NATIONAL INNOVATION SYSTEM AND THE EMERGENCE OF INDIAN INFORMATION AND SOFTWARE TECHNOLGY MULTINATIONALS

Jaya Prakash Pradhan

Institute for Studies in Industrial Development
4, Institutional Area, Vasant Kunj, New Delhi - 110 070
Phone: +91 11 2689 1111*; Fax:* +91 11 2612 2448
E-mail: pradhanjayaprakash@gmail.com

PREFACE

On 10th October 2005, I received an e-mail from Karl P. Sauvant, who wanted a press release on Indian Transnational Corporations (TNCs) with an idea to 'identify the main players to watch, how they have expanded internationally through FDI and to give a sense of the dynamics of the process'. He suggested releasing it in early 2006 as a joint Columbia University-ISID (Institute for Studies in Industrial Development) press release. I formally accepted his suggestion on Indian TNCs and the work began in December 2005.

The work, which was initially thought to be a small piece on Indian TNCs, turned out to be a larger study. The existing data sources on Indian companies investing abroad like the erstwhile Indian Investment Centre or unpublished database of the Ministry of Finance, Government of India just provide data on name of Indian investing company, approved amount of investment, ownership participation and name of host country. However, these sources do not provide information on actual number of overseas subsidiaries of Indian firms, names of overseas subsidiaries, foreign sales and fixed assets, etc., which are needed for the proposed study. I realized that a new database needs to be constructed on the overseas business operations of Indian multinationals. Without a reliable dataset any study on Indian multinationals may not be able to throw more light on their overseas activities, the precise objective of the present study. I started constructing a dataset manually on Indian multinationals based on individual company's annual reports and information collected from their websites. Later my colleague, Mahua Paul, had shown interest in the subject and offered her help in compiling the dataset. After working for a couple of months she opted out from the project, obviously for tardiness and painful manual work of data compilation. I was again alone in the work and continued the data compilation myself.

Finally, I decided to proceed sectorally—targeting the most internationalized sector of Indian economy first and then moving on to other less internationalized sectors in descending order. The Indian software sector was selected and the work proceeded on a long drawn research exercise. This is the first report in a series of reports on Indian multinationals to be released in due time. I hope that these studies can help policy makers, researchers and thinkers to enhance their knowledge on Indian multinationals and better appreciate their role in the context of growing globalization of production from developing countries. I deeply appreciate Karl Sauvant for his suggestion on the press release that ultimately led to the present study on Indian multinationals. Vinoj Abraham has provided useful comments on the paper. I also acknowledge my colleagues at ISID, S.K. Goyal, K.S. Chalapati Rao, K.V.K. Ranganathan and others for their support

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NATIONAL INNOVATION SYSTEM AND THE EMERGENCE OF INDIAN INFORMATION AND SOFTWARE TECHNOLGY MULTINATIONALS

Jaya Prakash Pradhan*

[***Abstract*** *The dramatic growth of outward FDI from India over the past decade is significantly led by Indian information and software technology (IST) firms. These IST firms have aggressively adopted outward FDI as a competitive strategy for seeking overseas markets, networks, skills and technologies. This study analyzes the factors leading to the emergence of these Indian IST firms as multinationals in the global market. Applying the theoretical framework of national innovation system (NIS), the study establishes that origin of Indian IST multinationals are critically linked to the overall policy environment and strategic government intervention in skill formation, development of supporting institutions, proactive role of Indian households in undertaking human capital investment and providing risk taking entrepreneurs, and also to the firm-level business strategies. The Indian experience shows that the development of a suitable NIS is required if other developing countries are aspiring to build their capability in the IST industry.]*

1. Introduction

The dramatic growth of outward investment activities by Indian multinationals since the last decade has motivated a growing literature on the study of the behaviour of these multinational firms (Pradhan, 2004, 2005, 2007; Pradhan and Sahoo, 2005; UNCTAD, 2004, 2005, 2006; Sauvant, 2005). The actual stock of Indian direct investment has risen from about US $46 million in 1980 to US $8181 million at the end of February 2006 (Table-1). A key feature of the recent wave of Indian outward foreign direct investment (OFDI) has been the emergence of Indian information and software technology (henceforth IST) firms as the most aggressive outward investors from the Indian economy (see Pradhan, 2003, 2005 for detailed analysis). These firms together with firms from communication sector contributed about 56 per cent of total approved OFDI undertaken by the service sector alone in the late 1990s and about 30 per cent of OFDI by all sectors of the economy.

* Assistant Professor at the Institute. For communication, E-mail: pradhanjayaprakash@gmail.com

Table-1
Indian OFDI Stock (In $ million), 1976 to 2006

Year	*Number of Approvals*	*OFDI Stock ($ million)*			
		Approved		*Actual*	
		Value	*Percentage Change*	*Value*	*Percentage Change*
As on 1.1. 1976	133	38	-----	17	-----
As on 31-8-1980	204	119	213	46	171
As on 1-9-1986	208	90	-24	75	63
As on 31-12-1990	214	NA	------	NA	----
As on 31-12-1995	1016	961	------	212	----
As on 31-3-2000	2204	4151	332	794	275
As on 28-2-2006	8620	16395	295	8181	930

Note: NA–Not available.
Source: Pradhan (2007), based on Ministry of Commerce, Indian Investment Centre, and Ministry of Finance.

The expanding magnitude of OFDI by Indian IST firms raises several issues: Why are these firms investing abroad? Where are they investing? What are their competitive advantages for overseas investment? What set of problems they face while operating in overseas markets? Are there government agencies that provide timely information and assistance to these firms on the various aspects of host countries? What are the policy lessons that the Indian experience offers to other developing countries that want to develop their own capability in the IST industry?

The present study is an attempt to identify the factors that led to the rise of Indian IST industry and its overseas investment activities. Although, recently a number of empirical studies on Indian overseas investment have appeared, the present study seeks to contribute to the literature on two directions. First, these existing studies mostly rely on approved and actual OFDI flows data to analyze the behaviour of Indian multinationals but invariably provide incomplete picture and fail to identify the leading actors and their overseas subsidiaries. This study, based on a new dataset of Indian subsidiaries abroad, goes on to analyze the behaviour of Indian multinationals that are actually operating today. Secondly, the previous studies (Pradhan 2003, 2004) have explored the firm-specific advantages that led these Indian firms to invest abroad from a narrow theoretical framework. For example, they presumed the existence of some firm-specific advantages like technology, skill, advertising, etc., to start with and then proceed to identify which factors are in fact influencing the OFDI behaviour of domestic firms. In this process, these studies have failed to integrate the larger forces that led to the emergence of these advantages in the first place. In my view, unless the theories of foreign direct investment assimilate the forces that cause firm-specific advantages to appear with firms' internationalization process, we still lack a satisfactory theoretical framework to analyze

OFDI behaviour of firms. In this paper, I have proposed the use of the theoretical framework of national innovation system (NIS) to analyze firms' OFDI performance and to gain a larger understanding of the phenomenon. In the next two sections, I elaborate on this theoretical framework to explain OFDI by firms in general and apply the same to the case of Indian IST industry. Section 4 presents the geographical patterns of Indian IST multinationals, their ownership choice and undertakes identification of large IST multinationals with indicators on the extent of their global production. The firm-specific characteristics of Indian IST multinationals are also explored in this section. A brief case study of two selected large Indian IST multinationals is undertaken in Section 5. These case studies are inspired by the specific objective of examining the causes and motivations of IST firms' OFDI activities in the NIS theoretical framework. Section 6 concludes the study, summarizing main the lessons that other developing countries can learn from the Indian experience in the IST industry.

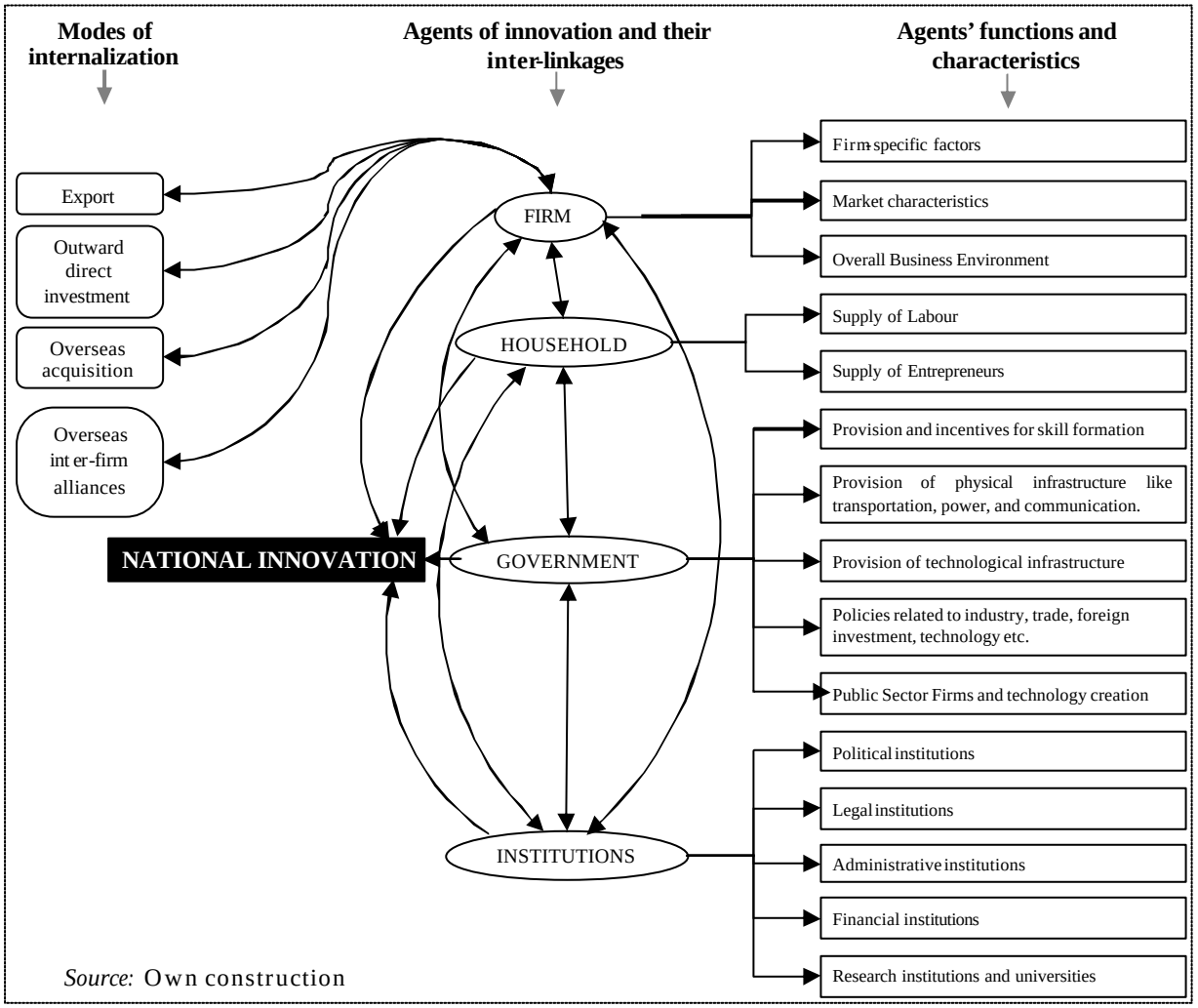
2. National Innovation System and Internationalization: A Theoretical Note

In the last decade or so there has been a growing realization among policy makers, researchers and technology practitioners across the world that national firms are just one of the agents of innovation and their innovativeness can't be completely related to their own firm-specific technological efforts alone. Following the pioneering works of Lundvall (1985) and Freeman (1988) a flowering literature has emerged to emphasize that innovation and technology developments of a nation are a result of a complex and dynamic interactive process among different agents that generate and commercialize new knowledge through changes in products, processes, or services. This literature (Lundvall, 1992; Nelson, 1993; OECD, 1997; among others) has come to be known as 'National System of Innovation' (NIS) perspective of innovation.

Before the arrival of NIS approach, the nature of innovation process was narrowly interpreted and the focus of science and technology policies was restricted to encourage R&D investment in the economy (OECD, 1997; Abrunhosa, 2003). Both public and private sector firms were provided with a host of incentives to undertake that basic research which is ultimately determined by market parameters like fragmentation of demand, market power, cost advantage and profitability. The NIS perspective concurs that the innovation process is usefully represented by technology variables like R&D or patents but these variables alone fail to provide the complete analysis of the actions and interactions of all the agents involved in that process.

Figure-1 presents my interpretation of NIS for an economy and relates the same to the process of internationalization. There are three related components in the present figure—*(i)* modes of internationalization, *(ii)* agents of innovation and their inter-linkages, and *(iii)* agents' functions and characteristics. First, I will take up the latter two components to elaborate on the concept of NIS.

Figure-1
National Innovation System and Internationalization



Source: Own construction

2.1. Agents of Innovation

NIS comprises four agents of innovation, which undertake innovative activities or create conducive atmosphere for such activities. They are firms, household, government and institutions. In today's economies, a significant part of national innovation takes place within the firm or industrial sector itself. Firms in their drive to grow and survive undertake various technological and specialized R&D functions to improve their production process, product, quality, and design. There exists a rich firm and industry-

level R&D literature that investigates the factors that motivate firms to undertake R&D activities. The decision of a firm to undertake R&D is strongly determined by a set of firm-specific factors like firm size, age, linkages with global market (i.e. foreign investment, export-orientation, technology licensing), location (i.e. rural-urban), etc. Apart from these factors, their R&D behaviour is also related to market characteristics like concentration, inter-sectoral differences in technological opportunities and demand characteristics, etc. The overall business environment like growth expectation, movement in prices, interest rate, exchange rate, and changes in public policies, etc., also influences firms' ability to undertake R&D.

The importance of households to the innovation process may be traced to their two important contributions. They are the source of productive labour and entrepreneurs. By supplying skilled and technical labour force to the firms, household plays a significant role in firms' technological activities. Households are also the source of entrepreneurs who identify market opportunities, undertake risks and ultimately start the productive units called firms. Besides, households also subscribe to the equity capital of enterprises and thus are a source of finance for them, indirectly affecting their innovative activities.

In NIS, government also plays a critical role. Public investment has an important influence on the provision of social, economic, and technological infrastructure like educational facilities (schools, colleges, universities, and training centre), hospitals, public housing, transport networks (railways, roads, water and airways), telecommunications, power, public research institutes and laboratories, etc. These infrastructures have a positive impact on labour quality and investment. They also lead to reduction in business costs, increase in quality and reliability of production process, and improvement in accessibility of firms to technological infrastructure. In this way public capital not only encourages the establishment of new firms, but also makes possible firms' expansion, favourably influencing their R&D decisions. Public policies with regard to trade, technology and foreign investment tend to determine market structure, competition, export-orientation and inter-firm technological linkages. Fiscal incentives for innovation activities, waiver of imports duties on capital goods and machineries imported by firms for innovation, are other mediums by which government plays its role in encouraging national innovation. Starting of public sector always remain a direct form of government intervention in the creation of local technological and production capabilities. Studies indicated that public innovation spending like defense and basic research in countries like US have played a crucial role in their national innovation and technological change via valuable spillovers to the rest of the economy (Krugman, 1987).

The importance of institutions for human creativity and innovation can hardly be undermined. A democratic and decentralized political institution along with an efficient, independent, and impartial legal institution (judiciary as well as law enforcing agencies) protects human freedom, choice and creativity. They help economic agents to undertake their respective activities of production, trade, and consumption with minimum transaction and information costs in an economy. Transparency and accountability in general administration and good governance system tends to strengthen the usefulness of public resources for development purposes. Development of financial institutions like banks, capital market, and venture capital improve accessibility and timeliness of finance for entrepreneurs to turn their vision into enterprises and businesses. Research institutions and universities come to be the centre of knowledge flows and their networking with business firms are of critical importance for NIS.

2.2. Interaction and Inter-linkages among Innovation Agents

The interaction and linkages between innovative functions of different agents form a system which is known as NIS. This is a more integrated approach to understand innovation process of an economy than just looking at traditional R&D or patent statistics since this system explicitly takes into account the fact that innovativeness of agents are interdependent in real market situation. Although these agents are connected in systemic ways, there always exists a possibility of inefficient synergies between their activities which in turn can negatively affect the innovative process.

In Figure-1, bi-way arrows of a curve or a line connecting two agents indicate that their relationship is dominated by reverse causation. Let's take the relationship between firms and household. The innovation function of firms is crucially dependent upon the availability of skilled and R&D manpower in the economy. Household decides the extent of investment in human capital like general and technical education, health, etc., for its member and is the supplier of skilled workers in the labour market. An economy where households invest more in human capital is likely to have a pool of trained labour force easily available for innovative activities of firms than another economy where its households shy away from undertaking such investment. Firms also influence the nature and content of human capital investment made by households since all the employees of firms are primary members in households. In other instances firms generate demand for a particular skill thus raising returns to that particular human capital and households in turn positively get affected to send their members for acquiring the concerned skill.

The relationship between government and household is also interdependent. Public sector investment in schools, colleges, management, technology, and science institutes,

improves households' access to education and positively affects their human capital investment. Government incentives for education like provision of cheap educational loan, liberal scholarships, freeships, and free study materials also increase the value of government service in the education of households. Social investment in roads, health and sanitation all positively influence the household's preference for higher human capital investment. Members in households as electorate influence the government support for education and thus are part of the decision making process in a democratic political system.

The link between government and firms for innovation is quite strong indeed. In several ways governments across countries have been influencing the way in which their industries evolve and attain competitive maturity. The fiscal incentives in the form of tax breaks and subsidies by governments for in-house R&D activities can push the pace of innovation in targeted sectors or their industrial policies covering foreign investment and trade can determine the market structure, which will ultimately impact the firm-level R&D activities. For example, providing strong protection from imports and foreign investment and encouraging small firms led industrialization would definitely introduce size-based limitation for achieving higher levels of innovation. The particular nature of patent regime these governments follow also affects the innovative activities of firms given the level of economic development. Developing countries like India with low levels of technological strength in knowledge-intensive industries like pharmaceuticals may like to have a short-duration process patent policy so that their infant domestic firms can use adaptive, incremental and reverse engineering forms of technological innovation to grow and gain their own competitive advantage. In Indian pharmaceutical industry, the starting of the public sector enterprises in the 1950s–60s had strong positive spillovers on domestic sectors for skills and local technology creation (Pradhan and Alakshendra, 2006) and hence government direct R&D spending can also determine the R&D activities of industrial firms. It is also a well known fact that corporate or industrial lobbies are a powerful group that influences government policies to serve their corporate interests. In the US, the pharmaceutical and health products industry had spent more than $800 million in federal lobbying and campaign donations at the federal and state levels in the past seven years (Centre for Public Integrity, 2005). As a result of industry's pressure, the U.S. government contributes more money to the development of new drugs through fiscal subsidies than any other government in the world.

A higher level of innovative activities of firms may not be actualized in an environment of political instability, uncertainty of life and property, weak laws and order system, corruption, severe restrictions on human freedom and creativity, etc. Efficient institutions that tend to remove general uncertainty of life, to ensure availability of finance,

transparency in dealing with business, existence of centre of knowledge like universities, play their own part in influencing the industrial R&D in an economy.

2.3. NIS and Internationalization

When each innovation agent plays its complementary role in expanding the innovation process, industries and firms evolve out of a growing sophisticated NIS. The growing firm-specific technological capabilities that are a result of cumulative interactive process between firms and other innovation agents ultimately led these firms to reorganize themselves into global value chains by undertaking different internationalization activities.

Once national firms achieve their competitive edge in innovation and technology, then the traditional theories of FDI play their role in explaining the nature of OFDI behaviour of outward investing firms. National firms may like to exploit their technological superiority in world market and depending upon relative benefits and costs they may chose any of these strategies or a combination thereof—manufacture the products and export to overseas market or license out their technology to a local player in the host market, or choose to produce the product in the host location by themselves (Figure-1).

The industrial organization theory of FDI (Hymer, 1960; Cave, 1971; Kindleberger, 1969) presupposes that outward investing firms must possess some firm-specific advantages which are easily transferable to overseas location. This theory does not go beyond the apparent market imperfections in which firms tend to have asymmetric access to product, production process, know-how, brand name, skills to explain the reason for the existence of these firm-specific advantages. This is where NIS gives a greater picture of forces that lie behind the creation of these advantages in certain industries and, within them, certain firms. NIS recognizes that there are regional and sectoral variations in the interaction of different innovation agents like government, household, and institutions, besides firm-specific variations in innovative capabilities. In a federal set-up like India, states have their own governments, industrial policies and a set of locational advantages like skill, power, transportation infrastructure, etc. In this framework, states with suitable policy and locational advantages are likely to host a particular industry than states lacking those suitable factors. This kind of variation can also be noted within a particular state. For example, starting of a firm may be easier in an urban area than in rural area since financial institutions are well developed in former area. A firm located in one urban area may have easy access to required skills due to location of large number of favourable institutions than another firm in another urban location lacking such institutions.

With all these variations in NIS, a set of advanced firms with technological and marketing advantages appears to think in terms of a global market. As far as out-licensing as a strategy of exploiting firm-specific advantages abroad is concerned, firms find internalization of these advantages (i.e. directly producing abroad via FDI) as the most efficient strategy to overcome the transaction costs and imperfections involved in the global markets for technology (Rugman, 1985, 1986; Buckley and Casson, 1985; Buckley, 1988). There are several reasons for firms to choose FDI over exports like tariffs, transportation costs, cheap factor prices in host location, etc. In the proximity concentration trade off hypothesis, Brainard (1997) assumed that export strategy compared to FDI strategy entails higher variable and lower fixed costs. Resourceful firms prefer to invest in a plant in foreign location (high fixed costs) with complete elimination of transport costs associated with exports from home country whereas firms that are not able to undertake this substantial fixed costs associated with foreign production will chose to undertake variable costs of exporting and small amount of fixed costs in building trade supporting networks abroad. Dunning (1980, 1988) has proposed an eclectic theory of FDI that encompasses theories existed before him. According to this framework, firms' FDI decision depends not only on ownership and internalization advantages as discussed above, but also on locational advantages offered by host countries. The relative locational advantages of a potential host country like market size and growth, geographical and cultural distance, availability of good infrastructure, low cost skilled manpower, etc., in relation to other competing potential locations explain whether a firm will invest or not in that particular location.

Besides FDI and exports, firms can also take other internationalization strategies like overseas acquisition and inter-firm strategic alliances. Overseas acquisition strategy can be adopted by a variety of firms and for variety of reasons. Technologically backward firms from NIS representing a home developing country may like to acquire knowledge resources in advanced countries, which are the centre of innovation activities at the global level. Technologically advanced firms may also adopt this strategy to acquire complementary strategic resources like technologies and marketing distributions and to enter the foreign markets (Pradhan and Abraham, 2005). Strategic inter-firm alliances are also increasingly becoming a new mode of internationalization in which firms from different NISs cooperate with each other according to their firm-specific advantages in different parts of a value-chain (Pradhan and Alakshendra, 2006). For example, given their cost-effective process a large number of Indian pharmaceutical companies are supplying raw materials and bulk drugs to developed country firms which in turn produce the formulations and market the world over. These strategic alliances in the form of contract manufacturing, collaborative R&D and marketing are beneficial for firms from both developed and developing countries and suggest that globalization not

only increase inter-firm competition, but also inter-firm cooperation based on their competitive advantages in different parts of a value chain.

It is important to emphasize here that these internationalization strategies also affect NIS. Export activities demand continuous innovation and learning whereas OFDI can act as a channel of knowledge spillovers to the home country. Overseas acquisitions of technologies and skills also help the acquiring national firms to improve their technological strength. There are also inter-relationships that exist among different internationalization strategies.

3. NIS and Rise of Indian IST Multinationals

By the early 2010s the Indian information and software technology sector had emerged as a major player in the global market with its phenomenal growth performance and significant structural transformation in terms of moving up the value chain. This led to the emergence of a large number of Indian IST firms investing cross-border and acquiring increasing number of businesses abroad. Presently, the IST sector is the most globalized and internationalized sector in the Indian economy. In this section, I have explored how NIS of India has contributed to the growth of this sector and thus led to the emergence of a large number of multinationals from this country. A recent study by Joseph (2006) has competently explored the role of various NIS elements like infrastructure, R&D, government policy, trade regime, etc., in the rise of IT sector in India and the ASEAN countries. However, this study has not gone beyond to link the growth process of Indian IST sector with the rise of Indian IST multinationals.

3.1. The Evolution and Transformation of the Indian IST Industry

The Indian IST industry has passed through different periods of development with different innovation agents playing their respective roles. Since the introduction of computer in 1955[1] at the public sector research institute to the exit of IBM (International Business Machines Corporation) on June 1, 1978, India's exposure to computer hardware was nascent with little domestic capabilities for manufacturing. In spite of policy initiative that set up a computer division in the Electronics Corporation of India Ltd. (ECIL) in 1969 to set the direction towards self-reliance in computer technology, the industry was completely dominated by foreign players like IBM and International

[1] A Russian computer URAL—1&2 was introduced at the public sector research institute, Indian Statistical Institute (ISI), in 1955.

Computers Limited (formerly known as International Computers and Tabulators), with IBM alone controlling about 70 per cent of the Indian computer market.

The exit of IBM due to implementation of Foreign Exchange Regulation Act (FERA)[2] has contributed to the entry of new domestic firms, mainly government owned, into computer manufacturing and system maintenance. The starting of the these public sector companies was strongly propelled by strategic importance of the industry for defence and restrictions imposed by developed countries like US on India's access to high-performance computing systems. The public sector company ECIL Ltd. took the leading role in indigenous hardware manufacture and started producing 12-bit systems in 1977. In addition, ECIL has also generated a strong spillover impact on the training and growth of high caliber technical and managerial manpower related to computers and information technology. In 1976, Computer Maintenance Corporation (CMC) Ltd. was set up to look after system maintenance and the Department of Electronics and the Electronics Commission that came up in early 1970s to laying down the policies to guide the development of electronics industry in India.

The positive spillovers from past foreign investment like IBM, public sector investment, and an unfulfilled demand for computers led to the emergence of a number of privately owned Indian companies like HCL (Hindustan Computer Ltd.) and DCM Data Products with their own microcomputers. Most importantly, ECIL and HCL had their own operating system alternative to foreign operating systems. The availability of a pool of extremely skilled programmers and entrepreneurs created by IBM had in fact played an important role in the development of indigenous companies. In fact Indian companies like IDM, CMC, ICIL, and HCL were set up by ex-employees of IBM[3].

Although, India was a pioneer in having operating systems and most of the demands for software were met in-house in the 1970s, the growth of software industry was severely limited due to a low base of computer usage in the country. It is estimated that at the end of 1977, there were just 450 computers installed in the country (Sharma *et. al.*, 2006). However, then increasing usage of computers since early 1980s led to a higher demand for computer software and technology. In this way, computer software grew in India as

[2] FERA required that foreign companies without having meaningful manufacturing base in India must dilute their ownership to 40 per cent of the equity. IBM refused to dilute its controlling interest and left India whereas the British company ICL diluted its foreign equity to 40 per cent and became ICIM.

[3] Dataquest (2006) '...Companies that defined Indian IT', Saturday, December 30; Harding, E. U. (1989) 'After IBM's exit, an industry arose; India offers a development alternative for U.S. firms facing make/buy decision', Software Magazine, November 15.

part of the broader process of development of the computer (and electronics) industry (Radhakrishnan, 2003). Like computer hardware, public sector investment has assumed a leadership role in the development of computer software industry. The public sector company, CMC, that was providing system maintenance service to IBM installations at over 800 locations in the country, subsequently emerged as the leading player in software development for both the indigenous and overseas markets (Dataquest, 2006).

The early 1980s to early 1990s marked the second stage of the transformation of Indian IST industry. The Indian electronic industry grew by a compound rate of 24.6 per cent in 1981–1990, from a mere US $965 million in 1981 to a noticeable US $5465 million (Table-2). Over the same period, the computer hardware segment has grown by even more impressive rate of 38.9 per cent and the computer software by 34.3 per cent. As a result of better growth performance by computer hardware and software segment as compared with others, their share in total electronic production has gone up respectively from 3.5 per cent to 10.7 per cent and from 0.7 per cent to 4.2 per cent. The rapid growth of domestic software at 105.8 per cent during this period is due to its extremely low base value.

The relatively higher growth performance of IST segment in India's electronics industry is related to suitable changes in public policy and international developments (Joseph, 2006). The adoption of National Computer Policy 1984 heralded a new liberalized policy regime for computer hardware and the Computer Software Development, Export and Training Policy 1986 visualized an outward looking strategy for software industry. This new policy has removed prior government approval for capacity expansions and put in place single window system of approval for broadly defined products for computer hardware. Computer software was recognized as a separate industry and a Software Development Agency (SDA) was established for its overall growth. Tariffs and import duties were slashed for imports of components and inputs for software development and a liberal view was adopted towards foreign technology imports and foreign collaborations. Similar to hardware, large domestic and foreign companies were allowed to become software producers. Various fiscal and non-fiscal incentives were provided to promote software exports like simplified procedures, granting export-oriented software units a liberal access to foreign exchange and exemption from 40 per cent ceiling on foreign ownership under FERA, allowing import of software packages/programmes under open general licence (OGL), according copy-right protection to software, etc.

The government procurement has also added another growth push for the industry. Government spending for computerization of government offices from central to district level, the establishment of National Informatics Centre (NIC), etc., fuelled the growth of the industry. These policies changed the overall market condition with removing policy-

led barriers to entry and improved market competitiveness. The changing policy regime in India coincided with two important developments in international markets—(i) emergence of IBM PC as the global standard for micro-computing, and (ii) rise of regional clone markets like Singapore, Hong Kong, South Korea and Taiwan, which led to large scale imports of PC-compatibles. These factors led to boom in Indian PC-compatible market, which in turn stimulated domestic ancillary industries like printed circuit boards (PCBs), floppy drives, power supply, and printers (Radhakrishnan, 2003).

Table-2
Electronic Production in India, 1981–1990

Sector	*Production in $ million (percentage share)*			*Growth rate*
	1981	*1985*	*1990*	*(%)*
Consumer Electronics	285 (29.54)	857 (40.02)	1698 (31.06)	26.2
Industrial Electronics	183 (18.96)	327 (15.25)	802 (14.68)	19.6
Computers	34 (3.52)	125 (5.85)	584 (10.69)	38.9
Communication & Broadcasting Equipment	177 (18.37)	308 (14.39)	932 (17.05)	32.2
Strategic Electronics	80 (8.25)	159 (7.43)	326 (5.96)	16.7
Electronic Components	199 (20.64)	332 (15.48)	895 (16.37)	21.1
Total Electronic Hardware	958 (99.27)	2108 (98.43)	5237 (95.82)	24.2
Domestic Software	0.26 (0.03)	6 (0.29)	114 (2.09)	105.8
Software for Exports	7 (0.70)	28 (1.28)	114 (2.09)	34.3
Total Computer Software	7 (0.73)	34 (1.57)	229 (4.18)	43.6
Total Electronic Production	965 (100)	2142 (100)	5465 (100)	24.6

Note: Growth rate has been obtained from running semi logarithmic regression of the form, logy=a+bt on annual production from 1981 to 1990, where y=production, t=time, a, b are constants. Growth rate = {antilog (b)-1]}*100; Percentage shares are provided in parenthesis.
Source: Based on two sources of Department of Electronics, Government of India, New Delhi: *(i) Electronics Information & Planning*, November 1991; *(ii) Guide to Electronics Industry in India* 1999.

During 1987–1990, Indian government established several other institutions to support the growth of the IST industry (Kokhova and Sukharev, 2001). Software exports by companies registered with Department of Electronics has been provided with export promotion benefits as granted to manufactureed exports. The clients of Indian software companies were provided with insurance protection against malpractices and software companies were granted access to export shipment credit and credit guarantees. The

Electronics and Computer Software Export Promotion Council (ESC) was established in 1988 as electronics and IT trade facilitation organization. In March 1988, Government of India established an R&D institution, National Centre for Software Technology (NCST) (presently known as Centre for Development of Advanced Computing), meant fro designing, developing and deploying of advanced IT based solutions. In the wake of the US government's refusal to sell supercomputers to India, the NCST has played an important role in developing indigenous technology for supercomputers and has introduced arange of high performance parallel computers, known as the *PARAM* series of supercomputers. These computers were later exported to several countries like Russia, Canada, Germany and Singapore. In 1990 the government adopted the scheme of Software Technology Parks (STPs) of India to leverage from cluster benefits and providing software companies with abundance of requisite infrastructure. India's adoption of satellite-based telecommunication has in fact significantly improved the speed of interaction between Indian software companies and their overseas subsidiaries and clients. In this period venture capital funding for software companies became available, which has helped many Indian software companies to come into existence. To further boost software exports, profits earned from software and services exports were totally exempted from taxation.

The differential performance of computer hardware and software industry both being two sides of the same coin should not surprise anyone. It is an example of how one segment of an industry that has benefited from efficient synergies among different innovation agents in a NIS whereas another is fighting for survival due to inefficient synergies. The government policy towards the exports and development of computer software was more systematic, dynamic and outward-looking whereas that towards hardware was marked by frequently changing and more of inward-looking protectionist strategy since 1970s. In post-Independent India, the policy regime towards computer can be divided into five phases—outward-looking to foreign investment and imports during 1950–72, became more restrictive over 1972–84, partially liberalized during 1984–87, reversal of partial liberalization specifically with regard to imports in 1987–1990 and moved into a highly liberalized and outward-looking phase from 1991 onwards. The changing direction of policy in the 1980s led to more confused firm-level strategies in the hardware industry. Since the hardware industry in India has a high import dependency due to lack of local availability of inputs and raw material, the imposition of high import duties had adversely affected the industry. The Indian hardware firms were devoid of seriousness of a government-backed cluster approach as in the case of software through software technology parks and thus were suffering from lack of suitable infrastructure. Although, the policy notifications for Electronic Hardware Technology Park (EHTP) were issued during 1992–1993, but government seriousness for hardware segment was

lost in "a general hostile policy environment and the impact of wrongly balanced structure of the original version of EHTP".[4] The unfavourable domestic market condition like low PC-intensity has not led these firms to achieve the economies of scale so important to the industry. There are also firm-specific inadequacies which have affected the competitiveness of Indian hardware industry in the global markets. Indian hardware companies although had shown their ability to design a new product like supercomputer but always they are late relative to global developments. They could not create a strong brand name for their products due to low quality and low level of innovation.

The growth of Indian IST industry in 1980s is also related to the overall strategy of government to build industrial capacity in the country during the period 1950s–1980s with targeted public sector investment in skill, infrastructure, and institutions. In various Five Year Plan documents, the policy has laid special emphasis on expanding facilities for post-graduate studies and research in engineering, technological, and management education besides improving facilities for diploma or certificate courses for training supervisory personnel. The basic objective was to create a skilled workforce to support the economic development of post-Independent India. The Central Government has established a number of higher technological institutes like five IITs (Indian Institute of Technology) at Kharagpur (1951), Mumbai (1958), Chennai (1959), Kanpur (1959), and Delhi (1961); IIMs (Indian Institute of Management) at Ahmedabad (1961), Bangalore (1973), Calcutta (1961); in addition a number of technological institutions (engineering colleges and polytechnics) and universities were being added to the national educational system. Between 1950–51 and 1981 the number has increased from 49 with an annual capacity of 4120 students to 171 with a capacity of 34835 students in the case of degree courses and 84 with a capacity of 5900 students to 363 with a capacity of 61114 students in the case of diploma courses. The increased availability of these specialized institutions has led Indian households to send their children for higher specialized and technical education. The overall enrollment ratio for secondary school education has gone up from 5.4 per cent in 1950–51 to 17.3 per cent in 1980–81 and the number of engineering graduates and diploma holders jumped between the same years from 4680 to 53499. All these have contributed to the major development of skills and education in India, which have greatly helped the growth of Indian IST industry (Abraham and Sharma, 2005).

In the meantime, the policy started laying emphasis on directly promoting computer education in the country. The Department of Electronics (DoE) in collaboration with

[4] Basic Background Report (BR-2) for National Task Force on Information Technology and Software Development, Government of India, 8th August 1998, available at http://it-taskforce.nic.in/bbr2/bbr2-2.htm.

Department of Education started a pilot initiative for introducing computer literacy and studies in about 250 selected secondary/higher secondary schools in 1984–85 and later 1700 more schools were covered under this progamme. The shortage of specialized skill for the growth of IST industry was felt in the 1980s and the DoE took the initiative to identify institutions that could undertake the bachelor and post graduate courses in computer applications in early 1980s. A number of new courses such as Master of Computer Applications (MCA), Diploma in Computer Applications (DCA), Bachelor of Engineering or Technology (BE/B.Tech.) in computer engineering and science were introduced in universities, IITs, engineering colleges. The large demand of households for IT and computer education led to proliferation of a number of private players like NIIT (1981), Aptech Ltd. (1986), etc., and which in turn trained a very large number of professionals in the country. Most importantly, Indian households started sending a group of their technical manpower to work overseas in countries like USA. Later on these expatriate Indian computer professionals turned into entrepreneurs strongly linking Indian software industry with global software industry and generating knowledge spillovers from the Silicon Valley to India.

The 1990s—the third stage of the evolution of Indian IST industry—saw significant transformation in the structure of Indian electronic industry. This was a period of rapid growth period for Indian software industry—domestic software and software exports respectively grew at 38 per cent and 51 per cent over 1991–2000 (Table-3). As a result of this phenomenal growth, computer software has emerged as largest component of Indian electronic industry. Its share has gone up from 5.7 per cent in 1991 to 53.7 per cent in 2001. On the contrary, the growth of computer hardware suffered a serious setback—its growth dropped by seven times from 38.9 per cent in 1981–1990 to just 5.4 per cent in 1991–2000.

The growth of Indian IST industries in 1990s also reveals the importance of institutions as a determining factor in the evolution of an industry. The development of Indian capital market has favourably affected the industry and a large number of Indian IST firms raised their resource requirement via this route of financing. Over 1993–94 to 2005–06 Indian electronics and software firms went for as many as 320 capital issues (both public and rights issues) raising over Rs. 126 billion worth of investment from Indian capital markets (Table-4). The emergence of software technology parks (STP) all over the country as institutions with excellent infrastructure and fiscal benefits have led to tremendous growth of software exports from India. The share of STP towards total software exports from India has increased from mere 3.3 per cent in 1991–92 to a staggering 67.7 per cent in 1999–00 (Table-5).

Table-3

Electronic Production in India, 1991–2000

Sector	*Production in $ million (percentage share)*			*Growth rate*
	1991	*1995*	*2000*	*(%)*
Consumer Electronics	1333 (29.5)	1715 (26.1)	2644 (17.8)	9.4
Industrial Electronics	624 (13.8)	790 (12.0)	883 (6.0)	5.2
Computers	425 (9.4)	622 (9.5)	745 (5.0)	5.4
Communication & Broadcasting Equipment	853 (18.9)	935 (14.2)	990 (6.7)	0.2
Strategic Electronics	229 (5.1)	239 (3.6)	385 (2.6)	10.2
Electronic Components	794 (17.6)	1064 (16.2)	1224 (8.2)	5.2
Total Electronic Hardware	4258 (94.3)	5364 (81.7)	6871 (46.3)	5.9
Domestic Software	110 (2.4)	478 (7.3)	1958 (13.2)	38.2
Software for Exports	145 (3.2)	725 (11.0)	6008 (40.5)	51.2
Total Computer Software	256 (5.7)	1203 (18.3)	7966 (53.7)	46.5
Total Electronic Production	4514 (100)	6567 (100)	14838 (100)	14.2

Note: Same as Table-1.

Source: Same as Table-1 and Ministry of Communications & Information Technology (2006) Information Technology Annual Report 2005–06, Department of Information Technology, Government of India.

Table-4

Resources Raised by Electronics and Information Technology Firms from Indian Capital Market, in Rs. crore.

Industry	*Electronics*		*Information Technology*	
	No.	*Value*	*No.*	*Value*
1993–94	70	828	22	409
1994–95	7	746	30	298
1995–96				
1997–98	3	62	1	9
1998–99	4	204	5	47
1999–00	3	213	36	1547
2000–01	4	69	89	804
2001–02	0	0	6	38
2002–03	0	0	3	227
2003–04	4	247	9	804
2004–05	2	61	5	5095
2005–06	2	54	15	902
All above years	99	2484	221	10180

Note: The number includes both public issue and rights issue.

Source: SEBI (2007), *Handbook of Statistics on theIndian Securities Market 2006*, pp.24–25.

Table-5

Software Exports by Software Technology Parks of India, 1991–92 to 1999–00

Name of STP	*Software Export (Rs. Crore)*								
	1991–92	*1992–93*	*1993–94*	*1994–95*	*1995–96*	*1996–97*	*1997–98*	*1998–99*	*1999–00*
Bangalore	16.1	22.9	56.6	126.4	405.5	913.7	1650.0	2888.1	4321
Bhubaneswar			0.3	0.5	1.1		3.8	53.3	89
Calcutta					7.6	15.9	27.4	96.1	150
Gandhinagar	0.0	0.9	0.0	1.2	1.5	3.8	6.2	13.3	27
Hyderabad	0.2	4.6	9.8	24.7	60.4	133.2	274.0	573.5	1059
Chennai						161.0	393.9	747.6	1890
Jaipur					5.4	8.0	6.1	3.7	15
Noida	0.1	23.6	45.7	82.1	200.0	415.8	750.0	1346.3	2450
Mohali								5.4	15
Pune	0.2	0.5	1.6	7.4	41.5	120.5	251.9	381.2	572
Navi Mumbai								147.5	962
Thiruvananthapuram		1.2	1.7	2.3	3.6	8.0	25.0	44.0	57
Total STP Exports	16.6	53.59	115.77	244.49	726.62	1779.86	3388.22	6300.04	11607
Total Software Exports from India	508	675	1020	1535	2550	3700	6500	10940	17150
STP as a per cent of total software exports from India	3.3	7.9	11.4	15.9	28.5	48.1	52.1	57.6	67.7

Source: Based on *(i)* Electronics and Computer Software Export Promotion Council (2000) Statistical Year Book 2000, New Delhi; *(ii)* Guide to Electronics Industry in India, various years, Data Bank and Information Division, Department of Information Technology; *(iii)* Annual Report (various years), Department of Information Technology, Ministry of Communications & Information Technology, New Delhi.

In the 1990s the policy regime governing Indian industries including IST industry has become more globalized and liberalized with progressive liberalization of industrial, foreign investment, technology and trade policies that have taken place since the issue of new industrial policy statement on July 24, 1991. The existing liberalized policy environment for the Indian electronics and IT industry is characterized by the following features—abolition of industrial licensing requirement except electronic aerospace and defence equipment which is still under reserved for public sector companies; automatic approval for foreign technology agreement and foreign equity up to 100 per cent; zero custom duties on computer software as well as for inputs, raw materials and capital goods imports for manufacture of electronic components and goods, imports of computer parts such as microprocessors, hard disc drives, floppy disc drives, CD ROM drives, DVD drives, USB flash memory and combo-drives; 12 per cent excise duty on imports of finished computers; income tax exemption on export profits earned by firms that are Export Oriented or are based in electronics hardware technology park (EHTP), STPs and Special Economic Zones (SEZs); 60 per cent depreciation on computers; and a weighted deduction of 150 per cent on expenditure borne for the purposes of scientific, social or statistical research. The exiting policy related to hardware segment of IST

industry is quite a contrast to the policy pursued during 1987–1995. Apart from instituting liberal trade measures for hardware segment, various policy notifications in the late 1990s made the EHTP as duty free area for hardware manufacture.

These liberal policy measures led to a continuous growth momentum of the IST industry during 2001–2005. In spite of the strong negative impact of the US economic slow-down and 9/11 World Trade Centre terrorist attacks, the software segment continued its high growth performance at 31.5 per cent in 2001–05, which is of course lower than the growth rate of 46.5 per cent in 1991–2000 (Table-6). The favourable policies towards hardware segment led to a reversal of growth set backs received during 1991–00 and this segment achieved an impressive growth rate of 35.3 per cent in 2001–05. Not withstanding the

Table-6
Electronic Production in India, 2001–2005

Sector	*Production in $ million (percentage share)*					*Growth rate (%)*
	2001	*2002*	*2003*	*2004*	*2005*	
Consumer Electronics	2607 (16.0)	2794 (14.6)	3188 (13.1)	3641 (11.4)	4082 (10.3)	12.3
Industrial Electronics	949 (5.8)	1111 (5.8)	1284 (5.3)	1832 (5.7)	2041 (5.1)	22.5
Computers	746 (4.6)	860 (4.5)	1417 (5.8)	1915 (6.0)	2268 (5.7)	35.3
Communication & Broadcast Equipment	943 (5.8)	988 (5.2)	1106 (4.5)	1053 (3.3)	1179 (3.0)	5.2
Strategic Electronics	371 (2.3)	479 (2.5)	573 (2.4)	629 (2.0)	680 (1.7)	16.0
Electronic Components	1197 (7.4)	1340 (7.0)	1599 (6.6)	1920 (6.0)	1995 (5.0)	14.8
Total Electronic Hardware	6814 (41.9)	7572 (39.7)	9167 (37.7)	10989 (34.3)	12245 (30.9)	16.7
Domestic Software	2246 (13.8)	2469 (12.9)	3327 (13.7)	4524 (14.1)	5669 (14.3)	27.8
Software for Exports	7206 (44.3)	9054 (47.4)	11807 (48.6)	16550 (51.6)	21769 (54.9)	32.5
Total Computer Software	9452 (58.1)	11523 (60.3)	15135 (62.3)	21074 (65.7)	27438 (69.1)	31.5
Total Electronic Production	16266 (100)	19095 (100)	24301 (100)	32063 (100)	39683 (100)	25.9

Note: Same as Table-1.
Source: Ministry of Communications & Information Technology (2006) Information Technology Annual Report 2005–06, Department of Information Technology, Government of India.

growth reversal, the local capability for a globally competitive hardware industry in India still continued to be low. The industry is largely import-led since capability for manufacturing components locally is either limited or has higher cost with low quality.

Inadequate R&D investment and skill upgradation have negated India's skilled manpower advantage to design world-class state-of-the-art hardware products. Therefore, the growth of Indian computer industry is actually led by screwdriver assembly operations of imported components rather by any major component that is indigenous.

3.2. Emergence of Indian IST OFDI

The first known case of Indian IST OFDI can be traced back to an Indian computer hardware company named Hindustan Computers Limited (HCL)[5]. On 10th December 1979, HCL entered into a joint venture with Far East Computers Limited to manufacture micro- and mini-computers in Singapore. This was the post-IBM period in the evolution of Indian IST industry when a number of Indian companies came into being as a response to the import substituting policy being followed towards computer hardware segment. HCL was among the few Indian private players to locally produce indigenous micro-computer in 1978 and that also at the same time as Apple and 3 years before IBM's PC. This first mover advantage of HCL in computer hardware industry led to the first ever internationalization drive by an Indian IST company. HCL was followed by two other oldest Indian IST companies to undertake OFDI for foraying into overseas market. DCM Data Systems Services Private Ltd. entered into an overseas joint venture for marketing software in Baharain on 5th May 1983 and Hinditron Computers System Private Ltd. established a wholly-owned subsidiary in USA on 10th January 1983. These three Indian companies were at their pinnacle in the late 1970s and 1980s with strong capability to manufacture microprocessor-based computers and required computer software. Given these capabilities it is no surprise that they led the internationalization of Indian IST industry in that period.

In the late 1980s, HCL Overseas Ltd. and Infosys Consultants Private Ltd. undertook one OFDI project each directed at the USA. Both these projects were for development of computer software. The real break in the trend of Indian IST OFDI took place in 1991 with an increasing number of Indian firms undertaking overseas investment project compared to the past. In 1991 there are cases of three overseas joint ventures and two overseas wholly-owned subsidiaries undertaken by five Indian IST companies[6]. The total

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[5] Author based on Indian Investment Centre (1998), Indian Joint Ventures & Wholly Owned Subsidiaries Abroad Approved up to December 1995, New Delhi.

[6] These outward investing companies are Computer Aided Learning Systems Private Ltd. KEI Systems P. L td. each undertaking a JV in Russia, Hinditron Services and International Computer Ltd. each establishing a wholly owned subsidiary in USA, and Tata Consultancy Services

contd...

OFDI approvals for Indian IST increased to seven in 1992—four joint ventures and three wholly-owned subsidiaries. In 1996, the approved IST OFDI was estimated to be 46 comprising 9 JV and 37 wholly-owned subsidiaries. The increasing tendency of Indian IST firms to have complete control over their overseas operation is similar to the behaviour of Indian manufacturing firms in 1990s[7] (Pradhan, 2005, 2007). As Indian hardware companies started loosing their competitive advantages because of their inability to innovate according to fast changing demand conditions and uncertainty in public policy in India as well as abroad the cases of OFDI by hardware companies went into oblivion in late 1990s. The Indian IST OFDI was largely led by Indian software companies that benefited from a suitable NIS system maturing in India. The liberalization of OFDI policy in 1990s and early 2010s has facilitated the emergence of Indian IST multinationals by relaxing policy led barriers to undertake trans-border investment activities (Pradhan, 2007).

4. Indian IST Multinationals: Main Features

In this section, I present the broad statistics related to Indian IST multinationals based on a unique dataset that has been constructed at the Institute for Studies in Industrial Development, New Delhi. This dataset contains information on a total of 165 Indian IST multinationals which in turn have a total of 645 overseas subsidiaries, 9 overseas joint ventures and 7 overseas associate companies (in which parent firms own a substantial equity interest). These subsidiaries and joint ventures are in operation presently. This dataset has been constructed from two sources—(i) annual reports of companies listed with Indian stock market and available at the EDIFAR (Electronic Data Information Filing and Retrieval System) of the Securities and Exchange Board of India[8]; (ii) websites of unlisted companies accessed based on the web addresses obtained from the NASSCOM (National Association of Software and Services Companies) Directory, 2005. As per the regulatory requirement, Section 212(1) of the Companies Act 1956, Indian companies investing abroad should attach the balance sheet, profit and loss accounts of their overseas subsidiaries to the accounts of the parent company. However, this legal provision is hardly implemented in India and hence it is rare to find Indian companies adhering to it. Ministry of Company Affairs, Government of India, has been liberally granting exemption to most of the Indian companies having operating subsidiaries from

entering into a JV in USA.

[7] Author based on Indian Investment Centre (1998), Indian Joint Ventures & Wholly Owned Subsidiaries Abroad Approved during the year 1996, New Delhi.

[8] This can be access at http://sebiedifar.nic.in/sebi_doc_pub.asp?value=ar

complying with this provision. As a result the constructed dataset could only collect information on the name of overseas subsidiaries, country of incorporation, and the percentage of ownership interest. Majority of available annual reports related to the fiscal year 2005–2006 or the date of searching companies' websites belong to 2006 (cover 610 Indian IST multinationals); with a few reports confined to 2004–2005 (cover 47 Indian IST multinationals) and two reports are related to the year 2003. In view of the manual construction of the dataset with different sources, the available information is obviously not comprehensive and sketchy in nature. However, this dataset covering a large number of Indian IST multinationals still can provide some broad indications of the phenomena under study.

4.1. Geographical Composition

The geographical distribution of the presence of Indian IST multinationals through their overseas subsidiaries, joint ventures and associate companies is presented in Figure-2 and Table-7. Two North American countries, USA and Canada, host 241 overseas ventures of Indian IST multinationals, accounting for 37.2 per cent of total overseas ventures. USA being the largest global market for software services has emerged as the top host of Indian IST multinationals with 226 overseas ventures. The large concentration of Indian IST multinationals in USA is also due to the presence of successful Indian immigrants and professionals related to the IT industry who have played a crucial role in development of Indian IST industry by providing overseas networks, contacts, skills and reverse brain drain.

Although India has risen as a software services player largely dependent on the USA, of late Indian IST companies are making consistent efforts to decrease their dependence on a single country. After being hit hard by the US slow-down in 2001, these companies have been aggressively foraying into Europe, the second largest market accounting for global IT services. As a result European countries emerged as the second largest host region to Indian IST multinationals. Within European software markets UK is the largest in size accounting for over 21 per cent of total European spending on computer services[9]. Apart from a growing market size, India's long history of economic and cultural ties with UK has also positively affected the location of Indian IST multinationals. UK turns out to be the largest European host with 84 overseas ventures of Indian IST multinationals. Germany and the Netherlands are other two most attractive European destinations for Indian IST firms respectively accounting for 38 and 19 overseas ventures.

[9] UK Trade & Investment (2005), 'Software & Computer Services Opportunities in the UK', February 22.

Figure-2

Overseas Subsidiaries, Joint Ventures and Associate Companies of Indian IST Multinationals

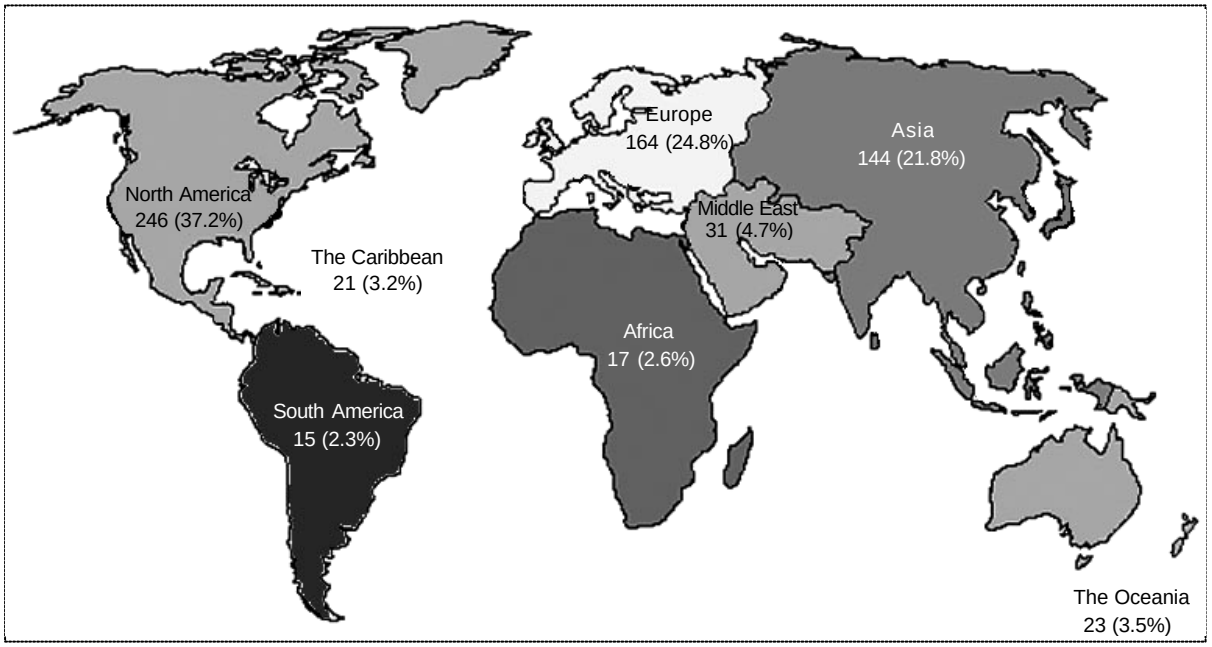

Table-7

Geographical Distribution of Overseas Subsidiaries, Joint Ventures and Associate Companies of Indian IST Multinationals, as in 2006

Region/Countries	*Number*				*Per cent*
	Subsidiary	*Joint Venture*	*Associate Company*	*Total*	
Developed countries	445	5	5	455	68.8
European Union	175	2		177	26.8
Austria	4			4	0.6
Belgium	6			6	0.9
Denmark	2			2	0.3
France	6			6	0.9
Germany	37	1		38	5.7
Ireland	7			7	1.1
Italy	3			3	0.5
Luxembourg	2			2	0.3
Netherlands	19			19	2.9
Portugal	1			1	0.2
Spain	1			1	0.2
Sweden	4			4	0.6
UK	83	1		84	12.7
Other Western Europe	4			4	0.6
Switzerland	4			4	0.6
North America	231	3	4	238	36.0
Canada	11		1	12	1.8
USA	220	3	3	226	34.2
Other Developed Countries	34		1	35	5.3
Australia	20			20	3.0
Japan	11		1	12	1.8

Region/Countries	*Number*				*Per cent*
	Subsidiary	*Joint Venture*	*Associate Company*	*Total*	
New Zealand	3			3	0.5
Developing Countries	199	4	2	205	31.0
Africa	16		1	17	2.6
Mauritius	12			12	1.8
South Africa	4		1	5	0.8
Latin America and the Caribbean	25			25	3.8
Argentina	2			2	0.3
Bermuda	5			5	0.8
Brazil	2			2	0.3
British Virgin Island	1			1	0.2
Cayman Island	1			1	0.2
Chile	9			9	1.4
Mexico	3			3	0.5
Uruguay	2			2	0.3
Asia and the Pacific	158	4	1	163	24.7
Bahrain	5			5	0.8
Bangladesh	1			1	0.2
China	17	1		18	2.7
Cyprus	1			1	0.2
Hong Kong	11			11	1.7
Indonesia	3			3	0.5
Korea	2			2	0.3
Malaysia	20	1		21	3.2
Oman	3			3	0.5
Philippines	2			2	0.3
Saudi Arabia	1			1	0.2
Singapore	60		1	61	9.2
Sri Lanka	1			1	0.2
Taiwan	1			1	0.2
Thailand	10			10	1.5
UAE	19	2		21	3.2
Vietnam	1			1	0.2
Central and Eastern Europe	2			2	0.3
Czech Republic	2			2	0.3
All Region	645	9	7	661	100

Source: Based on Appendix Table-A1.

Asian countries emerged as the third largest host region to Indian IST multinationals. They accounted for 144 overseas ventures of these multinationals (about 21.8 per cent of the total). Singapore with 61 overseas ventures, China (including Hong Kong) with 29, Malaysia and UAE with 21 each, Japan with 11, Thailand with 10 are important Asian host countries. Singapore has traditionally been the focus of Indian IST multinationals since 1989 with increasing number of Indian software firms selling their products and services. The booming financial sector in Singapore with user-friendly financial environment based on strong physical infrastructure and telecommunications

capabilities has generated a large demand for IT solutions related to financial and telecom sector, thus, attracting many Indian IST multinationals. The faster growing Chinese economy is the second most attractive country in Asia.

The share of other regions in attracting overseas ventures of Indian IST multinationals is quite low. Middle East countries could attract only about 4.7 per cent of total overseas ventures followed by Oceania with 3.5 per cent, Caribbean with 3.2 per cent, Africa with 2.6 per cent, and South America with 2.3 per cent. Another aspect of Indian IST multinationals is that their overseas activities are related to the developmental status of host countries. Developed countries that tend to spent large amounts on IT have claimed 68.7 per cent of the total overseas ventures undertaken by IST multinationals whereas developing countries have attracted just 31 per cent.

4.2. Ownership Pattern

The Indian IST multinationals are observed to have majority equity ownership in their overseas ventures. Wholly-owned subsidiaries account for about as high as 89 per cent of total overseas ventures (Table-8). The behaviour of Indian IST multinationals to have full control over their overseas operations can be explained by the nature of software services that they offer. Indian IST multinationals possess their competitive advantages in their global service delivery models based on an efficient interaction between their onshore and offshore development centres. Many Indian software firms have already opened their offshore development centre in overseas markets to achieve closer customer relationship, which is a critical component of a competitive service delivery model. Unless they possess majority control over their overseas subsidiaries, an efficient and effective service delivery system that strongly protects the customer data and may not be achieved. As most of the services offered by Indian firms involve trade and service secrecy and protected data, sharing ownership of overseas ventures with other parties is not a secure mode of operation. Majority-owned offshore development subsidiaries thus offer an efficient form of overseas expansion that can maximize the benefits from their global service delivery models.

Table- 8
Ownership Patterns of Indian IST Multinationals

Ownership Interest (%)	*Number*				*Per cent*	*Cumulative per cent*
	Subsidiaries	*Joint ventures*	*Associate Companies*	*Total*		
4%		1		1	0.20	0.2
20%			1	1	0.20	0.4
26%			1	1	0.20	0.6
40%	1			1	0.20	0.8
43%	1			1	0.20	1.0
49%			2	2	0.40	1.4
50%	1	3	1	5	1.01	2.4
51%	11			11	2.22	4.6
52%	1			1	0.20	4.8
53%	1			1	0.20	5.0
58%	2			2	0.40	5.4
59%	3			3	0.60	6.0
60%	1	2		3	0.60	6.7
64%	1			1	0.20	6.9
70%	1			1	0.20	7.1
72%	1			1	0.20	7.3
75%	2			2	0.40	7.7
76%	2			2	0.40	8.1
80%	2			2	0.40	8.5
82%	1			1	0.20	8.7
90%	2			2	0.40	9.1
91%	1			1	0.20	9.3
98%	2			2	0.40	9.7
99%	6			6	1.21	10.9
100%	442			442	89.11	100.0
Total	485	6	5	496	100	

Source: Based on Appendix Table-A1.

4.3. India's Leading IST Multinationals

Table-9 presents India's sixty leading IST multinationals by the number of overseas ventures. These sixty multinationals, which constitute about 36 per cent of the total number of Indian IST multinationals at 165, account for as much as 72.6 per cent of the total number of overseas affiliates of Indian IST industry operating in 2005–06. Clearly there is a high firm-level concentration among outward investing parent firms by the number of overseas subsidiaries. Tata Consultancy Services (TCS) with 47 overseas affiliates emerged as the top Indian IST multinational, accounting for over 7 per cent of the total overseas affiliations of the Indian IST industry. About 48.4 per cent of the total assets and 57.5 per cent of the total sales of the parent company (i.e. TCS) are accounted for by its foreign subsidiaries in 2005–06 (Table-10). H C L Technologies Ltd. with 31 overseas affiliates, Cambridge Solutions Ltd. with 19 overseas affiliates and Teledata

Informatics Ltd. with 15 overseas affiliates are the next three leading Indian IST multinationals. The foreign assets and foreign sales of these multinational firms constitute as high as 73.3 and 65.3 per cent of the total assets and sales in the case of H C L Technologies, 53 and 41.1 per cent in the case of Cambridge Solutions, 38.3 and 46.7 per cent in the case of Teledata Informatics. Taking the number of overseas affiliates down, the fifth ranking IST multinationals are Mphasis Ltd. and Wipro Ltd. with 14 overseas affiliates each, followed by N I I T Technologies Ltd. and R Systems International Ltd. with 12 overseas affiliates each, and Firstsource Solutions Ltd., G T L Ltd. and Megasoft Ltd. with 10 overseas affiliates each. In 2005–06, 39 per cent of the assets of eleven leading Indian IST multinationals are based in foreign countries and about 40 per cent of their sales are from their overseas subsidiaries (Table-10).

Table-9

Top Sixty Indian IST Multinationals by Number of Overseas Ventures

Name of Indian Parent Firm	*Number of Overseas Ventures*	*Per cent*	*Cumulative per cent*
Tata Consultancy Services Ltd.	47	7.11	7.1
H C L Technologies Ltd.	31	4.69	11.8
Cambridge Solutions Ltd.	19	2.87	14.7
Teledata Informatics Ltd.	15	2.27	16.9
Mphasis Ltd.	14	2.12	19.1
Wipro Ltd.	14	2.12	21.2
N I I T Technologies Ltd.	12	1.82	23.0
R Systems International Ltd.	12	1.82	24.8
Firstsource Solutions Ltd.	10	1.51	26.3
G T L Ltd.	10	1.51	27.8
Megasoft Ltd.	10	1.51	29.4
N I I T Ltd.	9	1.36	30.7
Trigyn Technologies Ltd.	9	1.36	32.1
3I Infotech Ltd.	8	1.21	33.3
Four Soft Ltd.	8	1.21	34.5
I-Flex Solutions Ltd.	8	1.21	35.7
Igate Global Solutions Ltd.	8	1.21	36.9
Infotech Enterprises Ltd.	8	1.21	38.1
Polaris Software Lab Ltd.	8	1.21	39.3
Aurionpro Solutions Ltd.	7	1.06	40.4
ISGN Technologies Ltd	7	1.06	41.5
Network Systems & Technologies (P) Ltd	7	1.06	42.5
Nucleus Software Exports Ltd.	7	1.06	43.6
Patni Computer Systems Ltd.	7	1.06	44.6
Rolta India Ltd.	7	1.06	45.7
Satyam Computer Services Ltd.	7	1.06	46.8
BPL Telecom Pvt. Ltd.	6	0.91	47.7
Cybertech Systems & Software Ltd.	6	0.91	48.6
Hexaware Technologies Ltd.	6	0.91	49.5
Hinduja T M T Ltd.	6	0.91	50.4
Infinite Computer Solutions (India) Pvt	6	0.91	51.3
K P I T Cummins Infosystems Ltd.	6	0.91	52.2

Name of Indian Parent Firm	*Number of Overseas Ventures*	*Per cent*	*Cumulative per cent*
Mascon Global Ltd.	6	0.91	53.1
Mastek Ltd.	6	0.91	54.0
Melstar Information Technologies Ltd.	6	0.91	54.9
Tech Mahindra Ltd.	6	0.91	55.9
Zensar Technologies Ltd.	6	0.91	56.8
Aptech Ltd.	5	0.76	57.5
Cranes Software Intl. Ltd.	5	0.76	58.3
Helios & Matheson Information Technology	5	0.76	59.0
Insoft.com Pvt Ltd	5	0.76	59.8
Java Softech Private Limited	5	0.76	60.6
Northgate Technologies Ltd.	5	0.76	61.3
Orient Informati on Technology Ltd.	5	0.76	62.1
Panoramic Universal Ltd.	5	0.76	62.8
Quintegra Solutions Ltd.	5	0.76	63.6
Ramco Systems Ltd.	5	0.76	64.4
Tata Technologies Ltd.	5	0.76	65.1
Thirdware Solution Ltd.	5	0.76	65.9
B 2 B Software Technologies Ltd.	4	0.61	66.5
California Software Co. Ltd.	4	0.61	67.1
Geodesic Information Systems Ltd.	4	0.61	67.7
IBS Software Services (P) Ltd	4	0.61	68.3
Infosys Technologies Ltd.	4	0.61	68.9
Kale Consultants Ltd.	4	0.61	69.5
Olive e-Business Pvt. Ltd.	4	0.61	70.2
Ontrack Systems Ltd.	4	0.61	70.8
SunTec Business Solutions Pvt. Ltd.	4	0.61	71.4
Synergy Log-In Systems Ltd.	4	0.61	72.0
Unisoft Infotech Pvt Ltd.	4	0.61	72.6
Total IST Multinationals	661	100.00	
Source: Based on Appendix Table-A1.			

Table-10

Foreign Assets and Sales of Top Eleven Indian IST Multinationals, 2005–06

Name of Indian Parent	*Gross Assets (Rs. crore)*			*Revenue (Rs. crore)*			*Year*
	Total	*Foreign*	*FPT**	*Total*	*Foreign*	*FPT**	
Tata Consultancy Services Ltd.	6975	3373	48.4	13252	7617	57.5	2005–06
H C L Techndogies Ltd.	4024	2951	73.3	4572	2986	65.3	2005–06
Cambridge Solutions Ltd.	824	437	53.1	1181	485	41.1	2005–06
Teledata Informatics Ltd.	1142	437	38.3	1038	485	46.7	2005–06
Mphasis Ltd.	844	744	88.1	940	638	67.9	2005–06
Wipro Ltd.	7979	552	6.9	10603	211	2.0	2005–06
N I I T Technologies Ltd.	498	255	51.3	608	534	87.9	2005–06
R Systems International Ltd.	95	27	28.7	157	95	60.1	2005
Firstsource Solutions Ltd.				550	176	32.0	2005–06
G T L Ltd.				980	429	43.8	2005–06
Megasoft Ltd.	103	9.60	9.4	115	60	52.1	2005
All above companies	22484	8785	39	33996	13716	40	

Note: * FPT: Foreign as percentage of Total; Rupee 1 crore = Rupee 10 million; total figure is the consolidated value (i.e. parent, Indian subsidiaries and foreign subsidiaries) while foreign is the value of foreign subsidiaries.
Source: Based on annual reports of individual companies.

4.4. Firm-specific Characteristics of Indian IST Multinationals

Earlier studies on Indian manufacturing industry such as Lall (1986) and Pradhan (2004) suggest that outward investing Indian firms constitute a separate group as compared to other firms not performing such investment activities[10]. Whilst Lall (1986) found outward investing firms to be only large-sized, export oriented and dependent on imports of raw materials, Pradhan (2004), based on relatively a large sample and for a most recent period, observed them to be relatively older, large-sized, technology-intensive (in-house R&D as well as imports of disembodied technology), productive, export-oriented and to have strong dependent on managerial skills (proxied by residual profitability), selling activities and liberalization of the policy regime. How do Indian IST multinationals differ from other Indian IST firms that are not engaged in overseas investment activities?

Table-11 presents an explorative comparative picture of Indian IST firms with and without overseas subsidiaries on six selected firm-level characteristics for the year 2005. Except advertising intensity, overseas investing IST firms on an average possess higher values for indicators like firm age, size, R&D intensity and export intensity than IST firms without cross-border investment. The difference is quite substantial in the case of firm size as outward investing firms turn out to be more than eight-times in size than non-outward investing firms. Outward investing firms are observed to have R&D and export-intensity nearly double those associated with non-outward investors. Table-12 provides statistical content to the comparative analysis by implementing a non-parametric test that examines whether the groups of outward investing and non-investing IST firms are from the same population distribution or not. The results from the Wilcoxon rank-sum test suggest that Indian IST multinationals differs significantly from other Indian IST firms on all the five firm-specific characteristics such as firm size, age, R&D intensity, advertising intensity and export intensity. The probability of non-outward investing IST firms having

[10] Based on a total sample of 162 compabies broken down into 138 firms without outward investment and 24 firms with outward investment over 1977–78 to 1978–79, Lall (1986) through Probit and Tobit analysis found that outward investing firms are intimately related with four firm-specific characteristics such as firm size, capital-output ratio, export-intensity and imports of raw materials. Therefore, in the sample period outward investing activities of sample firms were generally limited to a group of large, highly export-oriented, and import dependent firms. Pradhan (2004) is the most recent study based on a larger sample of 3951 manufacturing firms with 26 346 observations of which 2 155 observations are of outward investing firms over the period 1990–91 to 2000-01. This study found that the outward investment intensity, measured as stock of outward investment as a per cent of net worth, of Indian manufacturing firms was significantly and positively related to firm size, firm age, R&D intensity, disembodied technology imports intensity, selling cost intensity, managerial skills (proxied by residual profitability), labour productivity, export-intensity, and liberalization dummies.

higher values for these variables *vis-à-vis* IST firms with outward investment is less than 0.5, indicating that statistically former group of firms have lower values than the latter category of firms. However, only in the case of firm size and export intensity that the difference in probability is considerable. Therefore, the Indian IST multinationals are relatively large-sized and higher export oriented firms than other Indian IST firms. They are also characterized by relatively higher values for R&D intensity, advertising activities and firm age.

Table-11

Difference between Indian IST firms with and without Overseas Subsidiaries, 2005

Variables	*Indian IST Firms*		
	Firms without overseas subsidiaries	*Firms with overseas subsidiaries*	*All IST Firms*
AGE (In number of years)	12.9 (306)	14.9 (111)	13.4 (417)
Size (In Rs. Crore)	44.5 (190)	365.1 (105)	158.6 (295)
RDINT (In %)	0.36 (190)	0.66 (105)	0.61 (295)
ADVINT (In %)	0.51 (190)	0.38 (105)	0.40 (295)
EXPOINT (In %)	46.85 (190)	83.65 (105)	77.00 (295)

Note: Number of firms in parenth esis; RDINT- R&D expenditure as a per cent of sales; ADVINT- Advertising expenses as a per cent of sales; EXPOINT- Exports as a per cent of sales.

Source: Estimation based on a dataset constructed by merging the Prowess database of the CMIE and OFDI data from Appendix Table-A1.

Table-12

Results from Wilcoxon Rank-Sum (Mean-Whitney) Test

Variable	*Z Statistics*	*Level of Statistical Significance (two-tailed test)*	*P{(IST firms without OFDI)> (IST firms with OFDI)}*	*Obs with firms*	
				Without OFDI	*With OFDI*
Firm Age	-2.653	1%	0.415	306	111
Firm SIZE	-6.649	1%	0.261	176	103
RDINT	-3.132	1%	0.441	176	103
ADVINT	-2.663	1%	0.410	176	103
EXPOINT	-7.884	1%	0.223	176	103

Note: Estimated through STATA statistical package; P{(IST firms without OFDI)> (IST firms with OFDI)} provides the probability that the values of the particular variable associated with Indian IST firms without OFDI is larger than those values associated with Indian IST firms with OFDI.

Source: Same as Table-11.

5. Case Study of Two Selected IST Multinationals

In this section a brief case study of India's two largest IST multinationals, namely Tata Consultancy Services and HCL Technologies Limited is presented. These firms are among India's oldest IST firms and an analysis of their emergence as multinational firms can throw valuable light on the internalization process of Indian IST industry. The growth of these two firms is found to be strongly related to the evolving NIS of India from 1960s onwards. In 1960s, Indian households were pioneers in sending their members for studying and working abroad. Most of these early immigrants have generally returned to India after finishing their studies or after earning sufficient amount to lead a decent life in India. Large Indian companies like Tata have successfully tapped these home country bound foreign trained skilled and technical manpower. This is amply clear in the case of TCS' rise under the business model identified by Dr. Fakir Chand Kohli. The proactive government policy in the domestic skill creation led to the establishment of the Indian Institute of Technology (IIT) and various other technical institutions. These institutions along with universities emerged as the knowledge core of India's manpower and entrepreneurship with ever rising number of students being sent by Indian households. Availability of technical manpower at lower cost ensured that companies like TCS and HCL leveraged for their growth and internationalization. The government initiative for computerization of its different departments, banks, and demand from research institutions for database services has provided early demand for TCS. The government and research institutions also generated demand for indigenous computers thus helping the growth of HCL. The role of foreign investment has been instrumental in the growth of these two companies. Foreign investment in the form of IBM has led to a process of skill creation and when IBM exited in 1978–79 it left a pool of trained manpower in India. Some of these ex-IBM skilled employees started their own businesses, some others migrated to the US and others joined existing Indian companies like TCS, HCL and DCM Data Systems. HCL came up to serve the domestic demand for computers in the post IBM period. The adoption of favourable and stable government policy on software exports, starting of satellite based communication system, software technology parks, growing number of technical manpower in India, rising entrepreneurship of the US-based Indian professionals and technical manpower, etc., have all positively influenced the growth of TCS and the software part of HCL known as HCL technologies. The case studies on these two Indian IST multinationals are provided below.

5.1. Tata Consultancy Services Ltd.

The origin of Indian computer software industry can be traced back to the starting of Tata Consultancy Services (TCS) by the Tata group way back in 1968 in Mumbai. The company under the leadership of Dr. Faqir Chand Kohli, an electrical engineer trained at the Massachusetts Institute of Technology, has identified the niche business of providing IT solutions and started offering data processing services to various domestic companies and institutionsin 1969. TCS perceived emerging business opportunity in the demand for computerization of information that is being led by increasing use of computers in the public sector. Up to 1973, the focus of the company was largely on domestic market tapping business opportunities like automation of inter-branch reconciliation process of nationalized banks under the Reserve Bank of India, computerization of the database of the Mumbai telephone directory, computerization of the Income Tax department, etc[11].

After achieving a successful record of project execution in the domestic market, the company entered into the global market in 1974. The company wanted to exploit its limited capabilities by catering to overseas business opportunities and to benefit technologically from interacting with overseas customers. The company bagged its first international software assignment related to a health care system project from Burroughs, the second largest hardware manufacturer after IBM that time[12]. This happened in an unplanned visit of Dr. Kohli to the Burroughs office in Detroit in 1974 where he was able to convince the US hardware company to outsource their project from India. In the same year TCS also got another overseas order from an Iranian electricity generation company to provide software solution for stores and inventory control.[13] Subsequently, the company's exposure to the US market grown in the late 1970s with a successful completion of a number of projects including archiving of crime database of the Detroit City Police Department, maintenance and upgradation order from the Institutional Group and Information Co (IGIC), etc. To expand further and to have active business interactions with potential customers in the US market, TCS opened its first office in New York City in 1979. This is the beginning of TCS' overseas expansion mainly to ensure service supports to its export activities.

With the arrival of New Computer Policy 1984, TCS and other software companies benefited from easier access to foreign exchange and also were recognized as a separate

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[11] Economic Times (2002), 'We've to tap the power of computers', Interview of Dr. Faqir Chand Kohli, March 22.

[12] Economic Times (2002), 'To a global village: F C Kohli is ET's lifetime achiever' August 21.

[13] Dataquest (2002), 'THE HOT VERTICALS: The Great Indian Software Revolution', December 23.

industry with simplified licensing and openness to foreign investment. Under this liberal policy regime in late 1990s TCS continued its export-led growth with rapid diversification in its service profile from data entry to software development and application maintenance. Its annual sales reached about $35 million in 1989, of which exports constitute about 70 per cent[14]. Geographically its export market became diversified to cover about 35 countries from North America, Europe and the Middle East. In 1989 TCS entered into a strategic alliance with Japanese trading company Nichimen where the latter will market former company's software in Japan. With rising number and size of overseas orders and growing base of overseas customers, the company's need to be present overseas via its direct subsidiaries becomes irresistible as most of the offshore contracts also have parts to be executed on-site, nearer to the overseas customers. As a result the company went for direct investment abroad and entered into two joint ventures targeted at the US in 1991 and 1994[15].

The liberalization of policy regime towards OFDI, software industry, making of Software Technology Parks with abundant infrastructure, satellite based high speed communication systems, rising number of trained manpower and the global factor in the form of Year 2000 (Y2K) problem have all positively contributed to the growth of Indian software industry including TCS. In the early 1990s the export model of Indian software companies has shifted from physical transfers (i.e. sending programmer onshore or software on floppies) to an offshore-onshore model facilitated by satellite communication system and overseas presence thorough subsidiaries or marketing offices[16]. The software packages of Indian firms on accounting, banking, etc., which did not grow beyond India in the 1980s, also started attracting international attention in 1990s. These favourable factors led to the rapid organic growth of TCS. The resources (i.e. Rs. 5,000 crore) that it has raised from the Indian capital market in 2004 have allowed it to grow inorganically via acquisitions. The company became a billion dollar company in 2003 with a total of 24000 employees. By March 2006, company's total revenue increased to above $2.5 billion and its manpower jumped to 62832 (Table-13). A significant part of this impressive growth achieved by TCS has been contributed by establishment of a large number of overseas subsidiaries that have played important role in directly contributing to the parent's global revenue and indirectly to the higher exports performance from India. As

[14] Ken Takahashi (1989), 'India group in Tokyo - Tata Consultancy Service', Newsbytes News Network, August 01.

[15] Author based on Indian Investment Centre (1998), Indian Joint Ventures & Wholly Owned Subsidiaries Abroad Approved up to December 1995, New Delhi.

[16] Dataquest (2002), 'THE HOT VERTICALS: The Great Indian Software Revolution', December 23.

noted earlier the overseas subsidiaries of the company have contributed above 57 per cent of parent's consolidated sales in 2005–06. The role of overseas subsidiaries in promoting parent's exports is also likely to be quite substantial. Without an onshore presence through overseas subsidiaries, TCS would not have achieved such a dramatic growth performance. By blending their onshore delivery and strong offshore supply capability in India, Indian software companies such as TCS have significantly improved the effectiveness of their delivery system of software services to global clients[17]. As a result the contribution of exports in total sales of TCS is consistently above 90 per cent since 2001. Geographically, about 88 per cent of the company's consolidated revenue originates from overseas markets and America alone accounts for around 59 per cent share (Table-14). The share of European region is in the range of 21–23 per cent.

Table-13
The Size of TCS, 2001–2006

Year	*Revenue ($ million)*	*Net Income ($ million)*	*Net Profit Margin (%)*	*Employees (In number)*
March 2006	2,528.50	864.7	34.20%	62,832
March 2005	2,221.70	468.7	21.10%	40,992
March 2004	1,614.00	365.4	22.60%	
March 2003	1,041.00			24,000
March 2002	880			19,000
March 2001	689			16,000
Source: hoovers.com				

Table-14
Composition of TCS' Global Revenue, 2005–2006

Region	*Consolidated Revenue (%)*			
	2006	*2005*	*2003*	*2002*
Americas	59.06	59.20	59.28	61.13
Europe	22.40	23.08	20.00	20.63
India	12.50	12.18	14.85	11.94
Others	6.04	5.54	5.86	6.31
Total Revenue	100	100	100	100
Source: TCS Annual Report 2005–2006 and 2002–2003.				

Table-15 summarizes the performance of overseas subsidiaries of TCS during 2005–2006. The total assets and revenues of its overseas subsidiaries have grown by 158 and 33 per cent respectively between 2005 and 2006. This high growth rate is because of two factors—*(i)* expansion of existing subsidiaries and *(ii)* acquisition of new subsidiaries by the parent firm. The New York-based subsidiary, Tata America International

[17] John Ribeiro (2004), 'Pure' outsourcing model falls from favor: Indian BPO companies are finding they need U.S. facilities and staff to run operations', IDG News Service, October 07.

Corporation, is the largest overseas subsidiary accounting for about 39 and 81 per cent of total overseas assets and sales respectively. The sales of this subsidiary have grown at a rate of 28.4 per cent between 2005 and 2006. Other subsidiaries except TCS Iberoamerica SA also have shown tremendous sales growth over the same period.

Table-15
Assets and Turn overs of TCS' Foreign Subsidiaries, 2005–2006

Name of the Subsidiary Company	*Total Assets (Rs. Crore)*			*Turnover (Rs. Crore)*			*Country of location*
	2006	*2005*	*Change (%)*	*2006*	*2005*	*Change (%)*	
TCS Argentina S.A.	0.8 (0.02)	0.3 (0.02)	171.4	2.1 (0.03)	0.4 (0.01)	491.4	Argentina
TCS FNS Pty. Limited	126.6 (3.75)			0.2 (0.00)			Australia
Financial Network Services -Holdings Pty Limited	21.1 (0.63)						Australia
Financial Network Services Pty Limited	48.1 (1.42)			27.2 (0.36)			Australia
Financial Network Services -Facilities Management Pty Limited	0.5 (0.01)						Australia
Tata Consultancy Services Belgium SA.	53.6 (1.59)	16.7 (1.28)	221.5	51.2 (0.67)	34 (0.59)	50.7	Belgium
TCS Brazil S/C Limitada	9.0 (0.27)	3.0 (0.23)	204.1				Brazil
Tata Consultancy Services Do Brasil S.A.	77.2 (2.290	17.2 (1.32)	349.0	98.8 (1.30)	34 (0.60)	186.4	Brazil
Exegenix Canada Inc.	3.3 (0.10)			1.8 (0.02)			Canada
TCS Inversiones Chile Limitada	117.9 (3.50)	1.4 (0.11)	8263.1	0.0 (0.00)			Chile
Tata Consultancy Services Chile S.A.	15.8 (0.47)	8.6 (0.66)	83.5	28.1 (0.37)	15 (0.26)	88.5	Chile
Tata Consultancy Services Chile Limitada	117.5 (3.48)						Chile
Comicrom S.A.	56.8 (1.68)			45.3 (0.59)			Chile
Sisteco S.A.	7.0 (0.21)			4.0 (0.05)			Chile
Syscrom S.A.	11.4 (0.34)			10.3 (0.14)			Chile
Pentacrom S.A.	4.7 (0.14)			4.9 (0.06)			Chile
Pentacrom Servicios S.A.	2.2 (0.07)			0.3 (0.00)			Chile
Custodia De Documentos Intres Limitada	3.2 (0.09)			0.7 (0.01)			Chile
Financial Network Services Chile Limitada							Chile
Tata Information	16.1	9.7	65.4	30.0	20	47.9	China

Name of the Subsidiary Company	*Total Assets (Rs. Crore)*			*Turnover (Rs. Crore)*			*Country of location*
	2006	*2005*	*Change (%)*	*2006*	*2005*	*Change (%)*	
Technology -Shanghai Company Limited	(0.48)	(0.75)		(0.39)	(0.35)		
Tata Consultancy Services France SA.	0.5 (0.02)	0.6 (0.05)	-20.3				France
Tata Consultancy Services Deutschland GmbH	152.9 (4.53)	41.3 (3.16)	270.3	191.6 (2.52)	144 (2.51)	33.4	Germany
Tata Infotech Deutschland GmbH	0.5 (0.02)			0.0 (0.00)			Germany
Chong Wan Investments Limited	-1.2 (-0.04)			0.0 (0.00)			Hong Kong
Financial Network Services -H.K. Limited	0.0 (0.00)			0.3 (0.00)			Hong Kong
PT Financial Network Services	0.6 (0.02)			2.7 (0.04)			Indonesia
TCS Italia SRL	36.2 (1.07)	16.9 (1.30)	113.7	51.7 (0.68)	31 (0.54)	67.1	Italy
Tata Consultancy Services Japan Limited	39.8 (1.18)	31.6 (2.42)	26.0	118.4 (1.55)	78 (1.36)	51.9	Japan
Tata Consultancy Services Luxembourg S.A	13.4 (0.40)			12.4 (0.16)			Luxembourg
Tata Consultancy Services Malaysia Sdn. Bhd.	6.6 (0.20)	3.3 (0.25)	102.8	6.4 (0.08)	2 (0.03)	278.2	Malaysia
Financial Network Services Malaysia Sdn Bhd	0.1 (0.00)			0.0 (0.00)			Malaysia
Tata Consultancy Services de Mexico S.A. De. C.V.	15.4 (0.46)	4.2 (0.32)	265.2	23.2 (0.30)	8 (0.14)	190.5	Mexico
Tata Consultancy Services Netherlands BV.	163.5 (4.85)	85.5 (6.55)	91.1	193.1 (2.53)	177 (3.09)	9.2	Netherlands
Tata Consultancy Services Portugal Unipesoal Limitada	1.2 (0.04)			0.9 (0.01)			Portugal
Tata Consultancy Services Asia Pacific Pte Ltd.	123.9 (3.67)	54.8 (4.20)	126.0	143.2 (1.88)	93 (1.63)	53.3	Singapore
Tata Infotech -Singapore Pte. Limited	2.7 (0.08)			1.5 (0.02)			Singapore
Financial Network Services -Africa Pty Ltd	0.0 (0.00)						South Africa
Tata Consultancy Services de Espana S.A.	3.6 (0.11)	3.1 (0.24)	17.5	21.8 (0.29)	10 (0.17)	123.9	Spain
Tata Consultancy Services Sverige AB.	71.4 (2.12)	43.7 (3.35)	63.5	117.7 (1.55)	79 (1.37)	49.8	Sw eden
Swedish Indian IT Resources AB	0.5 (0.02)			-0.3 (0.00)			Sw eden
Diligenta Limited	515.0 (15.27)			48.8 (0.64)			U.K.
Financial Network Services -Europe plc	0.8 (0.02)			2.6 (0.03)			U.K.
Tata America International Corporation	1323.10 (39.23)	877.7 (67.24)	50.7	6186 (81.22)	4816 (84.26)	28.4	U.S.A.

Name of the Subsidiary Company	*Total Assets (Rs. Crore)*			*Turnover (Rs. Crore)*			*Country of location*
	2006	*2005*	*Change (%)*	*2006*	*2005*	*Change (%)*	
CMC Americas Inc.	37.7 (1.12)	29.2 (2.23)	29.1	130.0 (1.71)	87 1.52	49.9	U.S.A.
TCS Iberoamerica SA.	155.9 (4.62)	41.9 (3.21)	271.9	3.5 (0.05)	70 (1.23)	-95.1	Uruguay
TCS Solution Center S.A.	16.1 (0.48)	14.7 (1.13)	9.5	56.2 (0.74)	18 (0.31)	215.3	Uruguay
All subsidiaries	3372.6 (100)	1305.4 (100)	158.4	7616.7 (100)	5716 (100)	33.3	

Note: percentage share is in parenthesis.
Source: TCS Annual Report 2004-05 and 2005–06.

Along with greenfield OFDI, TCS has been aggressively pursuing inorganic growth through overseas acquisitions to become a global leader. After the acquisition of public sector company Computer Maintenance Corporation (CMC) Ltd. in November 2001, TCS set up a separate mergers and acquisitions (M&A) cell in December 2001 to identify potential target companies that possess synergy with the core business of TCS and can provide leveraging market strength[18]. Since then TCS has been experimenting with growth via "mergers and acquisitions that are a strategic fit, complement our capabilities and plug gaps in our portfolio of offerings" (TCS Annual Report 2005–2006, p. 7). During 2005–2006, TCS acquired as many as six overseas business entities aggregating an investment of about Rs. 10.2 billion (Table-16). In May 2005, TCS acquired a Swedish company named Swedish Indian IT Resources (SITR) through its wholly-owned subsidiary Tata Consultancy Services Sverige AB. The basic objective of this acquisition was to deal directly with end-customers rather than through SITR which was then TCS' exclusive partner in Sweden and a non-exclusive partner in Norway and also to increase presence in the targeted market[19]. The Australian company Financial Network Services was acquired by TCS in October 2005 with the basic objective of strengthening competitive position in the global banking industry. This acquisition ensures TCS' access to globally implemented BANCS software and a strong customer base that include banks in emerging markets in Europe, Asia, Australia and Africa. This software has been adopted by over 115 banks in 35 countries and TCS is motivated "to derive high synergistic value by combining its own product portfolio with BANCS software and by offering the customer its servicing capabilities" (TCS Annual Report 2005–2006, p. 18). With a view to expand its presence and capability in the global business process outsourcing (BPO), TCS acquired the BPO division of UK based Pearl Group in October 2005 and Chile based Comicrom in November 2005. In the UK life and pensions industry,

[18] Financial Express (2001), 'TCS forms special cell for mergers and acquisitions', December 15.
[19] TCS Annual Report 2005–2006, p. 18.

the acquired entity from Pearl Group is the second largest player and Comicron is the biggest player in Chile's banking and pensions BPO business[20]. Obviously, these acquisitions are motivated to benefit from the local expertise, skills and customer base of acquired entities and reap economies of operating synergies. In October 2006, TCS made a strategic decision to acquire 75 per cent stake in Switzerland-based TKS-Teknosoft. This acquisition is to increase the business of the company in Europe thus reducing excess dependence on the US market and to access TKS' ALPHA and ePortfolio product portfolio, global distribution rights over QUARTZ (a wholesale banking product), experience and domain expertise, language capabilities and knowledge of local practices[21]. The acquisition of an Australian company Total Communication Solutions was inspired by the desire to enhance TCS' market share in Australian business and IT consulting market[22]. In this case too the acquired entity is expected to provide substantial operating synergies by bringing in knowledge and experience on local practices and domain consulting.

Table-16
Acquisition by TCS, 2001–2006

Year	*Acquired Company*	*Country of Incorporation*	*Value of the Acquisition (Rs. Crore)*
November 2001	Computer Maintenance Corporation (CMC) Ltd.	India	157
January 2004	Airline Financial Support Services India (AFS)	India	NA
March 2004	Aviation Software Development Consultancy India (ASDC)	India	14.03
July 2004	Phoenix Global Solutions	India	27.02
May 2005	Sw edish Indian IT Resources AB	Sw eden	21.50
October 2005	Financial Network Services	Australia	110.27
October 2005	BPO division of Pearl Group	UK	426.20
November 2005	Comicrom	Chile	103.84
February 2006	Tata Infotech	India	stock swap
October 2006	TKS-Teknosoft	Switzerland	360
November 2006	Total Communication Solutions	Australia	50
Source: Based on different newspaper reports, TCS' website and various annual reports.			

Above discussion shows that TCS has been employing OFDI in greenfield and brownfield forms to increase its global presence, acquire new skills, technologies and benefits from operating synergies. Given the strong base of skilled manpower, higher

[20] Business Standard (2005), 'TCS: Acquisition spree', November 09.
[21] Hindu Business Line (2006), 'TCS buys 75% stake in Swiss co', November 01.
[22] Hindu Business Line (2006), 'TCS buys Australian co for Rs 50 cr, Business Line', November 09.

innovative activities[23] and aggressively pursued OFDI strategy the company is likely to emerge as a leading Indian multinational in the global market.

5.2. H C L Technologies Ltd.

HCL technologies is a part of one of India's oldest private sector hardware company HCL enterprise that led the first ever IST OFDI from India in 1979. HCL came into existence in August 1976 with a group of eight engineers who migrated from the calculator division of DCM Limited. The exit of IBM left an unfulfilled domestic demand for computers in India and companies like HCL came forward to meet that demand. Government institutions like IITs, institutes of science and various engineering colleges were source of the initial demand for computers from HCL[24]. In 1978, the company went for commercial computers and successfully launched in-house designed micro-computers in India. With its initial strength, the company decided to go for international production and received the government approval for a joint venture in Singapore in 1979, which started operating from 1980. This overseas expansion by HCL was targeted at the SME (small and medium size enterprises) market and to exploit its modest expertise in hardware[25]. The operation in Singapore has provided immense learning to the company, which Mr. Ajai Chowdhry, President and MD, HCL Infosystem, expressed as follows: "However, once there, we realized that the demand was more for solutions, not so much for boxes. We set up a software factory in Chennai—we would go to customers and tell them we would do everything—make the box, write the software, train the staff, maintain the equipment, the works..."[26] This is the beginning of HCL to devote some focus on software services apart from its primary orientation on computer hardware segment. The Software Export Division that was formed at Chennai in 1981 was to provide personalized application development needs of overseas clients in Singapore[27]. The Singapore experience led the company to work on the software integration database much before Intel but could not foresee the technological changes so it discontinued work on its original product. The company continued to grow in the

[23] As of February 2007, Tata group (excluding Corus) owns about 8 patents granted by the USPTO. Of these as many as 6 patent belongs to TCS, 2 patents are with TCS' subsidiary Tata America International Corporation and just 1 belong to Tata Tea Ltd. Source: Harish Damodaran (2007) '80 plus Corus patents for Tata Steel likely', Hindu Business Line, February 04.

[24] Hindu Business Line (2001), `Time to celebrate competition', September 05.

[25] Interview of Mr. Ajai Chowdhry, President and MD, HCL Infosystem, in Dataquest (2002) 'The Making of a Giant', March 15, first issue.

[26] Interview of Mr. Ajai Chowdhry, President and MD, HCL Infosystem, Ibid.

[27] The history of HCL Infosystems Ltd available at http://www.hclinfosystems.com/op_history.htm

domestic market in the 1980s by providing the largest selling software product to Indian banks during computerization of Indian banks and by launching HCL designs Unix-based computers and IBM PC clones. It has also taken the initiative in IT education and has established NIIT– the first private sector IT education institution in 1981.

In 1989, HCL entered into the US market with its expertise in computer hardware. This product led entry of HCL turned out to be an imperfect expansion strategy marked by inadequate resource base of the parent firm and its inability to even obtain required environmental clearances. The US reversal led the company to rethink on its business strategy to emphasize on its UNIX strengths for software development[28]. HCL's joint venture with Hewlett Packard in 1991 turned out to be a turning point in the growth of the company. HCL had a great learning experience with HP providing technical assistance to HCL in providing IT based services covering systems integration, IT consulting, and packaged support services. As a part of the joint venture agreement, HCL employees got the opportunity to work at the HP research centres mastering all of the technologies developed by the joint venture partner. However, HCL did not close down its RISC (Reduced Instruction Set Computer) and UNIX R&D units set-up as asked by HP and continued its R&D work under a separate entity named HCL Consulting. This is a classic example of how a domestic company has leveraged its technological capability by collaborating with a foreign firm.

The favourable policy regime for software exports and uncertain policy on hardware segment pursued by India has affected the business behaviour of HCL significantly. The company, which was predominantly a hardware player, started aggressively focusing on software and services in the mid-1990s. It also wanted to derive growth benefits from the home country's cheap manpower advantage as exploited by faster growing software companies like TCS, Wipro, etc. In 1994, HCL successfully completed its first offshore project from IBM Thailand and has set up a core group to define software development methodologies. Taking advantage of the policy of Software Technology Park (STP), the company entered into STPs at Chennai, Kolkata and Noida during 1996–97. In 1997 HCL bought back HP stake in HCL Hewlett Packard and HCL Consulting was later turned into HCL Technologies in 1998. The software business of HCL grew impressively in the late 1990s to dominate its overall business—the hardware to software ratio has consistently declined from 83:17 in early 1990s to 38:62 in 1997–98 to further 23:77 (including NIIT) in 2000–01 (Dataquest, 2001)[29].

[28] Interview of Mr. Ajai Chowdhry, President and MD, HCL Infosystem, Ibid.

[29] Dataquest (2001) 'HCL: Top of the Giants; A continuing shift toward services kept all group companies growing and profitable, and helped the HCL group stay No 1', July 21.

The late 1990s further saw HCL technologies establishing a number of greenfield subsidiaries in European countries like UK, Germany, Sweden, Belgium and Italy with the objective of providing software services on-site nearer to the overseas customers. The OFDI activity of the company was also directed at other developed countries such as New Zealand, Australia, Japan and Hong Kong. The company is also a forerunner among Indian IST firms to use acquisition as a strategy of growth. Its acquisition activities cover four overseas acquisitions targeting two countries such as Ireland and USA (Table-17). In December 2001 it acquired Ireland-based Apollo Contact Centre for $11.5 million to gain a sound market presence in the IT-enabled services space and in the European market[30]. The acquisition of Gulf Computers Inc. in June 2002 was motivated to

Table-17
Acquisition by HCL Technologies, 2001–2005

Month and Year	*Acquired Entity*	*Country of Incorporation*	*Value of the deal*
Feb. 2005	AnswerCall Direct Contact Centre	Ireland	Rs. 29.39 crore
Feb. 2005	Aquila Technologies Ltd (balance 43 per cent stake)	India	
Dec. 2004	Apollo Contact Centre (10 percent stake)	Ireland	Rs. 15.23 crore
Dec. 2004	Aalayance Inc. (Additional 36 per cent stake)	USA	$1.9 million
Oct. 2004	Shipara Technologies (remaining 23 per cent stake)	India	
July 2004	Aquila Technologies Ltd (additional 21.5 per cent stake)	India	
Jan. 2003	Aalayance Inc. (19 per cent stake)	USA	$0.45 million
June 2002	Gulf Computers inc.	USA	$9.75 million
May 2002	Aquila Technologies Ltd (35.5 per cent stake)	India	Rs 5.55 crore
Dec. 2001	Apollo Contact Centre (90 percent stake)	Ireland	$12.7million
Sept. 2001	Deutsche Software (51 per cent stake)	India	$11.5 million
Source: Based on various newspaper reports.			

access the strong client relationship and established advantages in application development for business process automation of the targeted entity in the US market[31]. The acquisition of strategic stake in the US based Aalayance Inc. in 2003 was to further improve the expertise of HCL technologies in the areas of enterprise application integration and business integration[32]. By acquiring the assets and business of

[30] Newsbytes News Network (2001), 'India - HCL Tech Acquires Irish Firm For $11.5Mil',October 30.

[31] Hindu Business Line (2002), 'HCL Tech buys Gulf Computers', June 02.

[32] Hindu Business Line (2003), 'HCL Tech acquires 19 pc stake in US company', January 18.

AnswerCall Direct in 2005, HCL technologies catapulted to the single largest Outsourced Contact/BPO Centre operating in Ireland[33]. This acquisition has provided access to expertise in newer domains of call centre services like media and transportation.

The foreign assets and revenues of HCL technologies is observed to be overwhelmingly concentrated in developed countries. Respectively about 81.6 and 93.7 per cent of foreign assets and revenues of the company in 2006 is accounted by them (Table-18). Within the

Table-18

Geography of HCL Technologies' Foreign Assets and Sales, 2005–2006

Region/Country	*Assets (%)*		*Sales (%)*	
	2006	*2005*	*2006*	*2005*
Developed Countries	81.6	77.2	93.7	94.7
Europe	37.0	40.4	30.4	46.6
Austria	15.9	13.8	1.1	0.5
Belgium	0.2	0.2	0.2	0.2
Germany	2.6	16.4	1.5	29.0
Italy	0.0	0.0	0.0	0.0
Netherlands	0.6	0.3	0.6	0.2
Sweden	0.4	0.2	0.3	0.1
UK	17.4	9.4	26.6	16.6
North America	42.3	35.4	56.3	43.2
USA	42.3	35.4	56.3	43.2
Canada	0.0	0.0	0.0	0.0
Other Developed Countries	2.2	1.5	7.1	4.8
Australia	0.8	0.6	2.8	2.2
Japan	1.2	0.7	3.3	1.9
New Zealand	0.2	0.2	0.9	0.7
Developing Countries	18.4	22.8	6.3	5.3
Africa	0.9	1.1	0.0	0.0
Mauritius	0.9	1.1	0.0	0.0
Latin America	14.8	18.8	1.3	1.2
Bermuda	14.8	18.8	1.3	1.2
Asia	2.7	2.9	5.1	4.2
Malaysia	1.0	0.9	1.3	1.2
Singapore	1.3	1.7	3.0	2.2
Hong Kong	0.4	0.3	0.7	0.7
All Region	100	100	100	100

Source: Based on Table-18.

developed region, North America led by USA is the largest overseas market for the company. Europe is the second most important foreign market for the company largely led by UK and Germany. However, the share of Germany has substantially plummeted between 2005 and 2006, thus leaving UK as the largest European market. Although

[33] Hindu Business Line (2005), 'HCL Tech acquires call centre in Ireland', February 25.

developing countries account for about 18 per cent of HCL technologies' foreign assets their contribution to foreign revenue is as low as 5 per cent.

The distribution of the foreign assets and revenues of HCL technologies among its individual foreign firms is summarized in Table-19. It can be seen that majority of HCL technologies' foreign subsidiaries are of small size in terms of the asset base. Of the 31 foreign subsidiaries, just four (HCL America Inc., HCL Holdings GmbH, HCL Bermuda, and HCL Great Britain) accounted for about 84 per cent of the total foreign asset of the parent company in 2006. Similar feature can also be obtained in terms of revenue distribution and the three large subsidiaries (HCL America Inc., HCL Great Britain, and HCL BPO Services (NI)) together accounted for about 78 per cent of total foreign sales of the parent firm in 2006. Between 2005 and 2006, the assets and sales of all foreign subsidiaries have been characterized by moderate change of 3.63 and 2.52 per cent respectively. However, there are substantial differences among individual foreign subsidiaries with respect to expansion of total assets and growth of sales during 2005–2006. Substantial investment in total assets has been undertaken in seven overseas subsidiaries such as HCL GmbH (279 per cent), HCL Great Britain (157 per cent), HCL Sweden AB (82 per cent), HCL Japan (74 per cent), HCL (Netherlands) (72.3 per cent), HCL Technologies (Mass) (69 per cent), and HCL Australia Services Pty. (59 per cent). At the same time, there has been significant dilution in the assets of small-sized foreign subsidiaries such as E Serve Holding, HCL Venture Capital, DSI Financial Solutions Pte, HCL Jones (Bermuda), and HCL Italy SLR. This trend in asset formation clearly shows that the parent company is making efforts to strengthen its market position in the European countries and also in Japan. In terms of revenue performance between 2005 and 2006, an impressive growth can be seen in HCL Sweden AB, HCL GmbH, HCL (Netherlands) BV, HCL Holdings GmbH, HCL Great Britain, HCL Japan, HCL Singapore Pte, HCL America Inc., HCL Australia Services Pty., HCL (New Zealand), HCL BPO Services (NI), and HCL Bermuda.

Table-19
Assets and Turnovers of HCL Technologies' Foreign Subsidiaries, 2005–2006

Name of the Subsidiary Company	*Total Assets (Rs. Crore)*			*Turnover (Rs. Crore)*			*Country of location*
	2006	*2005*	*Change (%)*	*2006*	*2005*	*Change (%)*	
HCL Bermuda Limited	427.59 (14.49)	516.68 (18.15)	-17.24	17.56 (0.59)	13.94 (0.48)	26.02	Bermuda
HCL America Inc.	1194.42 (40.48)	971.58 (34.12)	22.94	1531.16 (51.28)	1121.79 (38.52)	36.49	USA
HCL Great Britain Limited	382.04 (12.95)	148.59 (5.22)	157.10	529.69 (17.74)	273.12 (9.38)	93.94	UK
HCL Sweden AB	11.42 (0.39)	6.28 (0.22)	81.97	9.29 (0.31)	2.63 (0.09)	252.95	Sweden
HCL (Netherlands)	16.58	9.62	72.34	18.07	5.76	213.66	Netherlands

Name of the Subsidiary Company	*Total Assets (Rs. Crore)*			*Turnover (Rs. Crore)*			*Country of location*
	2006	*2005*	*Change (%)*	*2006*	*2005*	*Change (%)*	
BV	(0.56)	(0.34)		(0.61)	(0.20)		
HCL GmbH	77.45 (2.62)	20.42 (0.72)	279.26	44.11 (1.48)	14 (0.48)	215.11	Germany
HCL Italy SLR	0.04 (0.00)	0.06 (0.00)	-20.14	0 (0.00)	0 (0.00)	-93.48	Italy
HCL Belgium NV	5.59 (0.19)	4.71 (0.17)	18.72	6.99 (0.23)	6.42 (0.22)	8.93	Belgium
HCL Australia Services Pty. Ltd.	24.59 (0.83)	15.58 (0.55)	57.86	84.26 (2.82)	65.02 (2.23)	29.60	Australia
HCL (New Zealand) Limited	7.15 (0.24)	5.41 (0.19)	32.13	27.15 (0.91)	21.25 (0.73)	27.73	New Zealand
HCL Hong Kong SAR Limited	11.01 (0.37)	8.53 (0.30)	29.17	21.38 (0.72)	21.11 (0.72)	1.24	Hong Kong
HCL Japan Limited.	34.15 (1.16)	19.67 (0.69)	73.59	99.57 (3.33)	54.9 (1.89)	81.38	Japan
HCL Holdings GmbH	468.26 (15.87)	392.95 (13.80)	19.17	32.36 (1.08)	14 (0.48)	131.10	Austria
HCL Venture Capital Limited	0.38 (0.01)	4.78 (0.17)	-92.16	5.97 (0.20)			Bermuda
E Serve Holding Limited	0.02 (0.00)	4.4 (0.15)	-99.60	0.03 (0.00)			Mauritius
HCL Enterprise Solutions Ltd.	27 (0.92)	25.65 (0.90)	5.25	0 (0.00)			Mauritius
DSI Financial Solutions Pte Limited	0.53 (0.02)	1.16 (0.04)	-53.89	 (0.00)			Singapore
HCL BPO Services (NI) Ltd.	130.55 (4.42)	119.31 (4.19)	9.42	265.39 (8.89)	209.44 (7.19)	26.72	UK
HCL Technologies (Mass) Inc.	25.45 (0.86)	15.07 (0.53)	68.84	56.47 (1.89)	66.31 (2.28)	-14.85	USA
HCL Jones LLC	15.84 (0.54)	12.66 (0.44)	25.12	50.46 (1.69)	50.77 (1.74)	-0.62	USA
HCL Jones (Bermuda) Limited	8.14 (0.28)	13.95 (0.49)	-41.61	14.24 (0.48)	19.97 (0.69)	-28.66	Bermuda
HCL m.a. Limited	0.04 (0.00)	0.03 (0.00)	19.55	0 (0.00)			UK
Insys Inc, Canada	0 (0.00)	0.01 (0.00)	-51.00	 (0.00)			Canada
HCL Singapore Pte Limited	38.67 (1.31)	47.34 (1.66)	-18.30	90.11 (3.02)	65.34 (2.24)	37.91	Singapore
HCL (Malaysia) Sdn. Bhd	29.2 (0.99)	25.69 (0.90)	13.66	39.32 (1.32)	35.25 (1.21)	11.55	Malaysia
Infosystems (Europe) Limited	0.62 (0.02)	0.62 (0.02)	-0.39	 (0.00)			UK
HCL EAI Services Inc.	13.76 (0.47)			41.51 (1.39)			USA
Aalayance (UK) Limited	0.22 (0.01)			0.54 (0.02)			UK
Aalayance Inc.		7.78 (0.27)		 (0.00)	20.1 (0.69)		USA
Infosystems Australia		0.93			0.01		Australia

Name of the Subsidiary Company	*Total Assets (Rs. Crore)*			*Turnover (Rs. Crore)*			*Country of location*
	2006	*2005*	*Change (%)*	*2006*	*2005*	*Change (%)*	
Pty. Ltd.		(0.03)		(0.00)	(0.00)		
DSL GmbH		447.98 (15.73)		(0.00)	831.25 (28.54)		Germany
All subsidiaries	2950.71 (100.00)	2847.44 (100.00)	3.63	2985.63 (100.00)	2912.38 (100.00)	2.52	

Note: percentage share is in parenthesis.
Source: HCL Technologies Annual Report 2004-05 and 2005-06.

6. Conclusion

The emergence of IST multinationals from India is a result of growing sophistication of Indian national innovation system (NIS). The government has played a crucial role in the innovation process by creating conditions for skills accumulation, infrastructure building and adopting a more conducive and systematic outward looking policy for software industry. Indian software firms, in turn, have shown their ability to leverage from availability of skill resources and improve their firm-specific technology and other capabilities. As far as Indian households are concerned, they send their members for technical education in India and abroad and overseas labour markets (mainly US) as skilled workers linking Indian IST industry with global market by providing valuable contacts, linkages, and networking. The development of financial institutions like bank, capital market and venture capital, democratic polity, etc., also have positively influenced the growth of India's capabilities in the IST sector. With strong capabilities in skill-based technologies, Indian IST firms started serving global customers by establishing their subsidiaries overseas. This OFDI drive of these firms is primarily motivated to exploit firm-specific advantages through an offshore-onshore model of service delivery.

There are four distinct features of Indian IST multinationals. First, majority of their overseas subsidiaries are in developed countries with USA and UK as the two major hosts. The share of developed countries is about 69 per cent in total number of IST overseas subsidiaries from India. Developing countries accounted for just 31 per cent and Asia is the major host developing region with about 25 per cent. Second, the Indian IST multinationals tend to have majority ownership over their overseas ventures. Third, there is a high level concentration among Indian IST multinationals on the number of their overseas subsidiaries. A group of sixty large IST multinationals (about 36 per cent of total IST multinationals) disproportionately accounts for over 72 per cent of Indian IST overseas subsidiaries. Fourth, the firm-specific characteristics of Indian IST multinationals indicate that they are large-sized and highly export oriented and possess relatively higher values for R&D intensity, advertising intensity and firm age as

compared to Indian IST firms not investing in overseas investment. The case study of two selected large Indian IST multinationals reveals the firm-level dynamics in growth and capability building under an evolving and a favourable NIS.

6.1. Implications for Developing Countries

India's development experience in the IST industry offers a number of lessons to policy makers in other developing countries aspiring to benefit from promoting their own IST industry. Being a skill-based industry, a developing country may find it easier to build capability in the IST industry with relatively less resources than what may be required in the case of capital intensive manufacturing industries. These countries should judiciously invest their scarce resources in specific skill and infrastructural development required by IST industry. A more proactive government policy based on cluster approach and openness to IST FDI can also contribute to the development of IST industry. With the Indian IST multinationals showing increasing intensity to secure overseas skill base, other developing countries can also invite these firms to set up development and training centres in their respective location so as to benefit from knowledge-spillovers effect. Overall, developing countries need to build up a suitable NIS for achieving critical success in the global IST sector. This suitable NIS should address following three main areas of interventions:

i. Establishment of Skill Institutions

The most important factor that contributes to the development of software industry is availability of requisite skills in a country. India's unprecedented success in this industry can be traced back to a pool of highly trained software professionals routinely churned out by a rising number of public-funded autonomous technology centres like IITs, IISs, Regional Engineering Colleges, etc. Obviously, government investment in specific skill creation has a critical bearing on the growth of IST industry. Hence, developing countries should establish a chain of institutions in engineering and computer science and these technology institutions in turn will act as national centres for knowledge creation meeting the skill requirement of the IST industry. Besides, promoting technical knowledge and computer skills through general educational institutions like universities, colleges, schools, etc., can go a long way in helping developing countries to develop their own IST sector.

ii. Improvement in Infrastructure and Promotion of IT Usage

The Indian experience highlighted the importance of developing quality telecommunication and physical infrastructure for encouraging the growth of IST industry. Indian government has promoted several Software Technology Parks as a cost-effective means of ensuring infrastructure like high speed satellite links, power, etc., and has also provided incentives for locating services centres in such industrial clusters. Other developing countries shall explore ways to replicate India's experience in the provision of infrastructure in cost-effective manners. They should also go for computerization of various government departments thus generating demand for domestic software companies. Use of computers, internet, and other IT technologies in the domestic economy also needs to be encouraged by various policy initiatives.

iii. An Outward-looking Policy Regime

A systematic and outward-looking policy regime emerges as one of the critical factors leading to the rise of Indian IST industry. Developing countries' policy framework needs to adopt a more liberal attitude to the IST foreign investment. Inward foreign software services companies tend to provide state of the art training to domestic manpower and thus could generate valuable skill spillover effects in the host developing countries. These trained professionals by foreign firms could later start their own enterprises, as happened in the case of India in the post-IBM period. Domestic software companies should also be encouraged to enter into collaborative alliances with foreign firms. Various fiscal incentives to domestic software firms like exempting their export and consultancy revenues from custom duties and taxation, permitting them to have easy and duty-free imports of computers and other accessories, etc., are also valuable policy tools.

The above-listed policies together with those directed at helping the domestic firms with easy and cheap financial resources, information, marketing-support, R&D facilities, etc., can help other developing countries to develop their indigenous IST industry.

6.2. Implications for India

Although India is able to promote globally competitive software industry based on a well crafted NIS, its policy emphasis now needs to focus on emerging problems faced by the industry. The skill manpower, the fundamental competitive source of Indian software capability, is increasingly falling short of the requirement of a phenomenally growing sector. A sharp shortage of skilled labour can be seen in different segments of the IT sector. For example, the projected requirement for Outsourced Product Development

segment is 2.8 lakh product engineers by 2008, where the current availability of product-focused software professionals is just about 80,000[34]. As per Nasscom-McKinsey Report 2005 on Extending India's leadership in the global IT and BPO industries, India requires an additional 5 lakh professionals just to maintain its existing share in the global IT and BPO industries. While Indian government has set up additional IITs and IIMs and taken steps to covert Regional Engineering Colleges into National Institute of Technologies, the resources available at the disposal of policy makers for investing in higher education is quite inadequate. In this case policy measures to encourage private training institutions are required. It is not just the quantity of skilled manpower that is important for Indian IT sector but also, and more importantly, access to relevant skill. In this context, training and skill institutions should show needed flexibility to redraft their syllabus and courses in accordance with the skill requirement of a dynamic industry.

Apart from addressing the problem of skill shortages, India needs to tackle severe infrastructural constraints faced by urban locations hosting software technology parks. For example, India's Silicon Valley, Bangalore, is increasingly witnessing a serious lack of the basic infrastructure involving roads, electricity, public transportation, airport facilities and suffering from congestation and rising pollution[35]. Since these urban locations ac as nerve centres of India's software exports, it is essential that infrastructure spending must be at a comparable pace as the growth of these cities.

6.3. Implications for Indian IST Firms

Overseas presence through sales and development subsidiaries is a critical factor for increasing software exports from India and to maintain the global market share. In this context, outward FDI constitutes a basic element for developing an efficient and successful onshore-offshore model of service delivery system. The phenomenal growth of India's successful companies like TCS and HCL technologies can be attributed to their pioneering attempts to open sales subsidiaries abroad and then to establish software development subsidiary. It is also important for Indian companies to pursue the route of overseas acquisition to enter into a foreign market or to gain access to skill and knowledge-base of a host country. Once they have a sound acquisition strategy with well designed integration process, then acquisition provides an easy way to acquire new business domain or strengthen global position in a particular area.

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Appendix

Table-A1
Information on Overseas Subsidiaries of Indian IST Multinationals

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
3I Infotech Ltd.	3i Infotech (Thailand) Ltd	S	Thailand	100%	2006
3I Infotech Ltd.	SDG Software Technologies Pte. Ltd.	S	Singapore	100%	2006
3I Infotech Ltd.	3I Infotech SDN BHD (formerly ICICI Infotech SDN BHD)	S	Malaysia	100%	2006
3I Infotech Ltd.	3i Infotech (UK) Ltd	S	UK	100%	2006
3I Infotech Ltd.	3I Infotech Pte Ltd (formerly ICICI Infotech Pte Ltd)	S	Singapore	100%	2006
3I Infotech Ltd.	3i Infotech Consulting Inc.	S	USA	100%	2006
3I Infotech Ltd.	3i Infotech Inc.	S	USA	100%	2006
3I Infotech Ltd.	FormulaWare Inc	S	USA	100%	2006
AG Technologies Pvt. Ltd	AG Tech, Inc.	S	USA		2006
AXIS-IT&T Ltd.	Axis Inc.	S	USA	100%	2006
AXIS-IT&T Ltd.	Axis EU Limited	S	UK	100%	2006
Aftek Ltd.	Arexera Information Technologies GmbH	S	Germany	100%	2006
Aftek Ltd.	Opdex Inc USA (Formerly known as Aftek Infosys (USA) Inc.)	S	USA	100%	2006
Akal information Systems Ltd	SG Martin Infoways (USA) Ltd.	S	USA		2006
Allsec Technologies Ltd.	B2K Corp Inc.,	S	USA	100%	2006
Allsec Technologies Ltd.	Allsectech Inc.,	S	USA	100%	2006
Apt Software Avenues Pvt Ltd	Agarwal Associates Ltd	S	UK		2006
Aptech Ltd.	Aptech Worldwide Corporation	S	USA	100%	2005
Aptech Ltd.	Aptech (WOS) Bangladesh Limited	S	Bangladesh	100%	2005
Aptech Ltd.	Beijing Aptech Beida Jade Bird Information Technology Co. Limited	JV	China	50%	2005
Aptech Ltd.	Aptech Training Limited FZE	S	UAE	100%	2005
Aptech Ltd.	Aptech Worldwide Limited	S	South Africa		2005
Artech Infosystems Pvt Ltd	Dalton International Limited	S	UK		2006
Artech Infosystems Pvt Ltd	Artech Information Systems L.L.C.	S	USA		2006
Artech Infosystems Pvt Ltd	Artech China Ltd	S	China		2006
Aspire Systems (India) Pvt. Ltd.	Aspire Systems, Inc.	S	USA		2006
Aurionpro Solutions Ltd.	Software Professional Services	S	USA		2006
Aurionpro Solutions Ltd.	Aurionpro Solutions PTE Ltd	S	Singapore	100%	2006
Aurionpro Solutions Ltd.	Aurionpro Solutions, SPC	S	Bahrain	100%	2006
A urionpro Solutions Ltd.	Coban Corporation,	S	USA		2006
Aurionpro Solutions Ltd.	Agile Solv LLC	S	USA	100%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Aurionpro Solutions Ltd.	Infobyte International WLL	S	Bahrain		2006
Aurionpro Solutions Ltd.	Aurionrpo Solutions INC	S	USA	100%	2006
Aztecsoft Ltd.	Disha Technologies Inc	S	USA	100%	2006
Aztecsoft Ltd.	Aztec Software Inc.	S	USA	100%	2006
B 2 B Software Technologies Ltd.	B2B Infotech SDNBHD	S	Malaysia	100%	2006
B 2 B Software Technologies Ltd.	B2B Infotech Pte Limited	S	Singapore	100%	2006
B 2 B Software Technologies Ltd.	B2B Software Technologies Kassel GmbH	S	Germany	100%	2006
B 2 B Software Technologies Ltd.	B2B Softech Inc	S	USA	100%	2006
BPL Telecom Pvt. Ltd.	P.R. Glolinks Consulting	S	UK		2006
BPL Telecom Pvt. Ltd.	ATL Industries Pte Ltd.	S	Singapore		2006
BPL Telecom Pvt. Ltd.	BPL Systems	S	USA		2006
BPL Telecom Pvt. Ltd.	SEAIN Solutions Limited	S	Taiwan		2006
BPL Telecom Pvt. Ltd.	BK Solutions Limited	S	Japan		2006
BPL Telecom Pvt. Ltd.	HANI Corporation	S	Korea		2006
Bangalore Softsell Ltd.	Lemit Inc.	S	USA	100%	2006
Bangalore Softsell Ltd.	nv Lemit Europe sa	S	Belgium	100%	2006
Blue Star Infotech Ltd.	Blue Star Infotech (UK)	S	UK	100%	2006
Blue Star Infotech Ltd.	Blue Star Infotech America Inc	S	USA	100%	2006
C G-V A K Software & Exports Ltd.	C G-V A K Software Usa Inc.	S	USA	100%	2005
C M C Ltd.	C M C Americas,Inc.	S	USA	100%	2006
CG-Smith Software Private Limited	CG-Smith Software Inc.	S	USA		2006
California Software Co. Ltd.	Informed Decisions Corporations	S	USA	51%	2006
California Software Co. Ltd.	Cswl Inc. Usa	S	USA	100%	2006
California Software Co. Ltd.	American Healthnet Inc	S	USA	52%	2006
California Software Co. Ltd.	Healthnet International Inc	S	USA	100%	2006
Cambridge Solutions Ltd.	BWH SARL	S	France	100%	2006
Cambridge Solutions Ltd.	Cambridge Integrated Services Victoria Pty Ltd	S	Australia	100%	2006
Cambridge Solutions Ltd.	Scandent Group Pte Ltd.,	S	Singapore	100%	2006
Cambridge Solutions Ltd.	ProcessMind Holdings Mauritius Limited	S	Mauritius	100.00%	2006
Cambridge Solutions Ltd.	Cambridge Integrated Services Group Inc.	S	USA	100%	2006
Cambridge Solutions Ltd.	Cambridge Presidium Holdings Inc.	S	USA	100%	2006
Cambridge Solutions Ltd.	Scantalent Inc,	S	USA	100%	2006
Cambridge Solutions Ltd.	Indigo Markets Ltd, Bermuda	S	Bermuda	100%	2006
Cambridge Solutions Ltd.	Scandent Network Europe Ltd.,	S	UK	100%	2006
Cambridge Solutions Ltd.	ProcessMind Services Inc	S	USA	100%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Cambridge Solutions Ltd.	Scandent Group Inc,	S	USA	100%	2006
Cambridge Solutions Ltd.	Indigo Markets Europe Limited,	S	UK	100%	2006
Cambridge Solutions Ltd.	Indigo Markets Singapore Pte Ltd	S	Singapore	100%	2006
Cambridge Solutions Ltd.	Albion Inc,	S	USA	100%	2006
Cambridge Solutions Ltd.	Cambridge Galaher Settlements & Insurance Services	S	USA	100%	2006
Cambridge Solutions Ltd.	Scandent Group GmbH,	S	Germany	100%	2006
Cambridge Solutions Ltd.	ScadentGroup Sdn, BHD,	S	Malaysia	100%	2006
Cambridge Solutions Ltd.	e-Business Corp. Inc,	S	USA	100.00%	2006
Cambridge Solutions Ltd.	Cambridge Integrated Services Australia Pty Ltd.	S	Australia	100%	2006
Cherrysoft	Cherrytech Solutions	S	USA		2006
Compucom Software Ltd.	ITneer, Inc.,	S	USA	100%	2006
Compudyne Winfosystems Ltd.	COMPUDYNE WINFOSYSTEMS INC.	S	USA	100%	2006
Compulink Systems Ltd.	Compulink USA Inc.	S	USA	100%	2006
Compulink Systems Ltd.	Compulink Software Pte. Ltd.	S	Singapore	100%	2006
Compulink Systems Ltd.	Compulink Europe Ltd.	S	UK	100%	2006
Congruent Solutions Private Limited	Congruent Solutions, Inc	S	USA		2006
Congruent Solutions Private Limited	Congruent Solutions, Pte. Ltd.	S	Singapore		2006
Contech Software Ltd.	Contech America Inc.	S	USA		2006
Core Projects & Technologies Ltd.	Enterprises Computing Services, Inc.	S	USA		2006
Core Projects & Technologi es Ltd.	CORE Projects & Technologies (FZE),	S	UAE		2006
Cranes Software Intl. Ltd.	Cranes Software International Pte Limited	S	Singapore	100%	2006
Cranes Software Intl. Ltd.	Systat Software Inc	S	USA	100%	2006
Cranes Software Intl. Ltd.	Systat Software GmbH	S	Germany	100%	2006
Cranes Software Intl. Ltd.	NISA Software Inc.,	S	USA	100%	2006
Cranes Software Intl. Ltd.	Systat Software UK Limited, United Kingdom	S	UK	100%	2006
Cressanda Solutions Ltd.	Cressanda Solutions UK Limited	S	UK		2006
Cressanda Solutions Ltd.	Cressanda Solutions, Inc.	S	USA		2006
Cybertech Systems & Software Ltd.	CyberTech Europe S.A.	S	Luxembourg	100%	2006
Cybertech Systems & Software Ltd.	CyberTech Information Services BVBA	S	Belgium	100%	2006
Cybertech Systems & Software Ltd.	CyberTech Systems and Software Inc.	S	USA	100%	2006
Cybertech Systems & Software Ltd.	Corliant Inc.,	JV	USA	4%	2006
Cybertech Systems & Software Ltd.	CyberTech Systems Inc.	AC	USA		2006
Cybertech Systems & Software Ltd.	Corliant Japan, K.K.	AC	Japan		2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Danlaw Technologies India Ltd.	Danlaw Technologies Inc, Usa	S	USA	100%	2006
Datamatics Technologies Ltd.	Datamatics Technologies U.K Limited	S	UK	100%	2006
Datamatics Technologies Ltd.	Datamatics Technologies Inc.	S	USA	100%	2006
Datamatics Technologies Ltd.	Datamatics Technologies GmbH	S	Germany	100%	2006
DecisionCraft Analytics Limited	DecisionCraft Inc.	S	USA	100%	2006
Encore Software Ltd.	Ncore Usa Inc	S	USA		
F I Sofex Ltd.	FI Sofex LLC	JV	USA		
Financial Technologies (India) Ltd.	Financial Technologies Middle East DMCC	S	UAE	100%	2006
Financial Technologies (India) Ltd.	Dubai Gold and Commodities Exchange DMCC	JV	UAE	50%	2006
Firstsource Solutions Limited	Accounts Solutions Group, LLC	S	USA	100.00%	2006
Firstsource Solutions Limited	FirstRing Inc, USA ('FRUS')	S	USA	100%	2006
Firstsource Solutions Limited	MedPlans Partners	S	USA	100%	2006
Firstsource Solutions Limited	Firstsource Solutions S.A.	S	Argentina	100%	2006
Firstsource Solutions Limited	MedPlans 2000 Inc	S	USA	100.00%	2006
Firstsource Solutions Limited	Business Process Management, Inc	S	USA	100%	2006
Firstsource Solutions Limited	Pipal Research Corporation	S	USA	51%	2006
Firstsource Solutions Limited	Sherpa Business Solutions Inc	S	USA	100%	2006
Firstsource Solutions Limited	Firstsource Solutions USA Inc	S	USA	100%	2006
Firstsource Solutions Limited	Firstsource Solutions Limited	S	UK	100%	2006
Flextronics Software Systems Ltd.	HSS Japan KK	S	Japan	100%	2005
Flextronics Software Systems Ltd.	Tenet Software Limited	S	UK	100%	2005
Flextronics Software Systems Ltd.	Tenet Technologies Inc.	S	USA	100%	2005
Fortune Infotech Ltd.	Fortune Infotech USA, Inc.	S	USA		2006
Four Soft Ltd.	Four Soft LLC	S	USA	100%	2006
Four Soft Ltd.	Four Soft Germany GmbH	S	Germany	100%	2006
Four Soft Ltd.	Four Soft B.V.,	S	Netherlands	100%	2006
Four Soft Ltd.	Four Soft UK Limited	S	UK	100.00%	2006
Four Soft Ltd.	Four Soft USA Inc.	S	USA	100%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Four Soft Ltd.	Four Soft Singapore Pte Limited	S	Singapore	100%	2006
Four Soft Ltd.	Four Soft NL B.V.	S	Netherlands	100%	2006
Four Soft Ltd.	Four Soft Malaysia Sdn Bhd	S	Malaysia	100%	2006
G T L Ltd.	International Global Tele-Systems Limited	S	Mauritius	100%	2006
G T L Ltd.	iGTL Solutions (Australia) Pty. Ltd.	S	Australia	100%	2006
G T L Ltd.	iGTL Solutions (USA), Inc.	S	USA	100%	2006
G T L Ltd.	IGTL Solutions Lanka (Pvt.) Ltd.	S	Sri Lanka	100%	2006
G T L Ltd.	IGTL Solutions (Saudi Arabia) Limited	S	UAE	90%	2006
G T L Ltd.	IGTL Solutions (UK) Limited	S	UK	100%	2006
G T L Ltd.	IGTL Solutions (s) Pte ltd.	S	Singapore	100%	2006
G T L Ltd.	IGTL Solutions Mauritius Limited	S	Mauritius	100%	2006
G T L Ltd.	IGTL Solutions (Germany) GmbH	S	Germany	100%	2006
G T L Ltd.	IGTL Solutions Middle East FZ LLC	S	UAE	100%	2006
GAVS Information Services Private Limited	GAVS Information Services LLC	S	Oman		2006
GAVS Information Services Private Limited	GAVS Information Services Asia (Pte) Ltd.	S	Singapore		2006
Genesys International Corpn. Ltd.	Genesys Enterprises Inc.	S	USA	100%	2006
Genesys International Corpn. Ltd.	Aerial Surveyor Limited	S	UK	100%	2006
Genesys International Corpn. Ltd.	Genesys International (UK) Limited	S	UK	100%	2006
Geodesic Information Systems Ltd.	Engage Solutions Ltd.,	S	Hong Kong	100%	2006
Geodesic Information Systems Ltd.	Geodesic Information Systems AB,	S	Sweden	76%	2006
Geodesic Information Systems Ltd.	Geodesic Information Systems Inc.,	S	USA	100%	2006
Geodesic Information Systems Ltd.	Geodesic Information Systems Pte. Ltd.,	S	Singapore	100%	2006
Geometric Software Solutions Co. Ltd.	TekSoft, Inc.	S	USA	82%	2006
Geometric Software Solutions Co. Ltd.	Geometric Software Solutions Inc.	S	USA	100%	2006
Geometric Software Solutions Co. Ltd.	Geometric Software Solutions Pte. Ltd.	S	Singapore	100%	2006
Global Edge Software Ltd.	Global Edge Software Inc.	S	USA		2006
Globsyn Technologies Ltd.	Globsyn Technologies, Inc	S	USA	100%	2006
Goldstone Technologies Ltd.	Primesoft LLC	S	USA	100%	2005
Goldstone Technologies Ltd.	Staytop Systems Inc.	S	USA	100%	2005
H C L Technologies Ltd.	HCL (Netherlands) BV	S	Netherlands	100%	2006
H C L Technologies Ltd.	DSI Financial Solutions Pte. Limited [	S	Singapore	100%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
H C L Technologies Ltd.	eServe Holdings Limited	S	Mauritius	100%	2006
H C L Technologies Ltd.	HCL Bermuda Limited	S	Bermuda	100%	2006
H C L Technologies Ltd.	HCL BPO Services (NI) Limited	S	UK	100.00%	2006
H C L Technologies Ltd.	HCL Enterprise Solutions Limited	S	Mauritius	100%	2006
H C L Technologies Ltd.	HCL Japan Limited, Japan	S	Japan	100%	2006
H C L Technologies Ltd.	HCL Great Britain Limited	S	UK	100%	2006
H C L Technologies Ltd.	HCL Venture Capital Limited	S	Bermuda	100%	2006
H C L Technologies Ltd.	Infosystems Europe Limited, United Kingdom	S	UK	100%	2006
H C L Technologies Ltd.	HCL Technologies (Mass.) Inc.	S	USA	100%	2006
H C L Technologies Ltd.	HCL Jones Technologies LLC	S	USA	51.00%	2006
H C L Technologies Ltd.	HCL Australia Services Pty. Limited	S	Australia	100%	2006
H C L Technologies Ltd.	HCL Hong Kong SAR Limited	S	Hong Kong	100%	2006
H C L Technologies Ltd.	HCL Jones (Bermuda) Limited	S	Bermuda	51%	2006
H C L Technologies Ltd.	HCL (New Zealand) Limited	S	New Zealand	100%	2006
H C L Technologies Ltd.	HCL Answerthink Inc.	JV	USA	50%	2006
H C L Technologies Ltd.	HCL (Illinois) Inc.	S	USA	100%	2006
H C L Technologies Ltd.	HCL Belgium NV	S	Belgium	100%	2006
H C L Technologies Ltd.	HCL EAI Services Inc.	S	USA	58%	2006
H C L Technologies Ltd.	HCL GmbH	S	Germany	100.00%	2006
H C L Technologies Ltd.	HCL Singapore Pte. Limited	S	Singapore	100%	2006
H C L Technologies Ltd.	HCL (Malaysia) Sdn. Bhd., Malaysia	S	Malaysia	100%	2006
H C L Technologies Ltd.	HCL America Inc.	S	USA	100%	2006
H C L Technologies Ltd.	HCL Italy SLR	S	Italy	100%	2006
H C L Technologies Ltd.	Insys Inc, Canada	S	Canada	100%	2006
H C L Technologies Ltd.	HCL m.a. Limited	S	UK	51%	2006
H C L Technologies Ltd.	Infosystems Australia Pty. Limited	S	Australia	100%	2006
H C L Technologies Ltd.	HCL Holdings GmbH	S	Austria	100%	2006
H C L Technologies Ltd.	Aalayance (UK) Ltd	S	UK	58.09%	2006
H C L Technologies Ltd.	HCL Sweden AB	S	Sweden	100%	2006
Helios & Matheson Information Technology Ltd.	Helios &Matheson Inc.	S	USA	100%	2006
Helios & Matheson Information Technology Ltd.	The Laxmi Group Inc	S	USA	51%	2006
Helios & Matheson Information Technology Ltd.	Helios &Matheson(Singapore) Pte. Ltd	S	Singapore	100%	2006
Helios & Matheson Information Technology Ltd.	Maruthi Consulting Inc	S	USA	100%	2006
Helios & Matheson Information Technology Ltd.	TACT, USA	S	USA	43%	2006
Hexaware Technologies Ltd.	Hexaware Technologies Canada Limited.	S	Canada	100%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Hexaware Technologies Ltd.	Specsoft Consulting Inc.	S	USA	100%	2006
Hexaware Technologies Ltd.	Hexaware Technologies UK Ltd.	S	UK	100%	2006
Hexaware Technologies Ltd.	Hexaware Technologies Gmbh.	S	Germany	100%	2006
Hexaware Technologies Ltd.	Hexaware Technologies Asia Pacific Pte Limited.	S	Singapore	100%	2006
Hexaware Technologies Ltd.	Hexaware Technologies Inc.	S	USA	100%	2006
Hinduja T M T Ltd.	HTMT Europe Limited	S	UK	51.00%	2006
Hinduja T M T Ltd.	Hinduja TMT France	S	France	51%	2006
Hinduja T M T Ltd.	Source One HTMT Inc.	S	USA	100%	2006
Hinduja T M T Ltd.	Customer Contact Centre Inc.	S	Philippines	100%	2006
Hinduja T M T Ltd.	C-Cubed B.V.	S	Netherlands	100%	2006
Hinduja T M T Ltd.	C-Cubed (Antilles) N.V.	S	Netherlands	100%	2006
Honeywell Technology Solutions Lab	HTS China	S	China		2006
Honeywell Technology Solutions Lab	HTS-Brno	S	Czech Republic		2006
I-Flex Solutions Ltd.	i-flex solutions ltd.	S	UAE	40%	2005
I-Flex Solutions Ltd.	i-flex solutions b.v.	S	Netherlands	100.00%	2005
I-Flex Solutions Ltd.	SuperSolutions Corporation	S	USA	100%	2005
I-Flex Solutions Ltd.	i-flex solutions inc.	S	USA	100%	2005
I-Flex Solutions Ltd.	i-flex solutions pte ltd	S	Singapore		2005
I-Flex Solutions Ltd.	ISP Internet Mauritius Company	S	Mauritius	100%	2005
I-Flex Solutions Ltd.	i-flex America inc.	S	USA	100%	2005
I-Flex Solutions Ltd.	Equinox Corporation,	S	USA	100%	2005
IBS Software Services (P) Ltd	IBS Software Services Pty Ltd	S	Australia		2006
IBS Software Services (P) Ltd	IBS Software Services (P) Ltd.	S	UAE		2006
IBS Software Services (P) Ltd	IBS Software Services Americas, Inc.	S	USA		2006
IBS Software Services (P) Ltd	Avient Solutions Ltd.	S	UK		2006
ISGN Technologies Ltd	ISGN - CA	S	USA		2006
ISGN Technologies Ltd	MortgageHub, Inc.	S	USA		2006
ISGN Technologies Ltd	ISGN - UK	S	UK		2006
ISGN Technologies Ltd	ISGN - PA	S	USA		2006
ISGN Technologies Ltd	ISGN - Europe	S	Ireland		2006
ISGN Technologies Ltd	ISGN - Singapore	S	Singapore		2006
ISGN Technologies Ltd	ISGN - IA	S	USA		2006
ITC Infotech India Ltd	ITC Infotech Denmark	S	Denmark	100%	2006
ITC Infotech India Ltd	ITC Infotech Ltd, UK	S	UK	100%	2006
ITC Infotech India Ltd	ITC Infotech (USA) Inc.	S	USA	100%	2006
ITTI Pvt. Ltd.	ITTI MA Inc.	S	USA		2006
ITTI Pvt. Ltd.	ITTI FZ.	S	UAE		2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Igate Global Solutions Ltd.	iGATE Global Solutions LLC (formerly eJiva LLC)	S	USA	100%	2005
Igate Global Solutions Ltd.	Quintant Inc.	S	Canada	100%	2005
Igate Global Solutions Ltd.	iGATE Global Solutions (Wuxi) Co. Ltd.	S	China	100%	2005
Igate Global Solutions Ltd.	iGATE Global Solutions Sdn. Bhd.	S	Malaysia	59%	2005
Igate Global Solutions Ltd.	Mascot Systems GmbH	S	Germany	59%	2005
Igate Global Solutions Ltd.	Symphoni Interactive LLC	S	USA	100%	2005
Igate Global Solutions Ltd.	Quintant Corporation	S	USA	59%	2005
Igate Global Solutions Ltd.	Quintant Ltd.	S	UK	100.00%	2005
Infinite Computer Solutions (India) Pvt Ltd	Infinite Computer Solutions Sdn. Bhd.	S	Malaysia		2006
Infinite Computer Solutions (India) Pvt Ltd	Infinite Computer Solutions Inc.	S	USA		2006
Infinite Computer Solutions (India) Pvt Ltd	Infinite Computer Solutions, China	S	China		2006
Infinite Computer Solutions (India) Pvt Ltd	Infinite Computer Solutions Pte. Ltd	S	Singapore		2006
Infinite Computer Solutions (India) Pvt Ltd	Infinite Computer Solutions, Hong Kong	S	Hong Kong		2006
Infinite Computer Solutions (India) Pvt Ltd	Infinite Computer Solutions Ltd.	S	UK		2006
Infomart (India) Pvt Ltd	Infomart Technologies	S	USA		2006
Infomart (India) Pvt Ltd	Infomart Asia Pacific Pte. Ltd	S	Singapore		2006
Infosys Technologies Ltd.	Progeon S.R.O.	S	Czech Republic	72%	2006
Infosys Technologies Ltd.	Infosys Technologies (Australia), Pty. Limited	S	Australia	100%	2006
Infosys Technologies Ltd.	Infosys Technologies (Shanghai) Co. Limited	S	China	100%	2006
Infosys Technologies Ltd.	Infosys Consulting, Inc.	S	USA	100%	2006
Infotech Enterprises Ltd.	Infotech Enterprises Benelux, B.V	S	Netherlands	100%	2006
Infotech Enterprises Ltd.	Infotech Software Solutions Canada Inc.,	S	Canada	100%	2006
Infotech Enterprises Ltd.	Vargis LLC	S	USA	100.00%	2006
Infotech Enterprises Ltd.	Infotech Aerospace Services Inc.	AC	USA	49%	2006
Infotech Enterprises Ltd.	Mapcentric Consulting Limited	S	UK	100%	2006
Infotech Enterprises Ltd.	Infotech Enterprises America, Inc.	S	USA	100.00%	2006
Infotech Enterprises Ltd.	Infotech Enterprises Europe Limited	S	UK	100%	2006
Infotech Enterprises Ltd.	Infotech Enterprises GmBh.	S	Germany	100%	2006
Infovision Software Pvt. Ltd	Transcription South Inc.	S	USA		2006

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Infovision Software Pvt. Ltd	Choice Transcriptions Inc	S	USA		2006
Insoft.com Pvt Ltd	Insoft The Netherlands	S	Netherlands		2006
Insoft.com Pvt Ltd	Insoft USA	S	USA		2006
Insoft.com Pvt Ltd	Insoft Nordic	S	Denmark		2006
Insoft.com Pvt Ltd	Insoft Belgium	S	Belgium		2006
Insoft.com Pvt Ltd	Insoft France	S	France		2006
Integra Software Services Private Limited	Integra Software Services Inc.	S	USA		2006
Integrated Hitech Ltd.	Integrated Hitech (America) Corporation	S	USA		2005
Integrated Hitech Ltd.	Integrated Hitech Singapore Pte Ltd	S	Singapore		2005
Intergraph Consulting Pvt Ltd.	Intergraph Consulting Inc.	S	USA		2006
Intertec Communications Ltd.	De Two Forging P Ltd	S	USA	100%	2006
Intertec Communications Ltd.	Intertec America Inc.	S	USA	100%	2006
JK Technosoft Ltd.	JK Technosoft Ltd. Ireland	S	Ireland	100%	2006
JK Technosoft Ltd.	Proserve Consulting Inc.	S	USA	100%	2006
JK Technosoft Ltd.	JK Technosoft (UK) Ltd.	S	UK	100%	2006
Java Softech Private Limited	Prima Java Softech Fz - LLC	S	UAE		2006
Java Softech Private Limited	JavaSoftech Singapore PTE Ltd	S	Singapore		2006
Java Softech Private Limited	Java Viernam Co. Limited	S	Vietnam		2006
Java Softech Private Limited	PT JavaSoftech Indonesia	S	Indonesia		2006
Java Softech Private Limited	JSPL Philippines Inc.	S	Philippines		2006
Jopasana Software & Systems Ltd.	Jopasana Software & Systems (USA), LLC.	S	USA		2006
Jopasana Software & Systems Ltd.	Jopasana Software & Systems (UK) Ltd.	S	UK		2006
K P I T Cummins Infosystems Ltd.	KPIT Infosystems Gmbh	JV	Germany	60%	2006
K P I T Cummins Infosystems Ltd.	SolvCentral.com Inc.	S	USA	90%	2006
K P I T Cummins Infosystems Ltd.	Panex Consulting Inc.	S	USA	100%	2006
K P I T Cummins Infosystems Ltd.	KPIT Systems LLC	JV	UAE		2006
K P I T Cummins Infosystems Ltd.	KPIT Infosystems Ltd.	S	UK	100%	2006
K P I T Cummins Infosystems Ltd.	KPIT Infosystems Inc	S	USA	100%	2006
Kale Consultants Ltd.	Kale Softech, Inc.	S	USA	100%	2006

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Kale Consultants Ltd.	Kale Consultants Australia Pty. Limited	S	Australia	100%	2006
Kale Consultants Ltd.	Kale Technologies Limited	S	UK	100%	2006
Kale Consultants Ltd.	Antah Kale Sdn. Bhd.	JV	Malaysia	60%	2006
Kanika Infrastructure & Power Ltd.	Kanika Infotech (Singapore) Pte. Ltd.	S	Singapore	100%	2005
Kanika Infrastructure & Power Ltd.	Kanika Infotech (America) Inc.	S	USA	100%	2005
Kanika Infrastructure & Power Ltd.	Kanika Infotech (UK) Ltd.	S	UK	100%	2005
Kernex Microsystems (India) Ltd.	Avant-Garde Infosystems Inc	S	USA	100.00%	2006
Kirloskar Multimedia Ltd.	Kirloskar Multimedia Inc.	S	USA		2006
Larsen & Toubro Infotech Ltd.	LARSEN & TOUBRO INFORMATION TECHNOLOGY CANADA LTD.	S	Canada		2003
Larsen & Toubro Infotech Ltd.	L& T Infotech GmbH	S	Germany	100%	
Larsen & Toubro Infotech Ltd.	GDA Technologies, Inc	S	USA	100%	2006
Lifetree Convergence Ltd.	Lifetree Convergence (Pty) Ltd	S	South Africa	100%	2006
MEDICOM Solutions (P) Ltd	OCS Healthcare Informatics FZ LLC	S	UAE		2006
MEDICOM Solutions (P) Ltd	MEDICOM Solutions Middle East LLC	S	Oman		2006
Maars Software International Ltd.	Hi-Tech Software Services,Usa	S	USA	100%	2006
Mascon Global Ltd.	Mascon Global Technologies, Inc	S	USA	100%	2006
Mascon Global Ltd.	Mascon Global Information de RL de CV	S	Mexico	100%	2006
Mascon Global Ltd.	Mascon Global GmbH	S	Germany	100%	2006
Mascon Global Ltd.	Mascon Global (Europe) Limited	S	UK	100.00%	2006
Mascon Global Ltd.	International Software Consulting, Inc	S	USA	100%	2006
Mascon Global Ltd.	Mascon International Limited	S	Mauritius	100%	2006
Mastek Ltd.	Mastek MSC Software Sdn. Bhd.	S	Malaysia	100%	2006
Mastek Ltd.	Mastek GmbH	S	Germany	100%	2006
Mastek Ltd.	Mastek Asia Pacific Ltd.	S	Singapore	100%	2006
Mastek Ltd.	Mastek (UK) Ltd.	S	UK	100.00%	2006
Mastek Ltd.	MajescoMastek	S	USA	100%	2006
Mastek Ltd.	Carretek LLC	AC	USA	49%	2006
Megasoft Ltd.	Megasoft Consultants BV	S	Netherlands	100%	2006
Megasoft Ltd.	Megasoft Consultants Pte Ltd	S	Singapore	100%	2006
Megasoft Ltd.	Megasoft (NZ) Limited	S	New Zealand	100%	2006
Megasoft Ltd.	Megasoft Consultants Limited	S	UK	100.00%	2006
Megasoft Ltd.	Megasoft Consultants GmBH	S	Germany	100%	2006
Megasoft Ltd.	Megasoft Consultants, Inc.	S	USA	100%	2006

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Megasoft Ltd.	Megasoft Australia Pty Ltd	S	Australia	100%	2006
Megasoft Ltd.	Megasoft Consultants Sdn Bhd	S	Malaysia	100%	2006
Megasoft Ltd.	Beam AG	S	Germany	64%	2006
Megasoft Ltd.	Megasoft (HK) Limited	S	Hong Kong	100%	2006
Melstar Information Technologies Ltd.	Melstar Singapore Pte Ltd.	S	Singapore	100%	2006
Mel star Information Technologies Ltd.	Melstar UK Ltd.	S	UK	100%	2006
Melstar Information Technologies Ltd.	Melstar Inc.	S	USA	100%	2006
Melstar Information Technologies Ltd.	Linkhand Support Ltd.	S	UK	100%	2006
Melstar Information Technologies Ltd.	Melstar Deutschland GmbH	S	Germany	100%	2006
Melstar Information Technologies Ltd.	Melstar Ltd.	S	UK	100%	2006
Metalearn Services Pvt. Ltd.	Metalearn US LLC	S	USA		2006
Mindteck (India) Ltd.	Mindteck Middle East SOC.	S	Bahrain	100%	2005
Mindteck (India) Ltd.	Mindteck USA Inc.	S	USA	100.00%	2005
Mindteck (India) Ltd.	Mindteck Software Malaysia SDN, BHD.	S	Malaysia	100%	2005
Mistral Software Pvt. Ltd.	Mistral Software Inc.	S	USA		2006
Mistral Software Pvt. Ltd.	Mistral Software Europe	S	Germany		2006
Moschip Semiconductor Technology Ltd.	Moschip Semiconductor Technology, Usa	S	USA	100%	2006
Mphasis Ltd.	MsourcE Mauritius Inc.,	S	Mauritius	100%	2006
Mphasis Ltd.	Eldorado Computing Inc.	S	USA	100%	2006
Mphasis Ltd.	MphasiS Europe BV	S	Netherlands	100%	2006
Mphasis Ltd.	MphasiS Ireland Limited	S	Ireland	100%	2006
Mphasis Ltd.	MphasiS (Shanghai) Software & Services Company Limited	S	China	100%	2006
Mphasis Ltd.	Princeton Consulting Limited	S	UK	100%	2006
Mphasis Ltd.	MphasiS Australia Pty Ltd	S	Australia	100%	2006
Mphasis Ltd.	MsourcE Holdings BV,	S	Netherlands	100%	2006
Mphasis Ltd.	MbrokeR Inc.	S	USA	100%	2006
Mphasis Ltd.	MphasiS UK Limited	S	UK	100%	2006
Mphasis Ltd.	MphasiS Corporation	S	USA	100%	2006
Mphasis Ltd.	BFL Software Asia Pacific Pte Ltd	S	Singapore	100%	2006
Mphasis Ltd.	MphasiS Deutschland GmbH	S	Germany	91%	2006
Mphasis Ltd.	MphasiS Pte Ltd	S	Singapore	100%	2006
N I I T Ltd.	NIIT USA Inc.	S	USA	100%	2006
N I I T Ltd.	NIIT Malaysia Sdn Bhd	S	Malaysia	100%	2006
N I I T Ltd.	NIIT GC Ltd	S	Mauritius	100%	2006
N I I T Ltd.	NIIT Middle East WLL	S	Bahrain	100%	2006
N I I T Ltd.	PT NIIT Indonesia	S	Indonesia	100%	2006
N I I T Ltd.	NIIT China (Shanghai) Limited	S	China	100%	2006
N I I T Ltd.	NIIT Limited, UK	S	UK	100%	2006

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N I I T Ltd.	PCEC NIIT Institute of Information Technology	S	China	100%	2006
N I I T Ltd.	NIIT Antilles NV, Netherlands Antilles	S	Netherlands	100%	2006
N I I T Technologies Ltd.	NIIT Technologies Gmbh, Osterreich	S	Austria	100%	2006
N I I T Technologies Ltd.	NIIT Technologies Inc., USA	S	USA	100%	2006
N I I T Technologies Ltd.	NIIT Technologies Ltd.	S	UK	100%	2006
N I I T Technologies Ltd.	NIIT Thailand Limited	S	Thailand	100%	2006
N I I T Technologies Ltd.	NIIT Smart Serve Limited,	S	UK	100%	2006
N I I T Technologies Ltd.	NIIT Belgium NV	S	Belgium	99.96%	2006
N I I T Technologies Ltd.	NIIT Benelux BV	S	Netherlands	100%	2006
N I I T Technologies Ltd.	NIIT Technologies Co. Ltd.	S	Japan	100%	2006
N I I T Technologies Ltd.	NIIT Asia Pacific Pty Limited	S	Australia	100%	2006
N I I T Technologies Ltd.	NIIT Technologies AG, Schweiz	S	Switzerland	100%	2006
N I I T Technologies Ltd.	NIIT Technologies AG, Germany	S	Germany	100%	2006
N I I T Technologies Ltd.	NIIT Technologies Pte Ltd.	S	Singapore	100%	2006
Navayuga Infotech Pvt. Ltd.	NAVAYUGA MIDDLE EAST FZC	S	UAE		2006
Navayuga Infotech Pvt. Ltd.	NAVAYUGA INFOTECH LLC	S	USA		2006
Navayuga Infotech Pvt. Ltd.	NAVAYUGA EUROPE LIMITED	S	UK		2006
NeilSoft Limited	Neilsoft Inc.	S	USA		2006
NeilSoft Limited	Neilsoft Technologies Co. Ltd.	S	China		2006
NetEdge Computing Global Services Pvt Ltd	Neruby Consulting Services Ltd.	S	UK		2006
NetEdge Computing Global Services Pvt Ltd	ProSoft Technology Group, Inc.	S	USA		2006
Nettlinx Ltd.	NETTLINX INC.	S	USA	100.00%	2006
Network Systems & Technologies (P) Ltd	NeST Canada Corporation	S	Canada		2006
Network Systems & Technologies (P) Ltd	NeST Technologies, Inc.	S	USA		2006
Network Systems & Technologies (P) Ltd	Ashling Microsystems Ltd.	S	Ireland		2006
Network Systems & Technologies (P) Ltd	Nihon NeST Corporation	S	Japan		2006
Network Systems & Technologies (P) Ltd	NeST Europe Ltd.	S	UK		2006
Network Systems & Technologies (P) Ltd	NeST Technologies MEA Fz Co	S	UAE		2006
Network Systems & Technologies (P) Ltd	NeST Solutions Pty Ltd	S	Australia		2006
Newgen Software Technologies Ltd.	Newgen Software Inc.	S	USA		2006
Nihar Info Global Ltd.	Winquest Consultants, Inc	S	USA	100%	2006
Northgate Technologies Ltd.	Axill Inc, Usa	S	USA	100%	2006

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Northgate Technologies Ltd.	Globe 7 HK Limited	S	Hong Kong	100%	2006
Northgate Technologies Ltd.	Northgate Holdings (S) Pte. Ltd.	S	Singapore		2006
Northgate Technologies Ltd.	Axill Europe Limited	S	UK	100%	2006
Northgate Technologies Ltd.	Globe7 Inc, Usa	S	USA	100%	2006
NuNet Technologies Private Limited	NuNet Technologies Pte Limited	S	Singapore		2006
NuNet Technologies Private Limited	NuNet Technologies Pty Ltd	S	Australia		2006
Nucleus Software Exports Ltd.	VirStra i - Technology (Singapore) Pte. Ltd.	S	Singapore	100%	2006
Nucleus Software Exports Ltd.	Nucleus Software Solutions Pte. Ltd.	S	Singapore	100%	2006
Nucleus Software Exports Ltd.	Nucleus Software Netherlands B.V.	S	Netherlands	100%	2006
Nucleus Software Exports Ltd.	Nucleus Software Japan Kabushiki Kaiga	S	Japan	100%	2006
Nucleus Software Exports Ltd.	Nucleus Software (HK) Ltd.	S	Hong Kong	100%	2006
Nucleus Software Exports Ltd.	Nucleus Software Inc.	S	USA	100%	2006
Nucleus Software Exports Ltd.	Nucleus Software (Australia) Pty. Ltd.	S	Australia	100%	2006
Ocimum Biosolutions Ltd.	Isogen Biosolutions	S	Netherlands		2006
Ocimum Biosolutions Ltd.	Ocimum Biosolutions Inc.	S	USA		2006
Olive Technology Limited	Olive Technology, Inc.	S	USA		2006
Olive e-Business Pvt. Ltd.	Olive e-Business	S	Canada		2006
Olive e-Business Pvt. Ltd.	Olive Global Ltd.	S	UK		2006
Olive e-Business Pvt. Ltd.	Digital Touch LLC	S	Oman		2006
Olive e-Business Pvt. Ltd.	Digital Touch Ebusiness	S	UAE		2006
Ontrack Systems Ltd.	Ontrack Systems Inc.	S	USA	100.00%	2006
Ontrack Systems Ltd.	Ontrack Systems (UAE) Ltd.	S	UAE	100%	2006
Ontrack Systems Ltd.	Ontrack Systems (UK) Ltd.	S	UK	100%	2006
Ontrack Systems Ltd.	Ontrack Systems BV., NETHERLAND	S	Netherlands	51%	2006
Onward Technologies Ltd.	Onward Technologies Inc.	S	USA	100%	2006
Onward Technologies Ltd.	Onward Technologies GmbH	S	Germany	100%	2006
Orient Information Technology Ltd.	Information Technology People WLL-	S	Bahrain		2005
Orient Information Technology Ltd.	Orient Information Technology Inc.	S	USA	100%	2005
Orient Information Technology Ltd.	Orient Information Technology FZ LLC	S	UAE	100%	2005

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Orient Information Technology Ltd.	Orient Infotech Limited-UK	S	UK	100%	2005
Orient Information Technology Ltd.	Orient Information Technology GmbH-	S	Germany	100%	2005
Panoramic Universal Ltd.	Panoramic Ace Properties Inc.	S	USA	100%	2006
Panoramic Universal Ltd.	Georgian Motel Corp.	S	USA	100%	2006
Panoramic Universal Ltd.	Sai Properties Inc.	S	USA	100%	2006
Panoramic Universal Ltd.	Sai Living Hudson Inc.	S	USA	100%	2006
Panoramic Universal Ltd.	Sai Motels Limited	S	New Zealand	100%	2006
Paradyne Infotech Ltd.	Dyne Techservices Inc	S	USA	100%	2006
Patni Computer Systems Ltd.	Patni Computer Systems (UK) Ltd.	S	UK	100%	2006
Patni Computer Systems Ltd.	Reference Inc.	S	USA	100%	2006
Patni Computer Systems Ltd.	Patni Computer Systems, Inc.	S	USA	100%	2006
Patni Computer Systems Ltd.	Cymbal Information Services (Thailand) Limited	S	Thailand	100%	2006
Patni Computer Systems Ltd.	Patni Computer Systems GmbH	S	Germany	100%	2006
Patni Computer Systems Ltd.	Patni Telecom Solutions (UK) Ltd.	S	UK	100%	2006
Patni Computer Systems Ltd.	Patni Telecom Solutions Inc.	S	USA	100%	2006
Pentasoft Technologies Ltd.	Esoftcom Mauritius Ltd.,	S	Mauritius	100%	2006
Persistent Systems Pvt. Ltd.	Persistent Systems Inc.	S	USA		2006
Polaris Software Lab Ltd.	Polaris Software Lab S.A	S	Switzerland	100%	2006
Polaris Software Lab Ltd.	Polaris Software Lab Canada Inc.	S	Canada	100%	2006
Polaris Software Lab Ltd.	Polaris Software Lab Pte Ltd.	S	Singapore	100%	2006
Polaris Software Lab Ltd.	Polaris Software Lab Ltd.	S	UK	100%	2006
Polaris Software Lab Ltd.	Polaris Software Lab Ireland Ltd.	S	Ireland	100%	2006
Polaris Software Lab Ltd.	Polaris Software Lab Japan KK	S	Japan	100%	2006
Polaris Software Lab Ltd.	Polaris Software Pty Ltd.	S	Australia	100%	2006
Polaris Software Lab Ltd.	Polaris Software Lab GmbH	S	Germany	100%	2006
Prologic First India Pvt Ltd.	Prologic First Dubai	S	UAE		2006
Prologic First India Pvt Ltd.	WISH Technologies	S	China		2006
Quadrant Infotech (India) Private Limited	Quadrant Technologies Inc.	S	USA		2006
Quintegra Solutions Ltd.	Quintegra Solutions Limited, UK	S	UK		2006
Quintegra Solutions Ltd.	Quintegra Solutions, Inc	S	USA		2006
Quintegra Solutions Ltd.	Quintegra Solutions GmbH	S	Germany	100%	2006
Quintegra Solutions Ltd.	Quintegra Solutions Pte. Ltd	S	Singapore		2006
Quintegra Solutions Ltd.	Quintegra Solutions (M) Sdn. Bhd	S	Malaysia		2006

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R S Software (India) Ltd.	RS Software UK Limited	S	UK	100.00%	2006
R S Software (India) Ltd.	Responsive Solutions Inc	S	USA	100%	2006
R Systems International Ltd.	ECnet (Hong Kong)	S	Hong Kong	100.00%	2006
R Systems International Ltd.	ECnet Limited	S	Singapore	99%	2006
R Systems International Ltd.	ECnet Inc.	S	USA	100%	2006
R Systems International Ltd.	ECnet Systems (Thailand) Co. Ltd.	S	Thailand	100%	2006
R Systems International Ltd.	ECnet (Taiwan) Co.	S	China	100%	2006
R Systems International Ltd.	ECnet Korea Co, Ltd.	S	Korea	100%	2006
R Systems International Ltd.	ECnet KabushikiKaisha	S	Japan	100.00%	2006
R Systems International Ltd.	Indus Software Inc.	S	USA	100%	2006
R Systems International Ltd.	R Systems Inc.	S	USA	100%	2006
R Systems International Ltd.	ECnet (M) Sdn Bhd	S	Malaysia	100%	2006
R Systems International Ltd.	ECnet (Shanghai) Co. Ltd.	S	China	100%	2006
R Systems International Ltd.	R Systems (Singapore) Pte Limited	S	Singapore	100%	2006
Ram Informatics Ltd.	Aravali Technologies Inc.	S	USA		2006
Ramco Systems Ltd.	Ramco Systems Sdn Bhd.,	S	Malaysia	100%	2006
Ramco Systems Ltd.	Ramco Systems Pte Ltd.,	S	Singapore	100%	2006
Ramco Systems Ltd.	Ramco Systems Ltd.,	S	Switzerland	100%	2006
Ramco Systems Ltd.	Ramco Systems Corporation	S	USA	98%	2006
Ramco Systems Ltd.	RSL Enterprise Solutions (Pty) Ltd.,	S	South Africa	100%	2006
Rave Technologies (India) Pvt Ltd	Rave Technologies, USA	S	USA		2006
Rave Technologies (India) Pvt Ltd	Rave Technologies, Italy	S	Italy		2006
Rave Technologies (India) Pvt Ltd	Rave Technologies, UK	S	UK		2006
Rishabh Software Pvt. Ltd.	Sytemart LLC	S	USA		2006
Rishabh Software Pvt. Ltd.	Rishabh InfoServices Pvt.Ltd.	S	UK		2006
Rolta India Ltd.	Rolta Deutschland Gmbh	S	Germany	100%	2006
Rolta India Ltd.	Rolta Benelux B.V.	S	Netherlands	100%	2006
Rolta India Ltd.	Rolta Middleeast	S	UAE	100%	2006
Rolta India Ltd.	Rolta International, inc	S	USA	100%	2006
Rolta India Ltd.	Rolta Saudi Arabia	S	Saudi Arabia	75%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Rolta India Ltd.	Rolta Canada Ltd	S	Canada		2006
Rolta India Ltd.	Rolta UK Ltd	S	UK	100.00%	2006
S Q L Star International Ltd.	SQL Star International, Inc	S	USA	100%	2006
S Q L Star International Ltd.	International SQL Star Pte. Ltd,	S	Singapore	100%	2006
S Q L Star International Ltd.	SQL Star International Ltd,	S	UK	100.00%	2006
S S I Ltd.	Telephoto International Pte Ltd	S	Singapore	100%	2006
Saksoft Ltd.	Saksoft Pte Ltd	S	Singapore	100%	2005
Saksoft Ltd.	Saksoft Gmbh	S	Germany	100%	2005
Saksoft Ltd.	Saksoft Inc USA	S	USA	100%	2005
Sankhya Infotech Ltd.	Sankhya SARL	S	France	100%	2006
Sasken Communication Technologies Ltd.	Sasken Communication Technologies Mexico, S.A.De C.V	S	Mexico	100%	2006
Sasken Communication Technologies Ltd.	Sasken Communication Technology (Shanghai) Co. Ltd.,	S	China	100%	2006
Satyam Computer Services Ltd.	Knowledge Dynamics USA Inc.	S	USA	98%	2006
Satyam Computer Services Ltd.	Satyam Technologies, Inc.	S	USA	100%	2006
Satyam Computer Services Ltd.	Info On Demand SDN BHD	S	Malaysia	100%	2006
Satyam Computer Services Ltd.	Satyam Computer Services (Shanghai) Co. Ltd.	S	China	100%	2006
Satyam Computer Services Ltd.	Knowledge Dynamics Pte. Ltd	S	Singapore	100%	2006
Satyam Computer Services Ltd.	Citisoft Inc.	S	USA	100%	2006
Satyam Computer Services Ltd.	Citisoft Plc.	S	UK	75%	2006
Saven Technologies Ltd.	Saven Technologies Inc.,	S	USA		2006
Saven Technologies Ltd.	Saven Technologies (UK) Ltd.	S	UK	100%	2006
Saven Technologies Ltd.	Penrillian Limited,	JV	UK		2006
Serviont Global Solutions Ltd.	5by5 Networks Inc.,	S	USA		2006
Serviont Global Solutions Ltd.	Servion Global Solutions Inc.	S	USA		2006
Serviont Global Solutions Ltd.	Servion Global Solutions Pte Ltd.	S	Singapore		2006
Silverline Technologies Ltd.	SKY Capital International Ltd., HK	S	Hong Kong		2005
Silverline Technologies Ltd.	eComServer Inc. USA	S	USA	100%	2005
Silverline Technologies Ltd.	Innovative BPO Solutions ltd., Canada.	S	Canada		2005
Softsol India Ltd.	SoftSol Resources Inc.,	S	USA	100%	2006
Software Technology	Software Technology Group	S	USA	100%	2006

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Group International Ltd.	International Inc				
Software Technology Group International Ltd.	Software Technology Group, Inc.	S	USA	100%	2006
Sonata Software Ltd.	Abisko Development Ltd	S	Cyprus	80.10%	2006
Sonata Software Ltd.	Sonata Software GmbH	S	Germany	100%	2006
Sonata Software Ltd.	Offshore Digital Services Inc.	S	USA	100%	2006
Spanco Telesystems & Solutions Ltd.	Spanco (S) Pte Ltd	S	Singapore	100%	2006
Spanco Telesystems & Solutions Ltd.	Global Respondez Inc.	S	USA	50%	2006
Srishti Software Pvt. Ltd.	IntelliApp Solutions Ltd.	S	USA		2006
Subex Azure Ltd.	Subex Technologies, Inc.	S	USA	100%	2006
SunTec Business Solutions Pvt. Ltd.	SunTec Business Solutions Ltd, UK	S	UK		2006
SunTec Business Solutions Pvt. Ltd.	SunTec Business Solutions, Singapore	S	Singapore		2006
SunTec Business Solutions Pvt. Ltd.	SunTec Business Solutions Inc	S	USA		2006
SunTec Business Solutions Pvt. Ltd.	SunTec Business Solutions GmbH	S	Germany		2006
Synergy Log-In Systems Ltd.	Synergy Log-in Systems Sdn.Bhd	S	Malaysia	100%	2006
Synergy Log-In Systems Ltd.	Synergy Information Technology Inc	S	USA	100.00%	2006
Synergy Log-In Systems Ltd.	Globsyn Technologies Inc	S	USA	100%	2006
Synergy Log-In Systems Ltd.	Sigmasoft Pte Ltd	S	Singapore	100%	2006
Tally (India) Pvt. Ltd.	Tally Solutions FZ LLC.	S	UAE		2006
Tally (India) Pvt. Ltd.	Tally Solutions International Pte Ltd.	S	Singapore		2006
Tanla Solutions Ltd.	Tanla Solutions (UK) Limited	S	UK	100%	2006
Tanla Solutions Ltd.	Mobizar Limited	S	UK	100%	2006
Tarang Software Technologies Pvt Ltd.	Tarang Software Technologies Pte. Ltd.	S	Japan		2006
Tasaa Netcom Private Limited	Tasaa Netcom USA, Inc.	S	USA		2006
Tata Consultancy Services Ltd.	Financial Network Services (H.K.) Limited	S	Hong Kong	100%	2006
Tata Consultancy Services Ltd.	Pentacrom Servicios S.A.	S	Chile	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Sverige AB	S	Sweden	100%	2006
Tata Consultancy Services Ltd.	Swedish Indian IT Resources AB	S	Sweden	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Solution Center S.A.	S	Uruguay	100%	2006
Tata Consultancy Services Ltd.	TCS Argentina S.A.	S	Argentina	99%	2006

Name of Indian Parent Firm	*Name of Overseas Venture*	*S / JV / AC**	*Country of incorporation*	*%age of equity holding*	*Year of the data*
Tata Consultancy Services Ltd.	Financial Network Services (Africa) Pty Ltd	S	South Africa	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Do Brasil S.A.	S	Brazil	51%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Chile S.A.	S	Chile	100%	2006
Tata Consultancy Services Ltd.	CMC Americas Inc.	S	USA	100%	2006
Tata Consultancy Services Ltd.	Chong Wan Investments Limited	S	Hong Kong	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Japan Limited	S	Japan	100%	2006
Tata Consultancy Services Ltd.	Tata Infotech (Singapore) Pte. Limited	S	Singapore	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services de Espana S.A.	S	Spain	99%	2006
Tata Consultancy Services Ltd.	Exegenix Canada Inc.	S	Canada	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Belgium S.A.	S	Belgium	100%	2006
Tata Consultancy Services Ltd.	Sisteco S.A.	S	Chile	100%	2006
Tata Consultancy Services Ltd.	Financial Network Services (Facilities Management) Pty Limited	S	Australia	100.00%	2006
Tata Consultancy Services Ltd.	Financial Network Services Pty Limited	S	Australia	100%	2006
Tata Consultancy Services Ltd.	Tata Infotech Deutscheland GmbH	S	Germany	100%	2006
Tata Consultancy Services Ltd.	TCS FNS Pty. Limited	S	Australia	100%	2006
Tata Consultancy Services Ltd.	Conscripti (Pty) Ltd.	AC	South Africa	20%	2006
Tata Consultancy Services Ltd.	Exegenix Research Inc.	AC	Canada	50%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Portugal Unipesoal Limitada	S	Portugal	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services de Mexico S.A. De. C.V.	S	Mexico	99%	2006
Tata Consultancy Services Ltd.	Pentacrom S.A.	S	Chile	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Asia Pacific Pte Limited	S	Singapore	100%	2006
Tata Consultancy Services Ltd.	PT Financial Network Services	S	Indonesia	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Deutscheland GmbH	S	Germany	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Luxembourg S.A	S	Luxembourg	99%	2006
Tata Consultancy Services	Tata Consultancy Services Chile	S	Chile	99%	2006

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Ltd.	Limitada				
Tata Consultancy Services Ltd.	Tata Consultancy Services France S.A.	S	France	100%	2006
Tata Consultancy Services Ltd.	Tata America International Corporation	S	USA	100%	2006
Tata Consultancy Services Ltd.	Financial Network Services Malaysia Sdn Bhd	S	Malaysia	100%	2006
Tata Consultancy Services Ltd.	Tata Information Technology (Shanghai) Company Limited	S	China	100%	2006
Tata Consultancy Services Ltd.	Financial Network Services (Holdings) Pty Limited	S	Australia	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Netherlands B.V.	S	Netherlands	100%	2006
Tata Consultancy Services Ltd.	Syscrom S.A.	S	Chile	100%	2006
Tata Consultancy Services Ltd.	Financial Network Services (Europe) plc	S	UK	100%	2006
Tata Consultancy Services Ltd.	Tata Consultancy Services Malaysia SDN. BHD.	S	Malaysia	100%	2006
Tata Consultancy Services Ltd.	Custodia De Documentos Intres Limitada	S	Chile	100%	2006
Tata Consultancy Services Ltd.	TCS Iberoamerica S.A.	S	Uruguay	100%	2006
Tata Consultancy Services Ltd.	Diligenta Limited	S	UK	76%	2006
Tata Consultancy Services Ltd.	TCS Brazil S/C Limitada	S	Brazil	99.99%	2006
Tata Consultancy Services Ltd.	TCS Italia SRL	S	Italy	100%	2006
Tata Consultancy Services Ltd.	TCS Inversiones Chile Limitada	S	Chile	99.99%	2006
Tata Consultancy Services Ltd.	Comicrom S.A.	S	Chile	100%	2006
Tata Technologies Ltd.	TATA TECHNOLOGIES U S A	S	USA	100%	2005
Tata Technologies Ltd.	INCAT Engineering Solutions BV	S	Netherlands		2006
Tata Technologies Ltd.	INCAT GmbH	S	Germany		2006
Tata Technologies Ltd.	Tata Technologies (Thailand) Ltd	S	Thailand		2006
Tata Technologies Ltd.	Tata Technologies Pte. Ltd	S	UK		2006
Tech Mahindra Ltd.	Tech Mahindra (R & D Services) Pte. Ltd	S	Singapore	100%	2006
Tech Mahindra Ltd.	Tech Mahindra (Americas) Inc.	S	USA	100%	2006
Tech Mahindra Ltd.	Tech Mahindra (Singapore) Pte. Ltd.	S	Singapore	100%	2006
Tech Mahindra Ltd.	Tech Mahindra GmbH	S	Germany	100%	2006
Tech Mahindra Ltd.	Tech Mahindra (R & D Services) Inc.	S	USA	100%	2006
Tech Mahindra Ltd.	Tech Mahindra (Thailand) Limited	S	Thailand	100%	2006
Teledata Informatics Ltd.	Alpha Soft Services Corporation	S	USA	100%	2006
Teledata Informatics Ltd.	SBC Data Systems Limited,	S	Ireland	60%	2006
Teledata Informatics Ltd.	Vanguard Technologies	S	USA	100.00%	2006

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Teledata Informatics Ltd.	Transworld Information Systems Inc.,	S	USA	53%	2006
Teledata Informatics Ltd.	Nemera International Company Ltd;	S	Thailand	100%	2006
Teledata Informatics Ltd.	Data Methods USA	S	USA	100%	2006
Teledata Informatics Ltd.	Teledata Informatics (Bangkok) Co. Ltd	S	Thailand	100%	2006
Teledata Informatics Ltd.	Insoft Systems Ltd;	S	Singapore	100%	2006
Teledata Informatics Ltd.	Bitech International Pte Ltd.,	S	Singapore	51%	2006
Teledata Informatics Ltd.	Teledata Marine Systems Pte, Ltd,	AC	Singapore	26%	2006
Teledata Informatics Ltd.	Hopway Limited	S	Hong Kong	100%	2006
Teledata Informatics Ltd.	Picnic Marine Company Ltd;	S	Thailand	70%	2006
Teledata Informatics Ltd.	Bitech International LLC, Dubai	S	UAE	100%	2006
Teledata Informatics Ltd.	I-Max Communications Ltd,	S	UK	80%	2006
Teledata Informatics Ltd.	Netsol Technologies Company. Limited	S	Thailand	100%	2006
Thirdware Solution Ltd.	Thirdware Ireland Limited	S	Ireland		2006
Thirdware Solution Ltd.	Thirdware Solution Deutschland GmbH	S	Germany		2006
Thirdware Solution Ltd.	Thirdware Solution Inc.	S	USA		2006
Thirdware Solution Ltd.	Thirdware Solution Europe Ltd.	S	UK		2006
Thirdware Solution Ltd.	Thirdware Solution Singapore Pte.	S	Singapore		2006
Trident Info-Tech Corpn. Ltd.	Trident Info.Inc.	S	USA		2006
Trigent Software Ltd.	Trigent Software, Inc.	S	USA	100.00%	2003
Trigyn Technologies Ltd.	Trigyn Technologies Inc.	S	USA	100%	2006
Trigyn Technologies Ltd.	eCapital Solutions (Bermuda) Limited	S	Bermuda	100%	2006
Trigyn Technologies Ltd.	eVector (Cayman) Limited	S	Cayman Island	100%	2006
Trigyn Technologies Ltd.	Trigyn Technologies Limited, UK	S	UK	100.00%	2006
Trigyn Technologies Ltd.	EVector Inc.	S	USA	100%	2006
Trigyn Technologies Ltd.	eCapital Solutions (Mauritius) Limited	S	Mauritius	100%	2006
Trigyn Technologies Ltd.	Applisoft, Inc.	S	USA	100%	2006
Trigyn Technologies Ltd.	EVector (UK) Limited	S	UK	100%	2006
Trigyn Technologies Ltd.	Trigyn Technologies Europe Gmbh,	S	Germany	100%	2006
Tutis Technologies Ltd.	Amex Information Technologies GmbH	S	Germany	100%	2006
Tutis Technologies Ltd.	Global Software Technologies Ltd.	S	UK	100%	2006
Twinstar Software Exports Ltd.	Twinstar Software Inc	S	USA		2006
Twinstar Software Exports Ltd.	Twinstar Software Exports Limited, UK	S	UK	100%	2006
Unisoft Infotech Pvt Ltd.	Unisoft Infotech Inc	S	USA		2006
Unisoft Infotech Pvt Ltd.	Unisoft Infotech Pte Ltd	S	Singapore		2006
Unisoft Infotech Pvt Ltd.	Unisoft Infotech Pty Ltd	S	Australia		2006
Unisoft Infotech Pvt Ltd.	Unisoft Infotech Sdn Bhd	S	Malaysia		2006
Unitex Designs Ltd.	Futur I Tech Inc Usa	S	USA		2006

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Usha Martin Infotech Ltd.	Usha Communications Technology Limtied	S	British Virgin Island		2006
ValueLabs (India)	ValueLabs,Inc.	S	USA		2006
ValueLabs (India)	ValueLabs Sdn. Bhd.	S	Malaysia		2006
Wipro Ltd.	Enthink Inc.	S	USA		2006
Wipro Ltd.	mPower Software Services Inc	S	USA	100%	2006
Wipro Ltd.	Wipro Holdings (UK) Limited	S	UK	100%	2006
Wipro Ltd.	New Logic Technologies SARL	S	France	100%	2006
Wipro Ltd.	Wipro Shanghai Limited	S	China	100%	2006
Wipro Ltd.	Wipro Holdings (Mauritius) Limited	S	Mauritius	100%	2006
Wipro Ltd.	Wipro Technologies UK Limited	S	UK	100%	2006
Wipro Ltd.	Wipro Inc	S	USA	100%	2006
Wipro Ltd.	Spectramind Inc	S	USA	100.00%	2006
Wipro Ltd.	Wipro Japan KK	S	Japan	100%	2006
Wipro Ltd.	New Logic Technologies Inc	S	USA	100%	2006
Wipro Ltd.	New Logic Technologies AG	S	Austria	100%	2006
Wipro Ltd.	BVPENTE Beteiligungsverwaltung GmbH	S	Austria	100%	2006
Wipro Ltd.	New Logic Technologies SA	S	Switzerland	100%	2006
Zenith Infotech Ltd.	Zenith Infotech (Singapore) Pte Ltd	S	Singapore	100%	2006
Zenith Software Ltd.	Zenith Software (UK) Ltd.	S	UK		2006
Zenith Software Ltd.	Zenith Software, Inc.	S	USA		2006
Zensar Technologies Ltd.	Zensar Technologies(Shenzhen) Limited	S	China	100%	2006
Zensar Technologies Ltd.	Zensar Technologies, GmbH	S	Germany	100%	2006
Zensar Technologies Ltd.	OBT Global Inc	S	USA	100%	2006
Zensar Technologies Ltd.	Zensar Technologies (Singapore) Pte Ltd.	S	Singapore	100%	2006
Zensar Technologies Ltd.	Zensar Technologies Inc.	S	USA	100%	2006
Zensar Technologies Ltd.	Zensar Technologies (UK) Ltd.	S	UK	100%	2006
softProjex Ltd.	softProjex Inc.	S	USA		2006
softProjex Ltd.	softProjex (UK) Ltd.	S	UK		2006
Note: * S: Subsidiary; JV: Joint Ventur e; AC: Associate Company					