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Indian IT Service Sector's development Opportunities

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ABSTRACT

India's successful IT Industry with its enormous growth and development has caught attention of international companies. Today, India is recognized as a major powerhouse for incremental development with competitive advantages which makes it outstanding IT services provider.

The purpose of this study was to find out what factors helped Indian IT Industry in its growth to develop in recent years and, specifically identify the key factors affecting the development of IT service sector of India. The publication begins by analyzing the development in recent years, continues by analyzing the current situation and finally exploring various possibilities on how further growth can be ensured for the benefit of the economy of India

Further attention is paid to the Satyam scandal (2009), analyzing how such incidents can affect country's image, and further development of the Indian IT Industry.

The study examined secondary data. Secondary data was gathered from literature (mainly articles, books focusing on Indian IT industry) examining Indian IT Industry's crucial role in the development of Indian economy since its independence.

This study provides more detailed description and analysis of IT services sector's development and growth opportunities as subject of the dissertation.

Key words: Indian IT industry, Indian IT service sector, India's economic history, Indian IT Industry's crucial role in the development of Indian economy, Satyam Scandal, Outsourcing

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EXPLANATION OF TERMS AND ABBREVATIONS

Value chain - Interlinked value-adding activities that convert inputs into outputs that, in turn, add to the bottom line and help create competitive advantage

GDP- *Gross Domestic Product:* is a basic measure of a country's economic performance and is the market value of all final goods and services made within the borders of a nation in a year

NDP - Net Domestic Product equals the gross domestic product (GDP) minus depreciation on a country's capital goods.

ROI -*Return on Investment:* is the ratio of money gained or lost (whether realized or unrealized) on an investment relative to the amount of money invested.

APAC - *Asia-Pacific:* **APAC** *is that part of the world in or near the Western Pacific Ocean. The area includes much of East Asia, Southeast Asia, Australia and Oceania.*

PE - *Private Equity - Is an asset class consisting of equity securities in operating companies that are not publicly traded on a stock exchange.*

IT -*Information Technology*

ITES –IT enables services.

MNC-*Multinational Companies*

BPO - *Business process outsourcing*

KPO - *Knowledge Process Outsourcing*

NDP- *National development plan*

CAGR -*Compound Annual Growth Rate*

STP -*Software Technology Park.*

SMB - *Small and Medium Business.*

SME- S*mall and medium enterprises.*

NASSCOM - *National Association of Software and Services Companies.*

ISO - *International Standards Organization.*

FDI - *Foreign Direct Investment.*

TCS - *Tata Consultancy Services*

1. INTRODUCTION

The IT industry in India has grown at a tremendous rate in the past decade. This has contributed immensely in the overall growth of the Indian economy. The policy initiatives taken by Indian government to develop the IT sector in India have yielded high profits in the terms of exports and established the country's credibility in international IT markets. However, the focus has mainly been to promote IT as a foreign exchange earner.

India is still known as low-cost offshore location. Despite the opportunities in the domestic market in the country, India has been concentrating on mainly in exports markets.

Increased competition with the other low-cost locations (such as Philippines and China) has forced the Indian IT industry to enhance its skills and service offerings, invest in new technology developments and keep themselves up-to date to meet the competitive requirements of the business world. Government's initiatives to continue to improve the IT developments are still attracting international companies to their market.

The theory of this paper has been divided into four parts: (1) First part of the paper gives an overview of Indian IT industry's a long journey to the platform that it has reached today and the key factors behind this success are discussed in more detail in the first chapter. India's low cost advantage, the role of government and FDI in Indian IT Industry's development throughout its journey till today are discussed in this chapter.

(2) Second part concentrates especially on Indian IT Service sector (how it has grown to its present situation), and what role it plays in the growth of Indian economy. It also focuses on the IT Service sector's future growth opportunities for the benefit of Indian economy. (3) Third part analyzes the Satyam scandal case that happened early this year. Reasons that lead to such scandal have been investigated and how this kind of incident influences the Indian IT Industry and country's reputation and the role of corporate governance in the country have been discussed in this part. Possible solutions to avoid such incidents in the future are discussed.

(4) The fourth part of the paper provides a conclusion and recommendations on the basis of the findings I have done during the research on this issue. Mainly it covers possible solutions for Indian IT Service sector to guarantee further growth in the coming years.

2. METHODOLOGY

This paper is based on secondary material. The material includes mainly academic literature and articles dealing with Indian IT industry, mainly focusing on Indian IT Service sector. The research work was mainly carried out in winter 2008 and spring- summer 2009, with author's high interest in this subject.

In order to find the literature relevant to the subject, author used different search tools, available library books, articles, internet, etc. Author wants to point out the importance of the articles related to Indian IT Industry provided by Helsinki School of Economics, Helsinki University of Technology and Mr.Michael Keaney for Satyam Scandal. Without these mentioned sources, it wouldn't have been possibly to provide the quality results on this issue. Also, VTT Technical Research Report (2007) has been important in providing crucial information on IT Services Sector part. Information taken from this and other listed sources in appendices are referred in the text.

For internet research, author used keywords such as Indian IT industry, Indian IT industry's developments, Indian IT services sector, Satyam Scandal, and other corresponding keywords to the subject. Sources for material were found in reference lists for suitable recent reviews and articles (e.g VTT Technical Research Report, 2007)

Author is aware of the fact that the selection of sources can affect the results of the study and therefore author used research articles and findings, with the basis on primary data. Because of wide range of information available, author had to narrow and evaluate the material by significance and relation to the study to achieve quality result.

3. IT INDUSTRY AND INDIAN ECONOMY

The IT industry is the driving force behind India's growth in leaps and bounds in recent years. This section provides the overview of the Indian IT industry, its impact on Indian economy, the IT sector market and size, and also covers the domestic market.

3.1 IT INDUSTRY IMPACT ON INDIAN ECONOMY

The Indian IT industry started in the early 1960s. Initially it was depending on Multinational companies (MNCs) for its hardware requirements, and Indian firms had opportunities only in the area of emerging IT services. However, it was only in the late 1970s, when the multinational companies withdrew from the Indian market (due to the high taxes and regulations which were not favorable to do business in the country). This is when Indian companies took advantage of the opportunity to enter the foreign market. Domestic market had been relatively small, hence the Indian ITS companies had to rely on the export markets. In the early 1980s, software exports exceeded $ 13 million. During this phase, many companies were founded, which later grew to become major players in the IT industry. During the 80s and 90s large companies in the sectors of the economy diversified into the IT sector. (Bharti.P, 2005, India's IT Services Industry: A Comparative Analysis).

Offshore advantage in 80s offered India chance to do business with the western world due to the differently paid Indian workers working on time differentiated location. This gave method for foreign companies to transfer their back office operations to IT services companies so that they could concentrate more on core business functions which would eventually increase productivity. Another advantage was the availability of highly educated and well qualified professionals at a cheaper labor rate.

After gaining its independence in 1947, India began a phase of rapid industrialization. India's economic policies were socially oriented and controlled by the state regulators and India began to follow a mixed economy pattern. (Raghbendra Jha, The Indian Economy Sixty Years after Independence, 2008)

In the beginning of 1990s, the Indian policy makers pursued a new economic policy that was based on liberalization, and privatization and globalization played a major role in the growth of the IT industry of India.

Before this, the state controlled economy didn't produce desired results which led to changes to economy situation. Deregulation policies adopted by the Government of India led to substantial domestic investment and inflow of foreign capital to this industry.

This began an era of rapid growth in some sectors of Indian economy. Information Technology (IT) and especially IT services were the most significant growers and contributors to the overall Indian society in terms of GDP and the creation of employment opportunities.

3.2 IT Sector Structure and Market Size

Information Technology is one of the fastest growing segments of Indian industry, both, in terms of production and exports. According to the National Association of Software and Services Companies (NASSCOM), Indian IT Industry alone generated quarter of the total country's revenues by exceeding $ 37 billion. The computer software services segment known as the information technology services (ITS) industry, has contributed more than half of these revenues. The estimation for the revenue for years FY 2008-2009 is 5.8 per cent of the gross domestic market (GDP). (NASSCOM, May 2009)

Software development and IT enabled services have emerged as a niche opportunity for India in the global context. The government is taking all necessary steps to make India, a global Information Technology superpower and a front-runner in the age of information revolution. The government has announced promotion of Information Technology as one of the five top priorities of the country and constituted a National Task Force on Information Technology and Software Development. (India.gov.in, Communication and IT sector, 2009)

India's IT growth is primarily dominated by IT software and services such as Custom Application Development and Maintenance (CADM), System Integration, IT Consulting, Application Management, Infrastructure Management Services, Software testing, Service-oriented architecture and Web services. (India Brand Equity Foundation, August 2009, Information Technology in India)

For future growth, Indian government has estimated the exports turnover grow to US$ 80 billion by 2011, growing at an annual rate of 30 per cent per annum. (Ernst & Young for IBEF, IT-ITES Market & Opportunities)

As per NASSCOM's latest findings (2009):

- Indian IT-BPO sector grew by 12 per cent in FY 2009 to reach US$ 71.7 billion in aggregate revenue (including hardware). Of this, the software and services segment accounted for US$ 59.6 billion.
- IT-BPO exports (including hardware exports) grew by 16 per cent from US$ 40.9 billion in FY 2007-08 to US$ 47.3 billion in FY 2008-09.

Moreover, according to a study by Springboard Research, the Indian IT services market is estimated to remain the fastest growing in the Asia-Pacific region with a CAGR of 18.6 per cent. (NASSCOM, 2009)

NASSCOM's report also states that despite the uncertainty in the global economy, the top three IT majors Infosys, TCS and Wipro have seen revenue growth from all important sources of income: from the North American and European regions, in the financial services vertical sector and from application maintenance and development (ADM) offerings between fiscal years 2008 and 2009.

India has the second largest English-speaking scientific professionals in the world, second only to the US. It is estimated that India has over 4 million technical workers, over 1,832 educational institutions and polytechnics, which train more than 67,785 computer software professionals every year. The enormous base of skilled manpower is a major draw for global customers. (Embassy of India, Indian Information Technology Industry)

According to NASSCOM (2009), software and services exports (including exports of IT services, BPO, engineering services and R&D and software products) reached US$ 47 billion in FY 2008-09, contributing nearly 78 per cent to the total software and services revenue of US$ 59.6 billion.

3.3 Domestic market

India's emerging domestic market with existing IT infrastructure evolves both in terms of technology and depth of penetration. According to NASSCOM, domestic IT market (including hardware) reached US$ 24.3 billion in FY 2008-09 as against US$ 23.1 billion in FY 2007-08, a growth of 5.3 per cent.

Growth in the software and services sector has been achieved because of spectacular growths in some segments. According to research firm Gartner, India's personal computer (PC) market is likely to grow by 13.7 per cent to 11.1 million units in 2009, aided by a surge in demand for laptops. The laptop market is expected to grow by 37 per cent in 2009 to 3.69 million units and constitute a third of the total PC market. (India Brand Equity Foundation, 2009)

According to a report prepared by McKinsey for NASSCOM, the exports component of the Indian industry is expected to reach US$ 175 billion in revenue by 2020. The domestic component will contribute US$ 50 billion in revenue by 2020. Together, the export and domestic markets are likely to bring in US$ 225 billion in revenue, as new opportunities emerge in areas such as public sector and healthcare.

4. IT INDUSTRY SECTORS

The IT industry can be broadly divided into four sectors: IT services, IT enabled services and business process outsourcing, software products and hardware.

4.1 IT Services

IT services is a major sector of the Indian IT industry. According to the definition by Kettunen (2007), IT services include client, server and web based services. Opportunities in the IT services sector exist in the areas of consulting services, management services, internet services and application maintenance. The major users of IT services are government, banking, financial services, retail and distribution and manufacturing. (Kettunen, Rakshit & Uoti, Market trends and industry practices in IT services, telecoms and online media, 2007)

The success of IT sector can largely be attributed to factor advantage of high quality of human resources. This comparative advantage has made possible the growth in exports. More and more companies are receiving the ISO 9000 certification.

Wipro, HCL, Tata Consultancy Services, Satyam computer Services, CMC, IBM etc are some of the major Software development and software consulting firms or companies in India.

4.2 IT enabled services

IT enabled services are defined as being the services, which make extensive use of information and telecommunication technologies. The IT enabled services (ITES) is the single most important contributor to the growth of the Indian IT industry. The common uses for ITES include call-centers, back-office services, accounting and data entry and conversion. (Outsource2India, Riding the IT-enabled services wave, 2009)

4.3 Software products

 The Indian software industry is estimated to be worth 1.2 billion US Dollars. The growth has been limited to a few cities around the areas of Bangalore, Noida, Delhi and Mumbai. The success that software industry has brought for the entire Indian economy has been tremendous. Presently there are 500 software companies in the country.

According to NASSCOM, together with the business process outsourcing (BPO) sector, the revenues are expected to top $71.7 billion with a growth of 17 percent. Of this, the export of software and services will account for $47 billion, growing by 16-17 percent. The association also said that the domestic BPO industry would log a growth of as much as 40 percent this fiscal. (Ians, Revenues of the Indian Software Industry to top $60 billion: NASSCOM, Feb 2009)

The software development companies comprise of businesses related to the production and maintenance of computer software. The software industry offers training, consulting and maintenance to the companies. Services regarding software such as training are a part of this ever-growing industry.

 The software companies are witnessing a rapid growth and offer lucrative job opportunities for the youth, making IT a premium career option for many. The software industry is one of the fastest growing sectors of Indian industry.

4.4 IT Hardware Manufacturing

India's manufacturing competitiveness is because of the factors such as Low-Cost Labour, Talent Pool of 3 million graduates passing out of universities every year. India has one of the richest sources of iron ore and a strong edge in bauxite, aluminum and textile. India has an edge in engineering and is a leader in hardware / software design. (Eleventh Five Year Plan, Department of Information Technology, Ministry of Communications and Information Technology, 2007)

The Indian IT hardware sector focuses on the manufacturing and assembling of computer hardware. The domestic consumption of computer hardware is high and has been on the rise in recent years. Much of this is due to the rise in the number of IT companies, sales of

desktops, laptops, servers, routers, etc, each of which create a positive cycle for the increase of future hardware sales. Many domestic and multi-national companies have invested in the computer hardware market in India.

The projected growth rate for the hardware industry leveraging India's demographic is expected to generate 7 million direct employment and 14 million indirect employment for 2011-12. (Eleventh Five Year Plan, Department of Information Technology, Ministry of Communications and Information Technology, 2007)

There is increased realisation in the government that a robust hardware sector is not only essential for reasons of national security considering the increasing dominance of China in this area, maintaining the competence of the software industry without a strong hardware base will also be a challenge.

5. Government's Incentives to attract Foreign Investment

During the pre-liberalization period, Indian economy suffered from low per capita income, chronic unemployment, low capital formation, increased trade deficit, low standard of living, low infrastructure development, low health and hygiene standard, low growth in GDP and NDP.

However, since 1990s, the government of India has been making continuous efforts to attract foreign capital during the post-liberalization period. The efforts include providing concessions in taxes, announcing tax holidays and increasing the investment cap in various sectors of the Indian economy. As a result of the continuous efforts by the Government, there has been a steady rise in the inflow of foreign capital on one hand, and overall progress in various sectors of the Indian economy on the other. According to the Reserve Bank of India (RBI), India has received total Foreign Direct Investment (FDI) inflows of $50.1 bn since 1991. There has been tremendous progress in the various sectors of the Indian economy due to the inflow of foreign capital. (A. S. Shiralashetti, Foreign Direct Investment and Economic Development of India, 2009)

Indian entrepreneurs initially gave less importance to exports by considering the domestic market as safe. Therefore, the export position of India was not satisfactory during the pre-

liberalization period. However, the exports are inevitable to expand the market share and earn foreign exchange in a liberalized economy.

In order to alleviate this situation and to promote Indian IT industry, the Government of India has taken some very important steps as follows:

Set up the National Taskforce on Information Technology and Software Development with the objective of framing a long term National IT Policy for the country.

- Enactment of the Information Technology Act, which provides a legal framework to facilitate electronic commerce and electronic transactions.
- The government-led National e-Governance Programme, has played an important role in increasing internet penetration in rural India.

Government of India is actively providing fiscal incentives and liberalizing norms for FDI and raising capital abroad. Recently an IT committee was set up by the Ministry of Information Technology, Government of India, comprising Non Resident Indian (NRI) professionals from the United States to seek expertise and advice and also to step up U.S. investments in India's IT sector. The committee is chaired by Minister of Information Technology, Government of India, and the members include Secretary, Ministry of Information Technology and a large number of important Indian American IT entrepreneurs. (Embassy of India, India's Information Technology Industry).

Government should monitor global IT developments and refine Indian IT policy to meet global requirements. Specifically, this will help angel investors, venture creators and incubation;

It should promote the growth of human resource development in the IT sector with the aim of creating quality-based education;

Promote R&D in the sector by identifying thrust areas and drawing up a blueprint for action. India's most prized resource in today's knowledge economy is its readily available technical work force. India has the second largest English-speaking scientific professionals in the world, second only to the U.S. It is estimated that India has over 4 million technical workers, over 1,832 educational institutions and polytechnics, which train more than 67,785 computer software professionals every year. Government of India is stepping up the number and quality

of training facilities in the country to capitalize on this extraordinary human resource. It is the knowledge industry that will help take the Indian economy to a sustained higher rate of growth and the policy makers are fully aware of this.

Due to such extensive measure taken by the government, the Indian economy is reaping the fruits after sustained growth of the Indian IT Industry for past several years.

6. IT Services Sector

India's IT services sector has evolved immensely over years and its main foray into the IT Industry started post liberalization era. The need for Multinational companies (MNCs) to remain globally competitive triggered relocation of labor-intensive operations overseas to low-wage countries.

Businesses from banks to manufacturers in Europe and North America have shifted routine back-office tasks and IT functions to India's talented, low-cost workers.

In the past decade, India's IT services industry has emerged as an important player in the global IT services market.

Below is a list (not exhaustive) of some of the primary services that the major Indian IT services companies offer to clients. (TCS, Infosys: Service offerings) :

Custom Application Development & management: Involves customization of applications that are specifically tailored according to client's business requirements. Companies may be handling several applications. So application management services relieve the burden off the company's resources and simplies the entire application development and management process.

Performance Engineering: This includes effectively managing, monitoring and optimizing the applications, resulting in better productivity and even better ROI. (Return on Investment).

Systems Integration: Integrating multiple IT systems, in a product life cycle can be very complex and challenging. Companies need well integrated systems to help them make real-time decisions and thereby increasing ROI. Systems Integration services provide right tools

and methodologies to accelerate business processes, reduce business cycle time, resulting in higher and better performance.

Testing: Any software development project requires testing to produce reliable and robust software product. Testing services provide tools and methodologies for different types of testing, which can reduce the time-to-market and produce reliable software.

Infrastructure services: These include different services like systems and storage management, database management, support for enterprise services such as SAP.

Information Management: High information flow and poor data quality pose challenges to organizations in information management. They prevent businesses from utilizing information effectively. Hence Information Management services like Business Intelligence and Data Warehousing address these issues.

Consulting: IT consulting, network consulting.

ITES Services

Some of the ITES services include: (World Bank, Information and Communications for Development, 2009)

Horizontal Processes: HR management, Finance and administration, customer interaction and support (including call centers), supply chain.

Vertical Processes: Banking, insurance, travel, pharmaceuticals.

Knowledge Process Outsourcing: Business and Financial research, Data analytics, Legal process and patent research.

Estimating the market size for trade in IT services and ITES is difficult given definitional issues and the relative novelty of the field. As a result, much of the data on the size of the current market comes from private surveys, consulting firms, and anecdotal evidence. Also the two sectors are so closely related, that majority of the reports cover both the sectors together.

India is the global leader in the provision of both IT services and ITES.
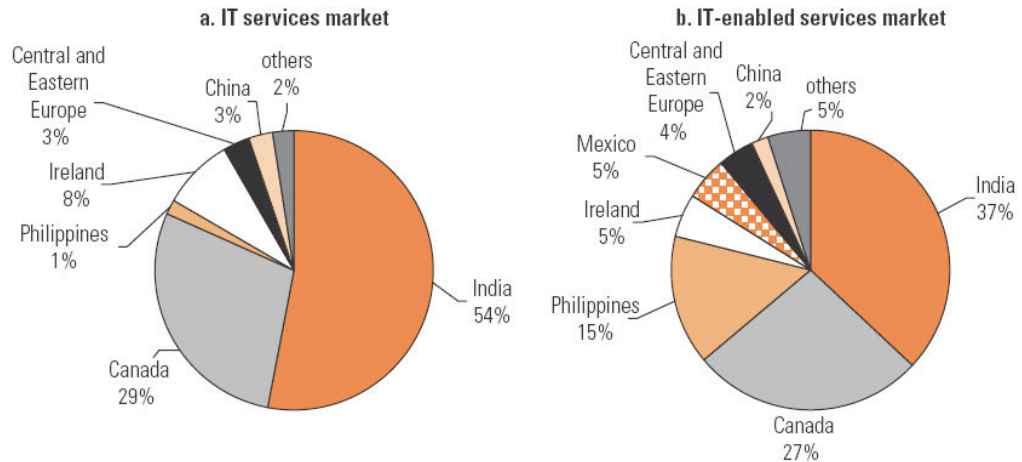
Figure 1: shows India's share in the global IT Services Market and ITES market.

(McKinsey & Company 2008; NASSCOM-Everest 2008; Tholons 2006)

6.1   Export-oriented

IT services and business process outsourcing companies in India have a strong export focus. The main export markets are USA, accounting for 70 % of the total exports, followed by Europe with around 20 % and Asia with 10 %. (Kettunen, Rakshit & Uoti, Market trends and industry practices in IT services, telecoms and online media, 2007)

FY 08-09 export revenues aggregated USD 46.3 billion recording a growth of 16.3% over previous year. (NASSCOM, Indian IT-BPO industry shows resilience; to grow by 4-7 percent in FY09-10 previous year, August 2009)

Export revenues in FY 09-10 are estimated at USD48-50 billion; domestic revenues expected to grow by 15-18%. (NASSCOM, Indian IT-BPO industry shows resilience; to grow by 4-7 percent in FY09-10 previous year, August 2009)

There has been a tremendous growth in the export in the last decade. The exports CAGR from 1998 to 2009 has increased by 33 %. (NASSCOM, Perspective 2020)

The IT industry's contribution to India's GDP has grown significantly from 1.2% in 1999-2000 to around 5.2% in FY 08. (Chaudhari, Goyal, Hussain, Rai, Strategic Analysis of Infosys, 2009)
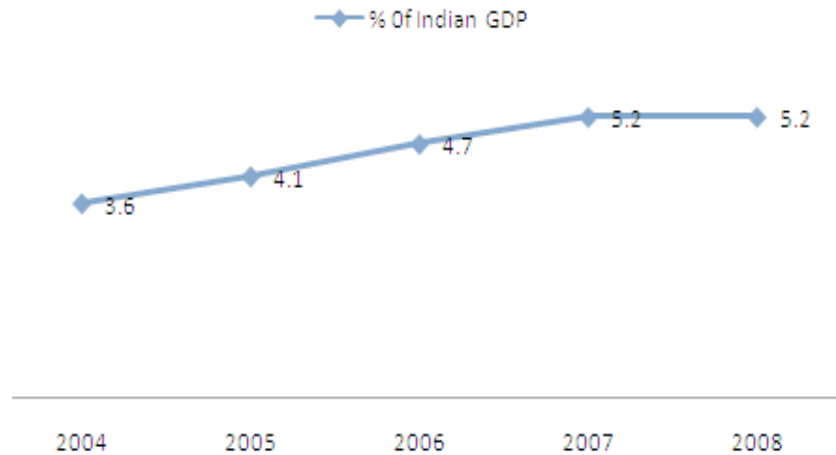
Figure 2: Contribution of IT industry to Indian GDP. (Chaudhari, Goyal, Hussain, Rai, Strategic Analysis of Infosys, 2009)

This sector generated around 2 million direct jobs and 7-8 million indirect jobs. (Scribd, IT Industry in India, 2008).
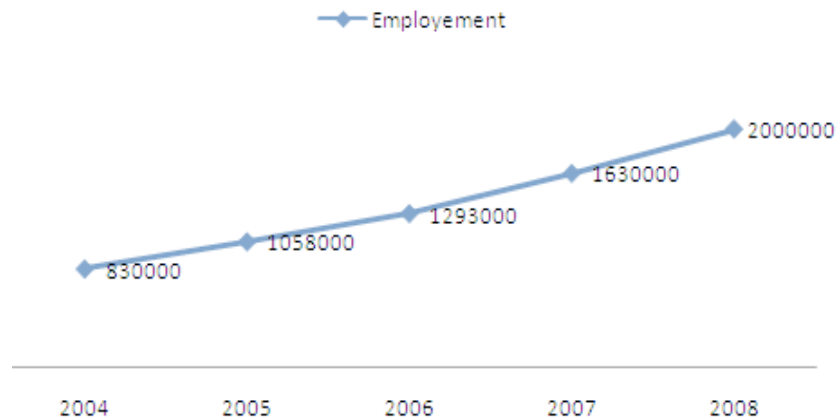
Figure 3: Direct employment in IT sector. (Chaudhari, Goyal, Hussain, Rai, Strategic Analysis of Infosys, 2009)

Figure 4 shows the IT/ITES services sector Revenues.
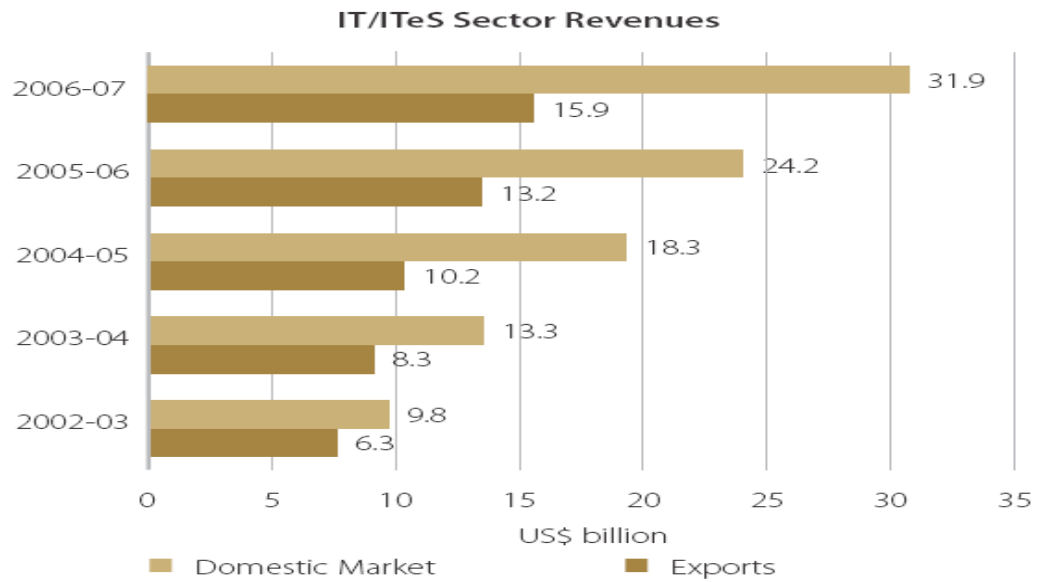
Figure 4: IT/ITES services sector revenues. (Ernst & Young for IBEF, IT-ITES Market & Opportunities)

Several Fortune 500 companies already outsource to India and many of them have already established their own development and service centers there. This has resulted in several employment opportunities in the Indian IT industry, thereby boosting the Indian economy.

6.2. IT Service Sector Model of Indian IT companies

(Kettunen, Rakshit & Uoti, Market trends and industry practices in IT services, telecoms and online media, 2007)

One of the key roles in this success story has been played by the offshore model of resource deployment. In this model a lot of development and maintenance work is carried out offshore, and the parts that cannot be transferred abroad are done locally. For example requirements specifications are carried out as close to the end-users as possible.

For private companies and public organizations across the world that are in need of capable IT and IT enabled services partners, this means new opportunities. For the local markets, this

increased global supply of services is increased competition and translates to cost pressures and higher efficiency requirements.

Generally the Indian IT services companies follow the following service model:

- During the initial phase of the project, the IT company's representatives meet with the client and try to understand client's specifications and expectations.

- After signing the contract, knowledge acquisition and transfer is carried out by sending a task force to the client's site. The service provider sets up client support teams that start working under the client's management and with the client's corresponding teams. Simultaneously, they set up an offshore client servicing team in India on the basis of required skills.

- Majority of the related development work like systems integration, and/or new application development, is carried out in India and is conducted by the offshore servicing team that works closely with the local client support teams. Some service provider companies may have their development facilities or subsidiaries in the client's country or nearby country. Sometimes, when needed, some of the work can also be carried out at one of these near shore centers.

- The service provider's Project Management team oversees the integration of the work packages.

- After the development completion, the client support teams provide the solution to the customer and provide hands-on support during the implementation process. Sometimes a dedicated team may remain present at the client's premises for a specified period of time.

- Generally, the contracts will include a clear description of the expected service level and related metrics, as well as performance-related compensation and penalty clauses.

Figure 5 shows a basic overview of the IT service sector model. Different companies may have different custom models. Hence this is not a comprehensive model.
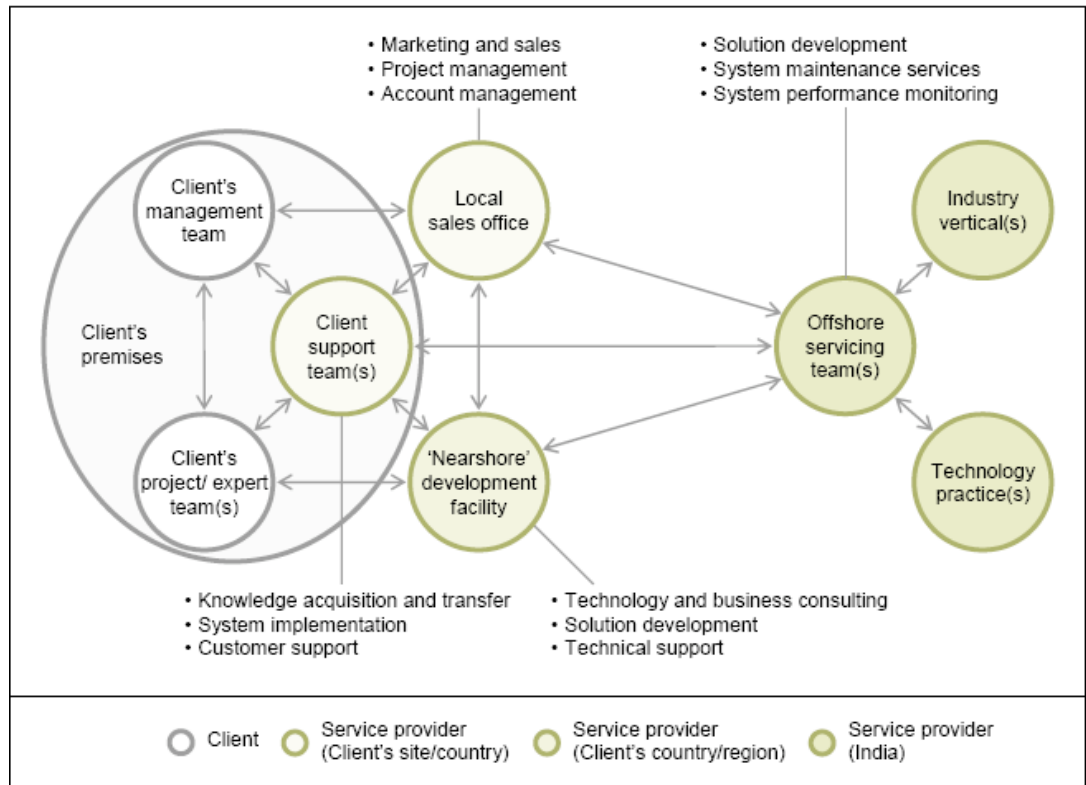
Figure 5: The service deployment model applied by the globally-operating Indian IT service providers: key actors and examples of related tasks**.** (Kettunen, Rakshit & Uoti, Market trends and industry practices in IT services, telecoms and online media, 2007)

There has been a tendency among potential Western companies that Indian companies may lack the necessary discipline or process focus when implementing demanding software projects. Hence most of the Indian IT companies, including all major players, have invested in acquiring various certifications. Statistics show that over 70% of all CMM9 certified companies are from India. Apart from this, a large number of companies have adopted PCMM (People CMM), CMMI (CMM Integration), ISO as well as Six Sigma certifications. This establishes the credibility of the Indian IT companies and proves that they focus heavily on quality.

6.3 Major Indian IT Companies

There are some very big Indian IT companies like TCS, Infosys, Wipro, which account for the majority share of the Indian IT services sector. According to the NASSCOM Survey, the top 10 services exporters in India are as follows: (Indian IT-BPO industry shows resilience; to grow by 4-7 percent in FY 09-10.

Top 10 IT Service Exporters in India for FY 08-09:

1   Tata Consultancy Services Ltd. (TCS)

2   Infosys Technologies Ltd.

3   WIPRO Ltd.

4   HCL Technologies Ltd.

5   Tech Mahindra Ltd.

6   Patni Computer Systems Ltd.

7   MphasiS Ltd.

8   Oracle Financial Services Software Ltd.

9   Aricent Technologies Services (Holdings) Ltd.

10 CSC India Pvt Ltd.

TCS is currently the largest Indian IT service provider, followed by Infosys and Wipro. These three combined, occupy the major share of the Indian IT market. These three players entered the IT market well before 1980s. These three companies offer a range of services across the different stages of the software development and maintenance lifecycle. However, currently over 90% of their business is focused on the export market with foreign clients. Domestic sector has seen minor growth so far, but now the companies have started to focus on the domestic market too, since there is a huge potential for the Indian domestic market.

Many large foreign companies like IBM, HP, Oracle and Accenture have established their services branches in India. It is ironical that in spite of the presence of large Indian companies, the domestic IT services market is dominated by foreign multinationals, IBM India being one of the largest players in this market.

Currently the Indian IT companies provide a broad range of services. All major IT service companies provide comprehensive turnkey solutions and are moving up in the value chain.

Some of the larger IT service companies have diversified into BPO operations. Earlier, companies used separate brand names for separate service lines.

However, the parent companies and their BPO arms are currently converging under one single brand umbrella. Till 2006, Infosys had 77% stake in its BPO arm Progeon Ltd, along with 23% stake of Citi Corp International Finance Corporation. In 2006, Infosys bought out Citi's 23% stake and hence merged the Progeon Ltd BPO brand as Infosys BPO. (Businesswire, Infosys Buys out Citi's Stake in Progeon, 2006).

Similarly, in January 2003, Wipro acquired the entire equity holding, owned by Housing Development Finance Corporation Limited in Wipro Spectramind Services Private Limited. (Allbusiness.com, Wipro Increases Stake to 100% in Wipro Spectramind Services Private Ltd., 2003). It now integrates its BPO operations under Wipro BPO brand.

Other companies like AccentureTCS, Xansa and Cognizant, had always offered IT and BPO services under a single brand. This unified branding provides the client with a one-stop shopping opportunity, rather than having the client deal with multiple entities for varied service requirements.

The big Indian IT service companies spend around 5% of their revenues on research and development. They have separate Research labs. For example, Software Engineering & Technology Labs (SETLabs) is the research arm of Infosys. Similarly TCS Innovation labs and Wipro Council for Industry Research are the research arms of TCS and Wipro respectively. (Infosys, Wipro, TCS). However this R&D spending is still quite low compared to western countries like US and Europe.

6.4 Domestic ITS/ITES market in India

The domestic IT market has been growing fast during recent years. the Indian IT domestic market kept growing at an an average rate of 24.3 per cent during 2003-08.

The domestic market had witnessed unprecedented growth, nearly tripling the market size from Rs 34,000 crore (Rs 340 billion) in 2003 to Rs 1,01,031 crore (Rs 1,010.31 billion) in 2008, a CAGR of over 24 per cent.

However, according to IDC report 'India Domestic IT/ITeS Market Top 10 Predictions for 2009', due to the global economic recession, the country's IT/ITeS market is expected to grow by 13.4 per cent in 2009 to achieve revenue of Rs 1,14,574 crore (Rs 1,145.74 billion), which will be the slowest growth since 2003. (Rediff, IT/ITeS market may grow 13.4% in '09: IDC, 2008)

According to the IDC report, the domestic IT market (excluding domestic ITeS) grew at 15.4 per cent in 2008 over 2007 to report a revenue of Rs 94,185 crore (Rs 941.85 billion) , while the ITeS market grew 53.2 per cent in 2008 to report a revenue of Rs 6,846 crore (Rs 68.46 billion) from Rs 4,468 crore (Rs 44.68 billion) in 2007.

The different customer segments of the Indian domestic market for IT and related services are BFSI (Banking, Finance, Services and Insurance), Communications, and Manufacturing.

 The Indian domestic IT market is dominated by foreign multinationals (MNCs) like IBM India, Accenture and HP. This is ironical given the presence of so many large Indian IT service companies that are dominant in the international market. Apart from TCS and NIIT, which receive significant revenues from their domestic operations, other Indian IT majors had been for a long time, almost entirely been dependent on export revenues. Although many foreign players have partnership agreements with Indian IT service providers, the extent of participation by the leaders like TCS, Infosys, and Wipro had been limited.

However, due to the current economic situation and expected slower growth, it is believed by experts that 2009 has started new business cycle that will be marked by slow growth but would eventually be the basis of a new phase of growth, which has been termed growth phase

2.0. This phase will bring innovative services sought by both customers and enterprises, by leveraging the existing infrastructure built so as to align with emerging opportunities.

The top 5 growth markets in the APAC region are India, China, Vietnam, Thailand and Philippines. India will continue to lead the pack with 13.4 per cent growth in domestic IT spending projected for 2009.

6.5 Advantages of Indian IT service industry

Despite stiff global competition, India continues to be the leader in terms of Financial Attractiveness.
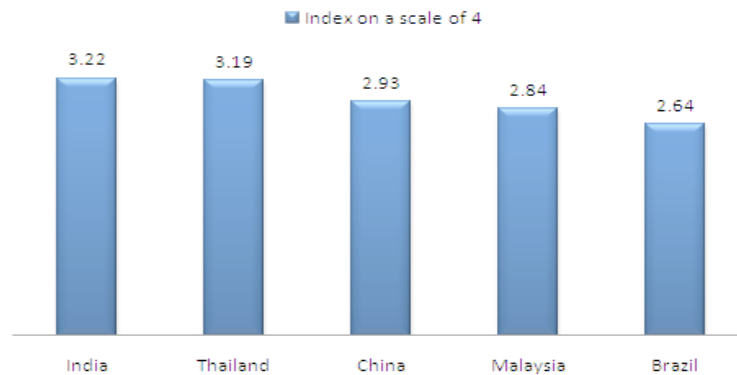
Figure 6: Figure: Financial Attractiveness of Top 5 Global Services Locations on a scale of 4. (Chaudhari, Goyal, Hussain, Rai, Strategic Analysis of Infosys, 2009)

Another advantage of India is its large pool of skilled IT professionals. **Table 1** shows the comparison of the number of IT graduates in India.

	2006-07	2007-08 F
Number of Engineering Graduates	501,000	536,000
Degree (four year course)	270,000	290,000
Diploma & MCA (three year course)	231,000	246,000
Number of IT (Computer Science, Electronics, Telecom) professionals	280,000	303,000
Engineering IT graduates (degree)	162,000	180,000
Engineering IT graduates (diploma)	118,000	123,000

Table 1: Number of IT graduates in India. (Chaudhari et al. Strategic Analysis of Infosys, 2009)

6.6 Government Initiatives

The Indian government has played a very proactive role in attracting foreign countries to invest in the Indian economy. The Indian government has taken several initiatives like:

- Setup Software Technology Parks of India (STPI) to provide several incentives like Fiscal benefits like tax holidays to attract FDI into the market, providing basic infrastructure to the companies doing business in India. Companies operating in STPI scheme will continue to get tax-benefit till 2010.
- Introduced no FDI restrictions.
- Area limits exemptions for the IT-BPO sector in the SEZ (Social Economic Zone) policy.
- Indian government is strengthening the IT act, 2000 to provide a sound legal environment for companies to operate especially related to security of data in transmission and storage, etc.
- To facilitate the penetration of IT and ITES in rural areas, the Indian Government has formulated a proposal to establish 100000 Common Service Center (CSC) in rural areas. Indian Government takes the initiative to execute the scheme through PPP (Private Public Partnership) to connect rural people to World Wide Web and the sanctioned amount is 57.42 billion for such proposal.

6.7 Challenges

There are several challenges that the Indian IT industry faces today, however there are several opportunities too, for future growth.

Cost Advantage facing competition

For years, India has been an attractive destination for IT outsourcing due to its low cost model. However, there are new emerging players in the market like China, Philippines who are also offering similar competitive low cost model and the governments are also helping their respective industry to attract foreign companies. In the meantime, however, employment costs have been rising fast in India. For example, the salaries for technologists were increasing till last year at an alarming rate of around 12% annually. This year hasn't seen such a high rise due to global economic recession. Due to more competition globally and locally, the Indian IT companies are facing extreme pressure on pricing and maintaining profitability.

Appreciating Rupee

The value of US Dollar has come down by more than 10% and Indian rupee has appreciated, and has been eating away the margins of Indian software industry. In future, if the decline continues, the advantage of doing business in India may be lost because of the high salaries of software engineers.

Required Skills shortage

Though Indian Institutions churn out large number of engineers every year, there is a skill gap between the in-demand skills and the required skilled pool available. Most of the engineers hired by the Indian IT majors pick up the knowledge in specific sector of their work.

However, there is often lack of exposure to and expertise in specific domain areas. To tackle this issue, the IT companies are hiring senior executives from other industries and trying to enhance their expertise in the in-demand skills.

Lack of new product innovation

India's IT services industry is called the world's back office. However, Indian companies haven't taken much risk to introduce new products. They have been using the products innovated by the foreign countries. They have been mostly just providing services. They haven't introduced their own technology products, hence the industry can face trouble with shortage of foreign offers. Major Indian IT companies have started their own research labs, but there hasn't been yet significant impact of that on the industry.

Lack of Governance

The most recent 2009 Satyam Scandal (discussed more in the next section) exposed the lack and flaws in the IT industry governance policies. Satyam was a premier brand name in the IT outsourcing industry and fraudulent dealings had taken everyone by surprise The Satyam Scandal tarnished Indian IT Industry's image and foreign companies are now concerned more than ever about their data security and privacy.

There have been few cases of identity thefts and frauds in the past which has raised industry concerns. This has also showed the importance of having better governance in the Indian IT industry. The Indian IT industry realizes this concern and is trying to address it by improving the governance and making efficient and secure policy models.

Global recession effect

Recession in the global economy has directly affected the Indian IT industry which has historically grown at double digits over the last decade. The number of deals signed by the industry has also reduced this year. Some of the most important customers of Indian IT industry are from US and Europe which continue to be engulfed by growing recession woes, particularly the Banking and Insurance sectors. Recession has forced them to lower their technology spending and shift to a fixed pricing and transaction based model. Infosys sacked 2100 employees and has announced plans to hold back promotions and pay hikes this year. A small percentage of low performance Engineers were laid off at TCS and IBM and it is happening in many companies now. This process will likely increase in future and companies will prefer hiring freshers out of college at relatively lower salaries.

Higher Training Costs

The IT service sector suffers from high attrition rates among employees. This results in higher recruitment and training costs. This coupled with the talent crunch, puts high pressure on the operating costs of these companies.

Anti-Outsourcing lobbies

There are voices raised against Outsourcing in US and other European countries. Protectionist policies by the US government continue to threat the IT sector, to raise local jobs and regain taxpayer's confidence. H1-B visa category which has been widely used by top Indian IT companies to send their employees at client's location in US is facing wide criticism and opposition inside the US and Indian IT companies have been blamed to abuse this H1-B program though Indian IT companies have denied that. This coupled with today's global recession has led to under-filling of H1-B visa quota for FY 2010 year, which has traditionally been over-flowing in the past few years. (Murthy, Investigations and Sluggish Economy Slow FY2010 H1B Filings, 2009), (USCIS(United States Citizenship and Immigration Services)).

6.8 Future Outlook and Growth Opportunities

Despite the several challenges and increased competition, the NASSCOM and the CEOs of major Indian IT companies are still upbeat about the future growth of the Indian IT service industry.

The addressable market for global sourcing will triple in size from USD 500 billion today to USD 1.5-1.6 trillion in 2020. The exports component of the Indian industry is expected to expand three-fold and reach USD 175 billion in revenues by 2020.

 Indian companies are trying to reduce dependence on US and UK markets. They are expected to work with SMBs beyond Fortune 500 companies), and venture into new emerging markets like Japan, BRIC (Brazil, Russia, India and China), and GCC (Gulf Co-operation Council: comprising of Gulf countries in the Middle East)

Major Indian IT companies like Infosys, TCS, Wipro are establishing their stronghold in other foreign countries by establishing their offices outside India. Indian IT companies are acquiring foreign companies to make inroads globally in the emerging economies.

Table 2 shows the major acquisitions that have happened recently.

Target	Acquirer/ Investor	Value in US$ million	Stake
Flextronics Software System	Kohlberg Kravis Roberts & co	900	85%
Mphasis BFL Ltd	Electronics Data Systems Corporations	398	52%
Syndesis	Subex Azure Ltd	158	100%
Azure Solutions, UK	Subex Systems	141	100%
eSys Technologies	Teledata Informatics	141	51%
Hexaware Technologies	General Atlantic Partners	68	15%
Enabler	Wipro Technologies	55	100%
Saraware Oy	Wipro Technologies	34	100%
Scandent Solutions Corporation Ltd	Indopark Holdings Ltd	31	55%
BPM Inc	Firstsource Solutions Ltd	30	100%

Table 2: Private Equity (PE) and Merger & Acquisitions (M&A) in the IT-ITES sector.

(Ernst & Young for IBEF, IT-ITES Market & Opportunities)

6.9 Emerging IT/ITS destinations

So far, Indian IT-ITS industry had been primarily concentrated in Tier 1 and Tier 2 cities like Bangalore, Delhi, Hyderabad, Chennai, Pune, Mumbai and Kolkata. Most IT companies started their operations in India in tier 1 cities, and have subsequently expanded into tier 2 cities. Emergence of Tier 3 cities like Chandigarh, Mysore is important for future growth in this sector, as these locations offer higher savings in administration, maintenance, real estate and infrastructure costs and human resource availability and costs. (Ernst & Young for IBEF, IT-ITES Market & Opportunities)

A number of IT giants are currently operating heavily in India. According to Kettunen (2007), "the operations of IT firms like Wipro, Infosys, Accenture, Capgemini, Tata Consultancy Services and many more in different locations of India have changed the entire scenario". A whole new sector, the IT enabled services, has also come up to complement the growth of the Indian IT industry.

7. THE BUSINESS CASE: SATYAM SCANDAL

The growth of India's IT sector has played a pivotal role in the development of India's economy. Over the last few years, India has attracted lot of international companies to its shores and established itself as a key destination for world by maintaining the competitiveness in the global market.

The following case study of Satyam scandal is one of the setbacks that Indian IT Industry has faced in beginning of this year and that has questioned Indian IT Industry's reliability and has put country's image at stake as a reliable IT service provider.

Ever since the news of Satyam's scandal came out in January 2009, the analysts have been guessing how it will affect Indian IT industry, and it is believed that it happened at the worst possible time. Markets had just started recovering and after this incident it will take time to put things back on the track. The entire issue has put Indian corporate governance in the spot light.

The following part of this chapter will reveal how media reacted to the Satyam Scandal in the beginning of 2009. This is done by presenting references to the articles that can be found in the appendices. These articles are covering different viewpoints of the scandal, the reasons that led to it and possible future effects and lessons to be learned by the Indian government.

7.1 The case background

On January 7,2009, the news broke out that B. Ramalinga Raju, founder and CEO of India's fourth largest IT Services firm, Satyam Computers announced that his company had been manipulating its accounts for several years, inflating profits by Rs. 50 billion (USD $1 billion, € 700 million). (Leahy, Joe, Financial Times, 14 January 2009, p.11)

Many in the financial circles were appalled (with the fact that) the biggest-ever corporate fraud in the country could have escaped unnoticed for so many years. It has brought into question the levels of corporate governance in the country, and has cast an ugly shadow on the once shining image of Indian industry overseas.

Satyam's clients including Unilever, Cisco and GE considered shifting back-office operations to other companies to avoid any disruptions of service. (Jan 2009 Leahy, Joe, Financial Times, January 29 2009, p.22) . Partner companies had started seeking advice from IT consultants to make sure their interests and operations were protected.

Edigio Zarrella, partner and IT adviser at KPMG, said in Financial Times that Satyam's clients had sought for his advice as they were unclear on whether Satyam would survive or be kept under the control of the government administration. (Jan 2009 Leahy, Joe, Financial Times, Jan. 30, 2009, p.3)

Despite the shocking news of the company, some of the Satyam's clients, Nestlé among them had extended their support to Satyam through their bad time. The spokesman of Nestlé told that it had been assured by Satyam that all of its services will continue as normal. The group admitted having explored other options to avoid any problems with the future, but was going to stay with Satyam for the time being. (Heath, Nick. Silicon.com, Jan 12, 2009)

However, many analysts had expressed concerns that this incident will have effect on Satyam's and Indian IT Industry' image and will take some time to rebuild the investor trust as many investors had left the company (Leahy, Joe, Financial Times, Jan 29, 2009, p.22).

7.2 The analysis

Satyam fraud has left India's business community appalled and has left them, fearing for the country's attractiveness to foreign investors. Though there are also many supporters, this scandal raised fundamental questions about the role of regulators and auditors in investor protection.

After the news Satyam scandal came to public, it has been discussed what makes companies to rely on such solutions what leads companies to such problems.

The competition in the market is tough, and companies have to meet shareholders' and stock markets analysts' expectations or maybe the situation within the company (internal budget) forces executives to take such actions/invoke in order to survive in the market.
Companies are under continuous pressure to reach targets monthly, quarterly and yearly.

In order to improve the situation just little bit, manager starts to make changes little by little until it gets out of control. When the company is unable to make up the gap, a larger distortion is needed to cover it up. This in turn creates pressure to deliver even better results which leads to bigger cover-ups and creates the kind of problems that Satyam is facing today.

These include outsider representation on the board, boards that aren't too large, boards that meet often, etc. In the case of Satyam, it had, for example, a reputation of excellent corporate governance. In fact, the World Council for Corporate Governance awarded Satyam its Golden Peacock Award for Corporate Governance in 2008. To run the company successfully, several characteristics have been considered important ingredients of excellent corporate governance.

When an accounting fraud involves reporting cash that is not there, it is typically the result of adding fraudulent transactions, such as cash sales, to customers that never happened.

Actions such as those of Satyam are being observed all over the world, and their effects are not simply localized to their executives, employees or even their countries. These types of actions affect the global economy. In other words, they affect us all. If there isn't sufficient belief in the notion that business will act in good faith, then the capitalist system is itself at risk.

As executives at other Indian outsourcing companies nervously assess what impact the scandal will have on them, many industry observers have argued that the Satyam case will damage India's reputation as a reliable provider of IT services. Because of the Satyam scandal, they say, Indian rivals will come under greater scrutiny by regulators, investors, and customers.

However, many larger rivals such as TCS, Wipro and Infosys will also benefit from Satyam's case. They all have solid reputation and it will now give them opportunity to gain market share. The competition is getting tough, also non-Indian companies, such as Accenture Ltd. and International Business Machines Corporations (IBM) see their chance to grow.

Other low-cost competitors from other locations such as China, the Philippines, Vietnam, and Eastern Europe will certainly take advantage of the situation.

Decline in governance and institutions represent Indian government a serious challenge, says Rajeev Chandrashekhar, president of the Federation of Indian Chambers of Commerce and Industry. Other companies in the industry are hoping it does not affect the entire Indian IT industry. Undoubtedly, this is going to hurt the prospects of foreign money flowing into India in near future.

Also, Investors and clients want answers. They want to know, for instance, how Satyam's auditor, PricewaterhouseCoopers, endorsed the company's accounts. After Raju's confession, company's share price crashed by 70% to Rs 30 (approximately 60 cents) as opposed to its 52 week high of Rs 544 ($11.35). (Wharton, Scandal at Satyam: Truth, Lies and Corporate Governance)

Tech Mahindra, a joint venture between British Telecom and the Indian conglomerate Mahindra & Mahindra, emerges as the highest bidder for Satyam to have a 31% stake in Satyam in April 2009. (NY Times, Tech Mahindra Wins Bid to Control Satyam, 2009).

"The smooth completion of the bidding process for Satyam demonstrates that India has an adequate legal and institutional mechanism for handling and resolving a major corporate crisis," said FICCI president Harsh Pati Singha.

In June 2009, Satyam unveiled its new brand identity "Mahindra Satyam". (Tech Mahindra, Satyam unveils its new brand identity, 2009).

8. RECOMMENDATIONS

There is no doubt that Indian IT Industry plays significant role in the Indian economic progress. The constant growth and prosperity, however, depends on some crucial factors. The Indian government is making constant improvements in order to ensure the development of Indian IT Industry. Government initiatives are planned/designed in five year plans (such as the latest 5 year plan: 2007-2012) to ensure continued growth of the country's economy. Based on the Eleventh Five Year Plan (2007-2012) on the Indian IT industry, published by the Department of Information Technology, Ministry of Communications and Information Technology, several policy actions have been recommended as follows.
These recommendations apply to the entire IT industry including the IT services sector:

- Re-orient the education system to make it demand based, effectively improving the supply of suitable talent. This must be a joint academia-industry effort. Curriculum should be prepared with close collaboration between college professors and the industry professionals.
- Encourage active involvement of industry in university-level education to make the graduates more employable.
- Setup a common nation-wide benchmark for assessing graduating students, which makes it useful for recruitment. The IT-ITES sector has already begun work on the first such certification (for entry level in the BPO industry), this initiative needs to be supported and institutionalized by encouraging universities across the country to participate.
- Building adequate basic, business and social infrastructure: Strengthen the intra-city road network and public transport infrastructure to decongest existing hubs.
- Ensuring a favourable business policy and regulatory environment, with a special focus on encouraging SMEs and new ventures.
- Continue the Benefits Provided by the STP Scheme.
- Set-up an Advanced Projects Agency (APA) that drives technology research at central and state government level, facilitated through a public-private partnership model.
  Indian IT-ITS/ITES export revenues can be further accelerated through deep and enduring innovation.
- The issue of intellectual property protection, data and information

security is a key risk to the sector (in the form of a potential non-tariff barrier to international IT-ITES trade). Hence, it is essential for India to proactively formulate a robust policy framework to address this challenge.

Few recommendations to increase domestic IT market, including the IT services sector.

- Increase IT adoption in the SMB segment: While the larger firms have largely adopted IT as a critical element, of competitiveness, the SMB sector has lagged behind.
- Create new business models suited to the needs of the SMBs.
- Increase development and deployment of multi-lingual products, which can help in further penetration in the domestic market.

Thus overall, Indian IT industry is poised to drive the country's growth in future.

9. CONCLUSION

India has strengths in information technology and that catches many multinational companies' attention with several key success factors in the countries, and is therefore a preferred destination for foreign direct investments (FDI).

India's liberalized FDI policy and deregulating the economy and escalating foreign investment has made India one of the front-runners in Asia Pacific Region. Industrial policy reforms have substantially reduced industrial licensing requirements, removed restrictions on expansion and facilitated easy access to foreign technology and FDI.

There is no doubt about the fact that there has been a worldwide foreign direct investment in India. Indian Government has played significance role in IT Industry growth where some of positive reforms have brought a positive growth in the Indian economy in terms of GDP growth. Analysts perceive continued growth for coming years.

Government's five years plan (2007-2012) has been designed to ensure the growth of the economy. Present plan concentrates on the IT/ITES sector. India has a niche in the IT world and is regarded as the premier destination for the global sourcing of IT services and IT-enabled Services (ITES)

Recently, Indian IT Industry's contribution in increasing productivity in various sectors of the economy has been remarkable. Its positive impact on the national income and employment has accelerated the rise in direct-tax collections and propelled an increase in consumer spending. The growth of India's IT sector has brought about many other positive changes in the Indian economy. The purchasing power of a large section of Indian population has increased dramatically. This has resulted in an increase in the average standard of living of a large population of the country. The increase in purchasing power of the common people has propelled the growth rate of the other sectors of the economy as well.

India is now home to a number of IT giants. The operations of IT firms like Wipro, Infosys, Accenture, Capgemini, Tata Consultancy Services and many more in different locations of

India have changed the entire scenario of the Indian job market. The ITES sector has also come up to complement the growth of Indian IT sector.

IT sector in India has played a major role in drawing foreign funds into the domestic market.

**The growth and prosperity of India's IT industry depends on some crucial factors. These factors are as follows*:*

* India is home to a large number of IT professionals, who have the necessary skill and expertise to meet the demands and expectations of the global IT industry.
* The cost of skilled Indian workforce is reasonably low compared to the developed nations. This makes the Indian IT services highly cost efficient and this is also the reason as to why the IT enabled services like business process outsourcing and knowledge process outsourcing have expanded significantly in the Indian job market.

The emergence of Indian information technology sector has brought about sea changes in the Indian job market. The IT sector of India offers a host of opportunities of employment.

India has the advantage of a very large number of English speaking populations, which is more than in any other non-English speaking country. Add to that the lower cost of manpower; it becomes very attractive to hire Indian IT specialist professionals. IT education starts right from Nursery and specialized institutes are available to provide diplomas/degrees in various fields of IT.
India's offshore advantage allows companies to production costs without need to compromise on the quality. Experienced employees are trained for using a variety of technologies applications available.

However/ despite the huge success in IT sector, Indian corporate governance has also challenges in the coming years such as to avoid the fraud incidents like Satyam fiasco of 2009. Government should realize the importance of investor trust and thus protect the investors. There is room for improvement in the governance method of the Indian IT industry, by the government.

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11. APPENDICES

India's IT Services Industry: A Comparative Analysis

India's rapidly growing IT services industry has many parallels—and some differences—with East Asia's electronics and computer hardware industries.

Pratyush Bharati
University of Massachusetts Boston

In the past decade, India's information technology services industry emerged as an important player in the global IT services market. The country's share of this market, valued at more than $350 billion, increased from 1.5 percent in 2000-2001 to 1.9 percent in 2002-2003. While worldwide revenue of IT services grew less than 2 percent during this period, India's IT services industry experienced 22 percent revenue growth[1,2]—a pace comparable to the rise in Hong Kong's electronics industry during the 1970s.[3]

The outsourcing of IT services by multinational corporations (MNCs) is driving this rapid growth. For example, General Electric's oft-cited 70-70-70 strategy mandates the outsourcing of 70 percent of its IT service requirements, of which 70 percent are given to strategic suppliers, who in turn execute 70 percent of the work outside high-wage countries. GE currently subcontracts more than $500 million worth of IT services to India, representing about 8 percent of the country's IT services export market.[1]

A major factor underlying the boom in IT service outsourcing is the need for MNCs to remain globally competitive by relocating labor-intensive operations overseas to low-wage countries. By moving away from the traditional corporate model of vertical integration to a more flexible "quasi-integrated" model that links various networks of suppliers and distributors, firms seek to complement high economies of scale with low input costs.[3-7]

INDIA-BASED IT SERVICE NETWORKS

Each IT service provider in India is part of a larger MNC production network that "combines a lead firm, its subsidiaries and joint ventures, its suppliers and subcontractors, its distribution channels, VARs [value-added resellers], as well as its R&D alliances and a variety of cooperative agreements.... The lead firm outsources not only manufacturing, but also a variety of high-end support services."[8]

In general, these production networks can be categorized as intrafirm, interfirm, or joint venture networks.[6-11] An *intrafirm* network consists of subsidiaries that the MNC wholly owns. A *joint venture* is an equity-based partnership between the MNC and another firm. An *interfirm* network is a business relationship between the MNC and another company that can have a long-term contractual basis or involve informal short-term, project-based, one-off services.[12]

MNCs source India-based IT services according to one of three models—subsidiary, subsidiary plus IT service provider, or IT service provider—that can include one or more production network subtypes depending on the business relationship between the MNC and its IT service provider(s). Table 1 describes each model and the possible MNC-IT service provider relationships and production network subtypes, along with a few key examples.

The subsidiary plus IT service provider model is currently becoming the dominant MNC model. To

Table 1. India-based IT service network models.

Firm network model	Description	Possible relationships	Possible network subtypes	Examples
Subsidiary model	The MNC's Indian subsidiary provides all IT services to the firm.	Wholly owned	Intrafirm	Oracle
Subsidiary plus IT service provider model	The MNC's Indian subsidiary provides IT services along with one or more Indian or non-Indian IT service provider(s).	Wholly owned Equity-based partnership Contractual (long-term) or informal, project-based (short-term)	Intrafirm Joint venture Interfirm	General Electric, Citibank, Hewlett-Packard, IBM
IT service provider model	The MNC does not have any Indian subsidiary and employs Indian or a combination of Indian and non-Indian IT service providers either independently or with the assistance of outsourcing firms.	Equity-based partnership Contractual (long-term) or informal, project-based (short-term)	Joint venture Interfirm	Pyxis (a manufacturer of automated medication and supply dispensing systems)

better understand India's IT services industry, it is useful to compare GE's IT service network, shown in Figure 1, with production networks in East Asia's electronics and computer hardware industries.

Single supply tier

A unique feature of India-based IT service networks is the absence of multiple tiers of suppliers. GE and other MNCs have only one tier of suppliers, compared to leading firms in Taiwan's computer hardware industry, which typically have several layers of suppliers. For example, major computer makers such as Apple, Dell, IBM, NEC, Packard Bell, and Siemens source motherboards from Taiwanese OEMs including Elite, First International Computer, and Tatung, which employ numerous small and medium-size enterprises to source parts.[3,13] The nature of IT services makes it difficult to subdivide work among multiple suppliers. Direct interaction with IT service providers allows the MNC to exert greater control over IT services.

Dependency on MNC

In many production networks, the lead firm and its suppliers and distributors are loosely bound together through equity and debt holdings, shared directors, and equipment leases.[6] India-based IT service networks, though limited to a single supply tier, are closely bound together in dependency relationships similar to those in East Asian production networks. MNCs in India influence their suppliers both as owners and buyers, impacting IT service providers' decisions, offerings, strategies, and prices.

MNC as owner. GE owns all four of its India-based IT service subsidiaries. GE Software Solutions provides implementation, consulting, development, transition, maintenance, and support services to GE and other MNCs. GE Global Technology Solutions provides advanced mainframe software solutions development, client-server solutions, e-commerce technology, and enterprise resource planning for GE Air-

craft Engines and GE Appliances. Global Technology Operations—India, owned by GE Medical Systems, designs and develops products and solutions for several computer platforms. The John F. Welch Technology Center is the company's first and largest multidisciplinary R&D facility outside the US.

In addition, GE Equity has a $108 million stake in Patni Computer Services. PCS is India's seventh-largest IT service provider with a focus on enterprise application solutions, e-business, implementation, and consulting.

Finally, GE has joint ventures with three IT service providers. Satyam—GE Software Services, also known as the India Design Center, is owned by Satyam Computer Services, India's fourth-largest IT service provider, and GE Industrial Systems; it designs and develops new products and software solutions for embedded systems, e-commerce, and human-machine interaction. GE Medical Systems Information Technology is a joint venture between GE Medical Systems and Citadel Health, a niche Indian IT firm. GE Equity and the Birla Group formed BirlaSoft to develop software solutions.

MNC subsidiaries and joint ventures likewise play an important role in Taiwan's computer hardware industry. For example, Texas Instruments and Acer have a joint venture to produce dynamic RAM.[3]

MNC as buyer. GE is a major customer of its India-based subsidiaries and joint venture firms as well as a number of independent companies. In addition, it negotiated a $100 million deal with Tata Consultancy Services (TCS), India's largest IT service provider. GE also accounts for 20 percent of Satyam's business and 38 percent of revenues of iGATE Global Solutions, a midsize provider of application maintenance and data management solutions. Nucleus Software likewise provides consulting, software development, support, and maintenance services for GE Capital.

Hong Kong's electronics industry also has MNCs as major buyers. For example, VTech serves as an
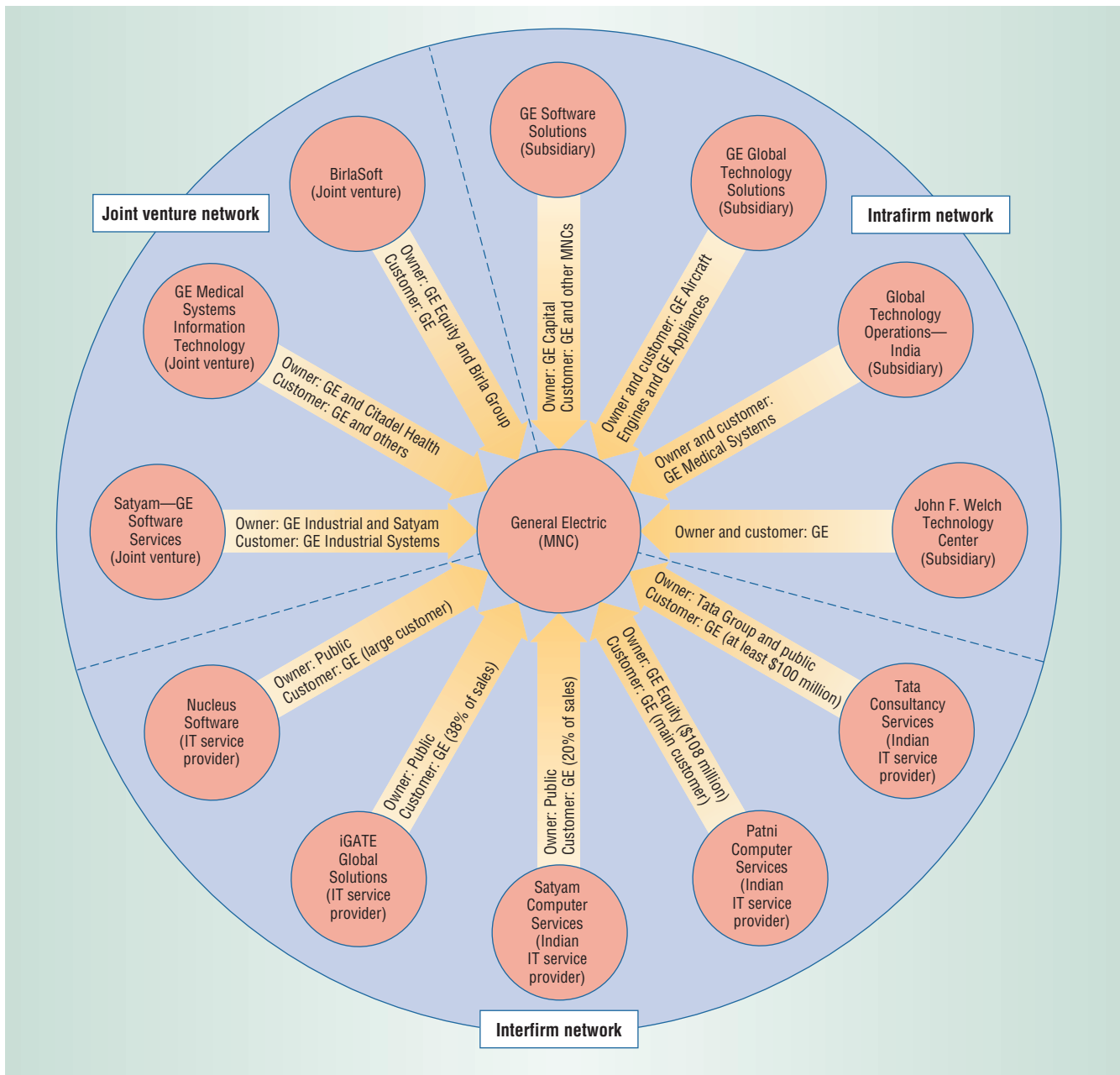
GE Software Solutions (Subsidiary)

GE Global Technology Solutions (Subsidiary)

BirlaSoft (Joint venture)

Joint venture network

Intrafirm network

GE Medical Systems Information Technology (Joint venture)

Global Technology Operations— India (Subsidiary)

Owner: GE Equity and Birla Group
Customer: GE

Owner: GE Capital
Customer: GE and other MNCs

Owner and customer: GE Aircraft
Engines and GE Appliances

Owner: GE and Citadel Health
Customer: GE and others

Owner and customer:
GE Medical Systems

Satyam—GE Software Services (Joint venture)

General Electric (MNC)

John F. Welch Technology Center (Subsidiary)

Owner: GE Industrial and Satyam
Customer: GE Industrial Systems

Owner and customer: GE

Owner: Public
Customer: GE (large customer)

Owner: Tata Group and public
Customer: GE (at least $100 million)

Nucleus Software (IT service provider)

Tata Consultancy Services (Indian IT service provider)

Owner: Public
Customer: GE (38% of sales)

Owner: Public
Customer: GE (20% of sales)

Owner: GE Equity ($108 million)
Customer: GE (main customer)

iGATE Global Solutions (IT service provider)

Satyam Computer Services (Indian IT service provider)

Patni Computer Services (Indian IT service provider)

Interfirm network

Figure 1. General Electric's India-based IT service network model. The subsidiary plus IT service provider model is currently becoming the dominant MNC model.

original equipment manufacturer to numerous MNCs based in G-7 countries.[3]

Government support

The Indian government has played a central role in establishing and promoting the IT services industry. It created software technology parks to provide the necessary office space, data and satellite communication links, and hardware and prioritized funding of the country's telecommunications infrastructure. To facilitate exports, the Indian government provides easily obtainable licenses, rebates, duty-free imports, credits, international trade fair subsidies, and research support, and in 1995 it permanently exempted service exports from income taxes.[12]

This pattern follows the example of Taiwan's government, which established export processing zones

in the 1960s to promote electronics production and has since provided financial assistance, training, and research and development support.[13] The Singapore government likewise helped disk-drive giant Seagate Technology at every step, including a 10-year tax holiday and factory space in an industrial park. The Korean government similarly helped Samsung and other *chaebols* or conglomerates become major exporters in the electronics market.[3]

Quality focus

The East Asian electronics and computer hardware industries demonstrate that mastery of low-cost production is not sufficient to remain part of an MNC network. A supplier that wants to move up the value chain—from original equipment to original design manufacturer—must also meet

stringent quality, time-to-market, and flexibility requirements.[8] Following this example, IT service providers in India put a premium on quality. By December 2002, 254 firms had acquired quality certification—including International Organization for Standardization 9001, Capability Maturity Model, CMM Integrated, People CMM, and Six Sigma—with 77 more in the pipeline. Forty-eight of these had CMM Level 5 certification—the most in the world. All 12 of GE's IT service-providing entities are quality certified.

Traditionally, application development constituted about 80 percent of India's IT service exports. Indian firms are now beginning to offer other services such as system integration, package implementation, IT outsourcing, R&D outsourcing, and IT consulting. They have also expanded from banking and telecommunications to include utilities, healthcare, and retailing. Wipro and TCS recently won large IT outsourcing contracts from British utilities, and Infosys is providing mission-critical support for a leading network-equipment-manufacturing MNC.

This parallels the East Asian experience. In the late 1960s, US MNCs established cheap production locations in the region, but by the early 1980s they had started to upgrade their assembly platforms and source more parts and components from local firms. In the 1990s, these MNCs further upgraded their subsidiaries and significantly increased sourcing from local firms, which even designed key components.[9] MNCs have started upgrading some of their Indian subsidiaries, such as GE's establishment of the John F. Welch Technology Center in 2000, and sourcing higher value-added IT services from local service providers.

AN INDUSTRY IN FLUX

A decade ago, MNCs relied on interim IT service contractors in India, known as "body-shopping"

in industry terminology. Today, however, a substantial portion of this work is performed in India rather than at client sites in G-7 countries. In 1999-2000, revenue from IT services work done in the major industrialized countries was roughly double that of work performed in India; in 2002-2003, revenue of India-based IT service firms increased 49 percent, more than four times the growth rate of IT service companies based in G-7 locations.[1] Table 2 lists the total revenue of the leading IT service firms in India by firm type.

This shift has just begun, with fewer than 40 IT service contracts valued at more than $20 million. According to a 2000 Organization of Economic Cooperation and Development report, a typical project in India is "small (less than 10 man-years), has a value of less than $1 million, and involves maintenance, porting an existing application from a legacy platform to a client-server platform or Y2K work."[14] However, the size of IT service projects is increasing, and conglomerates capable of conducting large projects are emerging in India. For example, TCS recently won three contracts worth more than $40 million, while Wipro earned a $70 million deal.

MNCs headquartered in G-7 countries already account for nearly one-quarter of India's IT service exports, and they continue expanding operations. Major IT MNCs IBM and Oracle mandate Indian development centers as part of all global application development projects—for example, IBM Global Services has six such centers in India with 3,000 employees. Electronic Data Systems and Computer Sciences Corporation have also substantially increased their presence. As the example of GE shows, non-IT MNCs are also vying to provide India-based IT services. Other major MNCs with Indian subsidiaries that export IT services include Hughes, Hewlett-Packard, Siemens, Motorola, Texas Instruments, Intel, i2, and Cisco.

Although India's IT services industry is divided among many firms, a relatively small group of them have emerged as the main players. The top five IT service companies in India have grown faster than the rest of the industry and now have 32 percent of the market share; the next 50 firms have had considerably slower growth and have only 35 percent of the market share.[1] Thus, India's IT services industry is not as consolidated as the East Asian electronics and computer hardware industries. In Taiwan, for example, the top 10 PC manufacturers control 80 percent of total production.[11]

The rapid growth of India's IT services industry is largely fueled by the country's relatively low IT

employee costs, which average only $5,880 per year.[1] The wholesale shifting of industry locations due to international wage differentials is nothing new. Logitech, the world's largest producer of computer tracking devices, shifted production from the US to Taiwan in 1987 and, eight years later, moved its manufacturing operations from Taiwan to China.[8,10] Several other MNCs have likewise relocated their production networks to China and other low-wage countries including the Philippines, Argentina, the Czech Republic, and Russia. In fact, several Indian IT service providers, in large part to secure even cheaper labor, have recently opened offices in China and elsewhere.

With some differences, particularly the absence of multiple supply tiers, India's IT services industry is undergoing a transformation similar to that of East Asia's electronics and computer hardware industries. Currently, this industry is dependent on MNCs, partly as owners and mostly as buyers, who are outsourcing more IT service operations to remain internationally competitive. MNCs have adopted different production models, with the subsidiary plus IT service provider emerging as the dominant one.

India-based IT service providers, including MNCs, have significantly enhanced their operations in size, sophistication, and quality to increase market share and vie for higher value-added services. Local as well as MNC IT service providers continue to pursue new locations in India and other countries that provide skill and cost advantages. As these providers achieve quality parity, price-based competition is likely to increase, and industry consolidation along the lines of its East Asian counterparts is likely to follow. ◾

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