CHAPTER III

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INTRODUCTION

At the dawn of twenty-first century India's traditional image as an impoverished nation is undergoing considerable change. While India suffer from persistent inequalities and internal political uncertainties, there has been a quiet revolution underway in India's high-technology industry. India, known for its tea, jewellery and garment exports, has now become a significant exporter of software. In July 1991, Indian government introduced a new industrial policy that abolished the industrial license system in place until then. This new policy encouraged liberalization of the industrial sector and opening of markets to the outside. By country, the United States has consistently been the top investor in India since 1991 with the highest shares by far of the power, energy, industrial machinery and service industries.

In just about a decade and half, India has emerged, as a major exporter of software and services in the international economy the remarkable feet has been accomplished through extra ordinary growth of software revenue between the period 1995-2000. The country has emerged as a major hub for offshore software development as foreign companies have outsourced to Indian companies or set up their own development or services centers in India by employing 1.3 million in 2007 of which 930,000 were employed in the export sector. Indirect
employment by the software and services sector was 3 million. India's revenue from exports of software development grow by 30 per cent annually the country will however have to work around a shortage of 500,000 employees by the year 2010, and infrastructure bottlenecks\(^1\). In this chapter an attempt has been made to thrash out the growth and development of Indian Software Industry.

Indian Government formed a National Taskforce on Information Technology (IT) and Software Development in the year 1998 to formulate a long term National IT policy for the country and also removed impediments for the growth of infotech industry with the aim to become India IT software superpower. The success story of software growth depends the growth and capabilities of individual firms as they responded to changing opportunities offered by the external economic environment like induced policy changes and regulation, de-regulation of liberalization, demand for software due to computerisation spread and automated growth of business administrative processes in the western world hence it is essential to think the periods in growth of the industry:

\(^1\)www.nasscom.org (April2007)
3.1 THE DECOUPLING OF INDIAN SOFTWARE INDUSTRY

HISTORICAL PERSPECTIVE

The growth of Indian Software Sector is divided into four distinct phases\(^2\).

i) PERIOD PRIOR TO 1984

The period prior to 1984 was marked by excessive regulation of hardware industry through various government policies. The dependence of software on hardware components during this period was constrained potential entrants to the Indian software industry. As India was still trying to build a domestic hardware industry through import substitution, duties on hardware components were high, and importers had to go through a complex set of rules and regulations in order to obtain imports of hardware and components. Hardware was a more profitable business at this stage than software, but it was not open to everybody. One distinctive feature of this period was that firms were allowed to import hardware in exchange for export of software. Tata Consultancy Services (TCS) was the first company in 1974, which exported software in lieu of importing hardware\(^3\) through its collaboration with TCS- Burroughs and Tata Unisys.

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However software was an open field and free of the compulsions of licensing: both for public sector and some big business houses. Early companies TCS, Patni, Computer Maintenance Corporation (CMC) and Datamatics were established in this period. TCS was a subsidiary of the business house of Tatas with a reputation for its professionalism. CMC as noted earlier it was a public sector company. Datamatics and Patni were Indian companies promoted by expatriate Indians. A common feature of these firms was their strong links with foreign hardware manufacturers. This feature of the early Indian firms echoed the growth of the software industry worldwide, when software was mostly provided with hardware. The important difference in the Indian case was the predominance of non-IBM computers and non-IBM software followed suit and this led to an increase in export revenue during the period 1974-1984. By 1972, there was a dawning realisation of the importance of software as a foreign exchange earner.

The Electronics Commission and the Department of Electronics were set the task of energizing these exports. The existence of IBM and the regulations of hardware industry led to diversification and development of capabilities in the software sector. The software projects executed abroad by Indian companies in this early period often took the form of data conversion projects executed for the foreign firm on their premises. It was often easier to 'hire out' the services of an
engineer rather than try to do the work in India. In this way the software skills of Indian programmers could be leveraged for maximum benefit and neither the supplier nor the buyer had to accumulate the higher costs due to the protection of domestic hardware manufacture. Indian firms thus provided labour for client projects and the established names for the early firms namely TCS helped them to draw the best engineering talent in the country.

Contrary to popular and scholarly perceptions and analysis, the importance of promoting software development, particularly for export, had been recognized by the erstwhile Department of Electronics and suitable policies and programmers were put in place as far back as 1972. An important element of the policy was permitting import of computer systems on a custom-duty-free basis provided the computer importing companies signed a bond that they would export twice the cost insurance and freight value of the imported computers within a specified period. Another element of that policy was encouraging 100 per cent foreign-owned companies set up of software export operations provided they were located in the Santa Cruz Electronics Export Processing Zone by Government of India in 1972.

Later, in January 1982, a software export promotion policy was initiated by the Department of Electronics. However, direct attention of policy-makers to the importance of software as a major export earner
came about only with the PC revolution in the early 1980s. The Computer policy of 1984 gave a further thrust to software development. Imports of inputs needed for software development were liberalized. Computer production rose phenomenally after 1984 leading to a rationalization of the policy for import and manufacture of software, and using this base for promoting software exports.

(ii) From 1985-91:

The next period was marked by a visible shift towards software exports, helped by a multitude of factors. The period after 1984 saw a significant crash in hardware prices and also marked by a substantial reduction in import duties on personal computers. The reduction in hardware prices coupled with lower taxes meant that the setup cost for a software firm had reduced drastically. According to estimates, the number of personal computers went up from 3500 to 26560 during the period 1983-1987. Globally, there was a change from mainframes to network computing. The availability of skilled manpower coupled with a reduction in costs of personal computers led to a significant increase in software exports. Some of the multinational firms entered the market as subsidiaries during this period.

The year 1991 saw the liberalisation of Indian economy. Significant changes including devaluation of rupee value and liberalisation foreign capital flows were increased than earlier periods besides, there was also an increase in global demand for software services. The major tasks involved in this period were outsourcing with the required knowledge of diverse software languages and protocols. Indian firms, by now, had considerable experience of working with the migration of data across different systems, and the increasing credibility of Indian software professionals in the western world created an externality and goodwill that helped new entrants during this period. In this period “India brand” that was reasonably well established. More importantly the cost advantage by employing Indian programmers to write computerisation programs was first realized by foreign firms. In late eighties this cost advantage was very large. There are no systematic data on the movement of software salaries overtime a salary survey undertaken revealed that the salary earned by a computer professional was around Rs.8,000 per month,5 well below salaries in other industries. Posts in the Middle East offered salaries of Rs. 14,000 per month. In the same period Microsoft was prepared to offer $40,000 plus re-location expenses and a green card to Indian software engineers.6

5. Dataquest –1989 (Salary Survey)
6. Dataquest figures are as cited in Subramanian (1992). The conversion rate used is Rs. 17.5 = $1, which was the exchange rate in 1990.
The higher rewards to training in software also became readily apparent to Indian engineers, many of whom also migrated to the US in large numbers.

(iii) From 1992-1999

The liberalization of financial flows from 1992 meant that foreign capital moved in relatively easily. This was particularly opportune for the Indian software industry. Most of the multinationals set up their operations during 1992-99.

Table 3.1 Multinationals Entry in Indian Software Industry

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of MNC firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to 1980</td>
<td>0</td>
</tr>
<tr>
<td>1981-1984</td>
<td>5</td>
</tr>
<tr>
<td>1985-1991</td>
<td>18</td>
</tr>
<tr>
<td>1992-1999</td>
<td>68</td>
</tr>
<tr>
<td>2000</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Athreye 2003

Table 3.1 presents the growth of multinationals entry. It is clear that more than 70 per cent of firms that entered India till the year 2000. The entry of multinationals led to intense competition between domestic and foreign firms for both software labour and projects.

(iv) 2000 onwards:

The year 2000 is considered as a watershed for the Indian software Industry. Most industry analysts opined a slow death for the industry after this period. The reasons cited include a decrease in IT spending after Y2K and recession in the global market.
Despite the global recession, growth of the Indian software Industry remained undeterred. The industry grew only at 21 per cent as compared to a growth rate of 48 per cent between 1997-98 and 2002-03. While there is a decline in growth, it has been the second highest absolute terms. This growth was assisted by a shift in the delivery model from on site 2003-04. The offshore growth rate increased from 38 per cent in 2000-01 to 62 per cent in 2003-04. This was also a period of recession in the US market. The onsite or offshore model permitted Indian firms in hiring high quality engineers for onsite work coupled with engineers from less renowned universities and other institutions for undertaking offshore work. This transition from onsite to offshore came primarily from the absolute cost advantage and the development of Indian brand image by effective delivery of software projects. Creation of Indian image was assisted largely by the quality certifications and project management skills.

3.2 SOFTWARE SCENARIO:

i) 2001-2002: A year in which the industry took some knocks:

A lot of went wrong was external to the industry till almost August 2001 however, most companies believed the slowdown was a

brief phenomenon that would quickly pass away. The industry has attempted many fronts. Where the industry entered into next arena by crossing a revenue of Rs.48,000 cr in 2001-02 from Rs. 38,240 cr in 2000-01, registering overall growth of 26 per cent in rupee terms. The export revenue contributed up to Rs.36,500 cr.\textsuperscript{8} Despite 2001-02 being a very challenging year for the Indian software and services industry, the NASSCOM annual survey reveals that the industry has proven as resilient and recorded an impressive growth. The industry generated 92,000 new jobs and provided indirect employment to over 250,000 people in 2001-02.\textsuperscript{9} The industry was gaining significance in the Indian economy with sustainable growth rates, increased contribution to foreign direct investment, employment and exports and the industry has led to wealth creation of Rs. 90,000 cr in the last six years.

ii) 2002-03: Macro economic growth

As for software exports, year 2002-03 was a mixed bag. The software and Services exports were accounted for 47 per cent of the total industry size. Fiscal 2003 was in all respects just as bad as 2002 and probably worse for the smaller companies they saw the pressure of margins and de-growth of sales in their financials. Large companies were more resilient concerning market share from smaller companies as

\textsuperscript{8}www.nasscom.org\textsuperscript{9}www.nasscom.org (18th July 2002)
global corporations pruned their vendor lists and cut back on outsourcing while some companies were busy nursing their wounds, their smarter cousins were busy doing what the situation demanded – diversifying into Business Process Outsourcing (BPO), acquiring business to increase their vertical focus to penetrate non-US markets. The speed with which all that happened was seemed reminiscent of the dot-com boom, but with one difference – this is for real. Dollar arbitrage apart, the skill base of India in technology and the sheer power of number of English-speaking people make it an ideal location for process outsourcing, also one sees the possibility to use technology itself to further strengthen the competitive advantages in this area. The other activity was acquisitions. The biggest mergers and acquisitions was Polaris with Orbitech, making in the largest company in the banking, finance, service and insurance segment. Wipro and the Shiv Nadar group were among the more prolific acquirers with Wipro acquiring 100 per cent stake in GE Medical Information Technologies in the year 2002. In overall terms, mergers and acquisitions activity showed the ongoing trend of consolidation as well as increased focus on verticals. This trend made the Indian companies to become larger and more resilient to volatility and at the same time with a more vertically focused business operations.
According to a study made by the Electronics and Computer Software Export Promotion Council, in 2002-03, India exported 54.3 per cent of the total production of electronic hardware goods and computer software and services to 181 countries. However, just 10 destinations accounted for 88.27 per cent of these exports in 2002-03 against 89.11 per cent in 2001-02. The top 5 countries were accounting for 80.36 per cent of total exports were the US, UK, Germany, Singapore and Japan. The next five countries were the Netherlands, Belgium, Canada, Australia and China accounting for 7.88 per cent. The rest of 171 countries accounted for only 11.73 per cent of exports.10

iii) Scenario in 2003-04

In the financial year 2003, industry worked towards beefing up their capabilities in the area of marketing and the Indian companies were building expertise through thought leadership, gaining better customer access, key account management and global delivery models to overcome the geo-political risks. Further, the industry saw a strengthening of domain expertise due to lateral recruitment. The year 2003-04 was the best year for the industry since the slowdown of 2001, in 2003-04 it was among the top 10 industries in India. India's share in the world software and services market rose to 2.4 per cent in 2003-04

from 2.09 per cent in 2002-03 and 1.82 per cent in 2001-02. In 2003-04, the total value of software and services export from India was Rs.55,500 cr which was 20.4 per cent higher than in 2002-03.\(^{11}\)

iii) Scenario in 2004-05

With two long years of slowdown behind, the Indian software industry is warming up to the upcoming market rebound. Cautious optimism has slowly given a way to the good feel factor and both large and small companies were gearing up in their own different ways to get ready for the next boom. However, with the consolidation happening in the industry over the last two years, smaller companies found it increasingly harder to grow and only those who have a very niche focus. The fiscal 2004 have been in all respects much better than 2003 for big and small companies improving top line and bottom line growth. The larger companies have seen better sales growth and to some extent improved profits. Smaller companies have been hit both lower sales growth, lower margins as they face longer sales cycles and a limited entry to large accounts. In 2004-05, the southern region of India accounted for 61.8 per cent of the total computer software and services exports and the northern region for 18.18 per cent. The western region and the eastern region stood the third and the fourth in these exports.

\(^{11}\)www.nasscom.org (18th July 2002)
Once the US technology markets make recovery and mid market companies started outsourcing the larger companies were able to compete even on price with the smaller companies and they were busy trying to meet their ends. The larger companies were busy in managing the situation demanded, winning economy of scales and recruiting people to fill up capacity.

Unlike the previous year, mergers and acquisitions were fairly subdued in this year, acquisitions that happened were either to penetrate a new geography or a vertical where the company felt it was weak. This trend would continue into the next fiscal making Indian companies larger and more resilient to volatility and at the same time with a more vertically focused business operations, improved skill sets and more solid client referral lists.

iv) Current Phase Of Dynamic Capabilities

Exhibit 3.1 explains that the industry continues to show a robust growth and the total value of software and services exports are Rs.1,30,000 cr in 2006-07, as compared to Rs.1,04,100 cr in the year 2005-06, an increase of 36 per cent in rupee terms. The Software export revenue increased by 30 per cent annually and it is expected that there is a growing demand arises from the developing regions of Africa and
Arabic countries. United States is major software exporting destinations from India.\textsuperscript{12}

The composition of the software sector has changed significantly over the past few years. The research reports suggest that there is an increasing domain specialization focuses in Banking, Insurance and Financial Services (BIFS), manufacturing, telecom, retail, utilities and healthcare. Even the multinational firms specialize in financial services, but their revenues from financial services as a percentage of total revenues are lower than their Indian counterparts. Most Indian and multinational firms also specialize in telecom, communication, high technology and manufacturing domains, some small firms and medium firms domains, now the emerging areas include retail, logistics and healthcare, which saw a slowdown in the demand for software but an expansion in the demand for outsourcing more generally, forcing some consolidation in the industry. The changing constraints and opportunities in each phase of growth, whether induced by policy changes or changes in the external demand conditions had many implications towards direction and evolution of the software industry. The changing nature of constraints and opportunities favoured some categories of entrants and some types of business models over others.

\textsuperscript{12} Dinakaran- The daily, 26th May 2007, p.6
This in turn affected the evolution of the industry. Competition by heterogeneous entrants had effect on building of firm capabilities and profitability principally through two routes viz., selection of business models in the product space and building of organizational capabilities through its effect on the factor market.

3.3 GLOBAL MARKETS- In Top Gear

Table 3.2 evidences that while United States and Europe remain the dominant markets for software export revenues from newer markets and are growing rapidly.

Table 3.2 India’s Software Export Destinations

<table>
<thead>
<tr>
<th></th>
<th>FY03</th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>69.10%</td>
<td>69.40%</td>
<td>68.30%</td>
<td>67.18%</td>
</tr>
<tr>
<td>Europe</td>
<td>22.20%</td>
<td>22.60%</td>
<td>23.10%</td>
<td>25.13%</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>8.70%</td>
<td>8.00%</td>
<td>8.60%</td>
<td>7.69%</td>
</tr>
</tbody>
</table>

Source: www.nasscom.org

From the table 3.2 it is clear that US continues to be the major export destination from India when compared to other countries and from the current situation most of the African countries are highly interested in Indian products.
Growth Verticals:

Exhibit 3.2 presents the growth verticals from the emerging software services viz., Banking, Insurance and Financial Services, Telecom and Hi-Tech continue to account for 60 per cent of the pie, other verticals such manufacturing, retail, transportation, healthcare and utilities account for the remaining.

Emerging Locations: As global delivery matures, newer locations are emerging; however India is expected to remain the undisputed leader.

3.4 DOMESTIC MARKET- On the Growth Path

The domestic software market, which has been slow compared to the exports, is finally showing signs of growth. According to Nasscom report, growth in the domestic market has been in double digits during the last couple of years. The local market recorded a growth of 22 per cent during 2003-04, the same as in 2002-03.\textsuperscript{13} During this period the market marked a drop in prices, which boosted volume growth. This is an encouraging sign and the domestic software firms need to pay attention to this segment as well as, because this could give them the opportunity to further diversify their markets and to reduce geographical concentration.

\textsuperscript{13}Chartered Financial Analyst, January 2005, p.38
3.5 QUALITY CERTIFICATION

The real strength in Indian software Industry however, does not lie in its low-cost structure, instead, the reason that Indian firms dominate the outsource software development industry in their strong focus on quality software and processes. In software development, Carnegie Mellon Universities Capability Maturity Model (CMM) is a model, which prescribes standards in different stages of software development that the firms should have at a given level of maturity. All the top-tier Indian vendors are certified at CMM Level 5, which is the highest level, 23 firms in the world that have been awarded as CMM-5, 15 of them are Indian. The combination of large supply of topnotch low cost labour, high quality software processes, and the scale to handle all types of work has allowed the Indian software industry to become a global software powerhouse. However, Indian firms now face the threat of lower cost software developers from developing nations such as Romania, China and Russia. Although, some of the studies indicate that the certifications did not help in improving the productivity of employees, the certifications either acted as market signals or improved quality on other parameters like defect rates. Other factors like setting up Export Processing Zones (EPZ), Software Technology Parks (STP), Special Economic Zones (SEZ), and development of communication
infrastructure like broadband, telecommunication and government incentives contributed to rise in software exports.

Table 3.3 explains the number of companies availed quality certifications from the year 2001 to 2003.

Table 3.3 Quality Certifications

<table>
<thead>
<tr>
<th>SEI Quality Assessment</th>
<th>No. of Companies as on 31st Dec 2001</th>
<th>No. of companies as on 31st Dec 2002</th>
<th>No. of companies as on 31st Dec 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEI CMM Level5</td>
<td>36</td>
<td>48</td>
<td>67</td>
</tr>
<tr>
<td>SEI CMM Level4</td>
<td>19</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>SEI CMM Level3</td>
<td>9</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>SEI CMM Level2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ISO 9001</td>
<td>N.A</td>
<td>N.A</td>
<td>178</td>
</tr>
<tr>
<td>ISO 9002</td>
<td>N.A</td>
<td>N.A</td>
<td>13</td>
</tr>
<tr>
<td>ISO 9000</td>
<td>N.A</td>
<td>N.A</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: NASSCOM 2003 and 2004

By the year 1999, 170 Indian software companies have acquired international quality certification. From table 3.3 it is clear that the number of companies certified ISO/CMM level 5 increased from 36 in the year 2001 to 67 in the year 2003. This shows that there was a considerable increase in the process capabilities of software firms.

3.6 NATURE OF CONTRACTS: ONSITE VS. OFFSHORE ACTIVITIES

At the beginning of fiscal 2000 the software industry was compounded by the fact that much of India’s export of software services were actually carried out at the client’s site overseas, commonly referred as ‘onsite services’, rather than offshore in India. 70 per cent of export services consisted of onsite work, while only about 30 per cent were of
offshore type. Clients often replicate a lack of trust for Indian firms' credibility and perceive a higher degree of risk in sending work out to offshore. In order to reduce the risk, they prefer to retain most of the controls over production with themselves by undertaking onsite work; only the relatively risk-free tasks like coding and testing are contracted out. The growing number of Indian firms working onsite suggested that they tend to score quite high on all these areas. By contrast, for offshore, most popularly known as 'turnkey projects', cost becomes much less of a consideration. The important factors taken into consideration for decision on such projects are managerial skills, quality control and access to technology. Now most of the work is carried as offshore activity.

3.7 TYPE OF SKILLS

In its simplest possible explanation, software development process can be broken down into two consecutive stages. The earlier stage of analysis and design was defined as one where the idea of the software is conceived and the specific requirements are analyzed and designed. In the latter stage coding and testing were involved. At the former stage of analysis and designing it was required mature and sophisticated level of skills and experience. The latter stage of coding and testing refers basically non-creative segments of production process.
So that it defines a relatively lower level of skills requirements. As seen in the earlier section, major share of India’s software contracts consists of onsite programming services, which fall in the category of coding and testing of software. Indian software workers have worked basically to fulfill the requirements and design specifications set forth by foreign software developers.

3.8 RECENT MERGERS AND ACQUISITIONS

Mergers and acquisitions are considered as another approach for acquiring capabilities in the software industry. The reasons for acquiring or merging expands their customer base, size, synergies and the skill enhancement of the two firms to increase the pool of money available for upstarts and consolidation. Venture capital and private equity funding for software and software-related companies have grown by over 32 per cent annually since 2002. Notably the four largest private equity-funded software mergers and acquisitions deals since 2001 all occurred within the last year, including Telcordia, Doubleclick, Geac and SS&C Technologies as software becomes more pervasive, channeling these funds toward innovation is the key to success. Table 3.4 explains the major acquisitions occurred in the latter stage.
Table 3.4 Recent Mergers and Acquisitions

<table>
<thead>
<tr>
<th>Company</th>
<th>Merged with/Acquired</th>
<th>Reasons/Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polaris</td>
<td>OrbiTech</td>
<td>Acquired IPR of OrbiTech's range of Orbi Banking product suite</td>
</tr>
<tr>
<td>Wipro</td>
<td>Acquired Spectramind</td>
<td>Aimed at expanding in the BPO space, the acquisition gave Wipro an opportunity to run a profitable BPO business.</td>
</tr>
<tr>
<td>Wipro</td>
<td>Acquired global energy practice of American Management Systems</td>
<td>Acquired skilled professionals and a strong customer base in energy consultancy</td>
</tr>
<tr>
<td>Wipro</td>
<td>Acquired the R&amp;D divisions of Ericsson</td>
<td>Acquired specialized expertise and people in telecom R&amp;D</td>
</tr>
<tr>
<td>Wipro</td>
<td>GE Medical Systems (India)</td>
<td>A platform to expand the offerings in the Indian and Asia Pacific healthcare IT market</td>
</tr>
<tr>
<td>VMoksha</td>
<td>Challenger Systems &amp; X Media</td>
<td>Primarily aimed at expanding customer base. The company also leveraged on the expertise of the companies in BFSI space.</td>
</tr>
<tr>
<td>Mascot Systems</td>
<td>Acquired US-based ejiva and Hyderabad-based Aqua Regia</td>
<td>Expanded in size and leveraged on technical expertise of the acquired companies. Acquisitions have helped the company in offering multiple services and expanding customer base considerably.</td>
</tr>
<tr>
<td>Company</td>
<td>Merged with/Acquired</td>
<td>Reasons/Benefits</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mphasis</td>
<td>Acquired China-based Navion software</td>
<td>Expanded its presence in the Japanese and Chinese markets. It also plans to use it as a redundancy center for Indian operations.</td>
</tr>
<tr>
<td>*Tata</td>
<td>INCAT Technologies</td>
<td>Bolsters Tata Technologies offshore capabilities in engineering automation with its high-end onshore strengths and brings customers such as Daimler Chrysler, Ford, Lotus, Grumman, Honda, Magna and Boeing.</td>
</tr>
<tr>
<td>Technologies</td>
<td>*Aztec</td>
<td>Enables Aztec to offer testing services</td>
</tr>
<tr>
<td>*Disha</td>
<td>Technologies</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>Teksoft</td>
<td>Enhanced Geometric’s desktop product portfolio by bringing in ProCAM and CAM works suite of products.</td>
</tr>
<tr>
<td>*Geometric</td>
<td>SDG Software Technologies</td>
<td>The BankAlert AML product fills a gap in 3i’s banking product portfolio.</td>
</tr>
<tr>
<td>Software</td>
<td>*3i Infotech</td>
<td>The BankAlert AML product fills a gap in 3i’s banking product portfolio.</td>
</tr>
<tr>
<td>*3i Infotech</td>
<td>SDG Software Technologies</td>
<td>The BankAlert AML product fills a gap in 3i’s banking product portfolio.</td>
</tr>
<tr>
<td>*3i Infotech</td>
<td>FormulaWare</td>
<td>Extends 3i offerings amongst SMEs in the lubricants, paints, inks and glues process manufacturing industries.</td>
</tr>
<tr>
<td>*Zensar</td>
<td>OBT Global</td>
<td>Aimed to further its plans of foraying into the SAP market.</td>
</tr>
</tbody>
</table>

* Source: Dataquest, February 15, 2006 p46.

Multinationals have a strong, established presence in their home market, which is being taken away by Indian companies on the basis of cost savings. With their offshoring strategies, they are negating this
advantage, thereby posing a dual threat to the Indian companies. Nasscom has estimated that acquisition rate would grow by 30 per cent every year and it expects that more than 30 per cent of corporate technology work could be outsourced globally, so far the outsourcing market addressed is a mere 10 per cent of the total potential market.¹⁴ This huge and untapped potential has been triggering foreign companies to acquire the critical mass to serve global clients in every function and service line. On the other hand, the Asia-Pacific market is growing faster than their home markets.

This sector has seriously adopted the strategy of establishing global footprint through growth, having already achieved the significant size of scale, Indian companies are not looking for the big ticket acquisitions. Most Indian software companies sit on huge cash reserves and use them to acquire multiple foreign companies for strategic reasons. These acquisitions imply niche additions to their bouquet of offerings. Often they are acquiring a part of the companies or smaller firms. Many Indian service providers who started at the lower end of the value chain are now aspiring to compete and establish themselves in the international market.

Indian service providers are adding higher value services like consulting services to their portfolio of offerings, which also generates a lot of downstream work for them. Indian companies are following the de-risking strategy as they are getting more revenues from the US and European markets. These companies are focusing on Asia-Pacific markets such as China, Japan and Malaysia.

Since competition is increasing between Indian companies and multinationals more mergers and acquisitions in the industry likely to happen in future. The mid-tier Indian companies will pursue more acquisitions to fill up the strategic gaps in their portfolio. There are chances for big multinationals to acquire the top-tier companies in order to increase their numbers more rapidly through the inorganic route; thereby forcing Indian companies and multinationals to continue their battle for substantial share in the global outsourcing market.

3.9 MINISTRY OF INFORMATION TECHNOLOGY

In 1990’s India’s comparative advantage in the IT sector was software and not hardware. One of the major policy initiatives that have been taken by the Government of India was the formation of National Task Force on Information Technology and Software Development by the Prime Minister in May 1998. The Task Force had a mandate to formulate the draft of a long term National IT Policy for the country. Main objective of the Task Force was to recommend
immediate steps that Government needed to take to remove the bottlenecks and give boost to India's IT industry in general and software industry in particular. The Task Force has submitted three key reports to the government in April 1999. The report focused on software industry development and it submitted the Information Technology Action Plan-I comprising of 108 recommendations.

The major recommendations of the Task Force were opening of Internet Gateway access, encourage the private sector Software Technology Parks (STPs); zero customs and excise duty on IT software; income tax exemption to software and services exports; encouragement to set up venture capital funds; networking of all Universities and research institutions; allowing US Dollar linked stock options to employees of Indian software companies; new schemes for students including attractive package to buy computers. The Government has accepted almost all the recommendations and has directed all concerned departments to implement recommendations. The main thrust of its major policy recommendations has been the urgent necessity for raising both productivity and quality of the Indian software industry. Other than that the government has enacted an Information Technology (IT) Act, 2000 not only to provide a legal framework for e-commerce and prevention of computer crimes, but also to accelerate induction of IT in critical sectors of the Indian economy. The Act aims
to recognize electronic contracts, electronic filing/documentation, digital signature and e-govemment. Rules under the Act have been notified and the Act came into force on October 2000 and The Controller of Certifying Authority has been appointed.

**Table 3.5 Production of Software Revenue in the Ninth Plan**

(Rs. in crore)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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<tbody>
<tr>
<td>Software Exports</td>
<td>6500</td>
<td>10940</td>
<td>17150</td>
<td>28350</td>
<td>36500</td>
</tr>
<tr>
<td>Domestic Software</td>
<td>3470</td>
<td>4950</td>
<td>7200</td>
<td>9400</td>
<td>11634</td>
</tr>
<tr>
<td>Total</td>
<td>32070</td>
<td>41140</td>
<td>52450</td>
<td>68450</td>
<td>80884</td>
</tr>
</tbody>
</table>

**Source:** Dr. Gopal JI, and Dr. Suman Bhakri, "Taxmann’s Statistical Data on Indian Economy,” Taxmann Allied Services Pvt Ltd., 2005.p.158

Table 3.5 presents the production of software export revenue and domestic revenue during ninth five year plan and it is understood that due to government initiative plans software revenue has been increasing in a significant way.

3.10 INDIA’S SUCCESS

i) INVESTORS ADVANTAGE

The investors see more value in Indian software companies the reason is that for one, Indian firms are growing faster than their global peers in terms of net earnings. The software revenue of all four frontline Indian software firms have more than doubled over the last three years.
while global software companies are registering their revenues at an annual growth rate of around five to six per cent. The estimates of net earnings for Indian companies is pegged around 25-30 per cent while global majors witness an estimated earnings growth rate of around 15-20 per cent.

ii) Infrastructure Scenario

Credit for India’s rapid growth in the IT software services must go in part to the availability of a robust infrastructure of telecom, power and roads in the country. Relevant telecom facilities are an important prerequisite for success of the software industry. Over the years, the Government has taken steps to ensure that telecom remains a priority area. Similarly, regular, reliable, uninterrupted power, has also received substantial attention from the Government for running IT software and services businesses. Internet access is another area in which India lags its Asian neighbors, with India being the only Asian-Pacific nation with a single-digit home Internet access rate. Only one out of 14 Indian households with telephones had Internet access via a home PC, this compares to rates of over 80 per cent home internet access for some Asian-Pacific countries. The overall roads and highways scenario in India has also witnessed major improvements over the last few years. Most cities in first and second tier towns are connected and interlinked.
to each other. Major investments have gone into the development of highways, both on the part of central and state Governments. Indian Government has understood the importance of infrastructure to industries and created a supportive environment for its development and expansion.

iii) Educational System and Human Capital

One of the India's core strength lies with its education system at university level, school level and in training companies. The Indian Institute of Technology is a collection of six elite engineering institutes, which graduate the vast majority of India's best engineers. Computer Training Institutes have sprung up to provide software training throughout India. These training providers have fulfilled three important functions for the Indian software industry. The only clouds on the horizon for Indian software developers are that due to the industry growth programmer salaries increases across the board. This sector has grown as the biggest employment generator with number of jobs added every year. Exhibit 3.3 views that the total software and services employment reached 1.6 million mark in 2006-07 as compared to 1.293 million in 2005-06 at the growth rate of about 26 per cent. Indirect employment attributed to the sector is about 3.0 million.15

Nasscom McKinsey report estimates that there would a shortage of 500,000 manpower over the next four years.  

iv) Infrastructure Tech Parks

The Indian software industry has made its mark in the new world economic order and is today enjoying the benefits of world class infrastructure being created by leading corporatist to augment the growth of Indian Industry. For the last five years it has seen a tremendous growth in Tech Parks that are geared to meet the requirements of the knowledge industry. These parks offer Silicon Valley type infrastructure in India. Multi-tenanted intelligent buildings, built-to-suit facilities, large sprawling campuses the choices are tailored made to customer requirements. Unlike popular belief, India’s first technology park was set up not by the Software Technology Parks of India (STPI), instead the credit to set up such a project and the concept goes to Texas Instruments, which established the first 100 per cent export-oriented software technology park in Bangalore in 1986.

In 1991 the government decided to create STPI as an autonomous body with the objective of pushing software exports and encouraging entrepreneurs in this sector. These Software Technology Parks cater to

16. Business world, 26th March 2007, p.29
the needs of entrepreneurs by establishing 100 per cent export of software units and acted as the nodal point for day-to-day formalities and resource centre for member units. The units operating under this scheme enjoys various benefits. NSIC Software Technology Park is one of such parks established by the National Small Industries Corporation Ltd (NSIC) to promote small entrepreneurs in software development.

v) Organisational Factors

Effective induction to impart process specifies and tunes the inductees thinking towards the organisation's culture. Training in general contributes greatly towards building a common understanding and appreciation of processes in the organisation.

Periodic organisational assessments, process definition and improved works in a distributed fashion contribute significantly towards involvement of practitioners. Formal peer reviews of new processes, career growth and promotions take into account the contributions made by the individuals.

vi) Government Support

India's central and state governments have played a crucial role in promoting the industry revenue. The central BJP government has given top priority to the software services industry by setting up
Ministry of Information Technology, and appointing a task force to find out the IT industry's requirements and translating those requirements into policy. The liberalization and deregulation initiatives taken by the Indian government are aimed at supporting growth and integration with the global economy. The reforms have reduced licensing requirements and made foreign technology accessible also removed restrictions on investment and made the process of investment easier.

Now the government is actively promoting foreign direct investments from non-resident Indians including overseas corporate bodies owned by the non-residents. Till 1994, Department of Telecommunications was the sole provider of basic telecom services in India. The new National Telecom Policy has opened up the field for private participants. After realizing the potential of India as a major IT power, the government has taken several initiatives to promote the development of IT. The Ministry of Information and Communication Technology is playing an active role in developing the infrastructure that supports the IT Bill passed in 2000 and provides a legal framework.

Recognizing the importance of venture capital funding, the Ministry of Information Technology has set up a National Venture Fund for the software and IT industry in association with the Small Industries Development Bank of India and Industrial Development Bank of India.
with the aim to provide venture capital to start-up software professionals and IT units in the small-scale sector.

Indian state governments have also played an active role in the development and promotion of the software services industry in India. In particular, the states of Andhra Pradesh, Maharashtra, Karnataka and Tamil Nadu have all played an active part in promoting the software services industry through economic and other incentives in establishment of foreign and domestic businesses in their respective states.

First Indian IT Company Listed On Nasdaq

In March 1999, Infosys became the first Indian company listed on the world’s largest electronic exchange- the Nasdaq. Infosys offered 1,800,000 American Depository Receipt (ADR) representing 900,000 equity shares at $34 per ADR. By the same year, Infosys ADR was trading at a premium of 51 per cent to the underlying domestic shares listed on BSE. In October 1999, Satyam Infoway followed.

Note: ADRs are negotiable instruments issued by an Indian or any non-US company on an American Stock or electronic exchange like New York Stock Exchange or the Nasdaq.
vii) Industry Association Support

1. National Association Of Software And Service Companies (NASSCOM)

National Association of Software and Service Companies is the premier trade body and chamber of commerce of the IT software and service industry in India and it is a global trade body with over 1050 members, of which over 150 are global companies from the US, UK, EU, Japan and China. It's member companies are in the business of software development, software services, software products and IT-enabled/Business process outsourcing services. It was set up to facilitate business and trade in software and services and to encourage advancement of research in software technology. It is a non-profit organization, registered under the Societies Act, 1860. It has been the strongest proponent of global free trade in India. It is committed to work proactively to encourage its members to adopt world-class management practices, build and uphold highest quality standards to become globally competitive. In India and around the world, NASSCOM members are participants in the new global economy and are reputed for their cutting-edge business practices and social initiatives.

NASSCOM's vision is to establish India as the 21st century's software powerhouse and position the country as the global sourcing
hub for software and services. It welcomes as members, companies and firms that are incorporated and/or are registered in India, which would make a positive contributions to the IT industry in India and globally.

The primary objective of NASSCOM is to act as a catalyst for the growth of the software driven IT industry in India, other goals include facilitation of trade and business in software and services, encouragement and advancement of research, propagation of education and employment, enabling the growth of Indian economy and provide a compelling business benefits to global economies by global sourcing.

It has representatives in various committees in the Government of India including the Ministry of Information Technology, Ministry of Commerce, Ministry of Finance, Department of Telecommunication, Ministry of Human Resource and Development, Ministry of Labour and the Ministry of External Affairs. It acts as a consulting body for various state governments in India. It plays an active role in the International software community and it is a member of the Asian Oceanian Computing Industry Organization (ASOCIO). ASOCIO is a group of computing industry associations from the Asian Oceanian Region and comprises representatives from twenty countries and seven guest member countries. It is also a founder member of the World Information Technology and Services Alliances (WITSA). This forum comprises member associations from 67 countries.
NASSCOM encourages high standards of conduct to develop public confidence and respect for its members and the industry. The association provides assistance to its members in achieving international quality certifications by organizing seminars and related programs on quality standards and disseminating relevant information.

2. Electronics and Computer Software Export Promotion Council (ESC)

Electronics and Computer Software Export Promotion Council (ESC) is India’s largest electronics and IT trade facilitation organization sponsored by Government of India set up in 1989, when India’s export was mainly to North America by establishing the hallmark of India’s quality and competitiveness. It is an autonomous organisation under the Department of Information Technology has emerged as the premier nodal agency to promote trade of information technology and Electronics between India and rest of the world. ESC provides the following facilities to their member exporters:

- one-stop source of information on Trade related information and trade facilitation.
- Helping hand to members for participation in international trade fairs and exhibitions

With its heterogeneous membership, ESC is acknowledged as the most dynamic, proactive institution equipped to meet the aspirations of both Indian and global IT industry in the fast changing
technological world. ESC shoulders the responsibility of serving its constituents more efficiently and effectively as follows:

◊ As the bridge between exporters and policy makers
◊ As a proactive matchmaker between exporters and global buyers
◊ Catalyzing growth by participating in specialized IT meets.
◊ As a one-stop-shop for research and information center for excellence.
◊ Provide a network of relationships at national and international forums.

Inspired by the Indian software success story, several other locations have been presented as alternate options for offshore outsourcing. However, feedback received from several multinationals having multi-country operations as well as syndicated analyses comparing the various sourcing locations has revealed that India continues to offer and deliver the best 'bundle' of benefits sought from global sourcing with significant potentials still untapped, it is expected that the global sourcing phenomenon continue to expand in scope, scale and Geographic coverage.17 As global delivery matures, multi-location strategies become the sourcing destinations, including the emerging locations would grow in size. Building on its existing strengths, India

17 www.dgft.delhi.nic.in
would remain the leading destination and continues to play an important role in most global sourcing strategies.

3. Special Economic Zones (SEZ)

Special Economic Zones are set to change the entire Indian economic landscape. They are said to be the engine of economic growth. Apart from the manufacturing sector, Indian SEZs are quite successful in attracting investments from service sector as well. Most of the software companies are planning to move their facilities to SEZs to take the advantage of tax holidays. All the import/export operations of the SEZ units are on self-certification basis.

4. Software Technology Park (STPI)

India has earned itself a reputation of an IT superpower. Software Technology Parks of India have played a seminal role in accomplishing this status. Today, STPIs all over the country are synonymous with excellent Infrastructure and Statutory support aimed at furthering growth of Information Technology in the country.

Software Technology Parks of India (STPI), is a society set up by the Department of Communication & Information Technology, Government Of India in 1991, and registered as an autonomous society under the Department of Information Technology, Ministry of
Communications and Information Technology. STPI was set-up to implement the STP Scheme and to promote software exports by providing infrastructure facilities including High Speed Data Communication (HSDC) links with the objective of encouraging, promoting and boosting the Software Exports from India.

The idea of setting up dedicated Software Technology Parks was born in the wake of the policy adopted in 1986 by the Government of India, identifying IT as a potential growth driver and focusing on "Software Exports, Software Development and Training" as a key area for strategic development, further steps taken by the Government the growth of software industry, led to the creation of "Software Technology Park" scheme in order to encourage and enhance software exports from the country. To achieve the above goals, a suitable framework was designed based on key aspects such as:

◊ Simplification / rationalization of procedures;
◊ Providing single-point contact services to the industry;
◊ Providing basic amenities needed for export operations with very short gestation periods; and
◊ Sharing of captive infrastructure facilities like computing resources and data communication services in a cost-effective manner.
STPI maintains internal engineering resources to provide consulting, training and implementation services. Services cover network design, system integration, installation, operations and maintenance of application networks. It acts as a single window service for software exporters and incubation infrastructure to Small and Medium Enterprises. The total number of units registered with the STPs increased from 164 in 1991 to 5,582 in 1999, accounting for about 68 per cent of India’s IT exports. In 2006, STPI commissioned new centres at Jammu (Jammu and Kashmir), Jodhpur (Rajasthan) and Siliguri (West Bengal) with the addition of these three new centres, STPI now has 47 centres across the country. During the year 2005-06, 1052 new units were registered under STP Scheme. On March 2006, 6383 units were operative out of which 5,116 units were actually exporting the remaining units are at various stages of gestation as the scheme allows three years for companies to start commercial production.18 There has been an increase of 36.40 per cent in software exports through STPI units in the year under review, from Rs. 74,019 cr in 2004-05 to Rs 100,965 cr during 2005-06. At the national level, STPI units account for around 97 per cent of software exports.19

19. ibid., 2007
The STPI performs all functions necessary to fulfill its objectives as follows:-

STPI has designed and developed state-of-the-art High Speed Data Connectivity network called SoftNET, which is available to software exporters at internationally competitive prices. STPI has set up its own international gateways at 44 locations for providing HSDC links to the software industry. Local access to International Gateways at STPI centres is provided through point-to-point and point-to-multipoint microwave radios for the local loop. These communication facilities are the backbone of the success in the development of offshore software activities.

INCUBATION

The incubator concept has emerged world wide as an essential component of the infrastructure required for the growth of high technology businesses including Information Technology and Software Development. These incubators provide the necessary help to nurture technology ideas into commercial successes.

STPI has launched the concept of incubation facility in many of its centers for the Small and Medium Enterprises (SME). STPI sets entire facility ready for commencing operations by software units from day one. It offers advantage of no gestation period and does not require any capital investment. It helps in developing confidence in the client
and ensures that the business opportunity is not lost.

The Incubation facility has the following facilities:

- Modular Built up are for ready to use by the Software Entrepreneurs
- Back up power supply
- Telephones and Fax facility
- Air Condition
- Business Center
- Conference Rooms & Training Facilities
- High Speed Communication Links, Internet & Video Conferencing Facilities.

3.11 RESEARCH INVESTMENTS IN LARGE INDIAN SOFTWARE COMPANIES

A few of the software companies in India have already crossed the Rs.1000 cr it means that the path for future growth might be different from the previous path. Indeed, most of the large and giant companies in India have already started investing in research, however purpose of research is not clearly articulated. This part argues why investment in research is important for large Indian companies, and how research is to be managed.
Need for Research in Indian Service Companies

The goal of research is to create new knowledge. Research is typically not a business or a profit center but a long term investment, which helps a company to generate more revenue, profits and to get survive. The level of investment in R&D depends on the nature of business, but some have suggested that high growth and technology intensive industries spend about 10 per cent of their revenues in R&D, with about 1 per cent in pure research. Microsoft and Cisco spend about 15 per cent of their revenue in R&D, while IBM spends about 7 per cent. Indian companies, though much smaller than these IT giants, have also started spending on R&D percentages although they are less. A technology player needs research simply to develop new technologies that it can then use to bring out newer products in the market place.

In service companies' investment in research is used to generate new knowledge. As most large Indian companies are primarily in services business, for a small service company clearly there is no real need to invest in research – it can do its business by using existing knowledge to provide the desired services. The ability to adapt the changes and the readiness for absorbing changes in technology can help the company to build a leadership position in leveraging the new technology for offering higher value in services. Taking a leadership
position in specialized areas requires depth of knowledge and regular monitoring of latest developments in the technology and methodologies. This competence could build if there is a research group working in the area – without a research activity it is very hard to even keep track of the developments and properly understand their implications.

Research Agenda

It should be clear that the nature of research in a service company should be different from the nature of research in technology or product companies as the needs and business models are different. These are the areas in which investments in research can benefit the Indian software companies.

• **Services:** Much of the research in software has often focused around technology. Little work is done on services itself – how to improve IT services, technology needed to improve it. Some aspects of services get covered under different topics, but the area has not been researched well in a holistic manner.

• **Global software delivery:** This is the model that many companies in India are championing. However, in the research world, this area has not been researched much at all and little research has been done to properly leverage this model. Research in this area would tie with the business goals of the companies.
• **Outsourcing:** This is another area that is highly demanded, particularly from the supplier side. Whatever little work has been done it has been done mostly in the west and they have focused mostly on the impact on their industry and society. There is a need would arise to explore this topic from the supplier/vendor perspective also, so robust methods, technologies and frameworks could emerge.

• **Software reliability and dependability:** Most Indian companies have focused so far on the process quality. Though it is essential, it is important to look beyond the reliability and dependability of software, the need for higher reliability/dependability is increasing and vendors they can demonstrate ability to deliver on these fronts could command a premium.

• **Alternative paradigms for software development:** Many of the Indian companies are in a unique position of having long term relationships with many clients and having variety of contracts in different vertical domains. Currently, the domain expertise and continuity in time is exploited mostly through expertise of people. However they render themselves to the possibility of developing alternate approaches to software development to enhance productivity and quality.

• **Experimental software engineering:** Indian companies have all developed good systems for data collection, as well as a temperament and culture to support it. Having good data are the foundations
on which experimental work in software engineering rests. As this foundation is in place, this paradigm could be leveraged to bring a research temperament in creating hypothesis and evaluating them. Large companies easily occupy a leadership role in developing alternatives using this paradigm, and also continually improve their performance.

• **Software engineering education**: This is a very active area for research. However, the software companies in India have innovated in this area and are in a unique position of almost running universities to train their people. It is also clear that companies are still looking for improved ways of training and education to handle the manpower shortage.

• **Individual productivity**: This is again an area with immense possibilities. Some work has been done in this part but by-and-large, this is not a well-studied area. Again, Indian companies are unique here in that the profiles of people who work in the industry differ quite widely from that of the west. Good results in this area should have a huge impact on the companies' capability to deliver consequently, on its business parameters in profitability.

• **Focused technology areas**: Technologies in which a company aims to have special expertise and high-value offerings also form natural areas for research. The area clearly depends on the strategy of the company
but it includes very large databases, software and application security and middleware.

- **Heterogeneous systems and integration:** Most large systems today composed of a wide variety of different systems that are interconnected. Though technology for interconnection has developed well, many issues relating to heterogeneity and integration need better understanding for better execution of such projects.

The basic three requirements of quality experts to get successful inspires everybody from top to bottom in an organization. Quality has to be linked to business goals. There has to be a sense of pride deeply instilled in their organization. The third requisite for quality is a shared vision and commitment of top management.

The Indian software industry value chain could be done in terms of the following activities:

- data entry,
- body shopping,
- offshore development,
- customized solutions,
- premium services,
- niche technologies, and
- products.


115
The activities are ranked according to increasing value added as well as increasing risk. The next step for the Indian software firms are to move up the value chain and provide total solutions for their clients. Namely, in terms of concentrating on providing IT and business consulting services to their global clients, going head to head against global giants such as Accenture and EDS. This leap from writing back-end code to acquiring domain knowledge, business expertise and developing reusable code is a difficult transition. It requires a step up in gaining mind share of the key decision makers in global corporations. The Indian software companies have to make a large investment in hiring, training and retraining their employees to compete in a global market. They also have to expand overseas and establish subsidiaries in the US and Europe. All these moves will increase their overall costs; while at the same time tend off lower costs competitors from Russia, China and Eastern Europe. This scenario was set to change only in the latter part of the last decade. Firms started to differentiate themselves on domain expertise., viz., Infosys and TCS on financial services and insurance, Wipro in telecom and research and development and Stayam in transport and manufacturing. The period was marked both by Indian firms and MNCs in developing a significant process capability and also laying the seeds for extensive offshoring.
3.12 BARRIERS TO GROWTH

Many firms are weak on project management because such professionals are hard to retain. These workers continually try to move up the ladder, and from company to company, seeking to “leave the system” when they can find residence in the US, most likely working for a US-based company. While there is widespread acknowledgement that this propensity of employees to jump ship is hurting the industry, at the same time, their rapid movement reflects a strong desire to learn and upgrade themselves. This could eventually contribute to a more rapid accumulation of knowledge between firms, since new employees can be expected to deposit knowledge in each company they join.

Some indicated that in contrast to Silicon Valley, India did not really have an “innovative” economy, while others acknowledged that the level of capability demonstrated in India is still far behind that of the US. This lack of innovation includes a lower degree of risk-taking behavior and lack of free exchange of ideas among employees of different firms, let alone within firms. However, interviews with other firms suggest that this attitude might vary between companies. In another aspect the free flow of labour market in India does somewhat resemble that of Silicon Valley. Such low levels of R&D has resulted in missed opportunities for development of indigenous technologies and, hence, new software products. With regard to regulatory constraints,
more than 75 per cent of the producers sampled consider poor enforcement of copyright protection laws, both at home and abroad, to be of utmost significance for the insignificant market share of the pre-packaged Indian software products.

On the other hand, capturing a major share of the international market requires success in the following two areas: (1) development of a global distribution network to respond effectively to clients' needs and standards; and (2) setting-up of after-sale-service shops to provide support, maintenance and upgrades for the product line. India lags on both the fronts because developing of distribution capabilities and after-sale-service workshops are time consuming and expensive.

3.13 CHALLENGES TO THE INDUSTRY

Going forward, the industry faces significant challenges. While the concern over outsourcing backlash no longer scares the industry, threat from competing nations such as China, Taiwan and Philippines does, the domestic firms need to move up the value chain as they become more and more global. Now the competition is not among the biggies but the biggies want to face-to-face with the global giants, while the three to four large vendors would control the key standards. The IT industry's premier association Nasscom says that if the software sector
has to sustain its growth, it has to put in lace robust strategies to meet future challenges outlined as\textsuperscript{21}

\begin{itemize}
  \item The need for new transition management methodologies, process and capabilities.
  \item The requirement to shift significant workforce offshore while growing local jobs.
  \item The need to manage the downward pressure on revenue.
  \item The need for a robust legal and enforcement framework to stem security and privacy concerns.
  \item The need to improve infrastructure and the availability of quality manpower.
\end{itemize}

\textbf{Patent wrench}

Innovations are the unique process helps enormously in getting new clients. Patents are essential as customers are becoming choosy about vendors, as innovation takes a front seat, service providers are expected to deliver value-added services unless companies have innovative processes, winning contracts consistently is difficult. Software services companies have been blinded by the lure of product patents and do not realize the importance of process patents. Besides, the lack of patenting fails to create a culture of innovation in the company.

\textsuperscript{21} Chartered Financial Analyst, January 2005, p.39
This again affects the long-term client relationships. "To ensure multi-million dollar deals, one has to keep the innovation flag going".\textsuperscript{22} Nasscom has started lobbying with the government to create a Rs.100 cr fund to facilitate Small and Medium Enterprises in patenting solutions. "Patents allow greater access to markets and could be potential marketing tool"\textsuperscript{23}

Without strong initiatives from companies to promote patents, India may risk losing its position, as the world's most preferred IT destination.

\textsuperscript{22} Business World, 21\textsuperscript{st} May 2007, p.44
\textsuperscript{23} Business World, 21\textsuperscript{st} May 2007, p.46
CONCLUSION

The industry thrives on absolute cost advantage and there is no inherent competitive advantage for Indian firms. Today the industry has demonstrated a considerable project delivery capability in offshore and onsite project management. The industry has significantly developed process capabilities over the past one decade. Firms have developed expertise in various domains viz., BIFS, manufacturing, retail and healthcare. Most firms in the industry are trying to move away from high reliance on the US market. It involves building both language and business culture-based capabilities. Strong brand equity will help Indian firms to have easier access to boardrooms where outsourcing decisions are made. Hence the Indian Software Industry has developed process capabilities, domain competencies and service capabilities like IT enabled, product market, embedded software and market diversification capabilities in terms of new geographies, new service lines as well as higher penetration in new verticals. Amongst the new geographies that will provide growth opportunities for India include Germany, France and Italy in Europe; Singapore, Korea and Malaysia in South East Asia; and Chile, Mexico, Uruguay and Brazil in Latin America. On the Service lines front is Outsourcing, application outsourcing and systems Integration are the growth areas.
Among verticals, Healthcare, Retail, Government, Utilities and Telecom Service Providers are likely to increase their share in the total exports.

"India's greatest competitive advantage is not merely the large number of talented developers, but even more the large number of executives who understand how and why to run a high maturity organization" \(^{24}\)

The Indian software industry is experimenting with various paths and a new era of dynamic capability is dawning. It indeed brings about the second IT wave provided they have the right vision, right capabilities, enterprise-wide process maturity, more customer focus and proper execution.

Exhibit 3.1
India's Software Export Revenue

Source: www.nasscom.org

Exhibit 3.2
Growth Verticals of Software Services (2005-06)
Exhibit 3.3 Employment in Software and Services Sector

<table>
<thead>
<tr>
<th>Year</th>
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<td>2005-06</td>
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<td>2003-04</td>
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</table>

Source: nasscom.org (April 2007)

Exhibit 3.4

Source: www.stpi.in (May 2007)
Exhibit 3.5
Export Revenue through STPI (Rs.in cr)

Source: www.stpi.in

Exhibit 3.6
India is Best positioned for cross border IT services

Source: NASSCOM-McKinsey Study 1999