceutical companies to Indian laboratories such as NCL (Pune), IICT (Hyderabad) and CDRI (Lucknow) for development of new drug molecules.
- (ii) Placement of Indian post-docs for advanced research and training attachments in premier academic-cum-research institutions like Illinois Institute of Technology and the universities of Illinois, Purdue, Clemson, Texas, South California and Bristol. Indian post-docs placements abroad have been in fields such as Interfacial Science and Colloidal Phenomena, Reactor Engineering, Mathematical Modeling of Chemical Processes, Lipids Research, Hydrocarbon Chemistry, Industrial Separation, Distillation and Adsorption etc.
- (iii) Access of Indian scientists to certain facilities like Cancer Cell Lines for Testing Anti-cancer and Anti-AIDS Compounds at National Cancer Institute in Bethedsa, Maryland.
- (iv) Offer of technical consultancy to Indian companies like Gas Authority of India Limited on Natural Gas Hydrates, serving as resource person to Oil Technologists Association of India and maintaining professional contacts with Indian companies like Dabur, Piramal Pharmaceuticals, Biogen etc.

High Energy Physics

The Indian High Energy Physics community abroad based in institutes like University of Texas, Bell Laboratories, University of Maryland, Fermilab, Pennsylvannia State University, McMaster University, and Syracuse University have been associated with actions such as:

- (i) Feasibility Study for Setting up of Neutrino Observatory in India, which will involve development of new neutrino detector and attract young Indian experimental physicists with Ph.D. in Particle Physics and Neutrino Physics from within India and abroad;
- (ii) Serving as resource person to Asian Schools on High Energy Physics and National Workshop on High Energy Physics-Phenomenology;
- (iii) Setting up of the Center for Theoretical Physics at IISc, Bangalore; and
- (iv) Hosting Indian researchers from TIFR (Mumbai), IMS (Chennai), IIT (Kanpur), PRL (Ahmedabad), SINP (Kolkata) and IUCAA (Pune) for research and training attachment.

Meteorological Sciences

Indian meteorologists of international repute abroad have helped Indian initiatives, particularly those related to prediction and long-term variability of monsoons, climate change, and its impact on Indian sub-continent and prediction of tropical cyclones. In terms of specifics, the Indians based in the Institute of Global Environment and Society, Scripps Institute of Oceanography, University of Maryland and Florida State University have been instrumental in:

- (i) Installing numerical model for medium range weather forecasting and for long-term prediction of monsoons;
- (ii) Facilitating participation of Indian scientists in major international project, INDOEX (Indian Ocean Experiment);
- (iii) Setting up of a Center for Atmosphere and Ocean Sciences at University of Allahabad, and
- (iv) Hosting Indian scientists and post-docs from institutions like NCMRWF and IMD (Delhi), IITM (Pune), Andhra University, IISc (Bangalore), PRL and SAC (Ahmedabad) and IIT Delhi.

University of Maryland has a Department of Meteorology, which focuses on tropics and monsoons, including seasonal prediction. The Indian faculty in this institution has in particular rendered useful services to the Indian requirement in meteorology.

Biotechnology

Distinguished Bio-technologists of Indian origin based in institutions like Monsanto Company, Centre of Plant Biotechnology Research at Tuskegee University, University of Illinois, the Salk Institute, The Rockfeller University, Massachusetts Institute of Technology, National Institute for Medical Research and International Rice Research Institute have contributed to Indian biotechnology research, setting up of industrial joint ventures, mobilizing investments for biotech ventures in India as well as human resource development programmes covering fields of plant breeding and genetics, human genetics, oncology, immunology and micro-biology, neuro-biology and fertility.

The success stories involve association of a US based Indian scientist in sequencing of genome of Indian isolate of hepatitis C virus which causes chronic hepatitis, liver cirrhosis and cancer that affects around 20 million people in India and production of an affordable Hepatitis B vaccine in India by Shantha Biotech Hyderabad, a venture spearheaded by an Indian expatriate, who returned to India.

Materials Science and Engineering

Distinguished material scientists and engineers of Indian origin abroad are based in institutions like Watson Research Centre of Physical Sciences, Pranalytical Inc, Harvard University, Pennsylvania State University, Georgia Institute of Technology and Argonne National Laboratory, AT&T Labs, University of South California, Stanford University. They have been a source of providing expertise and partnership to collaborative research programmes in fields such as Thin Film Devices, Solid State Physics, Ceramic Materials, and Neutron Scattering of Materials. Some of these scientists of Indian origin abroad have been enrolled as Honorary Fellows of Materials Research Society of India. Some of the eminent NRIs on the technical and scientific societies such like ASM International have facilitated linkages of Indian scientists by inviting them as speakers to conferences and symposia. Indian engineers (alumni of IITs) have contributed as members of Motorola Research Team to develop Silicon based improved chip with better communication speed and this is significant for semi-conductor industry, Since the Company is keen for large scale commercialization and is being led by an Indian as Vice-President of the Company, India could take advantage in addition to the offers for Indo-US partnerships and creation of centers of excellence in Nano-technology in India through Indians abroad.

Medical Science and Health

Distinguished Medical Science and Health specialists of Indian Origin are based in Institutions like INSERM (Paris), Albert Einstien University (New York), Clevland Clinic Foundation (Ohio), John Hopkins University (Department of Immunology and Infectious Diseases), University of Texas (MD Anderson Cancer Research Center), Penn State College of Medicine (MS Hershey Medical Center), Stanford University (School of Medicine), Lab of Molecular Biology and Functional Genomic Unit and Gene Targeting Facility, and Fogarty International Center of NIH, Harvard Medical College University of South California (Research

Center for Alcoholic Liver and Pancreatic Diseases), University of Miami (Center for Liver Diseases), Kuwait University (Department of Microbial Pathogenesis and Vaccine Research), GBF German Research Center for Biotechnology, and University of Hamburg (Institute of Hormone and Fertility Research). These professionals are maintaining research and training links with the Indian laboratories in the fields such as communicable diseases, hemoglobinopathies, hepatocyte transplantation, neuro-sciences, gene therapy, molecular biology, immunology, surgical pathology, functional genomics, liver transplantation, oncology, viral hepatitis, hematology, RF/RHD vaccine development, interferon research, reproductive health etc. The NIH laboratories have over 100 specialists of Indian origin.

Some examples of the benefits to Indian medical science from Indians abroad are:

- A US based malaria immunologist of Indian origin (alumni of AIIMS) and having developed a vaccine against transmission stage of Plasmodium falciparum, provided facilities available at John Hopkins University to test the *neem* extracts prepared by NII scientist for their activity against malarial parasite.
- The HCG vaccine and antibodies which could treat or prevent lung cancer being developed in India were tested using cancer cell lines at Harvard Medical School with the cooperation of Indian abroad.
- A US-based pathologist of Indian origin has been coordinating since last 6 years a "CME Program for Indian pathologists in India" as an annual activity of Indian Association of Pathologists and Microbiologists (IAPM) involving participation of NRI based in Europe and USA.
- Setting up of state-of-the art hospitals in India (and an affiliated research center with some) with support in kind and cash of Indians abroad such as LV Prasad Eye Institute Hyderabad, Apollo Hospital Chennai, Medicity Chennai.

Endowments by US-based Alumni of IITs

US-based alumni of IIT Kharagpur and Kanpur have set up IIT Foundation to help their alma mater in upgrading research and education infrastructure and in keeping the faculty and students abreast of global trends in scientific and technological developments. IIT Kanpur Foundation has pledged Rs. 60 crores. IIT Kharagpur Foundation has dedicated Rs. 30 crores to the Golden Jubilee Partnership Program with IIT Kharagpur for (a) enriching the advanced research facilities at IIT Kharagpur; (b) Acquainting students and faculty with scientific and technological developments globally by setting up IIT Foundation Chair at IIT Kharagpur and establishing Golden Jubilee Distinguished Lecture Series on campus by world-renowned scholars and academicians and (c) giving incentive to undergraduate student ranked 1 to 100 in IIT-JEE who decides to join IIT Kharagpur in 2001 by giving Golden Jubilee Scholarship carrying a one time award of Rs. 50,000. Voluntary endowments from Indians abroad have resulted in setting up of Kanwal Rekhi School of Information Technology, the Bhupat and Jyoti Mehta Bio-sciences and Bio-engineering school; and. G.S.Sanyal School of Communications and Vinod Gupta School of Business Management at IIT, Kharagpur.

Initiatives by Association of Indian S&T Professionals Abroad

The overseas associations, such as the Association of Scientists of Indian Origin of America (ASIOA), American Society of Engineers of Indian Origin (ASEI) and American Association of Physicians of Indian Origin (AAPI), have contributed to enlarge the number of active Indo-US research collaborations and influence US S&T policy to suit Indian interests. Offers have been made to create emergency medical system and trauma center at Mumbai, accreditation of Indian hospitals in major Indian cities to the international standards and for assuring quality care to the patients by the former President of AAPI. It is pertinent to mention that Indian Ministry of Health is giving a serious thought to introduce accreditation system on a country-wide basis to ensure that the facilities, staff and services of quality are available in hospitals to Indian patients and offers of AAPI are timely utilized.

APPENDIX III

Statistical Appendix – Tables

Binod Khadria

TABLE 1: COMPARATIVE LABOUR FORCE CHARACTERISTICS IN INDIA AND SELECTED COUNTRIES: 1999/2000

BRAIN DRAIN (SURVEY 2000)			*SERVICES SECTOR EMPLOYMENT*	*OVERALL PRODUCTIVITY (1999)*		*LABOUR PRODUCTIVITY (1999)*		PRICE/QUALITY RATIO (SURVEY 2000)		HEALTH, SAFETY, & ENVIRONMENT		EMPLOYEE TRAINING (SURVEY)		SOCIAL RESPONSIBI-LITY (SURVEY)	
RANK (1-47)	COUNTRY	STD SCORE (0-10)	% OF TOTAL EMPLOYMENT *(1999)*	GDP/ PERSON EMPLOYED		GDP/ EMPLOYEE PER HOUR		DOMESTIC BETTER THAN FOREIGN		MGMNT. TAKES CARE (SURVEY)		HIGH PRIORITY IN COMPANIES		PVT. BUSINESS TAKES CARE	
				US $ 000	PPP$ 000	US $	PPP $	RANK (1-47)	SCORE (0-10)	RANK (1 - 47)	SCORE (0 - 10)	RANK (1-47)	SCORE (0-10)	RANK (1-47)	SCORE (0-10)
1	USA	8.524	74.3	69.5	62.5	36.29	32.60	2	6.9841	14	7.181	12	6.762	15	6.646
6	GERMANY	7.153	62.1	58.4	51.5	34.39	30.30	5	6.7711	8	7.690	9	7.082	19	6.400
7	IRELAND	7.119	57.6	61.1	58.0	34.31	32.56	19	5.9661	19	6.700	18	6.333	22	6.167
9	JAPAN	6.900	63.0	67.6	45.8	36.10	24.45	4	6.9600	23	6.364	6	7.313	27	5.879
10	SWITZERLAND	6.857	69.1	66.3	47.7	35.64	25.62	6	6.7347	9	7.673	7	7.306	14	6.653
11	AUSTRIA	6.700	63.0	55.4	51.4	32.08	29.74	1	7.1186	3	7.933	13	6.600	2	7.593
13	UK	6.343	71.7	52.0	44.9	28.25	24.39	28	5.2600	17	6.900	28	5.780	26	5.880
14	THAILAND	6.329	33.1	3.9	10.8	1.47	4.83	30	5.1163	31	5.581	35	5.163	36	5.395
18	AUSTRALIA	6.229	73.6	44.7	50.4	25.13	28.33	15	6.0412	12	7.361	16	6.474	17	6.515
21	ISRAEL	6.038	78.9	46.6	49.8	21.91	23.42	25	5.4118	26	6.000	20	6.192	32	5.692
23	BRAZIL	5.917	50.9	11.1	15.7	5.83	8.26	36	4.7391	24	6.167	22	6.043	24	6.042
24	FRANCE	5.802	70.9	62.6	56.4	35.94	32.35	14	6.1573	21	6.489	21	6.089	25	6.000
25	SINGAPORE	5.738	70.9	45.0	42.8	22.21	21.10	3	6.9836	11	7.443	2	7.770	5	7.377
26	ITALY	5.624	61.3	56.5	58.8	31.03	32.29	22	5.6905	37	4.976	44	4.376	38	5.200
27	MEXICO	5.556	56.2	15.5	24.5	7.29	11.48	35	4.7677	27	5.838	30	5.735	21	6.222
30	S. KOREA	5.429	61.1	20.3	33.3	9.02	14.79	31	4.9714	34	5.200	29	5.771	39	5.029
32	MALAYSIA	5.257	44.5	9.0	21.8	4.18	10.09	23	5.6571	29	5.657	26	5.913	30	5.714
33	TAIWAN	5.200	54.5	30.7	42.6	13.46	18.66	16	6.0000	20	6.533	31	5.729	23	6.067
35	TURKEY	5.111	34.0	8.6	17.9	3.80	7.92	29	5.1746	33	5.290	33	5.387	28	5.871
36	ARGENTINA	4.661	71.5	23.4	34.0	11.15	16.23	41	4.3415	45	4.574	37	5.041	40	4.959
37	INDONESIA	4.531	40.5	1.7	5.9	0.79	2.80	40	4.3830	40	4.898	36	5.102	45	4.163
38	SWEDEN	4.421	71.7	58.2	46.9	31.89	25.71	16	6.0000	5	7.789	4	7.553	9	7.026
39	CANADA	4.355	74.0	43.7	50.7	23.46	27.21	7	6.5902	10	7.516	17	6.355	11	6.774
40	CHINA	4.000	26.7	1.4	23.0	0.69	2.87	46	3.6322	18	6.733	19	6.289	20	6.292
41	NEW ZEALAND	4.389	67.4	30.6	38.7	16.30	20.60	9	6.3273	6	7.754	14	6.491	7	7.193
42	**INDIA**	**3.291**	**21.8**	**0.8**	**4.8**	**0.37**	**2.15**	**45**	**3.9250**	**46**	**4.152**	**43**	**4.436**	**43**	**4.709**
43	VENEZUELA	3.286	69.9	11.6	14.6	5.79	7.30	47	3.0476	39	4.952	40	4.667	37	5.268
44	PHILIPPINES	3.179	43.9	2.6	9.4	1.18	4.21	44	4.0702	32	5.474	23	5.964	29	5.789
45	RUSSIA	2.337	51.2	2.8	15.2	1.50	8.09	39	4.4304	47	2.902	47	3.457	47	3.415
46	COLOMBIA	2.280	56.5	6.4	17.4	2.93	7.95	43	4.2000	36	5.080	38	4.840	35	5.440
47	SOUTH AFRICA	1.932	66.1	17.1	41.7	8.39	20.20	34	4.8667	22	6.367	27	5.800	18	6.433

Source: Khadria, 2001a; compiled from data in IMD, 2000, *World Competitiveness Yearbook,* Lausanne, Institute of Management Development. *Various tables,* collated by the author.
Notes: Italicised column heads present "hard data" acquired from international and regional organizations, private institutions and national institutes. Roman column heads present results of Executive Opinion Survey through in-depth questionnaires. Some countries have common rankings and equal STD score values.

TABLE 2: COMPARATIVE OVERVIEW OF BRAIN DRAIN ESTIMATES OF GRADUATES OF VARIOUS INDIAN INSTITUTES

Institution Indicators	Indian Institute of Technology Bombay, Mumbai	Indian Institute of Technology Madras,Chennai	All India Institute of Medical Sciences, Delhi	Indian Institute of Technology Delhi,New Delhi
Year of Study	1987	1989	1992	1997
Period Covered	1973-77	1964-87	1956-80	1980-90
Population Size	1,262	5,942	1,224	2,479
Sample Size	501	429	402	460
In India	179	184	200	316
Out of India	322	245	202	144
Magnitude of Brain Drain	30.8% (+/– 2%)	25-28%	56.2% (+/–1.3%)	23.1% (+/–1.5%)

Source: Various Government of India, Department of Science and Technology sponsored institution-based survey studies as cited in Khadria (1999a).

TABLE 3: OCCUPATIONAL PROFILE OF INDIAN IMMIGRANTS IN THE U.S., 1986-1996

Occupational group Year group/ Share	Professional and Technical	Executive, Administrative and Managerial	Clerical and Administrative Support	Sales	Service	Farming, Forestry and Fishing	Skilled Workers	Total with Occupation	Occupation not specified	Total Immigrants
1986-90	19,160 (13.7)	8,292 (5.8)	3,982 (2.8)	1,989 (1.4)	6,453 (4.5)	4,646 (3.3)	3,583 (2.5)	48,105 (33.8)	94,035 (66.2)	142,140 (100.0)
1991-93	20,395 (16.7)	6,174 (5.1)	2,719 (92.2)	975 (0.8)	2,965 (2.4)	18,875 (15.8)	1,263 (1.0)	53,366 (44.0)	68,574 (56.0)	121,940 (100.0)
1994-96	19,603 (17.1)	6,246 (5.5)	2,390 (2.1)	1,489 (1.3)	3,487 (3.0)	3,567 (3.1)	1,613 (1.4)	38,395 (33.5)	76,133 (66.5)	114,528 (100.0)
Percent Share of Asain Immigrants, 1994-96	22.0	14.9	11.5	10.2	7.4	17.5	2.7	13.0	13.3	13.3
Percent Share of All Immigrants, 1994-96	9.7	7.5	3.8	3.7	2.2	8.4	0.6	4.5	4.8	4.7

Source: Tables 3.20 and 3.25 in Khadria (1999a); data from the U.S. Immigration and Naturalization Service.

TABLE 4: INDIAN PERSONS AND WOMEN AMONGST SCIENCE AND ENGINEERING FACULTY IN U.S. HIGHER EDUCATION, BY TEACHING FIELD, 1997

Region of origin of faculty	Total S&E	Physical Sciences	Life Sciences	Math & Computer Sciences	Social Sciences	Engineering
Total Science & Engineering	224,707	37,020	53,055	44,375	65,509	24,748
%	(100.0)	100.0)	(100.0)	(100.0)	(100.0)	(100.0)
U.S. origin	179,689	29,598	45,502	32,976	55,870	15,753
% of total faculty	(80.0)	(80.0)	(85.8)	(74.3)	(85.3)	(63.7)
Foreign origin	45,009	7,422	7,553	11,399	9,639	8,955
% of total	(20.0)	(20.0)	(14.2)	(25.7)	(14.7)	(36.3)
Female	6,447	1,156	2,043	1,182	1,845	221
% of foreign persons	(14.3)	(15.6)	(27.0)	(10.4)	(19.1)	(2.5)
Asian origin	23,559	3,541	3,250	6,315	4,630	5,823
% of total	(10.5)	(9.6)	(6.1)	(14.2)	(7.1)	(23.5)
% of foreign	(52.3)	(47.7)	(43.0)	(55.4)	(48.0)	(65.0)
Female	3,104	612	826	730	876	60
% of Asian persons	(13.2)	(17.3)	(25.4)	(11.6)	(18.9)	(1.0)
Indian origin	6,876	688	1,014	2,086	1,491	1,597
% of total	(3.1)	(1.9)	(1.9)	(4.7)	(2.3)	(6.5)
% of foreign	(15.3)	(9.3)	(13.4)	(18.3)	(15.5)	(17.8)
% of Asian	(23.2)	(19.4)	(31.2)	(33.0)	(32.2)	(27.4)
Female	832	115	320	289	94	14
% of Indian persons	(12.1)	(16.7)	(31.6)	(13.9)	(6.3)	(0.9)
% of Asian female	(26.8)	(18.8)	(38.7)	(39.6)	(10.7)	(23.3)
%of foreign female	(12.9)	(9.9)	(15.7)	(24.5)	(5.1)	(6.3)

Source: Computed and compiled by the author from National Science Foundation, *Science and Engineering Indiacators 2000, vols.1 & 2,* Tables 4-46 to 4-48., United States.
Note: Data includes first job of post-secondary teaching at four-year colleges and universities in the U.S.; does not include faculty in two-year or community colleges, or those who teach as a secondary job.

TABLE 5: NUMBER OF INDIAN STUDENTS GOING ABROAD BY FIELD OF STUDY, SEX AND CONTINENT, 1996 and 1997

Sex, Continent	Women		Persons		America		Europe		Asia		Oceania		Others	
Field of Study	1996-7	1997-8	1996-7	1997-8	1996-7	1997-8	1996-7	1997-8	1996-7	1997-8	1996-7	1997-8	1996-7	1997-8
Engineering & Architecture	103	96	1073	1014	1029	647	269	174	4	20	157	153	14	20
Science	109	128	631	789	407	471	80	141	2	6	136	148	6	23
Technology & Industry	36	35	381	325	162	77	53	38	4	2	148	205	14	3
Commerce, Business Adm. & Management	179	292	1777	2592	556	561	323	432	56	80	792	1494	50	25
Arts	89	127	235	302	136	152	50	96	4	6	43	41	2	7
Agriculture & Forestry	12	6	80	11	23	5	23	3	41	–	–	3	15	–
Medicine, Pharmacy, Dentistry & Vet. Sc.	116	102	907	607	334	45	425	502	4	7	95	45	49	8
Law	3	16	43	55	8	14	32	39	–	–	2	2	1	–
Banking Services	3	1	38	15	15	4	16	2	–	–	7	9	–	–
Fine Arts	34	29	69	62	47	45	11	14	–	–	11	3	–	–
Others	119	229	792	962	305	401	118	196	10	25	308	314	51	26
Total	803	1061	6426	6734	3022	2422	1418	1637	84	146	1714	2417	188	112

Source: Compiled by author from Government of India, Ministry of Human Resource Development, *Indian Students and Trainees Going Abroad,* New Delhi.

TABLE 6: INDIAN DOCTORAL RECIPIENTS FROM U.S. UNIVERSITIES WITH PLANS TO STAY IN THE US, BY FIELD OF STUDY, 1990-97
(Figures in parantheses are percentages)

Year	All fields			All Sciences & Engineering			Natural Sciences			Engineering			Social Sciences		
	Ph.Ds	Plan	FirmPlan	Ph.Ds	Plan	FirmPlan	Ph.Ds	Plan	FirmPlan	Ph.Ds	Plan	FirmPlan	Ph.Ds	Plan	FirmPlan
1990	881	586	470	709	467	371	319	220	180	314	211	162	76	36	29
		(66.5)	(53.3)		(65.9)	(52.3)		(69.0)	(56.4)		(67.2)	(51.6)		(47.4)	(38.2)
1991	924	689	518	752	554	408	304	225	174	357	272	191	91	57	43
		(74.6)	(56.1)		(73.7)	(54.3)		(74.0)	(57.2)		(76.2)	(53.5)		(62.6)	(47.3)
1992	1,072	880	609	860	703	485	365	307	220	405	335	222	90	61	43
		(82.1)	(56.8)		(81.7)	(56.4)		(84.1)	(60.3)		(82.7)	(54.8)		(67.8)	(47.8)
1993	1,139	920	577	932	759	462	382	315	200	448	368	209	102	76	53
		(80.8)	(50.7)		(81.4)	(49.6)		(82.5)	(52.4)		(82.1)	(46.7)		(74.5)	(52.0)
1994	1,289	1,049	662	1,065	871	536	474	389	251	480	402	235	111	80	50
		(81.4)	(51.4)		(81.8)	(50.3)		(82.1)	(53.0)		(83.8)	(49.0)		(72.1)	(45.0)
1995	1,425	1,179	746	1,206	1,003	632	499	417	281	572	489	292	135	97	59
		(82.7)	(52.4)		(83.2)	(52.4)		(83.6)	(56.3)		(85.5)	(51.0)		(71.9)	(43.7)
1996	1,500	1,264	882	1,276	1,084	753	520	454	316	625	539	376	131	91	61
		(84.3)	(58.8)		(85.0)	(59.0)		(87.3)	(60.8)		(86.2)	(60.0)		(69.5)	(46.6)
1997	1,382	1,131	839	1,173	968	714	484	403	287	584	486	374	105	79	53
		(81.8)	(60.7)		(82.5)	(60.9)		(83.3)	(59.3)		(83.2)	(64.0)		(75.2)	(50.5)

Source: National Science Foundation, *Science and Engineering Indiacators 2000, vols.1 & 2,* Tables 4-42., United States.
Note: Foreign doctoral recipients are on temporary visas. Natural Sciences include physical, earth, atmospheric, oceanographic, and biological sciences. Social sciences include psychology, sociology, and other social sciences. Those who ‘plan to stay’think that they will locate in the U.S.; those with ‘firm plan’ have a post-doctoral research appointment, or academic, industrial, or other firm offers of employment in the U.S.

TABLE 7: INDIAN DOCTORAL RECIPIENTS OF 1992-93 IN U.S. UNIVERSITIES IN SCIENCE AND ENGINEERING STILL WORKING IN THE U.S. , 1994-97

(Per cent)

Year	All Sciences & Engineering	Physical Sciences	Life Sciences	Engineering	Social Sciences
Number of Indian Ph.D. recipients in the U.S. in 1992-93	1,549	423	237	740	149
Percent in the U.S. in 1994	77	72	70	85	56
Percent in the U.S. in 1995	80	77	75	89	56
Percent in the U.S. in 1996	82	80	82	89	58
Percent in the U.S. in 1997	83	81	79	90	58

Source: National Science Foundation, *Science and Engineering Indicators 2000, vols.1 & 2,* Tables 4-44., United States.
Note: Foreign doctoral recipients are on temporary visas. Physical sciences include earth, atmospheric, and oceanographic sciences, mathematics, and computer sciences. Social sciences include psychology, sociology, and other social sciences.

TABLE 8: FLOW OF REMITTANCES, AND STOCK AND FLOW OF NRI DEPOSITS IN INDIA: 1991 – 2000

Private Transfer Receipts (Remittances to) : India 1990/91-1999/2000				Outstanding NRI Deposits in India, total Of various schemes, 1990/99-1999/2000		Net Inflows, total in various NRI Deposit Schemes 1990/91-1999/2000	
Year	US$million	INRmillion	%,GDP	US$million	INRmillion	US$million	INRmillion
1990/91	2,083	37,367	0.7	13,986	274,000	2,136	38,330
1991/92	3,798	98,149	1.5	13,549	403,040	577	14,120
1992/93	3,964	112,608	1.6	15,015	469,920	2,163	66,300
1993/94	5,287	165,821	1.9	16,230	509,160	2,185	37,800
1994/95	8,112	254,742	2.5	17,166	540,660	2,057	30,570
1995/96	8,539	287,684	2.4	17,446	599,270	948	40,990
1996/97	12,435	442,083	3.1	20,393	732,040	3,305	126,920
1997/98	11,875	439,293	2.8	20,369	804,600	1,153	73,440
1998/99	10,341	434,940	2.5	21,301	903,910	1,776	74,720
1999/00	12,290	532,800	3.0	23,098	1,008,656	2,141	93,497

Sources: Reserve Bank of India, *Report on Currency and Finance*, various years incl. 1998-99; *Handbook of Statistics on Indian Economy 1999; Annual Report 1999-2000*; Central Statistical Organization, *National Accounts Statistics 2000*, Ministry of Statistics and Programme Implementation, Government of India. *Collated and calculated by the author.*
Notes: (1) Private Transfer Payments from India are negligible figures of two-digit US$ million and three-digit INR (Indian Rupees) million.
The various schemes for NRI Deposits in India are: Foreign Currency Non-Resident (Accounts)-FCNR(A); Foreign Currency Non-Resident (Banks)-FCNR(B); Non-Resident (External) Rupee Accounts-NR(E)RA; Non-Resident (Non-Repatriable) Rupee Deposits-NR(NR)RD; Foreign Currency (Bank and other) Deposits-FC(B&O)D; Foreign Currency (Ordinary) Non-Repatriable Deposits.
All NRI Deposit figures are inclusive of accrued interest and valuation factor.

Table 9: A Classification of the US-based Indian Diaspora Networks

Category	Examples
1. General/ umbrella Network	GOPIA, NFIA, AIA, The Indian American Forum for Political Education (IAFPE), The National Association of Americans of Asian Indian Descent (NAAAID), Association for India's Development (AID) and Federation of Indian Associations (FIA), etc.
2. Professional Network	AAPI, SIPA, NetIP, TiE, EPPIC, SISAB, WIN, AIIMSONIANS, AIPNA, ASEI, IPACA, IFORI, SABHA, SRUTI and IACEF, etc.
3. Cultural Associations	Samband, KORKA, UANA, Telugu Association of North America, American Telugu Association (ATA), World Malayali Council, Bengali Cultural Association, Kenada Koota, Gujarati Samaj, etc.
4. Women / Support Network	MITHAS, Manavi, Sakhi, Asian Indian Women in America (AIWA), Maitri, IBAW (Indian Business and Professional Women), etc.
5. Students Association	Mayur at the Carnegic Mellon University Asangam at MIT Ashka at California University Diya at Duke University SASA at Brown University Boston University, India Club, Friends of India, IGSA (Houston University, Indian Students Association at different university.

Source: Author's classification based on website information about activities of various Indian expatriates Associations in the US.
Note: Full forms of some of the acronyms of the Associations are available in Appendix I.