CHAPTER-I

INDIAN IT INDUSTRY - A GENESIS
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1.0 Introduction

This chapter includes the historical perspectives and different developmental phases of information technology (IT) industry in Indian. The advent and growth of IT in the country is closely associated with the happenings in the IT industry in the western countries and especially in the United States of America. Indian scientists and IT professionals working in the west and particularly in the USA have also contributed a lot in this aspect and made their impacts Indian IT industry felt. The chapter has been divided into four parts – origin, growth, development and the present position. It is being discussed in the foregoing paragraphs under appropriate headings.

1.1 Origin

The origin of computer and information technology (IT) in India is to be traced back, with its origin and development worldwide, and especially in the United States of America. A large number of Indian engineers and scientists, while working with the pioneers and the world leaders in these fields, such as, IBM, Apple, Intel, Motorola, Bell Labs., Texas Instruments, Microsoft, Silicon Valley enterprises and the likes during the last two to three decades; and also as independent entrepreneurs based in Silicon Valley and other parts of America and Europe, have contributed enough towards their growth and development in all the phases.

It has been happening in many ways. Indians working abroad in this field, backed by their enriched experience, expertise and live connections with India, and also establishing computers and information technology related enterprises, research laboratories, software development centers and services etc. back home in India have been the major contributors. Also, their large scale operations in India, and integrating their experience with India’s inherent capability in
intellectual and knowledge sector, backed by its well educated, English speaking and intelligent – vast pool of engineers, scientists and software developers have been contributing heavily towards computer and IT related research, growth and development work right from the beginning. And, whether they have been based in India or abroad is immaterial. It is inseparable, as it has been a global phenomenon.

Meyer, Baber and Pfaffenberger (1999)\(^1\), while looking into the origin and growth of computer and information technology (IT), found that ‘the foundations of modern computing were laid by many inventors, and in the years preceding and during World War II, many inventors created electronic machines having characteristics of basic electronic computing machines, and in 1973, a U.S. court declared John Atanasoff, a professor at Iowa State University, to be the “inventor of the electronic computer,” based on an electronic calculator Atanasoff built in the late 1930s’ (p. 1.25).

The above authors further, while looking into the history, identified four generations of computer development as: ‘first generation computers – difficult to program and use and based on vacuum tubes (1950s); second generation computers – easier to program and cheaper and based on transistors (early 1960s); third generation computers – timesharing mainframe and microcomputers (mid 1960s to mid 1970s); and fourth generation computers – much powerful and speedier today’s personal computers (PCs), graphical user interface, local area networks (LANs), internet etc. based on very-large-scale-integration (VLSI) of circuits on a small chip and microprocessors (mid 1970s to the present day)’ – (p.1.25-1.26).

Furthermore, Meyer et. al. (1999)\(^1\), while talking about the advent of the wonder machines in the IT field, observed that ‘the revolutionary personal computers (PCs) – Apple-I arrived in 1977, followed by Apple-II (1979) and IBM-PC (1980). Apple-II and IBM-PCs changed the world, with their unimaginable power and speed in computing and processing, large storage, compact in size, a desk top machine, cheaper and affordable, which sneaked into all spheres of
work and life – offices, factories, large corporations, homes, individuals, professionals and every walk of life’ (p. 1.31-1.33). And, the authors further added that ‘computers and IT include a complete system consisting of hardware and programs or software; and software includes – the system software, application software and large variety of special purpose programs and packages; and a powerful computer without computer program or software, which tells the computer what to do, is simply of no use’ (p. 1.14). Elsewhere, Simmons (1991)² described software as ‘a set of instructions that direct the computer (CPU) to perform a particular set of tasks in a particular order, using specified hardware devices, memory locations etc.’ (p. 181), and program as ‘a series of instructions written by a computer programmer or operator for execution by the computer user’ (p. 158).

1.1.1 Contribution of Indians

The contribution of Indians working abroad is somewhat evident in the second generation computers (early 1960s), evident in third generation computers (mid 1960s to mid 1970s), and much more evident in the fourth generation computers – (mid 1970s to the present day). Indians and India, in the later part of the fourth phase - starting from mid 1980s, engulfing 1990s, and till date in the new 21st century, have taken a lead in computer and IT fields, in India as well as abroad. India has become the choicest destination for all the computers and IT majors of the world – be it new research work in these areas or large volume of operations in software development, business process outsourcing (BPO) and host of other IT based services. But the fact remains that India was a late starter in this field, initially it lagged behind by at least 20 years, but caught up quickly, and India is now in the forefront of all IT related initiatives.

Genesis dates back to 1897 when Kanavi (2003)³, a technology journalist, in his recent book “Sand to Silicon : The Amazing Story of Digital Technology” gave an account of Indian achievers and achievements into the very fabric of IT and its brief international history. Kanavi repeatedly reminded us of Indian contributions that tend to get overlooked : Jagdish Chandra Bose created a
semiconductor microwave detector using iron and mercury in his lab in Kolkata in 1897, the year Marconi used a version in his wireless radio receiver. When Neville Mott received the Nobel Prize in 1977 for his work in solid-state electronics, he remarked "Bose was 60 years ahead of his time." This basic research by J. C. Bose in the field of semiconductor 107 year back from now, became the basis of further development of semiconductors, chips and computer technology later on.

*Business Today (2002)* observed that 'computer and IT related growth and development in the U.S. had direct impact on computer's growth and development in India which was somewhat evident during the days of third generation computers (mid 1960s to mid 1970s), and much more evident during the fourth generation computers age (mid 1970s till date). Initially the U.S. was the developer of computer technology – hardware and software, and their sole supplier to India and the world; followed by India becoming the major IT software developer, software and R&D services provider to the U.S. and also to some other developed countries, and the U.S. becoming the major market for India in these selected areas' (p. 107).

And now, looking at India’s developing major market in the U.S. and a cursory view of developments taking place there in these areas, *Business Today (2002)* further observed that 'in the U.S., business started using computers beginning the 1950s. A few contract programming firms popped up during the time, and in the decade that followed, more such firms (now known as 'professional services' firms) jumped onto the bandwagon. The 70s saw users accept software as products and pay to use them. The advent of personal computers (PCs) pushed up the demand for software. The International Computer Programs (ICP) - a software buyer's guide - set up the first Million Dollar Awards programme in 1971 to recognize software that fetched $1 million (Rs. 47 crore) or more in revenues. In that year there were 29 such software products. By 1976 that number had grown to 100. This was just the taking off stage of the software products and IT based services and their demands in the
United States. Around this period the spending on IT in the U.S. grew at 9 per cent' (p. 107). IT and software services growth, development and demand in America had direct bearing on the IT and software services business in India. It provided India an unprecedented opportunity in the IT and software services sector to grow, produce volumes of IT software and provide other IT related services to the U.S. and few other developed or developing markets in the initial years of the revolution.

1.1.2 Indian IT Scenario

Gangopadhyay (2000)^, in his study of Indian IT industry, observed: “1975, India is yet to wake up from the realms of red-tapism in the information technology sector, saw computers with uncanny suspicion and very few were aware of its capabilities. Yet, an electrical engineer by training foresees the tremendous potential of IT in India and the man F. C. Kohli declares, “Many years ago, there was an industrial revolution. We missed it due to factors over which we had no control. Today, there is a new revolution – a revolution in information technology, which requires neither mechanical bias nor mechanical temperament. Primarily, it requires the capability to think clearly. This we had in abundance. We have an opportunity even to assume leadership. If we miss this opportunity, those who will follow us will not forgive us for our tardiness and negligence.” Twenty five years have passed since Faquir Chand Kohli predicted the emergence of India as an IT major. He is still at helm, shaping the future, laying foundations and directing new IT practitioners towards a better future. Kohli is the deputy chairman of the country’s biggest and most profitable software services company, Tata Consultancy Services (TCS)” - (p. 36).

Business Today (2002)^, in its article “6 Those Who Made a Nation Turn Around”, quoted Kohli as “father of Indian software industry” and wrote: “As an electrical engineer, F.C. Kohli was an unlikely candidate to be India’s software revolutionary. But, as it turned out, J.R.D. Tata couldn’t have picked a better man to lead the Tata group’s foray into the then esoteric software business. When Kohli took over the reins at Tata Consultancy Services in 1969, the electrical
engineer from the Massachusetts Institute of Technology only had experience in managing power plants. Worse, computer technology wasn't really a priority for the government. Kohli battled on, managing to get a modest share of the software boom that had begun in the US in the early 60s. The arrival of Rajiv Gandhi and his technology-friendly team opened up opportunities for TCS, and a horde of other software wannabes. Toady, TCS is Asia's largest software and Services Company, and set to cross the $1-billion turnover mark (Rs. 4,700 crore mark in 2001-02, which it crossed in the year 2002-2003) shortly" (p. 102).

Gandhi, 'the father of the nation' liberated millions of Indians from the Britishers way back in 1947 and Kohli, 'the father of the Indian software industry' liberated millions of Indians' minds and their intellectual capabilities in the recent decades and brought India to the fore front of development at the world stage. Kohli also earned high respect for them and was instrumental in establishing India as a brand and choicest destination for the software technology. The seeds which Kohli sown on the intellectually fertile Indian soils thirty five years back, have been continuously giving rich crops year after year in the form of high quality and large volumes of software, and supplying to the entire world.

1.1.3 The Origin Period in India (1968 to 1980)

In India, as Business Today (2002) observed, 'the first company to look at software as an opportunity was Tata Consultancy Services, which was lunched in 1968, and spearheaded by its CEO and the father of the Indian IT industry – the legendary F. C. Kohli, throughout this initial phase. A year later, Mafatlal Consultancy Services came into being in 1969, later followed by DCM Data Products, Hinditron Computer, Patni Computers, Datamatics, PSI Data, and ORG Systems. The software was a cottage industry with just Rs. 4 crore in turnover' (p. 107).

Further, Gangopadhyay (2000) brought out that 'during mid to late 1970s, TCS started gaining ground in the software business. It bagged software business from Burroughs, the second largest hardware manufacturer in the U.S.
after IBM, during 1973-74 due to the personal efforts of Kohli, followed by the first major order around this period from Institutional Group and Information Co. (IGiC), a data center for 10 banks and 2 million customers in the U.S.. And, another project from American Express on developing an accounts receivables system in 1979 swept TCS off the ground, and there was no looking back for the company’ (p. 39-40).

Another important entrant around the middle of the origin period span was HCL group\textsuperscript{788} - the company’s history goes back to 1975 when six entrepreneurs — Shiv Nadar and five of his associates — decided to create a computer systems and services business in India, started operations in computer hardware and technology at a miniature scale, faced many initial challenges, went through different phases, but remained in the business during this initial phase. Some more companies had also entered the IT field during this period, but mainly in the hardware segment, but could not do well due to various reasons.

Further, the prevailing business environment, unfavourable government policies, red-tapism, various restrictions, foreign exchange shortage debarring imports of components and IT related products, license and quota regime, complex import procedures, archaic procedures of excise and custom clearance, heavy duties etc. - all taken together proved to be detrimental for hardware sector to grow, and software's time had probably not yet arrived, but it exhibited signs to grow in the future. Thus, during this stagnant period of around 12 years (1968 to 1980), many players in the hardware sector could not survive, few of them partially or fully switched over to software later, which was in the stage of infancy and trying to stand on its feet. And, back in the United States, 1977 onwards the software products and IT based services applications and demands were increasing, which started making favourable impact on Indian IT industry. It provided an opportunity and life-blood to Indian IT industry, mainly in the software segment, to survive and grow. And, on economic and business front, there were no much claims during the major part of this period. But beginning with 1977 and till the end of this phase in 1980, some signs of improvement were
evident. However, this learning phase with slow movement and stagnant period had sown seeds for the future growth and development, especially in the IT software segment.

1.2 Growth

1.2.1 Growth Period of Indian IT Industry (1981 to 1990)

The decade 1981s is treated as the growth period and consolidation of Indian IT industry in the IT software business. The growth of Indian IT software business during this period was mainly due to the rapid growth and development of IT sector in the U.S.. By the end of 1970s and specifically 1977 onwards, software and services demand in the U.S. increased considerably. And, throughout this period the spending on IT in the US grew at 9 per cent. It also generated some demand of Indian IT services in America. In India, many players who had entered the IT business in hardware segment earlier and survived in the initial phase, diversified into or quickly switched over to the software segment. Foreseeing it as the new sunrise sector, a large number of new players entered the software field, and some of them made a mark on the international IT horizon later.

1.2.2 Major Players and New Entrants

*Tata Consultancy Services* - a division of Tata Sons, the holding company of the multibillion Tata Group, India’s best-known business conglomerate, was already established in 1968. Its founding was based on the understanding that ‘the management problems in Indian industry could be resolved through the effective use of information technology’. Under the leadership of the father of the Indian IT industry and the legendary F. C. Kohli, the company spearheaded the pioneering efforts in creating a globally recognizable brand for the Indian software industry. And, Gangopadhyay (2000) further observed that ‘as U.S. corporations resorted to large scale computing and outsourcing in a big way throughout the decade (1981-1990), TCS’ business flourished through the 1981s. Also, the effort to move away from the onsite work
to offsite development in TCS peaked around 1988. Currently offshore development accounts for 75-80 percent of the work. The shift was marked by the installation of IBM mainframe 3090 in Chennai. With this new development, IBM customers' and IBM research labs' projects started pouring in. By the end of this period (1990), TCS had 68 offices in over 50 countries and strong marketing teams positioned around the world' (p. 39-40).

**HCL Group's** IT business, mainly in hardware and high-end technology, was already founded in 1975 by six entrepreneurs with Shiv Nadar at the helm. Shiv Nadar, a technology savvy man is also known as the 'Cheetah' of Indian IT industry, a recognition for his sharp moves and technological strength. Having gone through many initial challenges and different phases of business life, the company continued its operations in hardware systems, created high end technologies during this phase and diversified into software operations by creating a separate space under the ongoing hardware business. The company had already started global operations in software and high end technology during this period. The company’s initiatives in the various segments of IT business and sharp moves for expansion and new ventures during this growth phase of Indian IT industry provided a base for the company for further development and global operations.

**Infosys Technologies Limited**, as a new entrant emerged on the scene when N R Narayana Murthy, Nandan M Nilekani and five others left Patni Computer to form a company of their own with a capital of Rs. 10,000 in the year 1981. The company earned a revenue of Rs. 12 lakh in the first year of its operations, but it could not even cross Rs. 5 crores mark in its one decade of operations or by the end of the present phase in 1990. Infosys, right from its birth, believed in and practiced for - ethics in business and professionalism. Throughout this phase, Infosys was led by its chief mentor and chairman, N R Narayana Murthy. And, the company possessed all the ingredients to grow and succeed, despite unimpressive financial performance during this phase.
Wipro Limited, another new entrant in this field, was a company founded in 1945 initially as an oil company. And Azim Hasham Premji having discontinued his studies at Stanford due to family circumstances and taking over this family enterprise in 1966 and trying his hands in new emerging fields, Wipro entered IT with India’s first mini-computers in 1981 followed by a software company launched in 1984. During the present phase, the company continued and consolidated its position in computer business, and strengthened its position in the software business. Right from day one and a matter of policy, the company gave highest priority to high values, ethical practices, honesty and integrity in business life and searched for the ways to succeed in business while maintaining its values without any compromise. Wipro and its topmost leader Azim Premji exhibited all signs during this period of a bright future of the company, though the take off stage had not come yet.

NIIT Limited, India’s first IT Training organization which later on diversified into IT software and solutions business also, was established in 1981 by three young IITians (IIT, Delhi alumnus), Rajendra S. Pawar, Vijay K. Thadani, and P. Rajendran, with a vision to create a unique company with a revolutionary mission of bringing people and computers together--created for the first time in India, which proliferated the use of computers in the country, produced millions of skilled IT professionals and effectively participated in the recent IT revolution which swept the nation later. NIIT, during the current growth phase of Indian IT industry, provided a solid ground with its IT training and education initiatives, for the entire IT industry to develop and grow. The company had sufficient growth during this phase, which provided it a base to become major player in the field later. The top management team of the company constitutes - Rajendra S Pawar, as the chairman of NIIT, Vijay Thadani as the CEO and P Rajendran as its chief operating officer – all three being the co-founder of the company.

Satyam Computer Services Ltd, another major entrant on Indian IT horizon during the current phase, was established in 1987 and headquartered in Secunderabad, India. In a short span of 3-4 years of operations in the remaining
part of this phase, the company made efforts to create a base for further
development. Its apex management consists of B. Ramalinga Raju, chairman
and B. Rama Raju, managing director. Right from the beginning, Satyam was
guided by its philosophy and well defined core purpose - "To leverage
information, knowledge and technology to enhance human endeavor."

Apart from above six major players and few of them being the new
entrants in this field during the current growth phase (1981 to 1990) of Indian IT
software industry, there were hundreds of other entrants and players in this field
during this period, and those companies which survived also made useful
contributions towards the growth of IT in India.

1.2.3 Indians in U.S. and Indian IT Industry (1981 to 1990)

Indians' contributions towards IT in the U.S., their direct impact on Indian
IT business, their own ventures, research labs., software development centers
back home, and India's major IT companies' operations in the U.S. and some
other countries – all these factors taken together suggest us to discuss such
happenings here in brief.

Kanavi (2003), while looking at Indians working in computer and IT field in
the U.S., further reminded us of the work of 'Indians behind key milestones in
computer history: In the 1980s, while the first microprocessors went under the
hoods of the first personal computers, Pallab Chatterjee at Texas Instruments
was honing the technology to pack more transistors on to a slab of silicon and
Tom Kailath, an Indian at Stanford University, developed the signal processing to
compensate for the effect of 'masking' during chip production, that revolutionized
the computer and information technology world over, with the advent of much
powerful, speedier and still much smaller in size and affordable too, the wonder
machines called - personal computers (PCs), which encompassed all walks of
life and all class of people - business, offices, factories, homes, schools, labs,
stores, shops, professionals, students, individuals – a PC was to be found on
everybody's table.' And, the rest is history. Much credit goes to Indians and India as well.

And, 'Vinod Khosla co-founded Sun Microsystems in 1982, a company that created the PC workstation.' Kanavi, simultaneously looking at India and the new initiatives taking place back home, also paid 'tribute to the pioneers of mainframe computer programming in India – R. Narasimhan at the Tata Institute of Fundamental Research (TIFR).'

1.3 Development

1.3.1 Development Period of Indian IT Industry (1991 to 2000)

The decade 1991s, starting from 1991 and closing in 2000, will be remembered as the major development and boom period for Indian IT industry. It took place mainly in the IT software and services sector. India possessed inherent capability in the knowledge and intellectual field. During this period, the initial demand for Indian IT software services was generated in the U.S., followed by worldwide IT services demand by the end of the decade, which was created by an universal phenomenon of 'Y2K' problem, which proved to be an unprecedented opportunity for India as well as Indian IT Industry. Indian IT industry took full advantage of it, and became a major player in the world IT business.

1.3.2 India's Software Industries – a Paradigm Shift

Software proved to be India’s revolution for the decade. If the White and Green Revolutions were because of governmental support (in some fashion, at least), the one in information technology happened purely because of free enterprise and because a bunch of techno-entrepreneurs could freely move around the world markets for business. Also, with no finished physical product to show, they could escape the arcane excise and customs laws that stunned India’s hardware industry. And, in the beginning, most of the IT software services were exported to the United States, some to Europe and few other countries.
1.3.3 The Turning Point

The turning point for the industry came in 1995, when enterprise resource planning (ERP), and the client-server technology became popular. Suddenly, there was a PC on every corporate desk in the US, and the demand to design and implement ERP systems snowballed. Between 1991 and 1995, the spending on IT in the US grew at a modest 9 per cent. But between 1995 and 2000, it almost doubled to 16 per cent. It provided a bigger opportunity to Indian IT industry to serve U.S. market. Demand of IT services from India accelerated.

Back in India in the early 80s, the then Prime Minister Rajiv Gandhi was clearing the decks for IT. He launched technology missions, and set focus on telecom. In the changing atmosphere, improved telecom and easier import of computers, Indian companies increased their share of business. A shortage of skilled manpower in the US led to Indian companies bagging more onsite projects, and the Y2K bug fear fuelled the demand to an unprecedented level.

The ‘Y2K’ problem or fear around the year 1999 was a worldwide phenomenon, which brought one time golden opportunity for Indian software and services sector to take off. India possessed the intellectual capability and abundance of well trained manpower - English speaking, intelligent, diligent, skilled IT specialists and programmers and yet cheaper. India, armed with all its competitive advantages and quality human resources did take on the problem and made the best use of the opportunity. The nation turned into a technology destination, got a new confidence and experienced a newly acquired respect in the eyes of the world community.

By the mid-90s, another phenomenon was sweeping across the US. This was the dotcom (internet related commerce) boom. Companies scrambled to ensure their survival by building capabilities that would allow them to interact with customers online. Internet allowed them to create a bigger network of suppliers and dealers. The National Association Software and Service Companies
(Nasscom) estimated that in 2000, the world market for software services was $400 billion. The market for software products was another $400 billion.

1.3.4 Major Players on the IT Scene

Wipro Technologies, led by its topmost leader Azim Premji, a late starter though in the IT software field, its software business became the biggest hit. A big brand makeover took place in 1998 with sunflower logo and ‘Applying Thought’ as the tagline. Azim Premji took Wipro to a new height. Wipro, during this period, crossed Rs. 200,000 crore figure with market capitalization to over $50 billion on NASDAQ. Wipro’s principal share holder Azim Premji had become a man worth $37.5 billion of personal wealth making him one of the world’s five richest man and world’s richest Indian in 1999. Also, regarding Azim Premji’s personal achievements and as a business leader during this phase, some of the world’s leading business magazines rated him as: Azim Premji voted the 15th most powerful man in the world (Power 50,2000, by Asia Week, 2000), Azim Premji in Forbes magazines’ list of the world’s richest people (1999), Azim Premji in Fortune’s Power 25 list, "Businessman of the Year" (2000, by Business India), "IT Man of the Year" (1999, by Dataquest), Azim Premji among 'The stars of Asia'. The apex management of the company during this period constituted – Azim Premji as chairman of Wipro Limited, and Vivek Paul as vice-chairman of Wipro, and CEO of Wipro Technologies.

Wipro, headquartered in Bangalore, provided during this phase a range of IT services, product design services and business process outsourcing services with six sigma quality consistency to its 300 customers (50 of these being Fortune 500 companies) across the world, through 21,000 IT practitioners and domain consultants and offices and development centers in 30 locations around the world including USA, Canada, Europe, Japan and India.

Wipro was ranked 1st in the year 2000 by Dataquest. Its financial performance during last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 2,035.7 Cr.), revenue 1998-99
Wipro got several awards\(^1\), recognition, achievements and rankings during one decade of IT development phase and some of them are: ‘Wipro’s Market Capitalization is the Highest in India’ (1999-2000), Among ‘Most Respected Indian Company’ (ranked - 16\(^{th}\), 1999; and 65\(^{th}\), 1997, by Business World), ‘Business Innovation Award’ for offshore development (Electronic and Software Export Promotion Council, 1993); certifications like - World’s first PCMM and CMMi ver. 1.1 Level 5 company, World’s first SEI CMM Level 5 software services company, World’s first TL 9000 certified software services company; and Listed at NYSE (WIT), Part of the TMT (Technology-Media-Telecom) Index of the New York Stock Exchange; and so on.

 Infosys Technologies\(^2\&\(^3\), led by Narayana Murthy as chairman and its chief mentor and Nandan Nilekani as next man at the apex, became a new trend setter during this phase. In the beginning of this phase, Infosys could reach for the first time, Rs. 5 crore mark in the year 1991, in tenth year of its operation. It underwent a major makeover including branding and an initial public offer (IPO) in 1993. It coincided with Manmohan Singh’s landmark budget and liberalization of Indian economy around the time. The company simply took off and never looked back and the rest is the history. It achieved various new heights during this period and became and important global player in IT software and services. Narayana Murthy guided one of India’s best known software companies through its birth, adolescence and now in its maturing stage.

 Infosys, headquartered in Bangalore, with over 19000 employees worldwide, provided consulting and IT services to its clients globally through its worldwide offices and development centers in various countries including Canada, France, Germany, India, Japan, Singapore, Sweden, Switzerland, United Kingdom, and United States among others. Infosys served 345 clients worldwide and many of them being Fortune 500 companies.
Also, Infosys was a very well globalised company in terms of 'customers' and 'investors'. It was listed on NASDAQ in 1999 during this phase and became the first Indian registered company to do so, and its shares were quoted at 2000 times their paid up value. Also, 30-35% of Infosys holdings were held by foreign investors during this period.

Infosys was ranked 9th in the year 2000 by Dataquest. Its financial performance during last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 882.3 Cr.), revenue 1998-99 (Rs. 508.9 Cr.), growth (73.4%), market cap (Rs. 54,178 Cr., as on 31.3.2000, rank 2nd), and market cap (Rs. 9,358 Cr., as on 31.3.1999, rank 2nd): (Dataquest, 2000).

Infosys got numerous awards, recognition and special achievements during this period: Ranked 'India's Most Respected Company' (6th-1999; by Business World), "National Award for Excellence in Corporate Governance" (2000, by Government of India), 'India's Most Admired Company' (1999, by The Economic Times Survey), "Award for Corporate Excellence" (ranked 1st, 1998), Chairman N R Narayana Murthy conferred 'IT Man of the Year Award' (1996, by Dataquest), 'Infosys Foundation established' (1996, focus on contributing back to the society), "Best Annual Report Award" (1996 and every year from 1995, by ICAI), and so on.

Tata Consultancy Services, continued getting the able leadership of the father of the Indian IT industry and the legendary F. C. Kohli during this phase until 1995, and the company further spearheaded towards becoming a global brand and attaining a giant stature. Over the years, TCS has become the 'Jewel in the Crown of Tata' and Asia's largest information technology company. The next CEO of TCS, S. Ramadorai is regarded as one of the top 25 consultants in the world, and at the helm, Ratan Tata continued as the group chairman.
It has nearly 25,000 consultants and having operations in 55 countries with over 100 branches throughout the world including USA, UK, Europe, Japan, and others, and serving over 1000 clients and many of them being ‘Fortune 500’ companies.

TCS continued during these years, India’s largest IT enterprise as well as Asia’s largest independent software and services organisation. It continued offering a range of IT services and consultation to many different and in diversified technological fields. Also, it remained the single largest software services exporter from India during the development phase of Indian IT and was conferred upon several national and international awards, recognition and rankings during this period.

TCS was ranked 2\textsuperscript{nd} in the year 2000 by Dataquest\textsuperscript{10}. Its financial performance during last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 2,033.9 Cr.), revenue 1998-99 (Rs. 1,652.3 Cr.), and growth (23.1%).

\textbf{Satyam Computer Services Ltd\textsuperscript{74}}, led by B. Ramalinga Raju, chairman and B. Rama Raju, managing director, and though a late entrant in the IT software field, gained considerable strength during this phase of Indian IT. It became one of India’s premier IT services company during this period. It also became an important global player during this period and earned name and generated wealth.

Satyam, headquartered in Secunderabad, employed around 11,000 IT professionals during this period and carried out its global operations in its 15 development centers scattered all over the world, 5 located in Indian cities and remaining 10 in USA, UK, Malaysia, Japan, Singapore, UAE and Australia.

Satyam during this development phase of Indian IT provided IT software and services to over 290 global clients which included more than 80 fortune 500 corporations, alliances with over 75 business and technology leaders and presence in 45 countries across 5 continents. And, its IT business included
intelligent applications in technology for diverse situations meeting varying requirements and helping customers in optimizing their strengths and also developed proprietary products during this period.

Satyam was ranked 12th in the year 2000 by Dataquest. Its financial performance during last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 677.1 Cr.), revenue 1998-99 (Rs. 378.1 Cr.), growth (79%), market cap (Rs. 22,912 Cr., as on 31.3.2000, rank 3rd), and market cap (Rs. 4,949 Cr., as on 31.3.1999, rank 4th): (Dataquest, 2000).

Satyam Computer had various special achievements and recognition during this period. And, Its chairman B. Ramalinga Raju's was named "IT Man of the Year 2000" by Dataquest magazine and won Ernst &Young Entrepreneur of the Year Award, 1999.

HCL Technologies, led by its founder, chairman, and a visionary corporate leader, Shiv Nadar, became a premier Indian IT company during this phase. The company carried out its operations globally in IT software, services and high end technology segments. This was the period when the company established itself as a leading IT group – HCL group with various companies, ventures and subsidiaries under its fold.

The surge in demand of IT software and services in 1990's led to a rapid rise of software development services within HCL. This resulted in the emergence of HCL's software factories in various geographic locations and finally, the group flagship company HCL Technologies Limited was formed in the year 1991 to serve its clients around the world.

HCL Technologies, during this phase, became a global information technology enterprise headquartered at Noida, and employing 8,748 people in various locations across India, U.S., Europe, Asia Pacific and Japan. Also, the company established 16 fully operational state-of-the-art software development centers and 26 offices in 14 countries and served over 300 blue chip global
clients and provided high-end technology services, and earned good reputation as well as created wealth.

HCL Technologies was ranked 10th in the year 2000 by Dataquest\textsuperscript{10}. Its financial performance during last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 830.3 Cr.), revenue 1998-99 (Rs. 649.3 Cr.), growth (27.9%), market cap (Rs. 22,174 Cr., as on 31.3.2000, rank 4\textsuperscript{th}): (Dataquest, 2000)\textsuperscript{11}.

HCL Technologies during this decade got a number of awards\textsuperscript{12}, recognition and special achievements to its credit. Outstanding Vendor Award\textsuperscript{1} (1998, by Unisys Corporation, USA), ‘Best Software Development Award’ (1997, in a joint effort with Anderson Consulting, now Accenture, and government of Singapore), ‘IT Man of the Year Award’ to Shiv Nadar, Chairman and CEO, (1995, by Dataquest, for his vision and leadership), and ‘QUEST Award’ (1994, the Quality and Excellence of Systems and Technology Award to HCL America, by Datamation), and so on.

\textit{NIIT Limited\textsuperscript{7\&8}}, led by Rajendra S Pawar, as the chairman of NIIT, Vijay Thadani as the CEO and P Rajendran as its chief operating officer, became Asia’s biggest IT Training organization and a premier IT software and solutions company during this phase.

The company’s carried out its operations in two complementary sectors - software and education, which brought synergy and an edge over others. It has become a $167 million global IT company and built up an impressive array of global customers which includes Fortune 1000 companies such as British Airways, ING, Office Depot and Qantas to key Indian state Governments.

NIIT was ranked 6\textsuperscript{th} in the year 2000 by Dataquest\textsuperscript{10}. Its financial performance during last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 1,095.8 Cr.), revenue 1998-99 (Rs. 861.7 Cr.), growth (27.2%), market cap (Rs. 7,327 Cr., as on 31.3.2000,
rank 5th), and market cap (Rs. 7,187 Cr., as on 31.3.1999, rank 3rd) : (Dataquest, 2000).

NIIT, got various awards and recognition during this decade such as:
Among "Top 10 India's Leaders" in the "Review 200 Survey" profiling Asia's leading companies (2000, by the Far Eastern Economic Review), 'India's Most Respected Company' (1999, ranked 48th by Business World), its chairman R. S. Pawar was got the 'IT Man of the Year Award' (1998, by Dataquest magazine), and so on.

The above account chronicles the brief history of six leading Indian IT software and services companies during the development phase (1991 to 2000). These companies made their mark on Indian IT software business and emerged as global players on the world IT horizon during this period, created wealth and earned high respect for themselves and the country. There were hundreds of other companies as well, which performed well and moved up the value chain and contributed towards development of IT in India during this period. Also, India's own supercomputers, built by Indians in India during this phase, became a major landmark in the country's IT history.

1.3.5 India's Supercomputer – A Milestone in IT History

Those days were not very far we were at the receiving end when superior technology stared us in the face. In the past, when US continued refusing to sell supercomputers to India for even non defense use like metrological and scientific ones; ultimately India took on the challenge. Its knowledge prowess worked. India developed its own super computers around the mid of the IT development phase (1995) in the country and became the third nation in the world, just after America and Japan, building much advanced super computers. It was a major achievement for the country as well as the IT industry during this period. It became a milestone in India's IT history.
1.3.6 Financial Performance of IT Industry (1991-2000)

The growth and financial performance of Indian IT industry during its development phase was phenomenal. And, during the decade, year 1999-2000 witnessed one of the steepest growth (38%, overall industry) in software and services sector. The top 20 companies revenues grew by 45.4 % in 1999-2000 (Dataquest, 2000) over previous year, exceeding the growth rate of the overall IT industry at 38%. Also, the percentage share of the top 20 companies revenues in the industry grew by 50.2% in 1998-99 to 52.9% in 1999-2000. In a study by Dataquest (2000), the top 20 software IT revenue trends during this phase (1990-91 through 1999-2000) were cited as: Year 1999-00 – revenues (Rs. 17,523.2 crore), growth (45.8%); 1998-99 – revenues (Rs. 12,022.4 crore), growth (42.4%); 1997-98 – revenues (Rs. 8442.9 crore), growth (24.9%); 1996-97 – revenues (Rs. 6,760.2 crore), growth (23.4%); 1995-96 – revenues (Rs. 5480.4 crore), growth (40.0%); 1994-95 – revenues (Rs. 3913.7 crore), growth (48.1%); 1993-94 – revenues (Rs. 2,642 crore), growth (34.5%); 1992-93 – revenues (Rs. 1664.4 crore), growth (32.4%); 1991-92 – revenues (Rs. 1,483.9 crore), growth (17.3%); and 1990-91 – revenues (Rs. 1265.5 crore). (p. 73-75).

Also, IT industry's total financial performance in software and services segment, domestic and exports taken together, during the last two financial years around the end of development phase was recorded as: revenue 1999-2000 (Rs. 18,116 Cr.), revenue 1998-99 (Rs. 12,373 Cr.), and growth (46%). (Dataquest, 2000, p. 86-87).

1.3.7 Indians' Contributions while in the U.S. (1991 to 2000)

Indians working in the U.S. on long or short assignments basis during this period, also contributed a lot in the computer and IT related research and development work. Kanavi (2003), further chronicled the major achievements of Indians working in computer and IT field in the U.S., who have been behind key milestones in the computer history as: ‘A team of 10 engineers from an Indian IT company working at Intel’s labs. in the U.S. took lead and designed and
produced the highest-performing Intel 486 microprocessors in the year 1991 which enabled the small PCs to possess the vast processing capability of a big mainframe computer; Vinod Dham at Intel, created that company’s most successful chip ever – the Pentium around mid 1990s, which is still in vogue worldwide with its latest version – Pentium-IV.'

Kanavi further observed that ‘while it is rarely appreciated that a significant part in the development of that industry-standard presentation-software, Powerpoint, was led by Vijay Vashee at Microsoft. And, the birth of the internet spawned a new generation of Indian technologists like Sabeer Bhatia who created the Web's first free email service, Hotmail; Arun Netravali, now chief scientist at Lucent Technologies, who provided key building blocks (softwares) for video streaming and digital satellite TV; and N. Jayant of Bell Labs who helped create the MPEG standard for audio compression – all based on digital technology and IT software.'

1.4 Present Position

1.4.1 Present Period of Indian IT Industry (2001 and beyond)

The present phase in Indian IT starts from 2001 and the study focuses on the happenings covering the period between 2001 till mid 2004 (till the writing of this thesis report). However, the present period of Indian IT industry would cover the entire decade 2000s, starting from 2001 and closing in 2010.

1.4.2 Maturing Phase of IT Industry

The ongoing phase of Indian IT will be remembered as the ‘maturing phase' in the IT history of India. The natural intelligence of Indians and global competitiveness of India, in the fields of IT and IT led high-technology, were amply demonstrated during the previous one decade of development phase of IT in India. And, the Indian business leaders and entrepreneurs in the IT software and services fields have proved their mettle during last one to two decades. Some of them in this field have emerged as world class visionary corporate
leaders, such as, F. C. Kohli, the father of the Indian IT industry and the legendary CEO of TCS, N. R. Narayana Murthy of Infosys, Azim Premji of Wipro, S. Ramadorai of TCS, Nanadan M. Nilekani of Infosys, Shiv Nadar of HCL group, Rajendra S. Pawar of NIIT, B. Ramalinga Raju of Satyam Computer, and many others are in the making. Among them, Narayana Murthy and Azim Premji are rated at par with Bill Gates of Microsoft and Jack Welch of General Electric, and S. Ramadorai has already been recognized as the fifth most influential technical figure in the world. These visionary leaders have placed their companies on the world IT map.

1.4.3 Moving Up the Value Chain

At the moment, Indian IT industry in general is moving up the value chain and undergoing its maturing stage. And, a few companies like Infosys, Wipro and TCS have already become matured enough and turned into world class IT companies in a span of two to three decades. Many others are in the making and moving up the value chain. With the current speed and growth of the industry, the entire Indian IT industry is expected to dominate the world IT scenario by the end of this decade. In fact, integration of Indian IT with the world IT has already started with the advent of the new century (21st century) couple of years back. India and Indian IT is riding on the knowledge wave led by the information technology.

1.4.4 Global Integration

The current phase of Indian and World IT is witnessing an interesting phenomenon of shifting towards the other side for different reasons. It started during the last phase of the development period of Indian IT in the previous decade. India did demonstrate its capability, ingenuity, competitiveness and core strengths in knowledge and IT, and did tackled ‘Y2K’ problem worldwide with great success. It also performed well and provided IT software services throughout the world during the dotcom boom period around the end of previous decade. The whole world realized India’s inherent capability and comparative
advantage in this sector. World believed us, provided us opportunity to serve and witnessed us delivering the goods – of high quality, in large quantity, at right time, yet cheaper and global delivery of IT software and services with our commitments. The world was ours. This trend is further continuing in the current phase with the thrust on outsourcing from India.

Indian companies established their global software and services operations throughout the world to serve the market better by taking advantage of being local. And, all the major world IT and technology players shifted their operations in India by establishing their R&D centers, development centers, and their operations in India to take advantage of the high quality, well trained and English speaking and yet cheaper manpower available in abundance. This integration of Indian IT and Global IT is based on age old economic principle of ‘comparative advantage’ – one being a profitable market and the other being the cheaper supplier of high quality manpower. The age old economic principle is still prevailing in this high-tech era and knowledge age of 21st century. India has become the choicest destination for all the IT software and services requirements of the world in the current phase of Indian IT.

1.4.5 A Cursory View at the Happenings

The major Indian IT companies in the current phase have been recognized as the major contributor in the world IT development as well as in providing software and services worldwide. Indian companies like Infosys, Wipro, TCS, Satyam Computer, HCL Technologies, NIIT, i-Flex Solutions, Zensar Technologies, Patni Computer Systems, Birla Soft and the likes have created their software and services facilities and operations worldwide and are providing their services to all the major countries of the world.

On the other hand, most of the world IT majors and technology companies have established their development centers and R&D labs. In India and operating in a big way to serve their own country market as well as the world market and taking advantage of the high quality and cheaper trained manpower available in
India. These companies include – IBM, Intel, Microsoft, Hughes Software Systems, Oracle, SAP, People Soft, SQL Star International, Cognizant, Texas Instruments, Accenture, Polaris Software, Bell Labs., G.E. R&D labs. and the likes.

1.4.6 Major Indian IT Companies in the Current Phase

Infosys\(^7\&\&\) has further consolidated its position in the global operations during the current phase. It has become one of India's software giants and turned $1 billion company recently (2003-04) and became the second Indian IT company to cross this mark. *BusinessWeek* Survey (2004)\(^13\) of the world's best IT company has ranked Infosys among the top 100 infotech company in the world and it is placed 27\(^{th}\) globally. The survey further adds that during 2003-04 Infosys posted revenues of $1.062 billion (90\(^{th}\) best returns), growth rate of 41 per cent (24\(^{th}\)), return on equity of 28.3 per cent (14\(^{th}\)), shareholder return of 90.6 per cent (25\(^{th}\)), and its profits were placed at $270.3 million.

The apex management of the company includes Narayana Murthy as chairman and chief mentor and Nandan Nilekani as CEO, President and MD. Narayana Murthy guided one of India's best known software companies through its birth, adolescence and maturity for over 21 years including the difficult formative years, then stepped aside in the year 2002 to play its 'Chief Mentor and Ambassadorial Role' like Bill Gates at Microsoft. The company aspires to become one of the top 5 IT company of the world.

During the present phase of Indian IT, four separate studies were carried out by *Business Today* (2000-2003)\(^14\&17\) to evaluate India's 500 most valuable companies from all sectors of industry in four successive years, on the basis of financial parameters like market capitalization, assets, sales, profits, earning per share, return on capital employed etc. *Business Today* (2002-03)\(^17\) found the recent financial performance of Infosys as India's one of the top most valuable companies as - market capitalization (Rs. 25,548.24 crores), rank (4); sales (Rs. 3,622.69 crores), rank (21); assets (Rs. 3,596.91 crores); net profits (Rs. 957.93
crores), rank (6); ROCE i.e. returns on capital employed (47.39 %); with maximum market cap in the year 2000-01 (Rs. 46,915.58 crores); and the rankings in market cap in four consecutive years as 4th, 3rd, 4th, and 4th on all industry basis, and the company remained in the top 4 slots in market capitalization in all the four years.

Gandhok, Subramanian and Dwivedi (2001-2004)^18-21^ carried out four consecutive studies during the current phase of Indian IT, for listing of India’s 500 biggest wealth creators from all sectors of industry in four successive years, which were done on behalf of BT-Stern Steward Survey (2001-2004). The studies were done on the basis of financial parameters like market value added (mva), economic value added (eva), net profit after tax (nopat), value of prospects, wealth flow, cost of capital, return on capital employed (roce) etc.

Gandhok and Subramanian (2004)^21^ found the financial performance of Infosys as one of India’s biggest wealth creators between 1998-2003 as: rank 2004 (3), wealth added between 2003 and 1998 (Rs. 7,066 crores), change in eva i.e. economic value added between 2003 and 1998 (Rs. 470 crores), change in value of profitability between 2003 and 1998 (Rs. 2,144 crores), change in value of prospects between 2003 and 1998 (Rs. 22,111 crores), and wealth-flow between 2003 and 1998 (Rs. 24,147 crores). The researchers also found the rankings of Infosys, among 500 companies, as India’s one of biggest wealth creators in four successive studies for the years 2000, 2001, 2003 and 2004, with its year wise rankings as: 2nd, 3rd, 3rd and 3rd; and the company remained in the top 3 slots during all the four years.

Infosys has also got numerous awards^12^, recognition and special achievements during the current phase. They speak of its strengths and multifaceted performance. Few of them are: consistently ranked ‘India’s ‘Most Respected Company’ (ranked 1st - 2003, 1st – 2001; by Business World), among ‘Best Employers in India’ (2003, for world class working environment; by Business Today – Hewitt Associates), ‘Best Employers in India’ (ranked 1st –

**Wipro** crossed $1 billion mark (2003-04) during this phase of Indian IT and became the third Indian IT company to attain this status. In 2003, the company went on an acquisition spree by acquiring BPO, R&D and consultancy companies to strengthen its IT business world wide. *BusinessWeek* Survey (2004)\(^{13}\) of the world’s best IT company has ranked Wipro among the top 100 infotech company in the world and it is placed 62\(^{nd}\) globally. The survey further adds that during 2003-04 Wipro posted revenues of $1.191 billion (86\(^{th}\) best returns), revenue growth at 20.4 per cent (56\(^{th}\)), return on equity of 22.9 per cent (26\(^{th}\)), shareholder return at 103.9 per cent (9\(^{th}\)), and its profits were placed at $210.8 million. And, regarding Azim Premji’s personal achievements, as a business leader during the current period, *Business Week* profiles Premji as ‘India’s Tech King’ (*BusinessWeek*, Oct 13, 2003)\(^{12}\) of the current era. The apex management of the company during the current phase constitutes – Azim Premji as chairman of Wipro Limited, and Vivek Paul as vice-chairman of Wipro, and CEO of Wipro Technologies.

*Business Today* (2002-03)\(^{17}\), in its aforesaid study, found the recent financial performance of **Wipro** as India’s one of the top most valuable companies as - market capitalization (Rs. 33,731.56 crores), rank (3); sales (Rs. 4,047.50 crores), rank (19); assets (Rs. 4,078.83 crores); net profits (Rs. 813.23 crores), rank (7); ROCE (32.76 %); with maximum market cap in the year 2000-01 (Rs. 61,714.07 crores); and the rankings in market cap in four consecutive years as 2\(^{nd}\), 1\(^{st}\), 2\(^{nd}\), and 3\(^{rd}\) on all industry basis, and the company remained in the top 3 slots in market capitalization in all the four years.

Gandhok and Subramanian (2004)\(^{21}\), in their study as mentioned earlier, found the financial performance of **Wipro** as one of India’s biggest wealth creators between 1998-2003 as : rank 2004 (9), wealth added between 2003 and 1998 (Rs. 4,632 crores), change in eva between 2003 and 1998 (Rs. 257 crores), change in value of profitability between 2003 and 1998 (Rs. 1,645
crores), change in value of prospects between 2003 and 1998 (Rs. 25,513 crores), and wealth-flow between 2003 and 1998 (Rs. 27,035 crores). The researchers also found the rankings of Wipro, among 500 companies, as India’s one of biggest wealth creators in four successive studies for the years 2000, 2001, 2003 and 2004, with its year wise rankings as : 1\textsuperscript{st}, 2\textsuperscript{nd}, 2\textsuperscript{nd} and 9\textsuperscript{th}; and the company remained in the top 2 slots during the first three years, but slipped to the ninth position in the fourth year.

Also, Wipro has got several awards\textsuperscript{12}, recognition, achievements and rankings during the current phase which speak of its standing in the IT business and some of them are : ‘Wipro: The Live Wire in Indian High Tech’ (BusinessWeek, Jan 20, 2003), ‘India’s IT Power’ (BusinessWeek, Dec 19, 2002), Ranked 7\textsuperscript{th} amongst software services companies in the world (BusinessWeek, Infotech 100, November 2002), Among ‘Most Respected Indian Company’ (ranked 2\textsuperscript{nd}, 2003, by Business World), Among ‘India’s 25 Best Employers’ (ranked 8\textsuperscript{th}, 2003, by Business Today – Hewitt Associates), Among the ‘Top 5 IT Companies’ based on return on equity (BusinessWeek, Infotech 100, June 2002), Among ‘Top 3 Employers in Indian IT’ (Dataquest, 2002), ‘India’s Most Valuable Company (Business Today, BT 500, October 2001), Amongst the ‘Top 30 Emerging Economy Companies’ (Far Eastern Economic Review, 2001), ‘Wipro’s Market Capitalization is the Highest in India’ (1999-2000), Among ‘Most Respected Indian Company’ (ranked - 4\textsuperscript{th}, 2001; by Business World), and so on.

Tata Consultancy Services\textsuperscript{78}, as a division of Tata Sons, the holding company of the $10.4 billion Tata Group, India’s best-known business conglomerate, has been contributing 98 per cent of the revenues of its holding company during the current phase. Over the years, TCS has become the ‘Jewel in the Crown of Tata’ and Asia’s largest information technology company and now poised to become world’s ‘top 10 IT companies’ after its initial public offering (IPO) in July-August 2004\textsuperscript{78}. The current CEO of TCS is S. Ramadorai, who is
regarded as one of the top 25 consultants and 5th most influential technical figure in the world, and Ratan Tata is continuing as the group chairman at the helm.

Today, TCS is a 1.55 billion-dollar company in terms of integrated revenue (2003-04) and it was the first Indian IT company to cross the mark of $1-billion in the year 2002-03. During the current phase, it has further strengthened its position on the world IT map by entering new markets and establishing new development centers in various countries. It has already been serving over 1000 clients and many of them being ‘Fortune 500’ companies. TCS has truly become transnational in character and reach – to the extent that eight companies out of ‘US Fortune top 10’ are TCS’s client. Also, It has been the single largest software and services exporter from India during the current phase of Indian IT.

Also, Rajadhyaksha and Sarkar (2002) and Celestine (2003), in their study of leading Indian corporates from all sectors of industry aimed at identifying India’s Real Worthy Companies, and having done ‘the most rigorous ranking of India’s top 500 companies’ for the years 2001 and 2002, they have also carried out ranking of computer software companies separately including TCS, on the basis of financial parameters like sales, total assets, net profit, roce etc.

The above researchers, about the worthiness of TCS in the current phase, have established the performance and worth of TCS in the all industry category for the recent year 2002 as : rank 2002 (36), rank 2001 (48), sales (Rs. 4,233.2 cr.), sales cagr i.e. compounded annual growth rate (40.9%), total assets (Rs. 7,073.3 cr.), net profit (Rs. 863.3 cr.), and roce (14.6%); and its rankings in the two consecutive years in overall industry category as 48th and 36th; and the rankings of TCS in computer software companies category in these two consecutive years were : 1st and 1st.

Tata Consultancy Services has been conferred numerous national and international awards, recognition and rankings during the current phase of Indian IT. Few recent achievements are: year 2003 – TCS ranked 3rd ‘India’s Most
Respected Company’ by Business World, TCS India’s top software exporter in 2002-03, TCS Won Asian Corporate Social Responsibility Award for adult literacy program. TCS became India’s first global billion-dollar software organisation (2002-03), TCS received STPI award for exports, TCS continues to be No 1 in IT services (DQ-IDC survey); year 2002 – TCS chief S. Ramadorai received ‘Asia Business Leader of the Year Award’, TCS joined global leadership consortium to improve software quality, reliability and security; TCS became the first company in the world to be assessed at P-CMM Level 4, Chinese leader Li Peng visited TCS in 2001; and so on.

Satyam Computer, continues to remain one of India’s premier IT services companies during the current phase of Indian IT. The company has further strengthened its position in its global operations during this period. And, its chairman, B. Ramalinga Raju has been flexing his IT muscles worldwide for some time, and making efforts to take the company to further heights during the current phase. Satyam’s latest financial performance during 2003-04 was: revenues (Rs. 2,541.6 cr.), net profit (Rs. 541.9 cr.), and exports (Rs. 2,472 cr., rank – 4th).

Gandhok, Subramanian and Dwivedi (2001-2004), in their previously mentioned four consecutive studies, Gandhok and Subramanian (2004) found the financial performance of Satyam Computer as one of India’s biggest wealth creators between 1998-2003 as: rank 2004 (25), wealth added between 2003 and 1998 (Rs. 1,756 crores), change in eva between 2003 and 1998 (Rs. 62 crores), change in value of profitability between 2003 and 1998 (Rs. 1,044 crores), change in value of prospects between 2003 and 1998 (Rs. 5,825 crores), and wealth-flow between 2003 and 1998 (Rs. 6,502 crores). The researchers also found the rankings of Satyam Computer, among 500 companies, as India’s one of biggest wealth creators in four successive studies for the years 2000, 2001, 2003 and 2004, with its year wise rankings as: 8th, 6th, 7th and 25th; and the company remained in the top 10 list during the first three years, but slipped to the twenty-fifth position in the fourth year.
Satyam Computer has various achievements to its credit during this phase (2001 – 2003)\textsuperscript{12}, such as, listed on New York Stock Exchange (NYSE:SAY) in 2001, bagged ‘Frost & Sullivan Award for Competitive Strategy in ASP’, rated as one of the ‘10 Most Well Regarded Companies in India’ by Hong Kong based \textit{Far Eastern Economic Review}, ranked 4\textsuperscript{th} twice as India’s ‘Most Respected Company’ in two consecutive ranking years (2003 and 2001) by \textit{Business World}, pioneer in offshore software development concept. And, the Chairman B. Ramalinga Raju’s achievements\textsuperscript{12} being CNBC’s Asian Business Leaders Award for "Corporate Citizen" for 2002.

\textbf{HCL Technologies}\textsuperscript{7\&8}, during the current period in Indian IT, continues to be a premier Indian IT company, and a major Indian IT player on the world IT horizon. Shiv Nadar, an ace technologist and a leading IT business leader at the helm, HCL group, with various companies, ventures and subsidiaries under its fold, has emerged as the 5\textsuperscript{th} largest IT group of India in the current phase. It has further strengthened its position as a global IT player during the recent times. HCL Technologies’ global customer base has increased by 23 per cent to 454, including 61 Fortune 500 companies and 104 “over $1 million” clients as per the latest report (Dataquest, 2004)\textsuperscript{25}. Also, the report cites their latest financial performance during 2003-04 as: HCL Technology – total revenues (Rs. 2,325 cr.), exports (Rs. 1,895, rank – 5\textsuperscript{th}); HCL Group – total revenues (Rs. 3,884).

\textit{Business Today} (2002-03)\textsuperscript{17} found the recent financial performance of \textbf{HCL Technologies} as India’s one of the top most valuable companies as - market capitalization (Rs. 5,709.95 crores), rank (22); sales (Rs. 723.42 crores), rank (138); assets (Rs. 2,310.59 crores); net profits (Rs, 401.95 crores), rank (16); ROCE (22.38 %); with maximum market cap in the year 1999-2000 (Rs. 29,413.58 crores); and the rankings in market cap in four consecutive years as 3\textsuperscript{rd}, 7\textsuperscript{th}, 11\textsuperscript{th}, and 22\textsuperscript{nd} on all industry basis, and the company remained on the top 25 list in market capitalization in all the four years.

Gandhok, Subramanian and Dwivedi (2003)\textsuperscript{20}, in their studies as cited earlier, found the recent financial performance of \textbf{HCL Technologies} as one of
India's biggest wealth creators between 2002-2003 as: rank 2003 (12), rank 2002 (10), mva 2003 (Rs. 2,792 cr.), mva 2002 (Rs. 5,847 cr.), eva 2002 (Rs. -108 cr.), eva 2001 (Rs. -58 cr.), roce 2002 (18.2%), roce 2001 (23.0%), capital employed 2002 (Rs. 2,215 cr.), capital employed 2001 (Rs. 1,776 cr.), nopat 2002 (Rs. 404 cr.) and nopat 2001 (Rs. 408 cr.). The researchers also found the rankings of HCL Technologies, among 500 companies, as India's one of biggest wealth creators in three successive studies for the years 2000, 2001 and 2003, with its year wise rankings as: 6th, 10th and 12th; and the company remained in the top 12 list during all the three years.

HCL Technologies, during the current phase got a number of awards, recognition and special achievements to its credit (2001s - 2003)12. It ranked 7th twice as 'India's Most Respected IT Company' in two consecutive ranking years (2003 and 2001) by Business World. 'Best Technical Paper in ESRI India User Conference' (2002), Dataquest Award for 'Top IT Group in India' (2001).

NIIT Limited788, during the current phase of Indian IT industry, remained Asia's biggest IT Training organization and a premier IT software and solutions company, and Rajendra S. Pawar at the helm, it continued its operations in software services and technology development space as an important global player. The top management team of the company during the current phase remained the same - Rajendra S Pawar, as the chairman of NIIT, Vijay Thadani as the CEO and P Rajendran as its chief operating officer. Company's latest financial performance during 2003-047 was: sales (Rs. 364.5 cr.), and net profit (Rs. 18.10 cr.).

Business Today (2002-03)17 found the recent financial performance of NIIT as India's one of the top most valuable companies as - market capitalization (Rs. 697.66 crores), rank (118); sales (Rs. 352.12 crores), rank (270); assets (Rs. 895.11 crores); net profits (Rs. 9.10 crores), rank (339); ROCE (4.65%); with maximum market cap in the year 1999-2000 (Rs. 8,938.14 crores); and the rankings in market cap in four consecutive years as 11th, 12th, 68th, and 118th on all industry basis, and the company remained on the top 12 list in the.
first two years market capitalization, but in the last two years it slipped down to lower positions.

Gandhok and Subramanian (2004)\(^{21}\) found the financial performance of NIIT as one of India's biggest wealth creators between 1998-2003 as: rank 2004 (within next 400), wealth added between 2003 and 1998 (Rs. -3.498 crores), change in eva between 2003 and 1998 (Rs. -112 crores), change in value of profitability between 2003 and 1998 (Rs. 62 crores), change in value of prospects between 2003 and 1998 (Rs. -47 crores), and wealth-flow between 2003 and 1998 (Rs. 116 crores). Gandhok et. al. (2001)\(^{10}\) have earlier cited NIIT's performance in the first study year (2001)\(^{18}\) as: rank 2000 (11), rank 1999 (8), mav 2000 (Rs. 6,163.21 cr), mav 1999 (Rs. 10,395.21 cr.), eva 2000 (Rs. 74.91 cr.), eva 1999 (Rs. 53.85 cr.), roce 2000 (34.44%), cost of capital 2000 (17.81%), capital employed 2000 (Rs. 450.43 cr.) and nopat 2000 (Rs. 155.13 cr.). The researchers also found the rankings of NIIT, among 500 companies, as India's one of biggest wealth creators in four successive studies for the years 2000, 2001, 2003 and 2004, with its year wise rankings as: 11\(^{th}\), 62\(^{nd}\), 371\(^{st}\) and the fourth ranking lies in the next 401-500 list; and the company was placed in the top 11\(^{th}\) slot in the first study year, but it slipped downward in the next three study years.

NIIT, during the current phase of Indian IT, got a number of awards, achievements and recognition, both in IT education and software domains, (2001s – 2003)\(^{12}\). They are the testimony to the multifaceted performance of the company and some of them are: among the 'Superbrands from India' (2003, by the Superbrands Council), among 25 "Great Places to Work" (2003, by Great Places to Work Institute & Business World Survey), among the 'Top 10 Indian Software Exporters' (2003, by Nasscom), 'India's Most Respected Company' (2003, ranked 8\(^{th}\) by Business World), "HRD Excellence Award" (2002), the only Asian company among the 'Global Top 15 IT Training Companies' (2002 and 2001, by global business intelligence firm, IDC, USA), "Excellence in Exports Award 2001-02", NIIT students declared the "First Choice of Recruiters" (2002,

1.4.7 Indian IT Industry : A General View

The above account has chronicled the brief history of only six leading Indian IT software and services companies during the present maturing phase (2001 till mid 2004, till the writing of the thesis). Apart from these, over the years, a large number of small, medium and a few other large companies of Indian origin have emerged on the Indian IT scene and playing their part in domestic and global operations. Many more companies are quickly moving up the value chain, and are in the making of larger companies. Due to various limitations, it is not possible to discuss about all of them in this study.

Further, Kanavi (2003)^, chronicled the major achievements of Indians working in computer and IT field in India, during the current phase, behind key milestones in computer history as : “H. Kesavan and V. Rajaraman of IIT Kanpur……. A tradition that continued into the 21st century when in August 2002, Manindra Agrawal of the same IIT, with two students, won global recognition for solving the centuries old problem of how to test for prime numbers; and the foray into Indian language computing was led by Mohan Tambe at the Center for Development of Advanced Computing (C-DAC) in India. And, the list goes on ....”

And, Rajagopal (2003)^, while talking about India’s newly acquired self confidence and a high stature on world IT scene during the current phase, observed as “We are now able to talk to advanced nations on more or less
equal terms, in terms of expertise, in a few areas and especially in the knowledge and IT, and partnering and collaborating with them, but essentially doing their jobs here in IT, software development, IT enabled services (ITES), business process outsourcing (BPO), electronics and chip designing, and other knowledge areas such as biotechnology, pharmaceuticals, R&D services and a host of other high technology areas. From there to rise to the next level of dominance, though a steep climb is necessary.

1.4.8 Financial Performance of Indian IT Industry

The financial performance of Indian IT software and services industry during this phase has been encouraging despite slowdown on IT spending in the U.S. and other advanced countries. The performance of IT industry during recent two fiscals has been recorded as: total revenue 2002-03 (Rs. 52,299 cr.), total revenue 2001-02 (Rs. 40,773 cr.), growth (28%); and, export revenue 2002-03 (Rs. 45,752 cr.), total revenue 2001-02 (Rs. 36,006 cr.), growth (27%): (Dataquest, 2004, p. 56-57).

1.4.9 Indian IT, Indians and U.S. IT: A Global Integration (2001 to 2004)

Kanavi (2003), a technology historian, presented many fascinating facts about Indians taking on the global technology arena in the recent days, and informed us about the ‘thaja khabar’ (fresh news) emanating from India’s Silicon Valley, Bangalore, on almost daily basis in the recent days as – “These days, every other announcement of a new IT development seems to involve Indian ingenuity somewhere in the process……often in the unlikeliest corners.” The author further added few recent happenings as – “recently during the Intel Developers Forum in Mumbai, Krishna Srinivasan, executive vice-president of Sandhill Systems, an Indian IT company based in San Jose, California (U.S.), explains his core work which is an example of e-governance osmosis in reverse, and Sandhill has created E-Forms and a complementary server, ‘SubmitIT’ that key U.S. federal departments are using for electronic capture and transmission of a variety of citizen forms (documents).”
Furthermore, Kanavi observed the recent contributions of Indian engineers and entrepreneurs, based in the U.S. and simultaneously having R&D and IT services operations in India, towards development in the field of computer and IT as: "P. V. Khanna, founder CEO of the California based 24/7 Customer, voice and email-based support services player, informs about his company winning 20 master Black Belts, the Six Sigma Black Belt given for quality of service, and the company being the first Indian contact center ever, to receive the ISO 9002 certification; and, another U.S. Silicon Valley based company, SiNett Semiconductors, unveils the world’s first multi gigabit System on a Chip (SoC) for wireless networking applications.....with 150 million transistors on board, and recently its cofounder and CEO Shiri Kadambi landed up in Bangalore to help set up company’s R&D center here."

Moving on, Kanavi (2003) further cited - "Two graduate engineers from the Karnataka Regional Engineering College, Aravind Melligeri and Ajit Prabhu, founded QuEST in Schenectady, New York recently, and the company provides critical solutions in aerospace, automotive and power generation industry leaders in the U.S., and their crash analysis work is used by leading manufacturers in Detroit to build better cars, and also, their testing and analysis of aero engine turbines, bolsters new designs that roll out from GE, Pratt and Whitney and other globally respected brand names that go into the Boeing and other passenger aircraft., and 80 per cent of their engineering muscle is located at Whitefield, Bangalore."

Kanavi (2003) continued – "And, Indian engineers at HP labs, Bangalore, a division of Hewlett Packard in India, recently developed an information and communication technology (ICT) based unique product for United Nation’s (UN) sponsored World Summit on Information Society (WSIS) in Geneva, the ‘Scriptmail’, an ‘e-inclusion programme’ .......to take IT to the rural heartland of the world’s developing nations, which is a handy device on which one can scribe a message in Kannada or Hindi or Telugu and see it converted into machine
readable format and then emailed so that it can then be received and seen exactly the way it was entered.”

1.4.10 Summing-up with Tributes to some of the Leading Lights

Finally, Kanavi (2003[^3]), while paying tributes to one of the leading lights of Indian IT Industry, observed that “as the Net becomes all pervasive, so seemingly is the inventive reach of Indian ingenuity, and on the global IT road map, each of these developments is one more meaningful signpost for a nation whose earthy goals were elegantly expressed by her most fervent techno-evangelist, the late Dewang Mehta: ‘Roti, kapda, makaan, bijlee aur bandwidth’ (bread, clothes, shelter, electricity and bandwidth).”

And, Sridharan, (2002[^27]), in his article “The Engines of Revolution”, wrote as – “A Poor Nation Dares to Dream of Economic Stardom, Thanks to a few Visionaries” and paid rich tributes to the ‘Father of the Indian IT industry – F.C. Kohli’ as: “Had not an electrical engineer staked claim to his share of the world’s growing software business and, thus, paved the way for others, India may still be – in the firangi’s (the Britishers) mind – the land of fakirs (saints, free of worldly things, detached) and exotic, swarthy princes. Not the birth place of Vinod Khosla or N. R. Narayana Murthy. Revolutions are good. Especially when they are wrought by the power of brain and not brawn.”
1.5 References: (Chapter-I)


7. Information Source-1: Company's literature and documents.

8. Information Source-2: Personal interviews with company executives and industry watchers.


17. BT 500, “India’s Most Valuable Companies” (2003), Business Today, November 9, 2003, pp. 53, 94-100, 110-111.


