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Diasporas have emerged as one of the agents of development in today's world. India's experience with the IT industry can be cited as one of the best instances of Diaspora-induced development. The Indian Diaspora has shared a symbiotic relationship with the Indian IT industry, where both have reinforced each other's quantitative and qualitative growth over the decades. On the one hand, the Indian Diaspora brought a multi-layered gain to the IT industry in terms of enhanced skills; capital formation (human, social and financial); inward remittances; foreign direct investment flows; creation of networks/markets and a boost for India's image. On the other hand, the Indian IT industry created a strong incentive for the mobility of highly skilled professionals and provided the Diaspora with the much needed opportunity to engage with their motherland.

Keywords: India Diaspora; Indian IT industry; Diaspora and development; brain regain

The Indian Diaspora has been an indispensable and integral part of the widely acknowledged and well-documented success story of the Indian IT industry. The Indian IT industry, which was almost non-existent in the 1970s, is now a massive US$100 billion industry. It fetches exports worth US$62 billion (accounting for 14% of India's overall exports), contributes as much as 7.5% to India's gross domestic product and directly employs over 2.8 million highly skilled professionals and another 9 million people indirectly, with immense positive spill-over. The Indian Diaspora has shared a symbiotic relationship with the Indian IT industry, where both have reinforced each other's quantitative and qualitative growth over the decades. On the one hand, the Indian Diaspora brought a multi-layered gain to the IT industry in terms of enhanced skills; capital formation (human, social and financial); inward remittances; foreign direct investment (FDI) flows; creation of networks/markets and a boost for India's image. On the other hand, the Indian IT industry created a strong incentive for the mobility of highly skilled professionals and provided the Diaspora with the much needed opportunity to engage with their motherland.

The contribution of the Diaspora, however, is yet to get its due recognition in the existing literature and government documents. This paper, therefore, aims at highlighting the role of Indian Diaspora in the growth and development of the Indian IT industry and the benefits it received due to this engagement. It also attempts to highlight the transformation of brain drain into brain circulation/gain as the highly skilled Diaspora return to their roots for a mutually advantageous relationship.

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Diasporas and development: theoretical perspective

India's experience with the IT industry[1] can be cited as a representative case of Diasporas[2]/migration-led development model that can explain several recent theories on the benefits emanating from brain drain. Brain regain/circulation/skill transfer has emerged as one of the most important areas of Diaspora contribution to the homeland. The early literature on brain drain and its effects focused more on damages caused by the outflow of skilled labour from the sending country (Kwok and Leland 1982; Todaro 1985; Grubel and Scott 1966). The argument centred not only on the loss of skilled labour force for the sending country, but also on the compounding ill effects in case the education of the skilled emigrants was funded by the government, like state-run Indian Institutes of Technology (IITs). However, subsequent studies have argued that the outflow of skills and knowledge may not necessarily mean a loss because it can bring multifarious gains for the home countries (Meyer 2001; Hunger 2004; Saxenian 2004). One of the essentials of this school of thought is that migration of skilled labour may in fact foster human capital formation and economic growth in the sending country as more people at home may take up similar professions (Stark, Helmenstein, and Prskawetz 1997; Biene, Docquier, and Rapoport 2001). Thus, countries like India that invested on higher/technical education in the early years of its independence are typically in a position to reap the benefits of brain circulation (Hunger 2004, 904).

Another approach advances the idea that any apparent loss of skills can be restored through the exchange or circulation of skill and knowledge between the Diaspora and their home country (Meyer 2001; Ouaked 2002; Siar 2013). In addition, the Diaspora can become excellent intermediaries, linking their home country into the global economy (Saxenian 2004; Kapur and Machale 2005), and contribute to institution building/transforming in the home country (Kuznetsov 2011). The benefits also pour in through remittances, investment and return of Diaspora, which can be maximised through favourable government policies (Martin 2004; Kapur and Machale 2005). The Diasporas are also keen to be a part of the developmental process of their homeland, making the opportunity of engagement mutually beneficial. Saxenian (2004, 164) notes, 'To take the advantage of the promising opportunities in the home countries the highly skilled entrepreneurs and professionals are reversing the brain drain and in the process linking their home countries to the centre of technology'. As stated above, the relationship between the Indian Diaspora and the IT industry has been of mutual dependence and has flourished in a symbiotic fashion. In order to understand this relationship, it is necessary to situate it in the context of the growth of the overall IT sector in India.

The growth of the Indian IT industry

India has steadily evolved from a non-player to the status of IT 'Super Star' over the decades. This journey began in the 1970s when, like other developing countries, India had no informatics capacity. However, New Delhi was aiming at self-reliance, largely necessitated by Nuclear and Space research requirements. Although the IT industry was kept under strict regulatory framework by the government, several public and private indigenous firms mushroomed, both for hardware (assembly/manufacture) and software production, like Tata Consultancy Services (TCS), Electronics Corporation of India Limited (ECIL), UP Electronic Corporation Limited, DCM DataSystems, Data Management Limited by Sarabhais and Operations Research Group (ORG).

Over the years, the government recognised the economic significance of the IT explosion in India. Subsequently, the sector witnessed consistent liberalisation and creation of necessary institutions like the National Association of Software and Services Companies (NASSCOM). India's policy approach gave enough space for indigenous companies to grow by creating the

'Greenhouse', and making the state play the 'midwifery' to 'husbandry' role (Evans 1995). The beginning of economic reforms in the early 1990s further facilitated the process, leading to the phenomenal growth of the IT industry. As a result, India has become home to a number of IT giants and several Indian companies compete with the top companies of the world. The IT industry has a pyramidal structure with few indigenous firms, like TCS, Infosys and Wipro, dominating the sector. However, low labour cost; high quality skill; high standard of management; high profitability and relatively low risk involved have attracted a large number of entrepreneurs and professionals, offering tremendous employment opportunity.

The IT sector has become the most significant growth catalysts for the Indian economy, with wide ranging effects that positively influence the lives of a cross section of people through direct/indirect means. It has played a crucial role in transforming India's image from a slow-moving economy, ridden with bureaucratic hassles, to a global player capable of providing world class technology solutions, business services and innovative entrepreneurs. The IT industry has grown at the annual average of 30% between 1990 and 2000. It witnessed 5.4% growth in 2010, which rose to 9% in 2012 (NASSCOM 2012). The sector is also a significant component of India's export basket, accounting for a progressively increasing share. The software exports grew at the annual rate of 50–60%; from a mere US$4 million of exports in 1980, the sector generated a whopping US$31.4 billion from exports in 2006–2007 and US$62 billion in 2011–2012. NASSCOM figures in 2012 suggest that the Indian IT industry is exporting about US$5 billion worth of engineering services and products.

The domestic market has also rapidly gained importance as the IT industry has helped to improve government efficiency. IT sales in the domestic market grew by 23% and reached US $8.4 billion in 2006–2007. Its overall revenues – including domestic sales of IT services and revenues generated by the hardware sector – are close to US$100 billion. It has witnessed growing Research and Development (R&D) spending, resulting in substantial increase in the number of patents filed. Indian IT sector accounts for 58% of workforce from smaller towns and cities; 31% women employment; 74% of workforce below 30 years; and 60,000 foreign workers. It has also given boost to India's higher education system, which is another fast emerging sector. Thus, apart from the economy, the IT industry has a significant social impact as well. Creation of jobs for the youth in rural and sub-urban areas (with a salary of ₹4000–7000 per month) through rural BPOs, and empowerment of women through gender inclusivity are some of the important highlights of the Indian IT industry (NASSCOM 2012).

The rise of India (and other developing countries) in the global IT industry challenged several established paradigms, the aspects of traditional models of development and the power relation between the developing countries and the multinational corporations (MNCs)/high-tech industries/developed nations. It completely defied ideas like the 'core-periphery' of World Systems Theory;[3] the 'hub and spoke' model;[4] the 'Bargaining school'[5] or the 'Marxist Dependencia'.[6] The growth of IT industry in the developing countries consistently shifted the power balance towards a far more complex and decentralised two-way flow of skill, capital and technology, cross-cutting hierarchical power structures. This decentralisation led to the rise of big MNCs in the developing countries like India and created knowledge hubs like the Silicon Valley, which gave space for the smaller players to utilise foreign partnerships, overseas expertise and markets.

The new system depended heavily on networks and created immense opportunities for Diaspora participation, which was evident in cases of India, Israel, Ireland and several other emerging IT nations. Diasporas emerged as the most important connecting thread or intermediary for the transfer of highly fragmented knowledge and know-how, no longer concentrated in MNCs. Terming them as 'The New Argonauts' (Saxenian 2011), Saxenian (2004, 166) suggests that, 'these transnational communities can become as important actors as the state and the multinational corporation … (as they) provide a more flexible and responsive skill and know-how particularly

between very different business cultures and environment'. Kapur and Machale (2005, 237) term them as 'reputational intermediaries – matching trading partners', further adding that

> the Diaspora can be a direct source of advantage when its members have the desire and ability to trade with, invest in and outsource in domestic businesses … overcoming negative national stereotypes through demonstrations of their capabilities. Finally there are benefits that result when emigrants return with enhanced skill, connections business ideas and savings.

As a typical representative case, the Diaspora became part of the growth story of Indian IT industry at a very early stage. Beginning in the 1970s and 1980s, the Indian IT professionals in the US facilitated the gradual evolution of IT and ITES by building trust in the country's intellectual abilities, which branded India as a source of well-educated and hard-working professionals. They became the link between the indigenous firms and technological clusters, like the Silicon Valley, to respond to the fast changing and uncertain market and technologies. The highly skilled Indian Diaspora later fed the IT industry with new ideas, technologies and markets through mentoring, coaching and knowledge-intensive outsourcing. Many from the Diaspora returned to India to start their own companies and created forums for information exchange and advising governments on ways to transform domestic institutions. Benefits also pored through inward remittances, FDI flows and the establishment of prestigious institutions like the International School of Business (ISB), where they joined as faculty. Such an engagement signified a win–win scenario both for the Diaspora and India, as suggested by one of the respondents to an interview 'The expatriate community was the major catalyst … (but) at this point it was no longer a sentiment … (the Diaspora) simply recognized the business opportunity' (Pandey et al. 2004, 12).

The role of Indian Diaspora

The stream of skilled migration from India started after the Second World War. However, after India's independence, as institutes of higher learning, like Indian Institutes of Management (IIMs) and IITs, were established in the 1950s and 1960s, a steady stream of emigration to the western countries began. Unable to find employment in India, most of the graduates of these publically subsidised institutions migrated initially to the UK, but as the US immigration regime became more liberal during mid-1960s, the wave got diverted towards the USA (Gottschlich 2008, 156). Termed as the 'Brain Drain', this process came under severe scrutiny and prejudiced the Indian public opinion against the highly affluent Diaspora. Nevertheless, these Indian professionals met with huge technical, managerial and entrepreneurial success, guided by what Bhatia (2007) terms as the 'American Karma', and could bring a drastic change in the overall perception towards India. Several of them joined the US information technology sector and proved extremely valuable as the floodgates for IT revolution opened in India. But, this success did not come easy to the Indian Diaspora. During the early years, 'they had to fight a strong perception and stereotyping' about 'lacking in general management capabilities and efficiency' (Pandey et al. 2004, 10). They largely kept away from co-ethnics and de-emphasised their Indian identity, concentrating more on their careers in racially-oriented, white people-managed corporations (Pandey et al. 2004, 10). They could hardly engage or invest in India due to the almost hostile policy framework.

When the Indian IT industry was still in its nascent stage and only few Indian companies were in operation, expatriate Indians promoted three Indian companies: Hindustan Computers Limited (HCL), Datamatics and Patni (Athreye 2005, 22–23). However, the most remarkable development was the founding of TCS in 1968 as a central service centre for the Tata Group of Companies. It marked the beginning of outsourcing work, which completely integrated the Diaspora and made it a part and parcel of the Indian IT industry. TCS imported a large number

of computer systems and recruited young Massachusetts Institute of Technology (MIT) trained Indian professionals. Utilising its excess computer capacity, TCS began outsourcing work and, within a few years, started sending engineers to the USA who excelled at doing platform conversions (Bhatnagar 2006, 5). In 1969, Mr Fakir Chand Kohli, a US trained engineer, took over the management of TCS and played an active role in founding the Computer Society of India along with fellow professionals from Tata Institute of Fundamental Research (TIFR). They were instrumental at various levels of policy-making.

The otherwise closed Indian economy saw an increase in the demand for engineers during the 1970s, providing an opportunity for what was termed as 'body shopping'. New companies emerged for body shopping, along with local agents, who recruited programmers locally on behalf of the MNCs (Leclerc 2008). The acute shortage of skilled professionals in the USA, coupled with the liberal immigration policies, made body shopping an attractive strategy and led to a drastic increase in the number of Indians in the USA. Body shopping was further expedited by the Indian Diaspora, who showcased the value of Indian programmers and fostered connections between software firms in the USA and India. Although these programmers were paid low wages, they gained the much-valued skills and know-how, which proved extremely valuable for the development of the domestic IT industry.

By the 1980s, several small companies that had come up in the Silicon Valley were willing to be a part of the Indian IT industry. However, as state initiative to engage the Diaspora was still absent, their role largely remained confined to being patient mentors, promoters, brand ambassadors, advisors or of middleman, linking US companies with software programming in India. The advent of personal computers in the 1980s substantially reduced the cost of importing hardware. It decentralised the IT industry in India, and boosted the rise of smaller players in the indigenous market, creating space for an increased role of the Diaspora. However, in the 1980s, India was still promoting Russian computers over USA, which led to a skill mismatch and technological gap between the western and indigenous Indian markets. To address this problem, the US-Indians created programmes to suit Indian programmers, and coached and guided Indian companies to improve their quality and performance (Pandey et al. 2004, 11). India's software exports grew from US$4.4 million in the 1970s to US$12 million in the 1980s, with more than 30 IT companies in operation. Another prominent development was the establishment of the National Institute of Information Technology (NIIT) by Rajendra S. Pawar and Vijay K. Thadani in 1981, which heralded the beginning of IT training in India. The subsequent expansion of technical and management education helped fuel the numbers of IT professionals who moved across borders.

By the 1990s, many of the highly skilled Indians in the USA had become high-level executives, venture capitalist, entrepreneurs and Chief Executive Officers (CEOs). They kept a watch on the growth of the Indian IT industry and began to collaborate with their Indian counterparts and outsourced their work to Indian companies. Many new entrepreneurs launched their own companies, like Cognizant, Techspan, Mphasis, or invested in the nascent IT and dot com companies in India. Some young Indians moved to India as expatriates and started R&D laboratories, such as the International Business Machines (IBM) India Research Lab established in 1998. Others came to India to supervise the US outsourcing contracts and to train Indian professionals. During the 1990s, the Diaspora also institutionalised social networking by establishing associations like the Indus Entrepreneurs (TiE).[7] Another significant endeavour was the formation of the Silicon Valley Professional Association (SIPA). These organisations provided a platform for mentoring promising young expatriates/IT professional/organisations and soon developed worldwide networks, substantially influencing the Indian IT industry.

Two important developments during the 1990s, which gave a significant boost to the Indian IT industry and facilitated Diaspora participation, were the beginning of economic reforms/

liberalisation and the simultaneous seismic shift in India's policy approach towards the Diaspora (Pande 2011, 130–131). New avenues for Diaspora participation were opened, which are slowly, but visibly, yielding results in terms of economic benefits, especially in the field of IT and ITES. By the 1990s, Indians made up 28% of the Silicon Valley's software and engineering talent and were founders of iconic firms, such as Vinod Khosla's Sun Microsystems, Kumar Malavalli's Brocade, Suhas Patil's Cirrus Logic and Sabeer Bhatia's Hotmail. Companies like July Systems and Silicon Automation Systems (SAS) were started in the Silicon Valley by US-educated Indian engineers, who moved part of their operation to Bangalore. Several highly skilled expatriate Indians returned and started software services firms in Bangalore. The creation of Software Technology Parks in 39 locations across India contributed significantly to the launch of new, medium and small-term enterprises. A study conducted by Nanda and Khanna (2007, 3–4) suggests that the entrepreneurs who had previously lived abroad relied significantly more on Diaspora networks for business leads and financing, especially when their companies were based outside the software hubs – in cities with weak networking institutions or limited access to bank finance. The study, thus, showed the crucial role played by the Diasporas in the growth of smaller enterprises, particularly in cases where the indigenous support was absent.

By 1999, India had become the world leader in the IT sector, capturing 70% of the total spending on outsourcing. However, the US immigration laws changed, with B1 and H1 visas being made conditional and Indian professionals have to pay social security taxes. As a result, the Indian companies adopted a new model; while some software programmers worked at client premises in the USA, others continued to work in the back office in India. The Y2 K problem[8] and the boom in the Internet telecom and dot com further opened opportunities for Indian professionals as it led to the USA and UK governments increasing their quota of professional visa. The growth and the confidence in the Indian IT sector also created space for venture capital industry (also known as angel investors) in India, which gave strength to expand the existing businesses. Several Indian-origin venture capitalists actively participated in funding Indian companies to produce intellectual property and innovative products and new business models for conducting R&D. Examples include West Bridge Capital, Kleiner Perkins Caulfield & Byers and Norwest Venture Group.

Indians were at the helm of 972 companies in the Silicon Valley and more than 25,000 jobs by 2000. Back home, most companies were operating in the high-end software services and were maintaining high rate of growth, which brought the IT industry at the national stage, attracting lot of government attention. A new breed of product-oriented companies was set up, led by the second-generation software entrepreneurs. In a survey on Chinese and Indian immigrant professionals in the Silicon Valley, Saxenian found that 80% of the Indian respondents exchanged information on American jobs or business opportunities with people in India, 67% had served as advisors or helped to arrange business contracts and 18% invested their own money in start-ups or venture funds in India.

There has also been a consistent effort by India to engage with the Diaspora as well as to encourage private participation. The establishment of a Global Indian Network of Knowledge (Global-INK)[9] by the Government of India in 2009 is a significant move in this regard. Another initiative to reconnect with the Indian Diaspora is in the field of education where IT is the most preferred discipline. The government is considering the idea of establishing five universities in different cities of India for persons of Indian origin to be funded via public private partnership, with the purpose of connecting with the Diaspora youth. Acute shortage of faculty in the field of education, especially IT education, presently encountered by India is expected to be addressed through Diaspora participation. The government is organising various roadshows targeting to recruit faculty from the Diaspora. The Department of Science and Technology,

under the 12th Five-Year Plan (2012–2017), is initiating the launch of a new research grant programme worth US$100 k each to 1000 Indians who decide to return to India to pursue their research (NESTA 2012, 40, 41).

The Diaspora has been extremely active in the encouragement of IT education in India and instrumental in the establishment of institutions of repute. Significant donations are being made by the Indian Diaspora towards educational projects in India, particularly the IITs to which most of them are alumni. A study conducted by David Finegold (Rutgers), B. Venkatesh Kumar (Tata Institute of Social Sciences) and Anne-Laure Winkler (Rutgers) in 2011, concluded that nearly three quarters of respondents (74%) plan to eventually return to India (as quoted in NESTA 2012, 41, 42). According to the study, 'Indian policy makers and Higher Education leaders have a huge opportunity to meet their pressing need for high-quality faculty' (as quoted in NESTA 2012, 43). The philanthropic contribution of the IT Diaspora, towards elementary education in India, is no less significant. Madhav Chavan's 'Pratham' and Sugata Mitra's 'hole in the wall' are some of the noted efforts in this regard. A glance at the remittance figures of India also show a drastic increase during the 1990s, which reflects the shift away from semi-skilled and unskilled occupations to highly skilled and skilled occupations, especially from the North America (Chandrashekhar 2012).

Annual NASSCOM figures, noted by Hunger (as quoted in Siar 2013, 8), show that in the year 2000, 10 out of the 20 most successful software enterprises in India (contributing more than 40% of the total revenues in the industry) were set up or managed by former Indian residents in the USA. Five out of the 20 companies were joint ventures between Indian and foreign companies, 19 of the 20 top software companies in India had non-resident Indians (NRIs) in top-level management positions, and half of all Indian software enterprises were founded and/or managed by them. According to the 2012 NASSCOM figures, surveyed by the author out of the top 20 IT firms in India, 12 firms have expatriates Indians as founders/co-founders or CEOs/managing directors.

Conclusion

In the emergence of India as the 'Super Star' of the IT industry in the world, the role of the Diaspora has been of mutual dependence and reliance. The decentralised growth of knowledge and economy has been eased by communication and information exchange through ethnic and professional networks. This has created space for Diaspora involvement, which was tapped by the Indian Diaspora for a mutually beneficial engagement with India. However, the FDI flow from the Diaspora is still a weak point, especially when several Diaspora IT companies are shifting their production base to China and Taiwan. Thus, immense potential remains to be tapped and the challenge for policy-makers lies in creating an environment that encourages and incorporates Diasporas/migration in the overall development process.

Notes

1. The IT industry is a fairly broad sector consisting of computer hardware, software and computing services. Besides, the sector may also include electronics and communications equipment, telecommunications services and a variety of content-oriented information services, including those drawing upon broadcast and new multimedia technologies. As a result of this broad coverage of the industry, the entire sector is also known as information communication and technology. The paper focuses largely on the activities in which India has earned its brand name globally – IT services including software and Information Technology-Enabled Services-Business Process Outsourcing (ITES-BPO).
2. The concept of 'Diaspora' is more than 2500 years old. The term comes from the Greek words 'to sow' and 'over'. From the imagery of tragic and victimised existence, the Diasporas have emerged as a

vibrant community capable of participating in economic, political and cultural processes of both the home and host countries through their transnational orientation.

3. The core–periphery model is based on the idea that the advanced economies remain the core of economic development, often leading to one-way flow of technology and know-how from advanced economies to the labour-intensive peripheral economies.
4. The hub-and-spoke model signifies a system arranged like a chariot wheel, in which production/deliveries are organised at the hub and distributed to different areas.
5. The Bargaining school although acknowledges the increase in the bargaining capacity of the third world economies over multinationals over a period of time, but underestimates their capacity over high-tech enterprises.
6. The theory largely observes that multinationals with their superior power resource always has the upper hand vis-à-vis the developing countries and there is little chance for the developing countries to change this power relation in their own favour.
7. The Indus Entrepreneurs (TiE) was launched as a non-profit conglomerate of NRIs in 1992 by Mr Kanwal Rekhi, an IIT Mumbai alumnus, who migrated to the USA and is popularly hailed as the godfather of Indian entrepreneurs in the Silicon Valley. It is dedicated to the advancement of entrepreneurship with some of the local chapters in India (Hyderabad, Delhi, Chennai and Mumbai). This company has been instrumental in mobilising venture capital in the IT sector.
8. At the turn of the twenty-first century, the Y2 K problem emerged from the longstanding practice of writing computer programs to store and handle only the last two digits of the year, assuming the first two would always be '19'. Owing to the Y2 K problem, software professionals were needed with the knowledge of COBOL that had already become obsolete in the USA, which provided significant advantage to Indian professionals to enter new markets and build trust.
9. It is a dynamic electronic platform for knowledge transfer, operating as an online web portal, to pull in the Diaspora as 'Knowledge' partners, the institutions in India as 'Stakeholder' partners and the Government as a 'Facilitator', to generate new ideas on issues such as development, education and healthcare (Ministry of Overseas Indian Affairs).

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