

# Indian Cyber Workers in US

*Though Indians make up only 1 per cent of the US population, they are well represented in the US IT industry. Beginning from the early 1990s, the flow of H1B workers from India has been unabated, though it did show stagnation in the years of the recession. Indian IT professionals work mainly in low and middle levels in a technical capacity. Barring a few spectacular examples of those who have set up their own companies in Silicon Valley, most follow the hard route to success. In general they are paid less than their US-born colleagues and often are also denied fair promotion opportunities. Though recent outsourcing of activities has boosted the IT industry in India, Indian cyber workers in the US still need to break the 'glass ceiling' to reach high level managerial positions.*

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Information technology (IT)<sup>1</sup> has brought about fundamental changes in the way people work, learn, interact, do business, and govern themselves in the US. According to US Federal Reserve Chairman Greenspan (2000), innovations in IT have begun to alter the manner in which business is conducted and value is created in ways not readily foreseeable even five years ago. The US president's Information Advisory Committee (1999) identified 10 national challenges due to IT— how we communicate, how we store and access information, how we become healthier and receive proper medical care, how we learn, how we conduct business, how we work, how we design and build things, how we conduct research, how we sustain a livable environment, and how we manage our government in the next millennium.

In recent years, the IT-producing sector has been growing faster than the US economy as a whole. Furthermore, fundamental changes in the US economy due to IT are taking place at a very fast unprecedented pace. Increasing innovations in IT have been having a positive effect on US productivity since the mid-1990s [Brynjolfsson and Hitt 1996, US Department of Commerce 2000]. The development, diffusion, and consequences of IT in the US are part of what has been called the information age [Naisbett 1982], the digital economy [Tapscott 1996], the network society [Castells 1996], the information society [Alberts and Papp 1997], the new economy [Atkinson and Court 1998], and the Internet economy [Centre for Research in Electronic Commerce 1999]. IT has transformed what Bell (1975) once called the post-industrial society.

Brainpower is the key resource in an information society. One of the main sources of diffusion of IT in the US has been the inexpensive skilled manpower generated by India in scientific and technical fields. Indians<sup>2</sup> are less than 1 per cent of the US population but comprise over 10 per cent of US scientists and engineers.<sup>3</sup> Many are working in the IT sector.<sup>4</sup> In Silicon Valley, the integrated circuit or IC generally refers not to semi-conductor chips but to Indian and Chinese workers who accounts for more than one-third of the science and engineering workforce in most technology firms [Saxenian 1999].

This paper documents the growing presence of Indians in the IT sector in the US. It is well advertised that many Indians in IT have broken the glass ceiling<sup>5</sup> and now lead their own high-technology<sup>6</sup> companies. Relatively, a few Indians have made the Forbes' billionaire list. It is less known that Indians in IT are building social and economic networks back to India that further

enhance entrepreneurial opportunities in the US and India. Most importantly, very little is known about the working conditions of Indians in the IT sector in the US. Many continue to face several structural barriers in career mobility into positions of authority.

## Demand and Supply of IT Workers

Defining an IT worker is complicated mostly because IT occupations are not located solely in the IT industry; instead, they are distributed throughout the US economy including industry, government, and non-profit organisations. Also, many occupations are considered IT work even though they vary enormously in the technical requirements, ranging from data-entry personnel to computer scientists. Furthermore, people are entering IT workforce with degrees in different fields. For instance, in 1999 the highest degree earned by college graduates in IT occupations was 41 per cent in computer/information science, 19 per cent in engineering, 15 per cent in social science, 13 per cent in mathematics, 12 per cent in business, 6 per cent in physical science, 4 per cent in life science, and 13 per cent in other fields [National Science Board 2002].

Different studies employ different definitions of IT workers. The US Department of Commerce (1997) includes computer scientists, computer engineers, systems analysts, and programmers in IT workforce; whereas the Information Technology Association of America or the ITAA (1997, 1998), a trade association representing 11,000 companies, includes all those who perform any function related to IT. Freeman and Aspray (1999) use the term IT worker for those who add more than half the value to work with his or her IT knowledge; for less than half the value added to the work with IT, they use the term IT-enabled worker.

We use the term IT worker in the general sense to include a computer scientist, computer product designer, computer engineer, systems analyst, computer science researcher, system architect, system designer, programmer, software engineer, micro-processor designer, chip designer, maintenance programmer, tester, database administrator, help desk specialist, hardware maintenance specialist, network installer, network administrator, customer support specialist, and system consultant. However, many sources used in the article may have a different meaning of IT worker and thus different statistics and claims.

The 1990s witnessed a growing perception that the US is facing a shortage of IT workers<sup>7</sup> in high-technology industry. The ITAA

(1997) reported that in 1996 American companies could not fill 1,90,000 IT jobs. The following year, the ITAA (1998) claimed the existence of 3,46,000 IT vacancies. The US Department of Commerce (1997) issued a similar warning after contrasting the Bureau of Labour's projection that between 1996 and 2005 the number of IT jobs would increase annually by 95,000 with the National Centre for Education Statistics that only 25,000 bachelor's degrees in computer science are produced annually. US Senator Spencer Abraham declared: "The one thing on which I think almost everyone is in agreement is that we face a serious worker shortage with respect to high-tech employment and skilled labour in America today." Similarly, US Representative David Dreier said: "There are 3,00,000 jobs that have yet to be filled" [Alvarez 2000].

During 2000-2010, employment in S and E occupations is expected to increase almost three times faster than the rate for all occupations. Although the economy as a whole is expected to provide approximately 15 per cent more jobs over this decade, employment opportunities for S and E jobs are expected to increase by about 47 per cent (about 2.2 million jobs). Approximately 86 per cent of the increase in S and E jobs will likely occur in computer-related occupations. Overall employment in these occupations across all industries is expected to increase by about 82 per cent over the 2000-2010 decade, with more than 1.9 million new jobs being added. Jobs for computer engineers and scientists are expected to increase from 6,97,000 to 1.4 million, while employment for computer system analysts is expected to grow from 4,31,000 to 6,89,000 jobs [National Science Board 2002].

At a time when American society is becoming increasingly IT-oriented, individuals studying core IT fields, namely, computer science and computer engineering are not keeping up with increasing demand. There has been a 20-year decline in the US college-age population and subsequent fall off in degrees in many science and engineering fields including computer science and computer engineering. For instance, the US college-age population decreased from 22 million in 1980 to 17 million in 1997, a reduction of 23 per cent. Since 1997, the college-age cohort has been increasing, with strong growth among minority groups. Similarly, in 1971, fewer than 2,400 students received bachelor degrees in computer science. By 1986, that number jumped to nearly 42,000 including almost 15,000 women. This number of recipients began to drop off sharply in 1987, stabilising by the mid-1990s at about 24,000. In the late 1990s, there has been an increase in bachelor degrees awarded in computer science and computer engineering [National Science Board 2002]. Even with these gains, the supply for labour force in IT is projected to remain low.

The dotcom bust in 2000-2001 has slowed the demand for IT workers. According to the ITAA (2002), the demand for new IT workers fell by 44 per cent, from 1.6 million in 2000 to 9,00,000 in 2001. The Bureau of Labour Statistics reported that the unemployment rate for computer scientists increased from 3.4 per cent to 5 per cent between 2001 and 2002 [Lewis 2003]. Joint Venture Silicon Valley found that "driving" industries – software, semi-conductors and computer and communications hardware – in Silicon Valley, lost 22 per cent of their jobs from

the second quarter of 2001 to the second quarter of 2002 [Fisher 2003]. However, the US has been treating the economic slow-down as a temporary phenomenon and expects to recover from it. According to *Time Magazine* (November 24, 2003), key indicators show the long-awaited economic recovery.

### **Pulling IT Workers from India**

The US is concerned about the nation's ability to meet its technical workforce needs and to maintain its competitive position in the global IT markets. One solution to the shortage of IT workers is to open the door to foreign-born. After second world war, the US changed its immigration and naturalisation policies from 'skin' to 'skill' to fill the expected shortfall of candidates in science and engineering fields.

Before 1965, Asians were forbidden to enter the US. The Chinese Exclusion Act of 1882 barred virtually all immigration from China and prevented all Chinese already in the US from becoming US citizens, even their American-born children. Similarly, the Gentlemen's Agreement in 1907 made Japan stop issuing passports for Japanese workers to go to the US. In 1917, Congress introduced the Barred Zone Act, which prevented immigration from the east Asia. Again in 1924, Congress enacted the Oriental Exclusion Act that virtually banned all immigration from Asia.

As America entered second world war, Congress started to liberalise US immigration and naturalisation regulations for Asians. The 1952 Act set a quota of 100 for several Asian nations. However, the decisive year for Asian immigration into the US was 1965 when Asian nations were placed on an equal basis with other countries. The 1965 Immigration Act set the limit of 20,000 per year per country, with the overall ceiling of 2,70,000 based on the preference system. Priority was given to family reunification, refugees, and skilled labour. For instance, the third preference was for professionals, scientists, and artists of exceptional ability (maximum 10 per cent) and the sixth preference was for workers in occupations with labour shortages (maximum 10 per cent). The only caveat was that these two preferences were to be approved by the US Department of Labour, so economically oriented visas could be watched closely.

The preference for skilled labour from abroad, which gained momentum in the mid-1960s, experienced accelerated growth in the 1990s. The 1990 Immigration Act created a category of 65,000 temporary workers (H1B visas) admitted for up to six years based on education and technical skills in demand. In 1997 and 1998, however, the quota of 65,000 visas was exhausted before the end of the each fiscal year. High-technology companies conducted a vigorous lobbying campaign, which resulted in legislation raising the quota to 1,15,000 for fiscal years 1999 and 2000. For instance, on October 21, 1999, Roberta Katz, chief executive officer of the Technology Network, testified before the Subcommittee on Immigration Committee on the Judiciary United States Senate that America's technological and economic leadership would be jeopardised unless American companies continued to have access to the most highly skilled employees from abroad. In 2000, even the expanded quota was used up barely six months into the year. Accordingly, the quota for H1B visas was expanded to 1,95,000 for the following three years. More than half of H1B visas have been issued for computer-related or electrical engineering positions. Because of high percentage, H1B visas are often thought to be for IT workers. Another visa, L1 allows multinational companies to transfer workers from

foreign operations into the US. The recent US economic slow-down has slowed the demand for skilled workers and H1B visas are back to 65,000 as the law had specified.

The tight IT labour market is not unique to the US. Western Europe has a current shortage of 8,50,000 IT sector jobs with the shortage expected to grow to 1.7 million by 2003. Similarly, a Canada IT worker shortage will grow to nearly half a million by 2010 [West and Bogumil 2001]. Western countries are changing their immigration policies to attract skilled labour from abroad. They are competing with each other for scarce and valuable IT workers in much the same way they have previously competed for raw materials.

India has been providing nearly half of the H1B petitions; the next share has been going to China (approximately 10 per cent). India has witnessed the largest increase in the US population for IT workers mostly because the number of India's IT workers is growing rapidly. American companies have been actively involved in recruiting Indians to fill job openings. They are trying to attract by promising top salaries, better living, health benefits, and challenging work environment. One advertisement promised: 'USA or Your Money Back.' Another declared: 'State of the Art Facility'. US companies favour IT workers from India because they offer a unique set of technical skills, well versed in English, do not demand higher wages, are willing to relocate and not very demanding, and help companies to build or strengthen their business in India. Many body shoppers or recruiting agencies have emerged in India to facilitate migration of skilled IT workers on H1B visas. Indian migration to the US is a consequence of globalisation and market penetration across national boundaries.

As the number of immigrants from Asia and developing countries has soared, many Americans are raising voices against immigration in high-technology companies. For instance, former US Senator Alan Simpson believes that immigrants take highly skilled jobs away from native-born Americans. Similarly, former US labour secretary Robert Reich feels that high-technology companies lay off native workers to hire foreigners in order to maximise their profits. The AFL-CIO, the largest labour union in the US, blames high-technology companies for holding down their costs by hiring immigrants. Many have been calling for more immigration restrictions especially after the attack on September 11, 2001, which demolished the World Trade Centre in New York, damaged Pentagon in Washington, DC, killed over 2,000 civilians, and affected over 3,00,000 people.

This fiscal year, the US Congress set a quota of 65,000 H1B visas, which was snapped up immediately after they became available on October 1. US business wants Congress to revisit the cap "to ensure American business has access to the talent it needs to help keep (US) economy strong." Those who oppose the tech visas argue that the existing 65,000 quota is inexcusably high considering more than 1,00,000 American programmers are unemployed and many more are underemployed. The National Hire American Citizens Society believes that H-1B visas are "American worker replacement programmes" [Francis 2004].

### **Population, Education, Income, Success**

Since 1965, the Indian population in the US has started to skyrocket. According to the 2000 US Census, there are approximately 1.9 million Indians<sup>8</sup> in the total US population. The Indian population is now the third largest Asian group, below the Chinese (2.7 million) and Filipinos (2.4 million) [Barnes and

Bennett 2002]. Over 70 per cent of Indians are born outside the US. The catalyst behind the growth of the Indian population in the 1990s seems to be the influx of graduate students and H1B visa holders and their families (spouses and children). Many have become permanent residents; however, they would have been counted in the US Census even with their temporary status.

There are a large number of Indians working in the IT sector in various metropolitan areas such as Atlanta, Austin, Boston, Chicago, Dallas, Detroit, Houston, Philadelphia, Los Angeles, New York, San Francisco and San Jose. Though the exact number is not known, available figures suggest there are over half-a-million Indian IT workers in high-technology companies. According to the Immigration Support Network in 1999 there were approximately 4,00,000 Indians on H1B visas in the US and the vast majority of them were IT workers. Over 25 per cent of all scientists and engineers in Silicon Valley high-technology companies are from India.

The Indian IT workforce in the US is not a homogeneous group. There are a small number of Indians, who are either born in the US or have migrated to the US at a very early age with their families. Then there are a significant number of former foreign students at American universities, who are recruited by high-technology companies after they completed their graduate degrees. Many hold undergraduate degrees from IIT and graduate degrees from top American institutions. These people often get green card or permanent residency under their company's sponsorship. The Bay area of the US is home to almost 4,000 former IIT students. Finally there are a large number of Indians, who came on H1B visas. They are educated from less prestigious institutions in India. Some may have become permanent residents though many work temporarily.

Indians in IT are predominantly young, highly educated, and well trained skilled male workers from urban areas in India. Thus, they differ notably from their earlier counterparts, who were mainly middle-aged, illiterate, male farmers from rural areas. Indians in IT have higher levels of education than the average Americans. For instance, more than two-thirds of all Indian IT workers have at least a four-year college degree. They are twice more likely to have obtained doctoral degrees than are native-born Americans [National Science Board 2002]. Indians have the most knowledge of advanced software of any ethnic group. Further, they are fluent in English. They differ from those Indian immigrants coming as relatives, as the latter may be less educated.

Indians form a prosperous ethnic community in the US especially in high-technology industry. Average household income of Indians is over \$50,000 per year – the highest income of any foreign-born group and higher than the income for all foreign-born households and US-born households [Schmidley 2000]. Indian software engineers earn from \$60,000 to \$80,000 per year based on degree and technical expertise. However, H1B visa holders are not paid well compared to others in high-technology industry. In 2001, the median salary of an H1B visa worker from India was \$52,000 [Matloff 2002]. Several studies have found that IT workers coming from India on H1B visas typically earn 25 per cent to 30 per cent less than their colleagues, who are already naturalised citizens.

Almost half of Indians own their home. Most Indians in IT fields who are green card holders live in suburbs and thus differ from the earlier immigrants who lived in the city. Those on H1B visas tend to live in sophisticated apartment complexes, which are recommended by their companies and mostly occupied by

Indians. Some Silicon Valley IT workers from India cannot afford to have their own separate apartments and thus share with others. Once Indians acquire a green card, they tend to move out of these high-tech ghettos to a house in the suburbs.

Indians seem to have 'made it' in mainstream America, despite most of them being foreign-born and coming to America without money and position. They have developed their skills to succeed in a technologically advanced society. Several of them have contributed to the growth and success of high-technology industry, which is the single largest employer in the US and the engine of technical innovation. For instance, approximately one-fourth of high-technology companies in Silicon Valley have Indian executives. In 1998, Indian-run firms had sales of \$2,16,110 per employee compared to \$2,42,105 sales per employee for all technology firms, which are listed in the Dun and Bradstreet database. Of the 11,433 high-technology firms started during the 1980 period, Indians ran 774 (or 7 per cent). In 1998, these companies collectively accounted for over \$16.8 billion in sales and provided 58,282 jobs [Saxenian 1999].

Many Indian entrepreneurs have been extremely successful in high-technology industries all over the world. For instance, Vinod Khosla is co-founder of Sun Microsystems; Aziz Premji is chief executive officer of Wipro Industries; Sabeer Bhatia founded Hotmail; Arun Netravalli is president of Lucent Bell Labs; N R Narayan Murthy is founder and chairman of Infosys Technologies; Gururaj Deshpande is co-founder of Sycamore Networks; Pradeep Sindhu is founder of Juniper Networks; Rajendra Singh is founder of the Virginia-based Telcom Ventures; Vinod Dham is co-founder of NewPath Ventures; Suhas Patil is founder of Cirrus Logic; and Prabhu Goel is founder of Gateway Design Automation. Among successful Indian women are Cisco's vice president Jayashree Ullal; Digital Link's chairwoman Vinita Gupta; Tioga Systems' chief executive officer Radha Basu and Smart Modular Company's founder Lata Krishnan.

Collectively, these and many other Indians have created a positive perception about Indians as a 'model' for other minorities to follow in their quest to achieve the American dream. US media have devoted special coverage to the success of Indian immigrants in the US. For instance, on January 12, 2003, CBS's *60 Minutes* carried a story on the IIT, which has produced a stunning percentage of chief executive officers and innovators in the American high-technology industry. Basically, the media tries to convey the image that most Indian immigrants in America have a 'rags to riches' story. Dinesh D'Souza, a conservative political commentator in the US, has contrasted the success of Indians to the failures of Afro-Americans. Such portrayal has made many believe that Indians, unlike women and under-represented minorities in the US, are unaffected by glass ceiling barriers. Even many Indians believe the glass ceiling is a diminishing problem in the US especially in Silicon Valley. There is a widespread belief that if people are competent in the US, they can make it to the top regardless of their ethnicity and gender.

### Cracking the Silicon Ceiling

The paradigm of a model minority perpetuates the illusion of a colour-blind American society. The hidden political message is that the US is a land of opportunity for hard-working minorities and Indians have become successful, despite past racial discrimination in American society. Most importantly, this image of model minority undercuts the demands of under-represented

minorities (Afro-Americans, Hispanics, and Native Americans). It conveys that under-represented minorities should emulate actions and beliefs of the Indians. In addition, the model minority stereotype penalises Indians by assuming they do not need guidance and support.

Further, not all Indians have made it in America. US immigration has brought in the cream of the techno-crop of Indians. As Bill Gates, chief executive officer of Microsoft Corporation, noted in his keynote address at the golden jubilee of the IIT in January 2003 that more than half the combined IIT output of 1,25,000 graduates now work outside India, mainly in the US. However, as family members join earlier immigrants, many Indians make up the working classes. It is because they do not have the same credentials as those techno-Indians carefully chosen by American authorities. For instance, almost 50 per cent of taxi drivers in the city of New York are Indians/south Asians, who struggle to make a living in the US.

Indians enjoy the status of being represented very highly as professionals<sup>9</sup> (60 per cent), despite being a small percentage (less than 1 per cent) of the US population. Yet, only 15 per cent of them hold management positions in high-technology companies [Saxenian 1999]. Indians in the US do not enjoy similar chances of being promoted and getting ahead in high-technology companies. Despite good records of achievement, they do not reach a level in which they can participate in policy and decision-making responsibilities [Varma 2002, 2004]. Some explain the disproportionately small representation of Indians in positions of authority and decision-making by pointing a finger to the language deficiencies or preference for technical over managerial positions. Others suggest organisational obstacles such as racial prejudice or being outside professional networks.

For those born in India, English is their second language. Yet, they are fluent in English and have little language difficulties though some may have accents that may be hard to understand. Once Indians have been recruited in high-technology companies, their accent and different communication styles influence their performance evaluation. It inadvertently creates barriers to their advancement and career. However, European employees with English-language difficulties are treated differently than those from India [Federal Glass Ceiling Commission 1995]. This suggests the existence of some racial prejudice.

Since Indians are concentrated in technical positions, it is often argued that they may not be prepared for managerial positions. Indians as a group are above the national average in terms of educational achievements and academic preparedness at high school and college level. Many go for higher education. They are mostly professionals – a category of workers from where most managers come.

However, Indians are not perceived as suited for high-level management work. They are considered highly educated, intelligent, good in mathematics and sciences, hard-working, meticulous, non-confrontational, law-abiding, collectivist, passive and non-violent. Such perceptions have enabled Indians to gain an initial entrance in high-technology companies. When it comes to managerial positions, the same perceptions work against Indians. Generally, managers are supposed to be quick decision-makers, risk-takers, creative, visionary, assertive, aggressive, direct, people-oriented, and individualistic. Typically, Indians are seen as good at programmed or routine repetitive decisions that are learned in advance rather than non-programmed or unpredictable decisions that are not formalised. Consequently, Indians are viewed

as “good technicians, rather than managers” or “superior professionals, but not as management material” [Federal Glass Ceiling Commission 1995].

When Indians do have desired leadership qualities, the image of a non-white high-ranking manager does not have appeal in many high-technology companies. For instance, many firms started by Indians in Silicon Valley have non-Asian senior executives because venture capital financing has been tied to the requirement that the latter be hired. Overt discrimination against Indians in high-technology companies may be on the decline, but they continue to face subtle discrimination, prejudice, and bias. Generally, cultural values for promotion end up reflecting traditional ‘white male’ values. The unstated, but ever-present question is whether Indians in the US are like their white counterparts.

Consequently, Indians believe that they have to work much harder to crack the silicon ceiling. Indian women believe that they have to work even harder than Indian men to succeed in the US. Failure is not an option for Indians in the US; they must succeed to achieve their career goals. In Vinita Gupta’s words, “we were immigrants because we were risk takers. We left our safe land behind and came to this place looking for something bigger and better” [Prasad 2003]. Being frustrated about their chances of promotion, some Indians started their own high-technology companies. As noted earlier, Indians are running some of the top high-technology companies in the US, which account for a significant portion of total technology sales and total technology jobs.

Successful Indians in technopolises – cities in which high-technology companies agglomerate such as Silicon Valley and Route 128 – have taken important initiatives to help other Indians. They have created professional associations to provide resources and support for Indians/south Asians. Membership runs anywhere from several hundred to over a thousand. For instance, the Silicon Valley Indian Professionals Association (SIPA) was founded in 1991 and currently has 1000 members. It provides a forum for Indians in the US to contribute to cooperation between the US and India. Similarly, the Indus Entrepreneur (TiE) was founded in 1992 to foster entrepreneurship among south Asians to succeed in America as well as build ties with India. There is Indian Mafia network within Microsoft Corporation. Typical activities of these associations are monthly meetings, informal get-togethers, annual conferences, presentations, networking, and mentoring for cross-generational investment, raising capital, starting a successful business, managing risk, building confidence, and ensuring the business grows. The journal, *SiliconIndia* ([www.siliconindia.com](http://www.siliconindia.com)) gives up-to-date information about technological business activities in the US. Such ethnic associations provide Indians/south Asians with special access to resources and information to succeed in the US. Most importantly, these associations are supplemented by informal network connections among Indians, which is really a network of networks.

In addition, there has been a tremendous growth in communication links between Indian IT communities in America and in India. Some successful Indians in American technopolises are sending funds as gifts to IITs and other institutions in India. Many have started IT companies in India to take advantage of its inexpensive skilled manpower. Venture capital is growing rapidly in India. For instance, from February 2000 to February 2001, \$5 billion in venture capital has been raised for Indian investments

[Luce 2002]. In the past, mostly large western corporations were able to grow internationally. Since the late 1980s and early 1990s, technopolises have been created in several Indian cities like Bangalore and Hyderabad. Many Indians in American technopolises are linking up US companies with Indian technopolises. They have an advantage since they speak the same language and share the same work culture. It is common for Indians who have also become a staple of the IT growth to export their knowledge and skills back to India.

### Plight of Indians on H1B Visas

Unlike Indians born in the US or who moved to the US at a young age or Indians who are former students with a graduate degree in an IT-related field, Indians on H1B visas experience a rather hard working environment. Generally, companies obtain IT workers from India at a discount from body shoppers or recruitment agencies. While recruiting workers for US companies and arranging visas for them, many recruiting agencies often charge a cut for themselves from workers; generally, the company, which hires workers, pays recruiting agencies. The US Immigration and Naturalisation Services (INS) is investigating whether H1B workers from India are being forced to turn over 25 per cent of their salary to recruiting agencies.

The majority of Indians' duties are maintenance related and not intellectual based. Even though the US federal law holds that benching or giving employees assignments that are below their respective levels is illegal, it is common practice among Indians on H1B visas [Cohn and Roche 2000]. Further, Indians earn less money than their counterparts. It is common to find Indians having a salary relevant to second level of the organisation chart even though they are working at level four of the organisation [Kumar 1999]. The US Department of Labour (1999) found that almost 20 per cent of the employers were not even paying the salaries they had promised in their H1B applications; it should be noted that the salaries in the applications tend to be low to begin with.

For instance, Syntel Inc, a company in Troy, Michigan, providing computer personnel and services on contract to other companies, has a workforce of more than 80 per cent H1B immigrants, most of whom are computer analysts from India. Syntel management has attested in writing that the company would pay its H1B workers the prevailing wage – a requirement established to protect US workers' wages from erosion. Wage and Hour Division, however, found that Syntel, in its operations in New Jersey, had wilfully paid its Indian IT workers \$34,000 per year rather than the prevailing rate of \$41,000 required by law – an underpayment of nearly 20 per cent [US Department of Labour 1999].

A major problem is that the H1B workers are indentured to a company, and thus they cannot switch jobs. Generally, the company makes H1B workers sign an employment contract under which a worker has to pay a significant sum in damages (approximately \$10,000), if he or she fails to stay with the company for certain duration (typically 18 months to two years), and to give the firm advance notice of quitting (generally six weeks to two months). Many Indians on H1B visas are constantly in fear of being sued or deported.

The US economic slowdown has further affected Indians on H1B visas. In 2001-2002, many high-technology companies such as Intel, Cisco, Sun Microsystems, Hewlett-Packard, IBM, Nortel,

Yahoo, and America Online (AOL) announced thousands of layoffs, which included many H1B workers. With a major shift from hardware to software production, many small software companies have emerged (average-size 20 people), who are vendors to Fortune 500 companies. These small software companies recruit many Indian IT workers. Without business orders from large companies, small software companies do not have jobs for Indians. This has caused a growing number of Indians with H1B visas to be unemployed in the US and head back home. The INS does not track the number of H1B visa holders who have lost jobs and or been forced to return to their home country; the INS only keeps data of the number of visas issued. The INS issued about 60,500 H1B visas from October 2001 to June 2002, over a 50 per cent decline from 1,30,700 visas issued between October 2000 and June 2001. Once unemployed, Indians on H1B visas cannot find another job in a different company because INS will not allow them to transfer their visas to the new company. According to the INS, a worker is 'out of status' when he/she has lost his/her job, and needs to go back home.

Because of massive layoffs in recent years, the US government has been willing to make an exception with H1B visas holders. Accordingly, H1B workers might be able to stay if they qualify and find a new company willing to sponsor them. Similarly, the state department has said that H1B visas may be valid until expiration date. However, H1B visa holders have to apply to the INS to see if they qualify under 'extraordinary circumstances'. The INS makes a decision on a case-by-case basis, which may take over two months. In the meantime, Indians cannot take any job even on a part-time basis. They live in uncertainty without an income [Stone and Conway 2001]. These workers had put in long hours of work for the company. Without a job, there is little to fall back on. Further, Americans who were also laid-off have been blaming workers on H1B visas. Americans feel that these workers were spared in rounds of layoffs because they make less than native-born workers do and are easier to boss around.

Young Indian males (median age 28 years) make up most of the H1B workers. Their wives and children come with them from India on an H4 visa. This visa allows them to stay in the US as dependents of H1B visa holders. It means women on an H4 visa cannot work in the US, although many are highly qualified to do so. In this way, they differ from the wives of earlier immigrants who were primarily homemakers with little education. Other than being frustrated with their inability to use their education and training in the US, many wives on H4 visas are physically and emotionally abused by their husbands. There has been an increase in the number of battered women among H4 dependent wives. For instance, in 2001 there were at least 150 complaints lodged by women with H4 visas. These wives cannot leave their husbands because current visa rules do not allow the dependents of H1B holders to work in the US. Further, they cannot stay on in the US in the absence of the primary applicant, which gives their husbands complete control over their wives' lives [Devi 2002]. If divorced on an H4 visa, women are immediately considered deportable.

Historically, workers in the IT industry have not been organised. There has been an attempt to keep the IT industry 'union-free'. For instance, Bob Noyce, the co-founder of Intel, declared in the early 1980s that "remaining non-union is essential for survival for most of our companies. If we had work rules that unionised companies have, we'd all go out of business. This is a very high priority for management" [Jayadev 1999]. The increasing unfair

treatment of IT workers has led to collective action and community intervention. HealthWATCH (Workers Acting Together for Change), Asian Immigrant Women Association (AIWA), and many other associations are involved in organising workers in Silicon Valley. The 495 Networking Support Group in Route 128 has been working to highlight concerns of laid-off IT workers and engage politicians in a dialogue about the future of the Massachusetts economy.

### Outsourcing to India

In the late 1990s, many US companies have begun outsourcing IT service jobs offshore to deal with the shortage of IT workers and fierce global competition. Further, outsourcing is not limited to only labour-intensive IT services such as software maintenance and low level coding; it has expanded to sophisticated IT tasks such as web applications development, XML, software design, architecture, and management. In addition, IT enabled business services such as data entry, low level processing, customer call centres, telemarketing, collections, accounting, human resources, procurement, and help desks are being outsourced by banks, insurance companies, mortgage lenders, credit card companies, airlines, and utility providers [Lieberman 2004].

There are various reasons for US companies to outsource offshore. Global availability of cost effective high speed digital internet connections and other communications tools do not require direct physical contact. Many developing countries have large surplus of well-educated low cost labour that can perform IT service jobs for US companies at reduce cost. For instance, total cost of a software programmer in India is approximately \$6,000 per year compared with over \$60,000 per year in the US [Lieberman 2004]. Further, many developing countries like India and China have been concentrating on the software industry as a viable option to strengthen their national economy. They have been implementing policies to provide favourable business environment to multinational corporations. For instance, the software technology parks of India provide space, finance, infrastructure support, and reduce time-consuming approvals from the government. This further provides US companies low-cost alternatives for their IT services. Yet, another reason for US firms to locate their IT services to India is the competitive advantage gained by working around the clock; 12-hour time difference with the US allows Indians to access US computers and for US companies to have work done continuously 24 hours a day, without the need for overtime pay. These and many other advantages have standardised the practice of outsourcing offshore by US companies.

India has a reputation for high quality technical education and English-speaking skills at a low cost and thus is the most popular destination for US companies' IT workforce needs. India had a \$12 billion IT services export industry in 2003, more than 900 software export firms and approximately 4,15,000 IT professionals, with about 70,000 new IT professionals coming into the workforce each year. By 2005, India is projected to be the second largest global provider of applications services (after the US), with a minimum of 30 per cent annual growth [Lieberman 2004]. Many US companies such as IBM Global Services, GE Capital Services, Oracle, EDS, Bank of America, Dell, AMEX, Citibank, Prudential, Delta Air Lines, HP, and Accenture have been off-shoring operations to India. Many prominent Indian companies such as Tata Consulting Services, Wipro Technologies,

Infosys Technologies, Satyam Computer Services and HCL Technologies have software development contractors in the US.

As US companies are sending more white-collar IT service jobs to India and China, outsourcing has become a hot political issue in the US. One headline captured the sentiment, 'India Rising: Programming Jobs Are Heading Overseas by the Thousands. Is There a Way for the US to Stay on Top?' Another stated, 'The Rise of India and What It Means for America'. Senator John Kerry, the losing Democratic presidential candidate in the 2004 elections, made outsourcing of jobs overseas a key election issue. Lou Dobbs of CNN-listed companies that move jobs outside US to take advantage of cheap labour. Many think that the American software programmers, who were once the symbols of hope, are going to become extinct within the next few years with competition from foreigners like India and China. The accepted image of the American IT worker has been of the white male, ambitious, high wage earner, home owner, and married, the perfect personification of the American dream. Now the identity of American IT worker stands against Indian IT worker who is foreign and exotic. For instance, the cover page of *Wired Magazine* (February 2004) portrayed 'The New Face of the Silicon Age'. An imagined female Indian IT worker is veiled by her own hand, which is in turn covered by a henna script that encrypts an imagined foreign computer code. The accompanying headline, "Kiss Your Cubicle Goodbye" reveals her sinister plan to demolish the American IT workplace and simultaneously the livelihood of millions of Americans [O'Donnell 2004]. The new reality is that American IT workers are competing in the global market. However, there is no international white-collar working class solidarity; instead, there are only American interests.

Indians have made vast strides in IT education and employment in high-technology companies. Instead of being under-represented like Afro-Americans and Hispanics, Indians are over-represented in IT occupations. Further, they are concentrated in professional and technical occupations. Yet, Indian IT workers with similar educational background and skills as whites do not have comparable prospects of success in career attainment. Indians on H1B visas in IT occupations face several barriers including low pay, less stimulating work, and insecurity. Some Indian IT workers are highly educated from prestigious institutions, have high paying jobs, and are running high-technology companies. While others are educated from less prestigious institutions, have comparatively low-level jobs, and are not sure about their future in US. The latter group of Indians makes up most of the Indian cyber workers in the US; they have to work much harder to succeed in high-technology companies in the US. [17]

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### Notes

- 1 IT is not a single technology; instead, it is a combination of four basic technologies – tools to access information, telecommunications linkages (including networks), information processing hardware and software, and storage media [Keen 1995]. The foundation of IT is the ability to represent text, data sound, and visual information digitally.

- 2 In the US Census, people are classified as Asian Indians if they are of Asian Indian origin or if they are of Asian Indian race, or if they are foreign-born people from India.
- 3 The National Science Foundation uses the term 'scientist' and 'engineer' for those who hold at least a bachelors degree in or are employed in science and engineering fields.
- 4 There are two areas – Silicon Valley and Route 128 – in the US that are considered the world's leading centres of IT innovation. In recent years, however, Route 128 has experienced a decline, compared to Silicon Valley. While Route 128 is dominated by a small number of high-technology companies, Silicon Valley has over one third of the 100 largest high-technology companies [Alarcon 1999].
- 5 In 1986, the *Wall Street Journal* popularised the term "glass ceiling" to describe the invisible barriers that women face as they approach the top of the corporate hierarchy. President George Bush created the Federal Glass Ceiling Commission in 1991 to identify the glass ceiling barriers that block the advancement of minorities and women as well as the successful practices and policies that lead to the advancement of minorities and women into decision-making positions in the private sector. The Federal Glass Ceiling Commission completed its mandate in January 1996.
- 6 In the manufacturing sector, four industries are identified as high-technology (science-based industries whose products involve above-average levels of R&D): aerospace, computers and office machinery, communication equipment, and pharmaceuticals. In the service sector, three industries are identified as high-technology (those incorporate science, engineering, and technology in their services): communications services, financial services, and business services (including computer software development).
- 7 Some have argued that there is no shortage of IT labour in high-technology industry; only a shortage of cheap labour. They point out that the ITAA's study does not address the difference between supply and demand and includes technicians within the programmer occupation. Furthermore, employers do not want to retrain older programmers since it is costly so they hire cheap labour from abroad (see Matloff 2002).
- 8 This number includes those who identified only Asian Indian (1.7 million) as a race as well as Asian Indian and one other race (0.2 million).
- 9 The occupational classification system used by the US Census includes over 500 detailed occupational categories, which are generally combined into the six summary occupational groups such as managerial and professional specialty; technical, sales, and administrative support; service occupations; precision production, craft and repair; operators, fabricators, and labourers; and farming, forestry and fishing.
- Federal Glass Ceiling Commission (1995): *Good for Business: Making Full Use of the Nation's Human Capital*, US Government Printing Office, Washington, DC.
- Fisher, Lawrence M (2003, January 20): 'Job-Rich Silicon Valley Has Turned Fallow, Survey Finds' *The New York Times*, B1.
- Francis, David R (2004, October 14): 'Endangered Species: US Programmers' *The Christian Science Monitor*.
- Freeman, Peter and Aspray, William (1999): *The Supply of Information Technology Workers in the United States*, Computing Research Association, Washington.
- Greenspan, Alan (2000): 'Business Data Analysis: Before the New York Association for Business Economics', <http://www.federalreserve.gov/boarddocs/speeches/2000/20000613.htm>
- Information Technology Association of America (1997): *Help Wanted: The IT Workforce Gap at the Dawn of a New Century*, Arlington, USA.
- (1998): *Help Wanted: A Call for Collaborative Action for the New Millennium*, Arlington, USA.
- (2000a): *Bouncing Back: Jobs, Skills and the Continuing Demand for IT Workers*, Arlington, USA.
- (2002b): *New ITAA Report Shows US IT Workforce Continues to Stabilize in Third Quarter*, Arlington, USA, <http://www.itaa.org/news/pr/OressRelease.cfm?ReleaseIT=1040248187>
- Javadev, Raj (1999): 'Next in Line: South Asian Workers in Silicon Valley' <http://www.zmag.org/Bulletins/psawsv.htm>, July 4.
- Keen, Peter GW (1995): *Every Manager's Guide to Information Technology*, Harvard Business School Press, Boston.
- Kumar, Rajesh (1999): *Stars and Stripes in My Eyes*, <http://206.20.14.671/achal/archive/sep99/stripes.htm>.
- Lewis, Diane E (2003 January 19): 'Laid-off IT Professionals Get Political' *The Boston Globe*, pp 1-3.
- Liberman, Joseph I (2004): *Offshore Outsourcing and America's Competitive Edge: Losing Out in the High Technology R&D and Services Sector*, Office of Senator, Washington DC.
- Luce, S (2002): 'Hard Sell to a Billion Consumers Marketing India', *Financial Times*, p 14.
- Matloff, Norman (2002): *Debunking the Myth of a Desperate Software Labour Shortage*, Testimony to the US House Judiciary Committee Subcommittee on Immigration, <http://heather.cs.ucdavis.edu/itaa.real.html>, February 4.
- Naisbett, J (1982): *Megatrends: Ten New Directions Informing Our Lives*, Warner Books, New York.
- National Science Board (2002): *Science and Engineering Indicators*, National Science Foundation, Arlington, NSB-02-1.
- O'Donnell, Casey (2004 August 25-28): 'A Case for Indian Insourcing' a paper presented at Joint Annual Meeting of Society for Social Studies of Science and European Association for the Study of Science and Technology (4S/EASST), Paris, France.
- Prasad, Vijay (2003): 'The Other Indian in Silicon Valley', *Little India*, <http://www.littleindia.com?india?Mar2k/revolutionary.htm>, February 13.
- President's Information Technology Advisory Committee Report (1999): *Investing in Our Future*, <http://www.ccic.gov/ac/report/>, February 24.
- Saxenian, AnnaLee (1999): *Silicon Valley's New Immigrant Entrepreneurs*, California: Public Policy Institute, <http://www.ppic.org/publications/PPIC120/ppic120.html>
- Schmidley, AD (2001): 'Profile of the Foreign-Born Population in the United States: 2000' *Current Population Reports (Series P23-206)*, Government Printing Office, Washington DC, US.
- Stone, Brad and Conway, Fe (2001): 'Laid Off, with No Place to Call Home' *Newsweek*, pp 36-40, May 14.
- Tapscott, D (1996): *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, McGraw Hill, New York.
- US Department of Commerce (1997): *America's New Deficit: The Shortage of Information Technology Workers*, Washington DC, USA.
- (2000): *Digital Economy 2000*, Washington DC: US Author.
- US Department of Labour (1999): *The Triennial Comprehensive Report on Immigration: Part II Economic Impacts*, Washington DC, USA, <http://www.ins.usdoj.gov/graphics/aboutins/repstudies/part2.pdf>
- Varma, Roli (2002): 'High-Tech Coolies: Asian Immigrants in US Science and Engineering Workforce' *Science as Culture*, 11(3): 337-361.
- (2004): 'Asian Americans: Achievements Mask Challenges', *Asian Journal of Social Science*, 32(2): 290-307.
- West, AL and Bogumil, AW (2001): 'Immigration and the Global IT Work Force', *Communications of the ACM*, 44 (7): 34-38.

## References

- Alarcon, R (1999): 'Recruitment Processes among Foreign-born Engineers and Scientists in Silicon Valley' *American Behavioural Scientist*, 42(9): pp 1381-1397.
- Alberts, D S and Papp, D S (eds) (1997): 'The Information Age: An Anthology on Its Impact and Consequences', National Defense University, Washington DC, <http://www.ndu.edu/ndu/inss/books/anthology1/index.html>
- Alvarez, Lizette (2000, October 4): 'Congress Backs Big Increase in Visas for Skilled Workers' *The New York Times*, A1.
- Atkinson, RD and Court, RH (1998): *The New Economy Index: Understanding America's Economic Transformation*, Progressive Policy Institute, Washington DC.
- Barnes, Jessica S and Bennett, Claudette L (2002): 'The Asian Population: 2000' *Census 2000 Brief C2KBR/01-16*, US Census Bureau, Washington DC, <http://www.census.gov/prod/2002pubs/c2kbr01-16.pdf>
- Bell, Daniel (1975): *The Coming of Post-Industrial Society*, Basic Books, New York.
- Brynjolfsson, E and Hitt, LM (1996): 'Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending' *Management Science*, 42(4): pp 541-558.
- Castells, Manuel (1996): *The Rise of the Network Society*, Blackwell, Cambridge.
- Centre for Research in Electronic Commerce (1999): *Internet Economy Indicators*, <http://www.internetindicators.com>
- Cohn, Gary and Roche, Walter F (2000, February 21): 'Indentured Servants for High-Tech Trade' *Baltimore Sun*, p 4.
- Devi, S Uma (2002): 'Globalisation, Information Technology and Asian Indian Women in US' *Economic and Political Weekly*, pp 4421-4428, October 26.