

Brain Drain to Brain Circulation: In Indian Context

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Abstract:

In this era of globalization the high skilled workers are moving freely and trapping the global opportunities. This new dimension of international migration is passing through an experience of Brain Drain and then followed by Brain Circulation in many parts of the globe. The international perspectives of application of regional development theories, especially the works of Myrdal and Hirschman, which are discussed in this paper in detailed manner, are also suggesting the similar process.

In many parts of the world, brain drain is giving way to the process of brain circulation as talented immigrants return to their homeland with technology, capital, managerial and institutional know-how, to harness promising opportunities. Such evidences are already emerging in India (Anna Lee Saxenian, 2000).

From late 1960s a strong wave of well-educated and professionally competent immigrants from India, started moving towards the industrially advanced countries. But now in every field of technology, returning emigrant Indian technocrats and scientists are taking India into the forefronts of technological innovations, where brain loss is compensated by corresponding brain gain. For sustaining this process we have to create opportunities in India and have to promote young talents to work in India for making brain circulation a catalyst for India's accelerating development.

INTRODUCTION:

In the history of mankind it is clearly found that man is a highly mobile but the characteristics of their mobility have been changed time to time. In the historical past, initially the natural factors played a prominent role for the migration of people in groups. As population started increasing the existing locations of human settlements became overburdened then people started migrating in all possible directions over the globe in the search of resources for their sustenance. The complexity in migration phenomenon increased in the last few centuries with the exploration of new world. It has got entirely a new perspective. In the present time a large section of voluntary migrants are searching new destinations for better job opportunities and growth environment, for superior education and training and for healthy social milieu. Largely migration is selective in terms of their gender, age, qualification, skills and ambitions to achieve heights in their life. Migration of such people has multi faceted implications on both, the place of their origin and destination. In this era of globalization, where the developments in the communication sector have made information revolution, the highly skilled workers, professionals and young entrepreneurs are moving freely and trapping the global opportunities. This new dimension of international

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migration is passing through an experience of Brain Drain and then followed by Brain Circulation in many parts of the globe. In this paper, India experience of similar kind has been discussed in elaborated manner.

India is having a great history of immigration as well as out migration and Indian society cannot be understood without the consideration of these experiences. Indians have a long tradition of assimilation of different cultures which has also made Indians flexible and accommodative in nature. This behavioural characteristic is helping Indians to mix easily in different societies at the land of their destination in different corners of the globe. On the other side Indians abroad are also influencing Indian society at home. In India, NRIs are important agents of social, cultural and economic changes. These impacts on the Indian society depend on the nature of contact between NRIs and their families. They send remittances and sponsoring the further migration of relatives and friends which also have multi-dimensional effects. Their migration is also broadening the world view of people in India. They have remarkable impression on the social, cultural, economic and political arena in their homeland as well as in their adaptive lands (*Johanna, Lessinger, 1999*).

BRIEF HISTORY OF INDIAN EMIGRATION:

The history of Indian emigration started long back in the 5th century B.C. where religious troops of Indian Buddhist monks migrated to the different parts of Asian continent for the cause of preaching and propagating their religious teachings. It was followed by the migration of traders in the environment of new trade relations with various Asian empires during Gupta period. The impressions of Indian culture and traditions are still well marked in these parts of Asia which are evidences of these movements.

During the colonial era large scale migration took place in the form of indenture labourers, under kangani and maistry system and through free and passage emigration. In this period along with Asian colonies Indians also migrated to the selected pockets of Africa, South America and Caribbean islands. Sikhs exceptionally migrated to North America in this colonial era. This was the first noticeable migration of Indians in different parts of the globe other than Asia.

After India's independence the well educated and professionally capable Indians migrated towards the developed countries specially United States of America, Canada and

United Kingdom. Later in 1990's Australia also emerged as favourable destination for these migrants. This migration is still increasing both in their spread and magnitude steadily. This is popularly known as brain-drain. From the beginning of 1970's Indian skilled and semiskilled labours migrated in big way towards middle-east countries to exploit the opportunities of Oil boom which resulted inflow of money in this region. Due to this large scale investment took place for the reconstruction in West Asian Countries.

Today, Indian diaspora is among the oldest diasporic community in the world. They constitute about 20 million people residing in more than 110 countries covering almost all parts of this globe. It is the 3rd largest diasporic community after China and UK.

The Indian diasporic community today is known for their professional competency. Indians are doing excellent in areas of technology, management, entrepreneurship, teaching and research. The Indian skilled and semiskilled personals are also known for their commitment towards their jobs in hand. The Indian diaspora is unique as it surprises all others in its extraordinary diversity and global spread. Indian emigrants have made remarkable contributions to their host countries by helping to transfer their economies (*L.M Singhvi, 2001*). Their hard work and higher educational status along with cultural values and heritage have made them reach the pinnacle of glory and success. At present there are about fifty countries where Indians are counting more than thousand. In some of these countries, sizeable Indian community is residing and forming influential minorities.

As a concept it has assumed importance in the recent past, which is influenced directly or indirectly by the process of globalization. India has its current interest in the overseas Indians in two ways. For older diaspora it is primarily cultural, patchy and patronizing and for recent migrants to the West, it is largely economic and political with the intention of attracting their capital and skills.

In this piece of work, Indian emigration with special reference to well educated and professionally proficient migrants to industrially advanced countries is discussed. This large scale emigration, which started from 1950s, influenced Indian progress in many ways. This is popularly known as brain-drain. But today, when India itself is emerging as a land of opportunities, a wave started where this brain-drain is resulting in some gains. The scholarly viewpoint of these processes can be understood in the following theoretical frames.

THEORIES OF REGIONAL DEVELOPMENT WITH SPECIAL PERSPECTIVE OF INTERNATIONAL LABOUR MIGRATION:

In the second half of 1950's two eminent development economist, Gunnar Myrdal and Albert O. Hirschman propounded theories of regional development & planning. They worked independently but they have many similarities in their theoretical framework.

Both theorists were from the school of unbalanced regional development and outlined the problem of economic development in underdeveloped countries in comprehensive manner. They exposed the existing relationship between developed & less developed regions within countries and also between countries. For the first time they have provided duly attention on the non-economic parameters in the process of underdevelopment of regions legged behind in the development. Here these theoretical formulations are used to explain the dynamics of international labour migration

Hirschman's Theory of Polarization and Trickle-down effects:-

While explaining the impact of a capitalist mode of economic growth on regions, in his theory, he tried to examine how growth can be communicated from one region or one country to another. According to him economic progress does not appear everywhere at the same time. For an economy to grow upwardly it must develop within itself one or several centres of economic growth and once these centers have appeared, than due to agglomeration of economies, spatial concentration of economic growth took place around these starting points. This 'industrial atmosphere' with its special receptivity to innovations and enterprise start attracting factors of production from the surrounding regions.

For lifting any economy and to raise the income levels, it is must to develop few regional centers of economic strength and potential which led to the emergence of growing points in the process of development. It suggests that international and interregional inequality of growth is an inevitable condition of developmental process. In states that in geographical sense growth is necessarily unbalanced

According to Hirschman, in analyzing the process of unbalanced growth, we could always show that an advance at one point sets up pressures, tensions and compulsion toward growth at subsequent points. The process of development is better conceived as a 'chain of disequilibria' where investment in one sector induces investment in other sectors in a cyclic manner. The forces that make transmission of growth from one region or one country to

another will be better if growth Points will be wide spread rather than falling within the same privileged growth space. Also if the ability and tendency of growth will hold within some regions or countries for a long time while backwardness retains elsewhere than it results in division of country or world in backward and progressive regions or developed and underdeveloped countries respectively.

Trickling-Down and Polarizing effects:-

No matter how strong and exaggerated the space preference of the economic operators work but once growth starts concentrating in one part of the country, necessarily certain forces sets in the remaining parts. Here preferred space was called 'North' and lagging parts as 'South'. This growth in north will have both favourable and adverse responses on the south.

The favourable effects include trickling down of Northern progress by way of increase in Northern purchases and investment in the south if the economies of these two regions are complementary, absorption of disguised unemployment of south in north which results in raising marginal productivity of labour and levels of percapita consumption expenditure in south.

In contrast to this, unfavourable or polarization effects also operates. The manufacturing sector of south, largely based on traditional and comparatively insufficient technologies and exports from south face adversities of competitive edge of northern part.

The most alarming effect of polarization is a kind of migration of people from south to north for trapping the economic advances in north. Instead of absorbing the disguised unemployment, northern progress may denude the south of its technicians and managers as well as of the more enterprising young men. This process is stimulated because in the south skilled work and better than average performance will often be poorly remunerated and simply not recognized. On the other hand, north provides better recognition to their expertise and their work is remunerated with higher scales of payments. Due to the high mobility of most productive and skilled persons, first and foremost south will lose highly qualified people to the north. Along with these experts, what little capital the south produce is also drains towards north in the lure of high returns there

This picture is seen hopeful if, in the end, the trickling-down effects would gain the upper hand over the polarization effects in the complementary regions.

Check to the trickling down effects-

Hirschman advocated that initially regional disparities will increase because of growth of north as a result of the concentration of factors of production but in the long run geographical trickling down effects will operate sufficiently to bridge up the disparities. This will result because of the occurrence of agglomeration diseconomies in the northern regions due to pollution, high labour and land costs and congestion. This will encourage to the dispersal of industries towards regions legged behind.

Sometimes checks to trickling down effects may also operate which further worsen the southern situation. In such situations polarization effects remain strong and regional imbalances are further accentuated. The existence of such conditions for a long run will impel the policy makers to explore the development potentials of south.

According to Hirschman, if the market forces that experts themselves through the trickle-down effects and polarization effects result in a temporary victory of the later, deliberate economic policy will come into play to correct the situation. Actually of course, economic policy will be an important influence throughout the process. The distribution of public investments in different parts of a country is most obvious manner for equilibrating mechanism. Inter regional transmission of growth will be hindered by some obstructionist forces. The international transmission will be more difficult.

International perspective –

He also talked about the trickle-down and polarization effects at international level, but in more idealistic conception. He stressed upon the bold role of developed world as taking steps towards helping the underdeveloped countries and optimal institutional arrangements to keep the polarization effects weak and strengthening trickling-down effects. In this process the underdeveloped countries ought to retain developmental advantages of sovereignty, obstacles to the emigration of best skills and capital and a major independence in tariff, monetary and foreign exchange policies. Along with this, they must be closely integrated with world economy with suitable arrangements for rapid growth and greater stability in their export markets.

Myrdal's Theory of spread and Backwash Effects-

In Myrdal's view, generally there is no such tendency towards automatic self equilibrating of social system for balancing forces for restoring unbalanced to balanced

development situation, as given in traditional equilibrium approach. With time, in the natural process, natural forces further create instability and unbalances magnifies. Any new exogenous change will, by the reactions in the system again, start a cumulative process away from this position in the direction of new change so, policy inferences, planned and applied with intension of stopping the movement of natural tendency are preferably required.

The basic assumption of his theory is that economic development under laissez faire is governed by the following two laws:-

1. Operation of free market forces creates regional inequalities and
2. These inequalities become more dominant as poorer a country is.

Myrdal explained these laws through the concept of circular and cumulative causation. Where in the underdeveloped regions due to cumulative causation trap in the vicious cycle of poverty

Circular and cumulative causation:-

Generally, the play of the market forces tends to increase, rather than decrease inequalities between regions. In a developing economy, if the things are left on the market forces, unhampered by any policy interferences, industrial production, commerce, banking insurance and almost all those economic activities which tend to give a bigger than average return and in addition science, art, literature education and higher culture generally would cluster in certain localities and regions leaving the rest of the country more or less in backwater.

To explain the process of economic growth and creation of inequalities at the national and international level Myrdal introduced the notion of backwash and spread effects. He explained that how the development, once started at any particular center for any reason, creates a growth momentum through a process of cumulative causation.

Migration, Capital Movement and Trade: the 'Backwash Effects':-

There are some regions with natural advantages for economic concentration which in some cases become the starting point for economic development. The expansions of these regions have adverse effects on other regions which are called backwash effects.

The backwash effects work in many ways but more importantly the movement of labour, capital and trade towards naturally advantageous region. This process works as the media for evolving cumulative process upwards in the favourable region and downwards in

the unfavourable one. As a result, the positive growth of the former has their negative effects on the later.

The attractive centers for economic activities receive immigrants from other regions. Due to the selectivity in migration process, the poorer regions loose their most enterprising and youngest workers. This favours the rapid growth in the advance region and disfavour the others. Capital movement and trade also operate in the similar fashion.

In the growing centers increasing demand will spur the investments which in return raise the income levels. Due to this demand further accelerate and raise investment in the second round and so on. Free trade tends to destroy small and traditional industries in the poorer regions which cannot compete with the industries in the richer regions operating on the principal of increasing returns to scale. In this process richer regions excel at the expense of other regions and inequality appears with greater magnitude. This cumulative process of regional inequality works through many causal chains of economic as well as non economic factors. These factors are interlocked in a circular causation at both the centers of expansion and lagging behind and move these regions in opposite direction with widening inequalities.

The 'Spread Effects'-

In opposition to the backwash effects there are certain centrifugal 'spread effects' of expansionary momentum from the growing center to the regions legging behind. This may happen due to increasing outlets of agricultural products, percolation of technological advances, increasing demand for their raw material, labour and in many other ways this process helps in cumulating social process by circular causation in the similar manner as the backwash effects and bring countervailing changes. The success of the balancing forces depends upon strength of their operation and spatial coverage. The problems of inequality then become a problem of differential progress between regions in the country. But generally many regions will be lagging behind, stagnating or even becoming poorer and there will be more regions in the last two categories if only market forces were left to decide the outcomes.

Myrdal found that the neutralisation of the backwash effects, when a country reaches a high level of development where the spread effects are strong, will itself spur on economic development so become an important factor in the cumulative process. Thus rapid and

sustained progress becomes an almost automatic process when once a country has reached a high level of development.

In contrast in an underdeveloped country spread effects will be weak and the free play of market forces create and widen regional inequalities more powerfully. This is one of the interlocking relations by which in the cumulative progress “Poverty becomes its own cause”.

Role of state-

According to him for reducing the inequality among social groups and regions of a country there should be created harmony. This is created through policy interference by organised society with the operation of market forces which, if left to themselves would have led to disharmony. For countries to be highly integrated, a complex networks of systems of state interferences needed for preventing any region or social group from lagging far behind in its development. Thus, policies for national integration, including regional equalisation themselves represent only a phase of the cumulative social process of economic development. Though this process has to be conceived of at a higher order since it includes also, in addition to the evolution of the market forces, people’s political attitudes, interferences by the state and infect the entire political process. The government in underdeveloped countries should therefore, adopt ‘egalitarian policies’ to weaken the backwash effects and strengthen the spread effects.

International perspective-

Myrdal also talked about of inequalities at international level. To explain this he has focused on the effects of trade, capital movement and migration.

Widening of markets and manufacturing industries in rich and progressive countries have adverse effects on whatever industries under developed countries have, specially small scale industries and handicrafts. The main positive effect of international trade on under developed countries is to promote the production of primary products where unskilled labour is employed. For exports of these products market is inelastic and excessive fluctuations in prices are found. This again restrained the development of under developed countries. Economic development has to be brought about by policy interferences either by the world community or by the individual in underdeveloped country.

In case of capital, if there is no exchange controls and if at the same time, there are no elements of national development policies for securing high profits for capital i.e. if the

forces in the capital market are given unhampered play, capitalists in underdeveloped countries would be exporting their capital.

His has ignored the labour migration as a factor of importance for international economic adjustment as between underdeveloped and developed countries. Emigration from these countries would be a natural phenomenon but for various regions emigration can not be much of real aid to economic development, even if it is possible.

At international level the backwash effects of trade and capital movement would dominate the outcome much more, as the countervailing spread effects of expansionary momentum are very much weaker.

In both these theories of regional development, theorists' main focus was on the strategies of development of various regions within a country, though they have also explained little bit of international application of their theoretical frames. Both the theorists provided inadequate attention towards the international migration of professionally competent, technologically and managerially superior and more enterprising young men from underdeveloped to developed countries in most of the cases, for instance in Indian case. But both of them were agree that polarization as well as backwash effects of trade and factor mobility have adverse influences on the development of underdeveloped countries.

For trickle down effects Hirschman gave much more idealistic view for the role of developed countries and international institutional arrangements. He favoured the sovereign and independent tariff, monetary and foreign exchange policies for the underdeveloped countries while participating in world economy for protecting their interests. Myrdal on the other hand gave very less attention toward the impact of labour migration on the underdeveloped countries. But for strengthening spread effects he was in favour of policy interferences by the governments of underdeveloped countries along with world community.

In the following section here in this paper in has been explained that how migration from India to the developed countries from 1950's worked as polarization or backwash effects, because cream of the crop of Indian professionals moved towards these destinations. Later in this paper an account of information has been provided which supports that in Indian case trickle down or spread effects worked in terms of improving Indian trade and remittances helped India to maintain its balance of payment through financial flows especially in the period of adversities. The Indian migrants also helped in the development of

India through new knowledge and investment and in many non economic parameters. Along with integrated economic policies of Indian state, contribution by Indian emigrants helped Indian to move forward on the path of development. This has created an environment in India where today India is becoming a favourable place for best Indian skills and entrepreneurs to work here and also attracting those who have migrated earlier to the developed countries.

BRAIN DRAIN FROM INDIA:

As per the UNESCO report (1969) “the brain drain could be defined as an abnormal form of scientific exchange between countries, characterized by a one way flow in favour of the most highly developed countries”. According to Part II of the World Economic and Social Survey (2004) on International Migration, large scale global migration took place after 1970. In 200, there were 175 million persons (2.9% of total world population) living outside their country of birth where 20% of this were accounted in U.S. only. It has been found that the overall economic impact of migration is beneficial for destination countries primarily through due to the supply of skilled labour. On the other side economic benefits from out migration to the developing countries are ambiguous. These countries are suffering from ‘brain drain’, which includes inability to make use of migrant’s talents and wastage of resources spent on the migrant’s education. Experience of migration of skillful people differs spatially i.e. country to country as well as temporally. So every country has a unique experience of migration it can not be generalized.

In case of India, from 1950’s a strong wave of out migration of skilled workers is well marked which is still continuing with increasing magnitude. Technocrats and expert professionals moved towards the western countries such as the USA, Canada, UK and Australia as permanent migrants largely. Although, information on them is scanty so the analysis is based on the immigration statistics of destination countries. Nayyar (1994) provides an analysis in this reference for the period of 1951-1990 and this information is updated from internet website on migration information. According to these data, up to 1970 UK was the most favourable destination for the Indian emigrants largely because of the colonial linkages but from 1970s, USA is receiving the largest number of Indian emigrants. From 1980s to till date USA is followed by Canada and Australia. In general, the number of Indian immigrants in USA, Canada and Australia are increasing regularly. While, in case of

UK, their number declined till 1990 but again showing increasing trend after 1990. In USA, Canada and Australia along with the total numbers, the percentages of Indian immigrants to the total immigrants from all countries are also increasing steadily. But in case of UK it has been declined over the years (See Annexure, Table No. 1 and 2). In the recent decades immigration laws were made more restrictive in developed countries, despite that, the Indian immigrants in developed countries have been increased in the last one and half decades.

The occupational structure indicates the quality of these immigrants. After analysing the occupational structure of Indian immigrants in USA, it is found that, in 1986-90 about 65% of the total Indian immigrants who reported their occupation were technocrats, skilled workers and professional experts, placing Indian knowledge workers at the top of the list of those from all Asian countries, including Japan. Similarly in Canada these experts account for more than 50% of the total Indian immigrants in the same period (See Annexure, Table No. 3 and 4). For other developed countries also occupational scenario of Indian immigrants is very much similar. These experts who are migrating towards developed countries are the young and most talented technocrats, skilled workers and professional experts who received their education and training in the premier institutions of India. For this reason also it becomes a matter of concern for India. India produces 25 thousand engineers annually. Of these, about 3 thousand come from IITs who try to pursue higher education in the developed countries. Graduates of IITs accounted for 78% of US engineering Ph. D.'s granted to Indians in 1990. These students once graduated from American Universities often stay on in the United States as it also offers an easy way of immigrating. Due to the large scale exodus of skilled labour India is facing acute shortage of talents in the field of science, engineering and technology where as India is producing adequate number of experts in these fields.

INDIA'S READINESS FOR BRAIN CIRCULATION:

Brain migration is not always carrying adverse effects even on the sending countries if there is exchange of scholars, researchers, engineers and technocrats, scientists, medical experts between developing and developed countries or within developing countries with the purpose of mutual benefits in the form of knowledge sharing. But in the reality such type of brain circulation is not taking place until and unless the sending country itself become competitive enough to attract the talented mass with creating opportunities and favourable work environment for them to work.

For a long period since Indian independence India was fighting for creating basic infrastructure and for providing mere basic amenities to its inhabitants. Even still India is struggling for these at some level. During this period our economy was not competitive, private sector was immature, research and development institutions were in infancy stage and because of inability to make use of migrant's talents brain drain became an unavoidable process. Developing countries with these bottlenecks can not offer modern professionals the economic rewards and desirable social conditions.

In the last few decades India has improved upon these areas. Presently, India is emerging as a favourable destination for the young talents. In India there is a remarkable progress in the development of basic infrastructure, Indian economy is sustaining in the global competition and playing effectively in the multilateral marketing structure, Indian research and development institutions are providing good research environment and giving high level research outcomes in many areas such as space technology, information technology etc., Indian multinationals have emerged as a global players in the last two decades.

Current Indian Scenario:

Today, India having over 250 million middleclass population with good paying capacity for maintaining their livening standard and providing better educational opportunities to their children. Nearly half of India's population is in working age group of 15-59 years. In the coming decades India is going to become a hub of technically sound human resource which will again strengthen the knowledge based economy of India and will transform the India's image in world context.

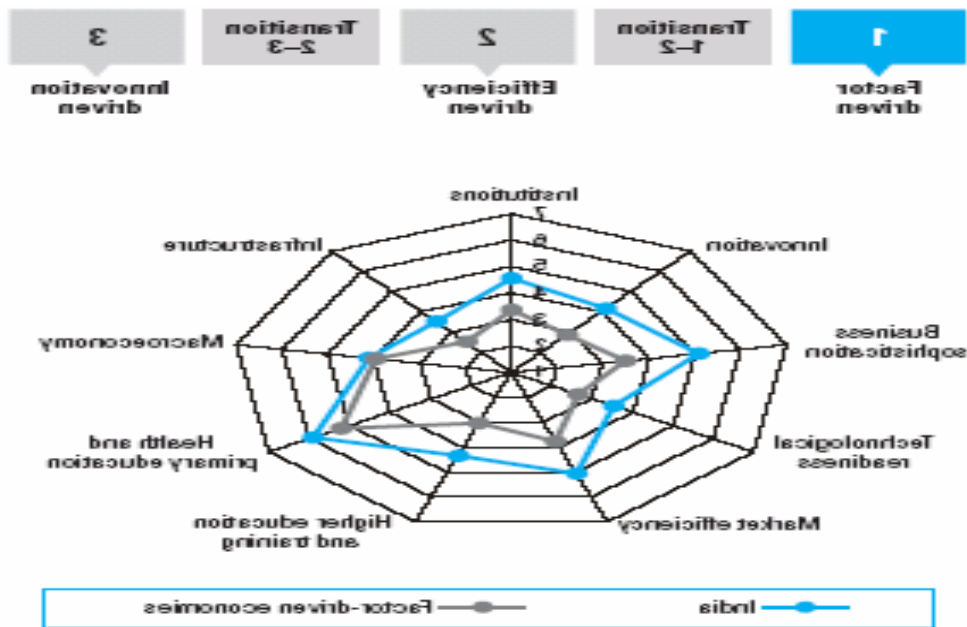
Status of Indian Economy:

India is the forth largest economy in the world in terms of purchasing power parity and expected to become third largest economy of the world in the first half of 21st century after USA and China. India is moving forward in many areas such as development of infrastructures, improving research and development in science and technology, world trade, competitiveness with sustained high economic growth. Much of economic success experienced by India during these decades can be attributed to her large base of human intellectual resource capabilities, knowledge industry and most importantly the continuous

effort in the promotion and innovation of science and technology. India is now ready to attract its young talented mass to work in India thus it provides opportunity for brain circulation.

Indian economy is now in stage of transition, where there is opportunity for India to jump to the higher ladder and face challenges in 21st century (Figure-1). There are various approaches and paths for achieving high standards in all sphere of development activity to transform the India's image on international arena.

Figure -1 Stage of Indian Economy



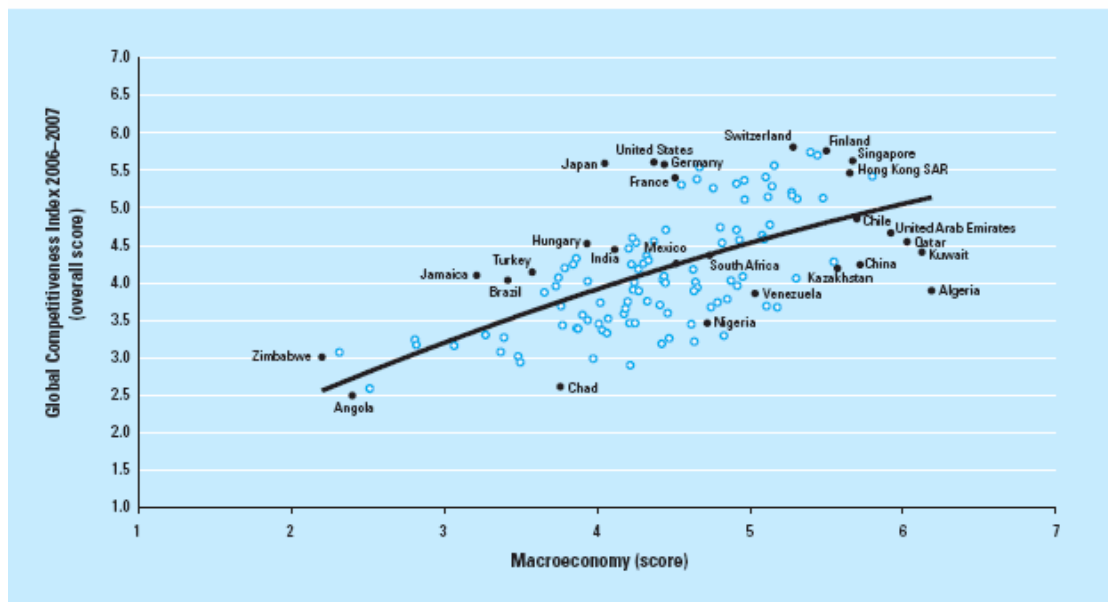
Source: GCI, Report, 2006-07, World Economic Forum

India's Competitive Strength:

The Global Competitiveness Report, 2006-07, which gives status of any country in terms of Global Competitiveness Index (GCI) score based on the macro economy pillars and analysis like basic requirement, efficiency enhancement and innovation factors. India's position has improved from 45th to 43rd in comparison to last year in the Global Competitiveness Index. India is well ahead of China (54), Brazil (66) among 125 countries (Figure-2, GCI, Report 2006-07). This figure shows that, India is in the GCI's first stage of development and scores remarkably high in capacity for innovation and sophistication of firm operations. In India, firm use of technology and rates of technology transfer are high, although penetration rates of

the latest technologies are still quite low by international standards. The report indicates that in terms of the level of technological readiness and FDI and technology transfer India's ranking is 23rd and 25th respectively among 125 countries worldwide. The Indian young talents can work as catalysts in this process and there are lots of avenues in which they can use their potential for further improving India's position.

Figure-2 The Global Competitiveness and Macroeconomic Analysis



Source: <http://www.weforum.org/pdf/india/India.pdf>, 2006

Emergence of Indian Multinationals:

The liberalization of Indian economy in the early 1990s had been seen as threat to the Indian companies with this notion that these companies would not be able to match up to the marketing, financial strength and technological advancement of MNCs. But the experience of last one and half decades depict that Indian companies has the capabilities to compete with the MNCs who have entered in India and also have ability to challenge their position in international markets. With opening of Indian economy, Indian players are relying more and more on technology acquisition, adaptation and absorption, besides indigenous technology development (Ashwani Gupta, 2006).

India is making sustained economic growth and increasingly becoming an attractive destination for many international companies and increasing competition in Indian market. Due to this, many Indian companies went through attitudinal change to become global player with strengthening their competitiveness by adopting mix of business strategies such as making investments in acquisitions, exports with competitive cost, forming international alliances, accelerating scale of production, leveraging international capital markets etc. Many Indian companies such as TCS, Wipro, Sundram Fasteners (engineering company), Amtek Auto, Asian Paints, VSNL, Nicholas Piramal (pharmaceutical), Wockhardt (biotech product company), Indian Hotels etc. are making investments in acquisitions and playing over the globe. Tata Steel, Tata Motors, Gokuldas Exports (apparel exporter) etc. Indian companies are strategically lowering their cost of production and making their presence in the global market. Few Indian companies are forming alliances with global companies for acquiring technology and to get access to the global market. Satyam Computers, Thermax (energy and environment solution provider), Larsen and Toubro (engineering company), Mahindra and Mahindra (multi utility vehicles), Ashok Leyland (commercial vehicles) etc. companies are following this path. There are few Indian companies for instance Moser Baer (optical media manufacturer), Bharat Forge (auto components), Reliance Industries, Arvind Mills etc. are investing in global size for building capacities to become global competitor. Along with the private sector, few public sectors are also trying aggressively to trap global opportunities. ICICI, Indian Oil and ONGC Videsh Limited are effectively functioning in global market. There are other Indian companies also which are trying to built core competency and striving for external finances and technological support to become competitive for participating in the world market. These Indian MNCs have lots of space to accommodate Indian technocrats and managers to harness their expertise and have potential to provide them good remuneration and work environment.

Opportunities in Science and Technology sectors in India:

Over the years the Government of India has created an impressive infrastructure and favourable environment for the growth of Research and Development in India. India has a sound Science & Technology base with enormous capacity with the chain of research and development (R&D) institutions through the length and breadth of nation. India has 12 major scientific agencies in the country with more than 225 R&D laboratories. In addition to these,

there exists a vast network of over 330 universities, deemed universities, technical independent institutions, including 13 institutes of national importance and around more than 17000 colleges (for details see www.ugc.in). There are around 505 management institutions equipping young Indian talents in managerial skills.

Time to time Indian Government came out with policy frameworks for promoting scientific temper in India. The Scientific Policy Resolution (1958) aimed at promoting scientific research in all spheres. In the Technology Policy Statement (TPS, 1983) importance of technology as crucial resources for development of the nation was emphasized. It stressed upon establishment of the R&D units in industry, university-industry interface involving national laboratories and the academic centres, as well as technology production centers in industry. Further, Science and Technology Policy (2003) framed with the objectives of to increase research and innovation in areas of relevance for economy and society, particularly by promoting socio-economic development through holistic approach in scientific areas. In this document productive interaction between private and public institutions in science and technology was underlined.

In India, during 1996-97 to 2004-05, national expenditure on Research and Development (R&D) has increased from Rs 89,136.1 million to Rs 216,395.8 million. R&D investment by the industrial sector has increased nearly 10 times (Rs 4,505.6 million to Rs 44,571.9 million) in the period of 1985-86 to 2002-03. This is clearly indicating that the Indian institutions as well as industries are determinant to strengthen research and development in India to make India globally competitive. In this changing environment the young talented professionals have opportunity to work in India and sharpen their innovative skills.

Financial Support by Various Ministries/Department/Organization:

The direct goals of the science and technology policies are to enable and promote scientific inquiry, technological research. These policy instruments include direct government funding to public sector research institutions/enterprises and subsidies for the R&D activities of the private industry. Therefore, the state started various science, technology and innovation related schemes/programmes for providing support system to the capable individuals and organizations.

The Technopreneur Promotion Programme (TePP) is started to trap vast innovative potential of Indian citizens aiming to support individual innovators, from formal as well as informal knowledge system and to enable them to become technology based entrepreneurs. The Technology Development and Demonstration Programme (erstwhile PATSER) is aimed to catalyze activities relating to technology absorption, adaptation and demonstration including capital goods development by involving industry and R&D organizations. The Technology Business Incubators (TBIs) scheme provides grants-in-aid for both non-recurring and recurring investments for a stipulated period for starting and running research activities. Technology Management Programme [TMP] is initiated to identify gaps in technology status, analyzing and compiling foreign collaboration approvals as well as to look into the aspects of management of technology.

The Government of India set up Technology Development Board (TBD) in 1996 to provides financial assistances in form of soft loan grants and equity in sectors like agriculture, chemicals, engineering, health medicines and transports. The National Science & Technology Entrepreneurship Development Board (NSTEDB) was established in 1982 by the Government of India as an institutional mechanism to promote knowledge driven and technology intensive enterprises. The Board aims to convert "job-seekers" into "job-generators" through Science & Technology (S&T) interventions. The Home Grown Technology Programme (HGTP) started by Technology Information Forecasting and Assessment Council (TIFAC) of the Department of Science and Technology in 1993 to support the Indian industry in achieving competitive strength through technological innovation. It provides soft loan for technology development and commercialization of technologies developed indigenously. Small Business Innovation Research Initiative (SBIRI) for Public Private Partnership is the new scheme launched by the Department of Biotechnology to support private industries and to get them involved in development of such products and processes, which have high societal relevance. Technology Development Council (TDI) Started by Department of information Technology to facilities research and development in information technology, promote free and open source software and to promote application of IT for indigenous, efficient and cost effective solutions for products and process development in the industrial sectors. All these above stated programmes offers Indian technocrats to start there venture with financial support by the government.

Venture Capital Association:

Venture Funds are the most suitable form of providing risk capital for the growth of innovative and high technology businesses. Creation of several venture capital funds supports new start up and for setting up large establishment. The Indian Venture Capital Association (IVAC) was set up in 1992 as a nodal centre for all venture capital funds in India. The Small Industries Development Bank of India (SIDBI) constituted a venture capital Fund in 1992, with the corpus of Rs.100 million. The SIDBI has launched SME Growth Fund, a new venture capital fund with a large corpus of Rs. 500 Crore, dedicated to the SME sector. Indian talents can start their dream plans with the help of these schemes in India.

Biotechnology:

Recently, biotechnology emerged as an important sector in the Indian economy. Biotechnology is providing considerable scientific and technological contribution to the development of life science, biopharmaceutical, health, and chemical related industries. Due to the increasing importance of this sector, Government of India is promoting research and development investment in biotechnology sector. In 1982, the National Biotechnology Board (NBB) was constituted as an apex nodal agency, focused on several priority projects including institutional support and development of human resource in this sector. In 1986, the government of India constituted a full fledged Department of Biotechnology under department of Science Technology. India is now becoming a favourable destination to work in this area.

Information Technology:

Strong share of private and foreign direct investment reinforces the importance of service sector after liberalization. India is emerging as a hub of IT industry and Government is providing many incentives for growth of this sector in India. There are lots of opportunities for the young talent in India in IT sector.

Currently, India is accomplishing international reputation in the most frontier areas of science & technology in recent decades. For realizing the potential of human intellectual, Prime Minister of India constituted the National Knowledge Commission (2005), with the objective of devising and guiding reforms that will transform India into a strong and vibrant knowledge based economy in coming years. With the main focus area of creation of knowledge application and promotion of innovation through the National Innovation

Foundation and other stringent agencies, by encouraging entrepreneurship at the local and national levels, and encouraging inter-disciplinary studies in S&T in order to encourage new approaches and methodologies.

The Beginning Stage of Brain Circulation in Indian Case:

Brain circulation is a process in which talented out migrants who have studied and worked abroad return to their home countries to pursue promising opportunities there. This reverse migration is either temporary or permanent. They transfer not only technology and capital, but also managerial and institutional know-how to formerly peripheral regions (Anna Lee Saxenian, 2000). In the recent years India is experiencing 'reverse migration' of the people who migrated to the developed countries earlier. Indian government does not have detailed figures of these return migrants but their presence can be well marked in many places. India has experienced many changes in last few decades. Today, Indian cities have good entertainment solutions like multiplexes, shopping malls, pizzerias and cafes. Indian markets are full of diversified goods including world class brands and have better social and educational institutions with lots of choices. Life-style gaps between India and West have narrowed remarkably.

Nasscom, a trade group of Indian outsourcing companies, estimates that more than 30,000 technology professionals have returned India during years 2004 & 2005. In Bangalore, the high-tech city of India, thousands of overseas Indians (IT professionals) have set up their home. Besides Bangalore, Hyderabad and National Capital region are the most preferred destination for these returnees. Here they getting western style work environment, good remuneration and quick career jumps. It has been noticed that most of returnees are first-generation expatriates, along with this second-generation Indians living in US are also returning (Saritha Rai, 2005).

There is a remarkable increase in foreign investment in research and development in India over the last five years is an indicator of India's growing reputation as an intellectual powerhouse. Return skilled workers and researchers are working as catalysts in this boom. Major developments in medical and information technology research along with many other scientific areas giving signs of brilliant future for India. There was (Raghunath A. Mashelkar, 2005).

In 2001, to slow down the emigration of Indian IIT pass outs and other engineers IIT Bombay has set up an information technology incubator at the Kanwal Rekhi School of Information Technology (KReSIT). This incubator has started building a culture of entrepreneurship in the areas of making intellectual property and products among IITians and encouraging them to work in India. At the incubator they have started work in a variety of technical fields and commercialize technologies and creating a challenging environment that would encourage the IITians to stay in India. Several government departments have stepped forward to support the initiative. On the line of this IIT Delhi, IIT Kanpur and IIT Madras have also started their own business incubators. The level of success of these incubators in persuading IITians to take up entrepreneurship as a career option in India can be judged after passage of time. Anna Lee Saxenian, a professor in University of California call this phenomenon 'brain circulation' (Venkatesh Hariharan, 2004). We need many such initiatives at different levels to provide opportunities to the young talents for encouraging them to work in India.

Conclusion:

This is a reality that only a few countries have been successful in luring their talented emigrants back home. China, Korea, Ireland etc. countries got relative success in attracting return migration due to the opening of their economies and aggressive policies to foster domestic investments in innovation and R&D. Developing countries with some infrastructure in R&D, like India, are likely to attract the returnees, as well as money and business contacts (Mario Cervantes & Dominique Guellec, 2002).

Countries which are capable to create opportunities for research and development, innovation and entrepreneurship those can stimulate return migration and capital flow. In many parts of the world, the brain drain is giving way to a process of brain circulation. For this developing countries need to open their economies, formulate effective science and technology policies, develop world class institutional infrastructure, improve physical infrastructure, high grade social amenities and supportive work environment. India in regularly progressing on these lines and a clear indication of initiation of brain circulation can be seen. For strengthening this process, India has to work more aggressively to fulfill its

commitments towards implementation of these strategies. Indian policymakers now have opportunity to transform the brain drain from a curse into an asset.

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ANNEXTURE

TABLE NO. 1: TRENDS IN IMMIGRATION FROM INDIA TO SELECTED INDUSTRIAL COUNTRIES:1951-2001					
	NUMBER OF PERSONS				
	A	B	C	D	E
IMMIGRATION TO	1951-60	1961-70	1971-80	1981-90	1991-2000
UNITED STATES					
FROM INDIA	2,120	31,214	172,080	261,841	383,304
FROM ALL COUNTRIES	2,515,000	3,322,00	4,493,000	7,338,000	8,517,866
INDIA'S SHARE(%)	0.1	0.9	3.8	3.6	4.5
CANADA					
FROM INDIA	2,802	25,722	72,903	79,304	180,938
FROM ALL COUNTRIES	1,574,841	1,409,677	1,440,338	1,336,767	2,204,303
INDIA'S SHARE(%)	0.2	1.8	5.1	5.9	8.2
UNITED KINGDOM					
FROM INDIA	N.A.	125,600	83,040	51,480	54,745
FROM ALL COUNTRIES	N.A.	635,000	732,900	516,870	684,775
INDIA'S SHARE(%)	N.A.	19.8	11.3	10	8
AUSTRALIA					
FROM INDIA	N.A.	N.A.	N.A.	N.A.	37,148
FROM ALL COUNTRIES	N.A.	N.A.	N.A.	N.A.	902,541
INDIA'S SHARE(%)	N.A.	N.A.	N.A.	N.A.	4.1

SOURCE: NAYYAR, 1994 FOR COLOMN 'A'-'D' and www.migrationinformation.org FOR COLOMN 'E'

TABLE NO. 2: TRENDS IN IMMIGRATION FROM INDIA TO SELECTED INDUSTRIAL COUNTRIES:2001-05					
	NUMBER OF PERSONS				
IMMIGRATION TO	2001	2002	2003	2004	2005
UNITED STATES					
FROM INDIA	70290	71105	50372	70116	N.A
FROM ALL COUNTRIES	1064318	1063732	705827	946142	N.A.
INDIA'S SHARE(%)	6.6	6.7	7.1	7.4	N.A.
CANADA					
FROM INDIA	28148	30804	31669	27419	28183
FROM ALL COUNTRIES	227465	250638	229040	221355	235824
INDIA'S SHARE(%)	12.4	12.3	13.8	12.4	12
UNITED KINGDOM					
FROM INDIA	7280	8005	11460	11870	N.A
FROM ALL COUNTRIES	106820	118255	143845	147700	N.A.
INDIA'S SHARE(%)	6.8	6.8	8	8	N.A.
AUSTRALIA					
FROM INDIA	6336	5091	5783	8135	9414
FROM ALL COUNTRIES	107366	88900	93914	111590	123424
INDIA'S SHARE(%)	5.9	5.7	6.2	7.3	7.6

SOURCE: www.migrationinformation.org

TABLE NO. 3: IMMIGRATION FROM INDIA TO THE USA BY MAJOR OCCUPATION GROUP 1971-1990

S.N.	OCCUPATION GROUP	1971-5	1976-9	1982-5	1986-90
1	PROFESSIONAL AND TECHNICAL	31,623	20,586	15,461	19,160
	%	43.4	26.9	15.7	13.5
2	EXECUTIVE, ADMINISTRATIVE AND MANAGERIAL	1,503	3,574	5,059	8,292
	%	2.1	4.7	5.2	5.8
3	CLERICAL AND ADMINISTRATIVE SUPPORT	1,620	2,491	2,326	3,982
	%	2.2	3.3	2.6	2.8
4	SALES	375	704	1,317	1,989
	%	0.5	0.9	1.3	1.4
5	SERVICE	800	788	2,115	6,453
	%	1.1	1	2.2	4.5
6	FARMING, FORESTRY AND FISHING	214	1,311	2,675	4,646
	%	0.3	1.7	2.7	3.3
7	SKILLED WORKERS	1,637	2,512	2,823	3,583
	%	2.2	3.3	2.9	2.5
8	TOTAL ABOVE WITH OCCUPATION	37,772	31,966	31,776	482
	%	51.8	41.8	32.8	33.8
9	NO OCCUPATION OR OCCUPATION NOT REPORTED	35,140	44,595	66,403	94,035
	%	48.2	58.2	67.6	66.2
10	TOTAL IMMIGRATION	72,912	76,561	98,179	142,140
	%	100	100	100	100

SOURCE: NAYYAR, 1994.

TABLE NO. 4: IMMIGRATION FROM INDIA TO CANADA BY MAJOR OCCUPATION GROUP 1971-1990

S.N.	OCCUPATION GROUP	1971-5	1976-9	1982-5	1986-90
1	PROFESSIONAL AND TECHNICAL	4,721	1,070	914	974
	%	11.1	3.5	2.8	2.1
2	ENTREPRENEURS, ADMINISTRATORS AND MANAGERS	567	210	221	687
	%	1.3	0.7	0.7	1.5
3	CLERICAL AND SALES	2,337	800	484	774
	%	5.5	2.6	1.5	1.7
4	SERVICE	549	179	236	432
	%	1.3	0.6	0.7	0.9
5	FARMING, HORTICULTURE AND ANIMAL HOSBANDRY	2,063	454	1,225	2,208
	%	4.8	1.5	3.7	4.7
6	SKILLED WORKERS	5,956	955	790	1,899
	%	14.0	3.2	2.4	4.1
7	OCCUPATION NOT CLASSIFIED	1,814	3,694	6,139	9,430
	%	4.2	12.2	18.8	20.2
8	TOTAL WORKERS	18,007	7,362	10,009	16,404
	%	42.3	24.3	30.6	35.2
9	TOTAL NON-WORKERS	24,625	22,909	22,648	30,243
	%	57.8	75.7	69.4	64.8
10	TOTAL IMMIGRATION	42,632	30,271	32,657	46,647
	%	100.0	100.0	100.0	100.0
SOURCE: NAYYAR, 1994.					