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INFORMATION TECHNOLOGY AND IT ENABLED SERVICES INDUSTRY IN INDIA

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ABSTRACT

Primarily, the software industry in India was worth Rs. 158.9 billion (US\$ 3.9 billion). If the value of in-house development, which is taking place at many large corporates, is added then the figure would touch around Rs. 190 billion (US\$ 4.6 billion). This phenomenal growth has not been achieved overnight. The C.A.G.R (Compounded Annual Growth Rate) for the Indian software industry revenues in the last five years has been 56.3 percent. Here the C.A.G.R. for the software export industry has been 60.71 percent while that for the domestic market has been 46.05 percent. The Indian Information Technology (IT) and Information Technology enabled

Services (ITeS) sectors go hand-in-hand in every aspect. The industry has not only transformed India's image on the global platform, but also fuelled economic growth by energising higher education sector (especially in engineering and computer science). The industry has employed almost 10 million Indians and hence, has contributed a lot to social transformation in the country. Furthermore, Indian firms, across all other sectors, largely depend on the IT & ITeS service providers to make their business processes efficient and streamlined. Indian manufacturing sector has the highest IT spending followed by automotive, chemicals and consumer products industries. Indian organizations are turning to IT to help them grow business in the current economic environment. IT is seen as a change enabler and a source of business value for organizations by 85 per cent of the respondents, according to a study by VMware. This paper highlights the factors affecting service sector in exports related to information technology. The paper, additionally, underscores the performance & growth of IT & ITES Industry in India.

Keywords - IT Industry in India, Growth and Opportunities in IT Industry in India, IT Enabled Services in India

INTRODUCTION

Information technology in India is an industry consisting of two major components: IT Services and business process outsourcing (BPO). The sector has increased its contribution to India's GDP from 1.2% in FY1998 to 7.5% in FY2012.[1] According to NASSCOM, the sector aggregated revenues of US\$100 billion in FY2012, where export and domestic revenue stood at US\$69.1 billion and US\$31.7 billion respectively, growing by over 9%.[1]

The major cities that account for about nearly 90% of the sector's exports are Bangalore, Chennai, Hyderabad, Trivandrum, Delhi, Mumbai and Kolkata. Bangalore is considered to be the Silicon Valley of India because it is the leading IT exporter.[2][3] Exports dominate the

industry and constitute about 77% of the total industry revenue. However, the domestic market is also significant with a robust revenue growth.[1] The industry's share of total Indian exports (merchandise plus services) increased from less than 4% in FY1998 to about 25% in FY2012. According to Gartner, the "Top Five Indian IT Services Providers" are Tata Consultancy Services, Infosys, Cognizant, Wipro and HCL Technologies.[4]

The Indian Government acquired the EVS EM computers from the Soviet Union, which were used in large companies and research laboratories. In 1968 Tata Consultancy Services—established in SEEPZ, Mumbai[5] by the Tata Group—were the country's largest software producers during the 1960s. The sector developed privately and the government did not play an active part in it till 1999. On 18 August 1951 the Indian Institute of Technology was inaugurated at Kharagpur in West Bengal. These institutions were conceived by a 22-member committee of scholars and entrepreneurs under the chairmanship of N. R. Sarkar.

Relaxed immigration laws in the United States of America (1965) attracted a number of skilled Indian professionals aiming for research. By 1960 as many as 10,000 Indians were estimated to have settled in the US. By the 1980s a number of engineers from India were seeking employment in other countries. In response, the Indian companies realigned wages to retain their experienced staff. In the Encyclopedia of India, Kamdar (2006) reports on the role of Indian immigrants (1980 - early 1990s) in promoting technology-driven growth:

The United States' technological lead was driven in no small part by the brain power of brilliant immigrants, many of whom came from India. The inestimable contributions of thousands of highly trained Indian migrants in every area of American scientific and technological achievement culminated with the information technology revolution most associated with California's Silicon Valley in the 1980s and 1990s.[6]

The ground work and focal point for the development of the information technology industry in India was led by the Electronics Commission in the early 1970s. The driving force was India's most esteemed scientific and technology policy leader M. G. K. Menon. With the support of the United Nations Development Programme (UNDP) under project IND/73/001, the Electronics Commission formulated a strategy and master plan for regional computing centers, each to have a specific purpose as well as to serve as a hub for manpower development and to spur the propagation of informatics in local economies. The first center, the National Centre for Software Development and Computing Techniques (from 1973 onward) was at the Tata Institute of Fundamental Research in Mumbai and was focused on software development.[7] A key decision of the strategy was to not focus on large-scale hardware production but rather intellectual capital and knowledge development. The success of this decision can be seen in the global leadership of Indian entrepreneurs and computer scientists in software development. Jack Fensterstock of the United States was the program manager on behalf of the UNDP and the key advisor to the Indian Government for the implementation of the master plan.

The National Informatics Centre was established in March 1975. The inception of The Computer Maintenance Company (CMC) followed in October 1976. From 1977 to 1980, the country's Information Technology companies Tata Infotech, ProcSys, Patni Computer Systems and Wipro had become visible. The 'microchip revolution' of the 1980s had convinced both Indira Gandhi and her successor Rajiv Gandhi that electronics and telecommunications were vital to India's growth and development but they were reluctant to anything because they were more focused on saving their government from falling and continue their vote bank policies. MTNL underwent technological improvements. From 1986 to 1987, the Indian government embarked upon the creation of three wide-area computer networking schemes: INDONET (intended to serve the IBM mainframes in India), NICNET (the network for India's National Informatics Centre), and the academic research oriented Education and Research Network (ERNET).

Regulated VSAT links became visible in 1994.[8] Desai (2006) describes the steps taken to relax regulations on linking in 1991:

In 1991 the Department of Electronics broke this impasse, creating a corporation called Software Technology Parks of India (STPI) that, being owned by the government, could provide VSAT communications without breaching its monopoly. STPI set up software technology parks in different cities, each of which provided satellite links to be used by firms; the local link was a wireless radio link. In 1993 the government began to allow individual companies their own dedicated links, which allowed work done in India to be transmitted abroad directly. Indian firms soon convinced their American customers that a satellite link was as reliable as a team of programmers working in the clients' office.

Videsh Sanchar Nigam Limited (VSNL) introduced Gateway Electronic Mail Service in 1991, the 64 kbit/s leased line service in 1992, and commercial Internet access on a visible scale in 1992. Election results were displayed via National Informatics Centre's NICNET.

The Indian economy underwent economic reforms in 1991, leading to a new era of globalization and international economic integration. Economic growth of over 6% annually was seen during 1993-2002. The economic reforms were driven in part by significant the internet usage in the country. The new administration under [[Atal Bihari Vajpayee] 1999 govt pm]—which placed the development of Information Technology among its top five priorities— formed the Indian National Task Force on Information Technology and Software Development.

Wolcott & Goodman (2003) report on the role of the Indian National Task Force on Information Technology and Software Development:

Within 90 days of its establishment, the Task Force produced an extensive background report on the state of technology in India and an IT Action Plan with 108 recommendations. The Task

Force could act quickly because it built upon the experience and frustrations of state governments, central government agencies, universities, and the software industry. Much of what it proposed was also consistent with the thinking and recommendations of international bodies like the World Trade Organization (WTO), International Telecommunications Union (ITU), and World Bank. In addition, the Task Force incorporated the experiences of Singapore and other nations, which implemented similar programs. It was less a task of invention than of sparking action on a consensus that had already evolved within the networking community and government.

"The New Telecommunications Policy, 1999" (NTP 1999) helped further liberalize India's telecommunications sector. The Information Technology Act 2000 created legal procedures for electronic transactions and e-commerce.

Throughout the 1990s, another wave of Indian professionals entered the United States. The number of Indian Americans reached 1.7 million by 2000. This immigration consisted largely of highly educated technologically proficient workers. Within the United States, Indians fared well in science, engineering, and management. Graduates from the Indian Institutes of Technology (IIT) became known for their technical skills. The success of Information Technology in India not only had economic repercussions but also had far-reaching political consequences. India's reputation both as a source and a destination for skilled workforce helped it improve its relations with a number of world economies. The relationship between economy and technology—valued in the western world—facilitated the growth of an entrepreneurial class of immigrant Indians, which further helped aid in promoting technology-driven growth.

THE CURRENT DEVELOPMENTS

The economic effect of the technologically inclined services sector in India—accounting for 40% of the country's GDP and 30% of export earnings as of 2006, while employing only 25% of its workforce—is summarized by Sharma (2006): "Today, Bangalore is known as the Silicon Valley

of India and contributes 33% of Indian IT Exports. India's second and third largest software companies are head-quartered in Bangalore, as are many of the global SEI-CMM Level 5 Companies."

Numerous IT companies are based in Mumbai, such as TCS (among India's first and largest), Reliance,[disambiguation needed] Patni, LnT Infotech and i-Flex.

Thiruvananthapuram (Trivandrum), the capital of Kerala state, is the foremost among the Tier II cities that is rapidly growing in terms of IT infrastructure. As the software hub of Kerala (more than 80% of the state's software exports are from here), comparisons have been drawn between Trivandrum and Bangalore. Major campuses and headquarters of companies such as Infosys, Oracle Corporation, IBS Software Services and UST Global are located in the city. India's biggest IT company Tata Consultancy Services is building the country's largest IT training facility in Trivandrum—the project is worth INR10 billion and will have a capacity of 10,000 seats. The completion of the facility is expected in 2014 or 2015.[9]

In January 2012, French company Capgemini announced the establishment of the software centre at the Technopark IT hub in the capital of Kerala. At the time of the announcement, Technopark's business development manager stated: "In two years time, Technopark IT campus is poised to become one of the country's leading IT hubs".[10]

On 25 June 2002, India and the European Union agreed to bilateral cooperation in the field of science and technology. A joint EU-India group of scholars was formed on 23 November 2001 to further promote joint research and development. India holds observer status at CERN, while a joint India-EU Software Education and Development Center will be located in Bangalore.

MAJOR IT INDUSTRY GIANTS

Firm	Revenues	Employees	Fiscal	Headquarters	Source
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			Year		
Tata Consultancy Services	\$11.57 billion	254,076	2012	Mumbai	[11]
Cognizant Technology Solutions	\$7.05 billion	185,045	2012	Teaneck, New Jersey	[12]
Infosys	\$6.69 billion	153,761	2012	Bangalore	[13]
Wipro	\$5.73 billion	140,569	2012	Bangalore	[14]
HCL Technologies	\$4.3 billion	85,335	2012	Noida	[15]

MAJOR IT LOCATIONS

Rank City

Description

1 Bangalore

Popularly known as the Silicon Valley of India and leading software exporter from India. Bangalore is considered to be a global information technology hub of India.

2 Chennai

Chennai is the second largest exporter of IT and ITES of India, and is the BPO hub of India.[16] Chennai has the largest operations centers of TCS, and Cognizant.

3 Hyderabad

Hyderabad is a major it hub in India which is also known as

- Cyberabad which consists of many Multinational corporation companies such as Google, Facebook, Microsoft, Amazon, Oracle and Electronic Arts, etc.
- 4 Mumbai The Financial capital of India, but recently many IT companies have established offices.
- 5 Delhi The National Capital Region comprising Delhi, Gurgaon and Noida are clusters of software development.
- 6 Pune Major Indian and International Firms present in Pune. Pune is also C-DAC Headquarter.
- 7 Kolkata The city is a major back-end operational hub for IBM, Texas Instruments, Intel, Deloitte, Sun microsystems (Oracle).
- 8 Bhubaneswar The capital city of Odisha, an emerging IT and education hub, is one of India's fastest developing cities.
- 9 Thiruvananthapuram The capital of Kerala, now houses all major IT companies including Oracle, TCS, Infosys, and contributes in IT export of India.

THE PERSPECTIVE OF EMPLOYMENT

This sector has also led to massive employment generation. The industry continues to be a net employment generator - expected to add 230,000 jobs in FY2012, thus providing direct employment to about 2.8 million, and indirectly employing 8.9 million people.[1] Generally dominant player in the global outsourcing sector. However, the sector continues to face challenges of competitiveness in the globalized and modern world, particularly from countries like China and Philippines.

India's growing stature in the Information Age enabled it to form close ties with both the United States of America and the European Union. However, the recent global financial crises has deeply impacted the Indian IT companies as well as global companies. As a result hiring has dropped sharply, and employees are looking at different sectors like the financial service, telecommunications, and manufacturing industries, which have been growing phenomenally over the last few years.[17] India's IT Services industry was born in Mumbai in 1967 with the establishment of Tata Group in partnership with Burroughs.[5] The first software export zone SEEPZ was set up here way back in 1973, the old avatar of the modern day IT park. More than 80 percent of the country's software exports happened out of SEEPZ, Mumbai in 1980s.[18]

SWOT ANALYSIS OF INDIAN INDUSTRY

Strengths

High Quality & Price Performance: Quality is the hallmark of Indian I.T. software and services. ISO 9000 certification and SEI Level 5 are the order of the day. High quality knowledge workers and attractive price performance have been and will continue to be a key component of India's value proposition.

Large Pool of Knowledge Workers: The basic raw material for any software development activity or a dotcom start up is the availability of quality knowledge workers. India's main competitive advantage is its abundant, high-quality and cost effective human resources.

Currently, India trains more than 73,000 professionals a year and has around 80,000 people working in the software and services sector. This is the second largest I.T. work force in the world. Recently, the Government of India has committed to providing computer education in every school by year 2003.

State-of-the-art Technologies: A majority of Indian software companies use state-of-the-art technologies, including the latest in client-networking, E-commerce, Internet, ASP, CASE tools, communication software, ATM, protocols, GUI etc.

Flexibility and Adaptability: Indian software professionals easily adapt themselves to new technologies. In the software industry, where technological obsolescence is the order of the day, flexibility to adapt to new technologies a major strength

Reliability: Software programmers from India are able to provide expertise for all or large projects with dollar savings. The motto is ultimate adherence delivery schedules and customer satisfaction

Off-shore Development through Datacom links: Off-shore software development in India especially through high-speed datacom (satellite links), provides immense cost and time saving.

Large Projects: Indian companies increasingly large numbers are demonstrating their ability to handle large projects (more than 500-700 man- ears), including turnkey projects.

High Growth: Software exports as well as the domestic demand in the last few years has been consistently growing at annual growth rate of about 50 percent.

Engineering Base: A strong base of national institutes, engineering college and universities has laid a strong foundation of education in engineering skills amongst Indian software professionals. The IIT's (Indian Institute of Information Technology) in various cities are the new institutions to join the bandwagon.

Mathematical and Logic Expertise: India's success in providing efficient software solutions can be also attributed to the mathematical and logical ability Indian's.

High Aspirations: The Indian IT software and services industry has set itself higher aspirations and goals. The recent aspiration is to reach annual revenues of U.S.\$ 87 billion by 2008 (from a level of U.S.\$3.9 billion during 1998-99), achieve 100 percent literacy, more, employment and entrepreneurship opportunities.

Indians in Silicon Valley: As per a recent survey, 23 of the *Fortune 500* company CEOs are of Indian origin. It has been reported that a business plan of a dotcom company in Silicon valley, U.S.A. receives higher priority if an Indian name associated with it. The successful India in Silicon Valley has organised themselves under the Indus Entrepreneurs Group (TiE).

Government Encouragement: Since 1999 the Government of India has accorded thrust area status to the software sector. The Government has amended the Copyright Law to make it one of the toughest in the world; eliminated import duty on computer software; exempted profits derived from software exports from Income Tax etc. The Government of India has also set up innovative scheme like Software Technology Parks, etc., for promoting software exports.

Infrastructure: A growing number of State Governments and cities are building hi-tech buildings and habitats to accommodate the ever increasing numbers of software companies and enterprises. These are in the form of intelligent habitats and buildings and include infrastructural support like high-class value-added data communication services, captive power, recreational facilities, etc. They incorporate state-of-art facilities viz. plug-and-play features. This is assisting companies to quickly set up their software operations in India.

Global Research & Development: More and more multinationals are setting up their global R&D units in India, recognising the immense power of local talent.

Weaknesses

Lack of Package Orientation: Although, a few companies have started making shrink-wrapped software packages, the industry as a whole is still not oriented towards development of world class 'shrink-wrapped' software packages. Thus, the industry is not able to take advantage of a multiplier effect for growth in revenues.

Lack of Domestic Computerisation: Lack of adequate computerisation has led to a relatively weak domestic software market. Even, the PC penetration rate is very low.

Lack of Internet Penetration: With low penetration of PC's, it is obvious that Internet penetration is also poor. At the end of the year 1999, India could only boast of 6,10,000 Internet connections with about 2.1 million users. The recently announced Internet Service Provider policy is expected to improve the situation.

Original Technology: The Indian software industry possesses the expertise to absorb and use the latest technology. However, barring a few exceptions, it has still not produced enough original technology breakthroughs. Succinctly put, the industry has not created original operating systems or new computer languages and technologies, which could be used globally.

Mission Critical Real Time Operations: Some of the leading companies in India have handled software development for mission critical real time operations. However, the industry as a whole does not have much experience in this field.

Project Management Skills: As the Indian software industry has been growing at a fast rate, most of the project managers are becoming entrepreneurs, thus creating a gap in demand and supply of project management skills.

Venture Capital: In building a robust venture creation process, India still faces few constraints. To build a prolific venture community, India needs to focus on boosting all stages of venture

creation process and have simplified procedures so that the domestic Venture Capital movement can flourish and overseas Venture Capital funds can be attracted.

Localisation: With the exception of isolated cases, not much exists in providing software applications in innumerable local languages. Thus, computer penetration in India is restricted to merely the English speaking population.

Opportunities

Global Market: The market is large and rapidly changing-from a mix of legacy client server to web / package-based services. Market openings are emerging across I.T. services, software products, I.T. enabled services and E-businesses, and creating a number of new opportunities for Indian companies.

Domestic Demand: The corporate, government and consumer sector of the Indian domestic market offers a U.S.\$ 18 billion opportunity by 2008 to software and services companies.

Outsourcing: The global outsourcing business was worth U.S.\$ 77 billion in 1997 and has been growing at the rate of 15-18 percent per annum. A recent survey indicates that by 2002, more than 59 percent of the *Fortune* 1000 companies and other multinationals will outsource some part of their application development and maintenance activities. India can gain and corner a greater marketplace.

E-Commerce/E-Business: India not only has a huge opportunity to service this market but also has a unique opportunity to address the needs of the NRI community around the world.

Overseas Listings: India today commands a very high respect among investors in India and overseas. Almost all major overseas stock exchanges -are keen for Indian software companies to list themselves on their respective exchanges. This is a major opportunity for the Indian software industry to attract the requisite investments.

Internet Service Provider (ISP) Policy: The recent permission to allow private ISP's operate in India and set up their own gateways will unprecedented Internet proliferation throughout India.

Threats

Government Interference: In the past decade, the Government and industry have worked very well together in India for the success of the I.T. software and services industry. Now the Government's role needs to be increasingly directed towards providing suitable infrastructure and continuing its role in the simplification of policies. Any further plans for Government control, restrictions or undue interference could well pose a threat to the industry.

Telecom Infrastructure: The immediate need of the hour in India is to have a world class telecom infrastructure at globally competitive tariffs. The Department of Telecommunications has taken a number of initiatives including the National Telecommunication Backbone, National Internet Backbone, and plans for providing high bandwidth Internet connectivity to remote corners of India. However, Government monopoly, lack of speed and adherence to archaic telecommunication rules and regulations can prove to be a threat to the industry.

Lack of Speed: The world is moving at the speed of Internet. The decision- making and time taken for implementation in India needs to be at a much faster pace so that the Indian I.T. software and services industry does not lose any opportunities.

Infrastructure: Although, the software industry is growing at a phenomenal rate, many other sectors in India have not yet been able to keep pace with it. Lately, almost all major cities are building hi-tech buildings to house the software industry. These buildings have state-of-art infrastructure, data communication facilities, captive power etc. But, lack of power, highways, housing and international airports in some cities has become a major constraint.

Cost: Rising cost of infrastructure, basic amenities and salaries can pose a threat if not adequately balanced with value addition.

Protectionism by Export Destinations: Many countries in North America and Western Europe are creating protective and non-tariff trade barriers, especially with regard to the movement of skilled manpower. Visa issues and non-tariff trade barrier may prove to be a threat. India should insist for removal of non-trade tariff barriers at WTO.

CONCLUSION AND ANALYSIS

Despite its rapid growth, the IT industry in India has attracted its fair share of criticism. This is primarily leveled against the industry's excessive political influence - as articulated through its association, NASSCOM - which, it is claimed, far exceeds its economic contribution to the country. This has allowed the industry to secure the support and resources of the Indian state ahead of other sectors of the national economy where the developmental returns would be greater. India's IT-business process outsourcing (BPO) industry revenue is expected to cross US\$ 225 billion mark by 2020, according to a Confederation of Indian Industry (CII) report, titled 'The SMAC Code-Embracing New Technologies for Future Business'. India is expected to become world's second-largest online community after China with 213 million internet users by December 2013 and 243 million by June 2014, according to a report by Internet and Mobile Association of India (IAMAI) and IMRB International. Technology firms in India are expected to reap the benefits of Internet of Things (IoT) data, considered to be a US\$ 18 billion opportunity, to help clients improve productivity and asset utilisation as well as to enhance end-customer experience, as per networking firm Cisco. India's total IT industry's (including hardware) share in the global market stands at 7 per cent; in the IT segment the share is 4 per cent while in the ITeS space the share is 2 per cent. India's IT and BPO sector exports are

expected to grow by 12-14 per cent in FY14 to touch US\$ 84 billion - US\$ 87 billion, according to Nasscom. Moreover, India plans to spend around US\$ 3.9 billion on cloud services during 2013-2017, of which US\$ 1.7 billion will be spent on software-as-a-service (SaaS), according the latest outlook of IT research and advisory company, Gartner Inc. The enterprise software market in India is expected to reach US\$ 3.92 billion in 2013, registering a growth of 13.9 per cent over 2012 revenue of US\$ 3.45 billion, according to Gartner. Mumbai with 12 million internet users has emerged as the top most city in the country with highest penetration of internet users, followed by Delhi (8.1 million) and Hyderabad (4.7 million), according to the data released by Internet & Mobile Association of India (IAMAI).

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