# Capability Building and Innovation in the Offshore IT Services Industry in India and China

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# Contents

# I.
# Introduction

Multinational enterprises (MNEs) from developed countries have been outsourcing manufacturing to developing countries for decades to benefit from their comparative advantage in labor costs, and increasingly to be close to their key markets. In the 1990s, however, MNEs also started outsourcing white-collar service functions, like software development and customer relationship management, to developing and middle-income countries, such as India, China, and Central and Eastern Europe – countries that offered skilled labor at low cost. Rising costs and competitive pressures, and a lack of adequate talent at home, led many developed-country MNEs to offshore core innovation, engineering, and research & development (R&D) work to such countries in the 2000s – to leverage not just low costs, but also the skills and talent available there. Over the last two decades, offshoring of simple back office and core R&D work, especially in the information technology (IT) industry, picked up pace with the rise of globalization and the accompanying technological developments. In the last 5-10 years, even high value-added R&D work has been offshored to those countries.

IT services firms in India and China, became dominant by making serious and continuing efforts to acquire and develop the knowledge, skills, and capabilities needed by their foreign clients

So, we know what happened in the IT industry, and why developed-country MNEs reached out to developing countries for IT services and software development. Many MNEs set up their own captive centers, and increasingly used third-party providers, in developing countries to leverage their low-cost and talent advantages. The question of how IT services providers in India and China became so dominant in the global IT services industry remains largely unanswered. We posit that IT services firms in India and China, especially the major players, became dominant by making serious and continuing efforts to acquire and develop the knowledge, skills, and capabilities needed by their foreign clients.

This report is about the offshoring of IT services to two emerging markets, India and China, with a focus on the services provided by third-party vendors there to their foreign clients[1]. In particular, it presents in-depth information on the capability-building and innovation approaches used by third-party providers of offshore IT services in India and China.

There has been some prior research on the IT services industry that deals with questions such as performance implications of outsourcing[2], firm-level characteristics that facilitate onshore and offshore BPO (business process outsourcing)[3], and the role of CEO personality in BPO firm performance[4]. However, these studies deal with broader, macro questions, often using

1 When a company offshores some internal functions, it can do so through its own foreign subsidiaries or by outsourcing the functions to third-party vendors in those markets. The foreign subsidiaries are known as captive centers or global in-house centers (GICs). This report covers services provided only by third-party vendors in India and China for their foreign clients.

2 See, for example: Bertrand, Olivier & Michael Mol, 2013, "The antecedents and innovation effects of domestic and offshore R&D outsourcing: The contingent impact of cognitive distance and absorptive capacity", Strategic Management Journal, 34(6); Weigelt, Carmen, 2009, "The impact of outsourcing new technologies on integrative capabilities and performance", Strategic Management Journal, 30(6); and Weigelt, Carmen & MB Sarkar, 2012, "Performance implications of outsourcing for technological innovations: Managing the efficiency and adaptability trade-off", Strategic Management Journal, 33(2).

3 For example, Whitaker, Jonathan, Sunil Mithas, & M.S. Krishnan, 2010, "Organizational learning and capabilities for onshore and offshore business process outsourcing", Journal of Management Information Systems, 27(3).

4 For example, Nadkarni, Sucheta & Pol Herrmann, 2010, "CEO personality, strategic flexibility, and firm performance: The case of the Indian business process outsourcing industry", Academy of Management Journal, 53(5).

archival and secondary sources of data, and do not provide any insights on the actual capability-building and innovation approaches used by IT services firms in developing countries. This is due largely to the fundamental interests and motivations of international business scholars versus practitioners. Scholars typically work with backward-looking data to explain the past, whereas managers seek forward-looking guidance[5]. Scholars are often focused on deriving generalizable results, whereas managers seek approaches and strategies they can benchmark. On the question of IT services firms' capabilities, we can learn a good deal about what capabilities they possess by simply visiting their websites or reading journal and magazine articles, but little about how they go about acquiring and enhancing those capabilities. And, most prior studies represent the perspectives of client organizations from the Western world rather than of IT services providers from the developing world. Further, most research studies look at competitive phenomena in a single country and make no attempt to develop comparisons of approaches used by multinationals in two or more countries. As more and more companies adopt global approaches to doing business abroad, such understanding will be valuable to managers and scholars alike.

This report attempts to fill this gap by utilizing a fine-grained research methodology that involved in-depth personal interviews, some lasting two hours or more, with over two dozen senior and top-level executives of leading IT services firms in India and China, as well as with some of their foreign clients. (Further information on the research methodology is contained in Appendix-1, and the list of executives and companies interviewed in Appendix-2).

Since the firms included in this study are mostly best-of-breed in their respective domains, the information on capability building and innovation presented here can be taken as benchmarks for other IT services firms to strive towards. Some of the innovation and capability-building approaches highlighted here can also be used by firms in other industries and other countries.

The rest of the report is organized as follows: Background on the global IT Industry and the offshore IT services industry in India and China; capability building in the IT services industry in India and China; innovation in the IT Services industry in India and China; and the future of the offshore IT services industry in India and China. The report ends with an appendix containing research methodology, lists of companies and senior executives interviewed by the author for this project, and an analytical table on the current and projected future growth of the global IT industry.

5 Ramamurti, Ravi, 2009, "What have we learned about emerging market multinationals?", in Ravi Ramamurti & J.V. Singh (Eds), Emerging Multinationals in Emerging Markets: 399-426. Cambridge University Press.

# II.
# The Global IT Industry

Research firm Gartner has classified the global IT industry into five segments: devices; data center systems; enterprise software; IT services; and telecom services[6]. Appendix-3 presents Gartner's worldwide IT spending forecasts for 2012-2017 as well as year-on-year growth rates. The global IT industry in 2012 was worth $3.6 trillion, and estimated to grow to $3.7 trillion in 2013, and 4.4 trillion by 2017. The total worldwide expenditure on IT services and software, which are the focus of this report, was $1.19 trillion in 2012, estimated to reach $1.23 trillion in 2013, and $1.52 trillion in 2014, with a compound annual growth rate (CAGR) of over 5 percent (Appendix-3).

According to the 2013 Strategic Review report by NASSCOM[7], of the $1.19 trillion market for IT services and software in 2012, the global outsourcing (i.e., offshoring) component is about $124 to $130 billion, or about 10-11 percent of the total worldwide spend on IT services and software. That is, of all the expenditure on IT services and software worldwide, only about 10-11 percent is actually offshored to other countries – to both developing and developed countries. Using the same percentage (i.e., 10-11 percent of the total spend), the offshoring component of IT services/software market for 2013 is estimated at $122 billion to $134 billion.

NASSCOM's 2013 Strategic Review estimates India's share of the global IT industry at $101 billion in 2012, rising to $108 billion in 2013. This includes IT software and services (including business process outsourcing and engineering and R&D services) worth $95 billion and hardware worth $13 billion. Of India's $95 billion market for IT services and software, the export (offshore) component is $76 billion – representing over half of the world's offshore IT services and software market. According to research firm IDC, China's share of the offshore IT services and software market in 2011 was $4.1 billion. China, a relative newcomer in the offshore IT services/software market, has been growing very fast, with a projected CAGR of 25 percent over 2011-2016. The offshoring component of Chinese firms has also been growing rapidly.

According to Gartner, the top five IT services firms in the world in 2011 were IBM (10.9 percent global market share), HP (6.1 percent), Fujitsu (4.5 percent), CSC (4.2 percent), and Accenture (2.6 percent). The top five Indian IT services firms are considerably smaller, but growing at much faster rates of growth. In 2011, they were Tata Consultancy Services or TCS (global market share 0.9 percent), Infosys (0.7 percent), Cognizant (0.7 percent), Wipro (0.6 percent), and HCL Technologies (0.4 percent)[8]. According to research firm IDC, the top five Chinese IT services firms in 2011 servicing foreign clients were much smaller, though they are also growing at fast rates of growth. They are: Pactera Technologies (ranked #1 in China in 2012 after the merger of hiSoft and VanceInfo), NeuSoft, ChinaSoft International, DHC, and iSoftStone.

India and China are two of the five major players in the offshore segment of the global IT services industry and are the focus of this report. (According to research by the NeoGroup, the world's top 5 IT and business process outsourcing hubs, in that order, are: India, Australia, China, Canada, and the Philippines). From 2010 to 2011, the Indian IT services industry grew by 23.8 percent and the Chinese industry by 22.8 percent, compared to a 2.5 percent growth rate for the global IT industry. It will be noted that Indian IT services firms are orders of magnitude larger than their counterparts in China. For instance, the largest Chinese IT services firm, Pactera Technologies, had 23,300 employees in FY2012, compared to 239,000 at TCS, 150,000 at Infosys, and 140,000 at Wipro.

6 Gartner's Definitions of IT Industry Segments are: Devices: PCs, tablets, mobile phones, and printers. Data Center Systems: Servers, external controller-based storage, enterprise network equipment, and enterprise communications applications. Enterprise Software: Applications and infrastructure software. IT Services: Business IT services and IT product support services. Telecom Services: Mobile voice and data, and fixed voice and data services.

7 NASSCOM is the premier IT software and services association in India.

8 Source: Company websites.

# III.
# The Offshore IT Services Industry in India and China

The Indian IT services companies have been in the business for a long time and by now have the maturity, expertise, client relationships, and scale needed for large and complex projects for overseas clients. For many of the major players, the core senior management teams have stayed together for five, ten, or more years, and have not only built deep domain knowledge and knowledge of the verticals they service, but have also developed and nurtured long-standing relationships with their key clients. Their clients, typically chief information officers (CIOs), tend to be risk-averse and often stick with the providers they have had good experience with for quite some time.

Foreign companies come to India to benefit from labor cost arbitrage and Indian professionals' English language skills, but soon find other reasons to be in India, such as a growing domestic market and a large and high quality pool of multi-skilled engineers with a breadth of knowledge and expertise as well as the ability to quickly understand clients' IT challenges and help resolve them. They also find that India's major IT services firms have deep knowledge of multiple verticals and technology domains, state-of-the-art processes, project management skills, and highly developed employee practices. These are the firms they (foreign MNEs) then utilize to create and strengthen their own competitive advantage[9].

Large Indian companies have the scale and slack resources to be able to ramp up the needed resources for a client quickly and cost effectively. And, with delivery centers and operations in dozens of countries and locations, they are able to service the needs of their clients offshore, onshore, or near-shore as needed by the client. They have the highest industry certifications, such as CMMI Level 5[10], and have successfully handled some very large projects for their clients. For instance, Mastek created the IT backbone for one of the largest public health services in the world, Britain's National Health Service, and helped reduce traffic congestion in London by 20 percent[11]. And one of TCS China's key projects is the iCity (intelligent city) project involving a host of cloud-based IT solutions to provide integrated urban management services to promote economic, social, and sustainable growth in China[12].

The three major Chinese companies interviewed for this research project also have some of the same strengths as their Indian counterparts, though they are at an earlier stage on the maturity scale. Pactera's parent, VanceInfo was the first Chinese IT services company to obtain ISO 9001 certification in 2002, while its other parent, hiSoft, was the first to receive CMMI Level 5 certification in 2003. However, being in a relatively young industry, it will be quite some time before Chinese firms reach the level of maturity, process expertise, and scale of Indian IT services firms. They do have strong application development capabilities and a strong cost-control culture. For their major domestic and government clients, they have the advantage of language and the relationships that are so crucial for obtaining government and public sector business in China. They also understand the culture and the country's economic and political systems and are able to navigate through challenges that may come their way. And, with rising FDI into China, they are able to service an increasing number of foreign clients, especially those who need local service providers for geo-political and/or localization reasons. Many Chinese IT services firms have high aspirations, e.g., for business in the North American market, and have significant support from the government.

9 Jain, Vinod K. & S. Raghunath, 2013, "Strengthening America's international competitiveness through innovation and global value chains", in Ben Kedia and Subhash Jain (Eds.), Restoring America's Competitiveness through Innovation, Edgar Allen.

10 Carnegie Mellon University's Capability Maturity Model Integration (CMMI) is a process improvement appraisal system, especially for software development, with CMMI 5 being the highest certification level a company can achieve.

11 Source: http://www.mastek.com

12 Source: http://china-wire.org/?p=29335

## Challenges Faced By the Indian and Chinese IT Services Companies

Indian and Chinese IT services firms face several common challenges. These include, among others, very high attrition rates, rising costs, over-reliance on the time & materials (T&M) revenue model, and a general lack of innovation culture along with an inadequate focus on developing their own intellectual property (IP) and IP-based products. But, because many of the major IT services firms interviewed for this project are best-of-breed in their respective domains, they suffer from some of these challenges to a lesser degree compared to smaller firms.

Indian IT companies face high employee attrition rates and rising wages and benefits; the annual attrition rate can be as high as 30 percent or 40 percent. This places a huge burden on employee recruitment, selection, training, placement, and retention. Research by McKinsey & Company refers to this as "the war for talent"[13], which of course is prevalent in many industries and not just in India and China. And, despite India's and China's huge population, the number of people with the skills needed for specialized IT projects is relatively limited, and companies often poach employees from each other.

To deal with high attrition rates and to continue to meet staffing needs due to industry growth, companies typically have aggressive recruitment, selection, and training programs. Other retention approaches include employee stock ownership programs (e.g., Infosys), opportunities to live and work in other countries (e.g., TCS), continuous employee training and development (used by most of the major companies), and promoting employees relatively early in their careers.

Ideally, companies should be looking to adopt business models where they do not need to double the headcount to double revenues

As the market for IT talent continues to heat up in Tier-1 cities such as Bangalore, Hyderabad, Beijing, and Shanghai (and even in some Tier-2 city like Pune and Dalian), companies are beginning to move to Tier-2 cities where competition for talent and wages is not so high. For instance, both Pactera and Beyondsoft have offshore development centers in Xi'an – Pactera for TIBCO and Beyondsoft for Microsoft – and several Indian IT services firms have operations in Dalian[14].

While the concept of non-linear growth is catching on, most companies still use the T&M (linear) revenue model for the bulk of their business. Under the T&M model, a client is billed for the manpower (time) and materials needed for a project. A main disadvantage of the model is that in order for a company to double its revenues, it will need to double the manpower and materials needed for its engagements. Ideally, companies should be looking to adopt business models where they do not need to double the headcount to double revenues; in other words, non-linear business models. Companies relying

13 Steven Hankin of McKinsey & Co. coined the term, "the war for talent" in 1997, later popularized by the 2001 Harvard Business School Press book with the same title authored by Ed Michaels, Helen Handfield-Jones, and Beth Axelrod. The "war" continues to this day, according to research by McKinsey Global Institute's Richard Dobbs, Susan Lund, and Anu Madgavkar. In a CEO briefing in November 2012, "Talent Tensions Ahead", they concluded that there could be a shortage of 18 million workers in the high-skill, college-educated category in advanced economies by 2020. With China included, the shortage could exceed 35 million high-skill workers by 2020.

14 Given its strategic location in Northeast China, close to Japan and South Korea, Dalian has a special place in the strategies of many IT services firms. Some 870,000 speakers of the Japanese language and two million Koreans live in China, many in the Dalian region. Neusoft is headquartered in Dalian and, by now, many of the large Indian players (including TCS, Infosys, Wipro, and Genpact) also have operations in Dalian to benefit from its language and cultural affinity to their clients in Japan and South Korea.

exclusively, or mostly, on the T&M model find it increasingly difficult to grow beyond a certain level, or even to survive given rising costs and the entry of new players from new, even lower-cost geographies into their markets. For non-linear growth, a company needs business models exhibiting network externalities, which can be achieved if the company has its own IP-based products. (Bill Gates once famously remarked, "We want to be in only those businesses that have network externalities!").

A good is subject to network externalities when the value of the good to the individual (and to the company that produces it) increases exponentially with the number of individuals who use the good. For instance, if only one person has a fax machine it is worthless to him, but if a lot of people have fax machines, the value of the fax machine to its owners increases exponentially. This is true for all information goods (digital products), such as operating system software, application software, an insurance product, and so on. A company can achieve network externalities with its own IP-based products and services. The larger Indian IT firms have been investing in R&D, creating their own IP- and platform-based services, but most others have not been doing so and are thus unable to benefit from network externalities. TCS, for example, builds a platform, runs many applications on it, and automates as much as possible inside the platform. The same is true about Infosys Edge™, a suite of 20 IP-based products and business platforms, hosted and managed by Infosys.

Chinese IT services companies also face many of the same challenges as those faced by Indian IT services companies. Additionally, they are yet to develop large-scale delivery and systems-development capabilities. Costs are rising faster than in India, and the rising Chinese yuan and falling Indian rupee have made the Chinese IT companies even less cost-competitive compared to their Indian counterparts. They also lack deep relationships and continue to face "translation loss" and trust issues with foreign clients.

Given challenges such as these faced by Indian and Chinese IT services firms, it is a bit of a surprise that they became so successful and powerful in the global IT services industry. While there are many possible explanations, one explanation is the efforts made by industry players to develop and continually upgrade their capabilities to be able to serve their global clients. Another is the innovation approaches adopted by them to remain at the forefront of their industry.

# IV. Capability Building in the Offshore IT Services Industry in India and China

Effective achievement of organizational goals depends on the capabilities that organization members possess. Thus, capability building and continual upgrading are essential for organizational performance and continued success. Much depends on the existing knowledge base of a firm's current and future employees, and the training and development they receive on the job. According to a survey by the Conference Board, human capital is the second most critical challenge facing CEOs worldwide, and, in India and China, it is the most critical challenge they face[15]. A 2005 report by the McKinsey Global Institute (MGI) on the demand for talent in services found that of all the engineering graduates coming out of colleges in India, only about 25 percent are suitable for employment by multinational corporations[16]. Another MGI research report found that less than 10 percent of university graduates in China have what it takes to succeed in multinational corporations[17]. It therefore is not surprising that many IT services firms in India and China have well-developed training and competency development programs for new (as well as continuing) employees.

## Capability-building Approaches

Most of the major and mid-sized IT services firms in India and China interviewed for this project have good to extensive capability-building programs. Due to space limitations, the discussion below focuses largely on the human capital angle in capability building at some of these companies, though some other approaches are also briefly mentioned.

The TCS Competency Development Model (Figure 1) provides a good starting point for how major IT services firms in India go about capability development. Capability development typically starts with identification of competency needs at the company and a survey of existing employees' proficiency levels. This leads to recruitment, selection, and training and development plans to have employees with the requisite knowledge and skills needed by the company.

Recruitment and selection. Since employee attrition is a major concern, companies typically have aggressive recruitment, selection, and training and development programs. Capability building begins with a firm's recruitment and selection policies and practices. Major IT services companies in India have huge recruitment and selection programs, due to attrition and fast business growth. The largest private sector employer in India, TCS, for instance, hired about 70,000 new employees worldwide during each of the last three years (Table 1). These were hired through both campus and lateral recruitment programs in India and overseas (especially in United States, Canada, China, Uruguay, and Hungary). In 2012-13, the company had employees from 118 nationalities spread across almost sixty countries. The attrition rate at TCS is about the lowest in the IT services industry in India, ranging between 11 percent and 14 percent during the last three years. The Infosys Group hired an average of 42,000 new employees each year during the last three years, with the attrition rate ranging between 15 and 17 percent annually.

With an employee base and growth like this, it is not hard to visualize the recruitment and selection policies and processes that major IT services companies in India must have in order to function effectively and remain at the forefront of their industry. During 2012-13, for instance, TCS visited 371 college campuses in India and made 24,531 job offers to students to join the company after graduation. This is in addition to their lateral and global campus recruitment programs. The highly competitive TCS campus recruitment process includes (1) an online aptitude test of quantitative, critical reasoning, analytical reasoning, and read-

15 Mitchell, Charles, Rebecca L. Ray, & Bart van Ark, 2012, The Conference Board CEO Challenge 2012: Risky Business – Focusing on Innovation and Talent in a Volatile World, The Conference Board Research Report 1491, March.

16 Farrett, Diana, Martha Laboissiére, Robert Pascal, Jaeson Rosenfeld, Charles de Segundo, & Sascha Stürze, 2005, "The emerging global labor market: The demand for offshore talent in services", McKinsey Global Institute, June.

17 Farrell, Diana & Andrew Grant, 2005, "Addressing China's looming talent shortage", McKinsey Global Institute, October.

ing comprehension skills, and (2) a personal interview with technical and managerial employees. Infosys has a somewhat similar recruitment and selection process, with some of its recruitment tests being known as tougher than the GMAT and GRE. Of almost 3.8 million applications received in 2012-13, Infosys selected only about one percent of the applicants (37,036) for jobs at the company.

> "We read, ask questions, explore, go to lectures, compare notes and findings ... consult experts, daydream, brainstorm, formulate and test hypotheses, build models and simulations, communicate what we're learning, and practice new skills."
>
> Bill Gates

Internal training and development. Even with such stringent and highly selective recruitment and selection processes, major IT services companies put new recruits through intensive classroom and on-the-job training. For instance, at TCS, all campus hires begin their careers with an Initial Learning Program (ILP), a training program designed to provide them with the knowledge and skills necessary to succeed at TCS and in client engagements. Software engineers attend the ILP for six weeks, and all other entry-level associates for one week, receiving additional post-ILP training on the job and at client sites as needed. They have access to numerous web-based training courses in multiple disciplines and can also earn technical and professional certifications while at TCS. Employees are put through job rotation, not just within a function, but also between functions such as delivery and sales. They get exposure to different verticals and geographies, especially people identified for middle management positions. Each TCS employee receives at least 14 days of training per year, and there are tailored programs for leadership development. The company spends about 6 percent of its earnings on staff training and development each year. TCS invested 12,789 person years of effort in employee training and development during 2012-13[18].

At Infosys, continuous learning opportunities are offered to employees along four dimensions – technology, client business domain, processes, and behavioral skills. The company's four in-house educational institutions and programs are Education & Research (E&R), Infosys Leadership Institute (ILI), In-Step – Infosys Global Internship Program, and Campus Connect. The E&R group has state-of-the art technology and offers training to about 30,000 new recruits each year, as well as just-in-time courses delivered to employees based on unforeseen client needs, and other education programs via e-learning. Employees have the opportunity not only to improve their competencies but also to obtain recognized certifications to further their careers. The Infosys Leadership Institute (ILI) is an in-house global business school offering leadership and management development programs intended for the top 600 or so employees in the company. Infosys spends about 2 percent of its annual revenues on employee training and competency development, making continuing education available for all employees at all levels. During 2012-13, Infosys provided employee training to the tune of 1.4 million person days, in addition to the external training and certifications received by employees[19].

In China, the situation with regard to the existing knowledge and competencies of current and future employees is even more acute,

18 Tata Consultancy Services Limited Annual Report, 2012-13.

19 Infosys Annual Report, 2012-13.

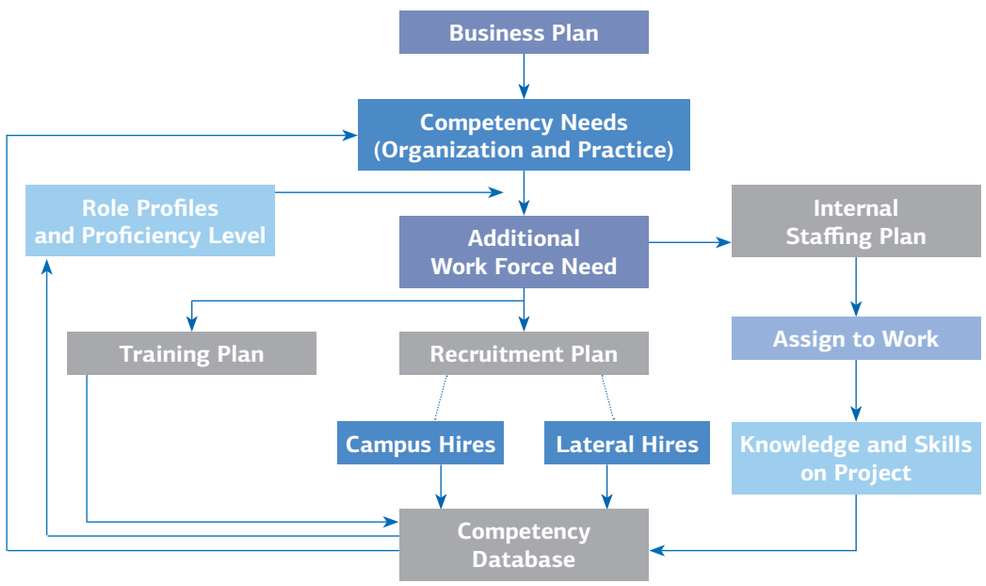
partly due to employees' inadequate preparation in the English language and deficient soft skills such as the ability to work in teams, critical thinking skills, and innovative flair[20]. Capability building at Beijing-based Pactera Technology International involves the usual technical training courses conducted in-house with company trainers as well as university professors. Pactera also offers training curricula tailored to the needs of specific clients, such as Microsoft and TIBCO, jointly with them. Top-level managers can study for company-subsidized Master's degree or MBA programs by taking 1-2 years off their regular jobs.

ChinaSoft International established its first Excellency Training Center (ETC) in Beijing in 2006 to develop human capital for its growing needs. By now, ChinaSoft International has several well- functioning ETCs all over the country, and has partnership with more than 400 higher learning institutions in China to provide university students with opportunities for internships and training. New employees go through induction training, and there are ongoing training programs for employees at different levels.

External training. Since the traditional colleges and universities do not prepare enough students to meet the increasing demand for IT talent, a number of private sector training institutions have been filling the gap in both India and China. The most prominent of these is NIIT (formerly, National Institute of Information Technology), established in 1981. With hundreds of training centers in India, China, and other countries, NIIT is one of the Top 5 training companies in the world with an annual turnover of $350 million. In 2004, the company was reorganized into two units – NIIT Limited, the training company, and NIIT Technologies Limited, which offers IT services.

In China, a number of U.S. and Indian firms have set up training centers. Among Western firms with their own or joint software training centers in China are IBM, Microsoft, Oracle, and Sybase. India's NIIT Limited entered Chi-

Figure 1: The TCS Competency Development Model




Source: Gargi Keeni, "Evolution of Quality Processes at Tata Consultancy Services", presented at SEPG Japan, September 2004

na in 1998 with a training center in Shanghai, and later set up a Wholly Owned Foreign Entity in 2001 to launch professional education centers in the nation. By 2009, the company had over 180 training centers across 25 provinces and cities in China and had been ranked as "the most influential IT training brand." In China, NIIT courses are typically part of the IT curricula at universities and colleges. Another Indian IT training firm, Aptech Limited, entered China in 2000 as a joint venture with Beijing University, and, by now, has several hundred software training centers in China.

Corporate universities. Many companies have set up their own "corporate universities" to not only have the workforce they need but also to improve employee retention rates. Zoho Corporation, with operations in United States, India, China, and other countries, has established the Zoho University in Chennai, India, which pays high school graduates in India and the U.S. to learn to code. Over 60,000 high school graduates compete for some 60 places at Zoho University each year – an acceptance rate of 0.1 percent. Graduates of its 18-month program now make up about 15 percent of programmers employed by the company. CRISIL, a Mumbai-based company that offers ratings, research and risk and policy advisory services, has a two-year work-study program that prepares college graduates as financial analysts. Participants in the CRISIL Certified Analyst Program (CCAP) receive on-the-job training in the company's various businesses four days a week, and classroom training two days a week. ChinaSoft International's ETC is effectively a corporate university, with extensive university relationships, and is now run as a profit center.

The most prominent corporate university in India is the "Infosys University" in Mysore, formally known as the Global Education Center (GEC). Spread across 337 acres with 200 classrooms and 500 instructors, GEC is the largest corporate education center in the world. It also is able to accommodate up to 5,000 students at a time. GEC runs the Infosys Foundation Program for fresh engineering graduates as well as programs for other employees. Given its educational, residential, and recreational facilities, Fortune magazine has dubbed it as "an odd combination of Disney World, Club Med, and a modern American university." China has sent four groups of 100-150 graduates each year to GEC in the last few years, with the cost of their education being absorbed by Infosys. The Infosys corporate university model has been copied by other companies, with training campuses proliferating in India's office parks and electronic cities, and not just in the IT industry[21].

Mergers & acquisitions. Overseas mergers and acquisitions are often made to gain valuable assets, including skills, capabilities, and technology, as well as market access. This has been a traditional method used by both Indian and Chinese companies to grow in foreign markets, while simultaneously acquiring the skills and capabilities they need.

The Chinese Government has been encouraging the development of services outsourc-

**Table 1. List of Companies/Executives Interviewed for This Project**

| Year | Tata Consultancy Services | | | Infosys Group | | |
|---|---|---|---|---|---|---|
| | Total No. of Employees* | No. of New Hires | Attrition Rate | Total No. of Employees* | No. of New Hires | Attrition Rate |
| 2012-13 | 276,196 | 69,728 | 10.6% | 156,686 | 37,036 | 16.3% |
| 2011-12 | 238,583 | 70,400 | 12.2% | 149,994 | 45,605 | 14.7% |
| 2010-11 | 198,618 | 69,685 | 14.4% | 130,820 | 43,120 | 17.0% |

20 Chen, Li-Kai, Mona Mourshed, & Andrew Grant, 2013, "The $250 billion question: Can China close the skills gap?", McKinsey Global Institute, May. (These comments pertain to all industries, not just to the IT services industry).

21 Chen, Li-Kai, Mona Mourshed, & Andrew Grant, 2013, "The $250 billion question: Can China close the skills gap?", McKinsey Global Institute, May. (These comments pertain to all industries, not just to the IT services industry).

ing since 2006, when the Education Ministry established some 35 pilot software colleges to produce industry-oriented graduates, and, in February 2009, the Government designated 20 cities as China's service outsourcing demonstration cities. As for India, the Government of India has established several Indian Institutes of Information Technology (IIITSs) with a view to meeting the demand for IT professionals with the requisite knowledge and skills needed by the IT industry. Twenty more IIITs are planned to be set up in the country as public-private partnerships, with plans to have an IIIT in each major state.

# V.
# Innovation in the IT Services Industry in India and China

Innovation is perhaps the most hyped term in company annual reports and news releases today. Digital product companies survive and grow on innovations and new product introductions. Microsoft, Adobe Acrobat, and other IT companies come up with new, upgraded versions of their digital products every few years. Companies selling smart phones, tablets, etc., try and come up with new, upgraded products every year or more often. For IT services companies, however, innovation is much more difficult. For most services firms, innovation is almost entirely customer driven. Other than that, IT services firms engage in innovation to improve processes and quality, lower costs, enter new technology domains and new industry verticals, and may even engage in business model innovation. This section explores the innovation landscape in the IT services industry in India and China.

## Business Model Innovation

While innovation typically refers to creating a new product or service, business model innovation refers to reinventing the business itself, or how a company conducts its business, not just what it does. Once a company has found a new value proposition, it aligns its resources and strategies to enhance that value proposition. An executive survey by the Economist Intelligence Unit concluded that, in many cases, business model innovation can be more valuable for company survival and growth than innovation in products and services[22]. Unlike product/service innovations, which tend to follow the product lifecycle (and most eventually die), business model innovation is "the gift that keeps on giving[23]."

Some of the Indian IT services firms interviewed for this project have developed innovative, new business models, which have actually transformed their businesses and differentiated their value proposition to their clients. Two examples are presented here: HCL Technologies and iGate.

Vineet Nayar, who became the CEO of HCL Technologies in 2005, when the company was performing well but not as well as its major competitors, held a "blueprinting" session of senior executives and adopted an "Employees First Customers Second" (EFCS) business model. The objectives of the EFCS model were: To provide a unique work environment to employees by inverting the traditional organizational structure, creating transparency in how the company functioned, making management accountable to employees, and encouraging a values-driven organizational culture. For instance, in reversing accountability, results of 360-degree surveys of the top 1,500 managers (including the CEO) were posted online for all employees to see. Since then, the company has generally recorded higher growth rates than India's Top 3 and the global Top 3 IT services providers, and has been recognized in various competitive benchmarking studies as best-of-breed for many of their service lines. Fortune magazine featured HCL as "One of the most innovative and disruptive companies in the world" and having "the world's most modern management." A book Vineet Nayar wrote on this theme became a bestseller in many countries and has been translated into several languages[24].

Most IT services firms in India bill their clients on a time and materials (T&M) model, billing them for the effort, time, and manpower expended for the client. In China, however, much of software development and IT implementation work is billed on a fixed price model. Phaneesh Murthy, CEO of iGate, started on a mission to change the T&M model to a "business outcomes" model for his company whereby clients "pay only for results" not for the time and resources spent on an engagement. For instance, mortgage companies pay their IT services providers for processing the mortgage applications they receive. Typically, only a fraction of the applications processed are eventually offered a loan, but the company pays its services provider

22 EIU, 2010, Business 2010 – Embracing the challenge of change, The Economist Intelligence Unit.

23 http://blogs.hbr.org/cs/2012/12/the_gift_that_keeps_giving_bus.html

24 Nayar, Vineet, 2010, Employees First, Customers Second: Turning Conventional Management Upside Down, Harvard Business School Publishing.

for each loan application processed. iGate, on the other hand, charges its mortgage company clients only for the loans that are actually approved, not for all loan applications processed.

## Structured Innovation

Many organizations have a strategic focus on innovation that involves one or more activities designed to develop innovations within the organization; we call it structured innovation. Some of the larger IT services firms in India and China do have a strategic focus on innovation, with activities such as R&D labs, technology innovation centers, centers of excellence, in-house research and education groups, and other formal initiatives to encourage innovation within the company. TCS, for instance, has had a long history of innovation, and established its first innovation lab in 1981 – the first ever and the largest, software R&D center in India. In addition to working on client-specific innovation projects, a key purpose of such initiatives is to create reusable assets based on the company's own IP and to develop IP-based products and business platforms. For instance, Infosys has a portfolio of some 20 IP-based products and business platforms, called the Infosys Edge™, using which it offers services with an outcome-based pricing model. The research and innovation group at iGate has developed over 300 reusable assets in cloud computing, social analytics, big data, enterprise mobility, and high performance computing.

A summary of some of the innovation and R&D initiatives taken up by IT services firms in India and China is presented below. Much of the information below pertains to large Indian IT services firms. Of the three large IT services firms interviewed in China, we found that only Pactera had a structured approach to innovation.

Innovation labs. TCS has a network of 19 global Innovation Labs located in India, USA, and UK — focused on technologies and verticals such as Web 2.0, software engineering, insurance, and telecom. The Infosys SETLabs (Software Engineering and Technology Labs), established in 2000, are designed to identify technology drivers to help the company stay at the technology frontier. The Labs enable Infosys' 500 researchers to work with standards bodies on future technologies, share best practices and maintain peer relationships with academic bodies, industry forums, conferences, and journals. The Technology Innovation Center at NIIT Technologies has a somewhat similar focus, and works on both current and future technologies. The Pactera Innovation Lab is involved in new and emerging technology areas as well as areas of high growth and high gross margins.

Research and innovation groups. Many of the major IT services firms in India also have research and innovation groups, typically involved in long-term, futuristic projects intended to sustain their competitive advantage. For instance, the Research & Education (R&E) Group at Infosys, which has dozens of Ph.D. scientists, works on "totally futuristic" and long-term projects, researching ideas "beyond IT" with a potentially big impact. The Research and Innovation Group at iGate focuses on delivery innovation, technology incubation, business analysis, and industry thought leadership.

Innovation portals. Some companies have established innovation portals within their organizations to help employees exchange ideas among themselves and to encourage grassroots innovation. For instance, the Value Portal at HCL Technologies is an ideas exchange platform for employees and is the largest company-based ideas platform in the world. As of June 2012, over 10,000 employees had been involved in idea generation, generating some 12,600 ideas, of which 2,242 had been implemented and 629 were under implementation.

## Open and Collaborative Innovation

Open innovation involves using any and all sources of ideas and innovations, inside and outside of the company[25]. These include aca-

25 The term "open innovation" was coined by Henry Chesbrough in his 2003 book: Open Innovation: The New Paradigm for Creating and Profiting from Technology, Harvard Business Review Press.

demia, independent researchers and scholars, other companies, and literally anyone with an idea. Another term sometimes used for open innovation is crowd sourcing. People get involved in open innovation for fun and excitement, and often for a "prize" or financial reward if their idea is accepted. Among the Indian and Chinese companies interviewed for this project, only one company, Genpact, was found to be using open innovation as a strategic approach to innovation. Genpact's SolutionXchange is an open innovation platform in which industry experts help generate solutions to business challenges posted by company employees and clients; significant financial rewards are offered to those submitting the most innovative solutions.

Another form of innovation considered for this project can be labeled collaborative innovation, whereby a company collaborates with clients and universities to develop technologies and applications. It is different from open innovation in that collaboration is with an identified group of individuals and organizations, and not quite like "crowd sourcing."

Several of the companies interviewed for this project do use collaborative innovation approaches. These typically include annual innovation forums held in different parts of the world in collaboration with clients and others (e.g., TCS), innovation workshops held jointly with clients (e.g., TCS's client innovation days, and NIIT Technologies' innovation workshops for its largest 8-10 clients once/twice a year), innovation co-creation jointly with clients and partners (e.g., TCS and Infosys), ongoing partnerships with major universities (e.g., TCS and Infosys), and running R&D centers for clients using the offshore development center model (e.g., Pactera). An example of innovation co-creation is the Infosys Oracle Innovation Center housed in a state-of-the-art facility at Oracle headquarters in Redwood Shores, California and at Infosys's offshore development center in Shanghai – involved in joint research, joint IP licensing, and joint product development. TCS's Collaborative Innovation Network[26] (COIN™), anchored at TCS Innovation Labs, connects players in the technology space, both large and small, to source innovations from multiple sources, including academic institutions, start-up companies, venture funds, multi-lateral organizations, and key clients to develop innovative solutions for clients. Pactera runs R&D overseas development centers for Microsoft and TIBCO in China.

26 http://www.tcs.com/about/tcs_difference/innovation/network/Pages/default.aspx

# VI. The Future of the Offshore IT Services Industry in India and China

The IT services and software industry, valued at $1.19 trillion in 2012, is estimated to grow at 5 percent a year through 2017. From the demand side, this implies potential new business worth almost $60 billion a year, representing a significant new business opportunity for IT services firms from India and China (and from newly emerging geographies in this space). This is in addition to their existing, long term business contracts, with over $100 billion worth of renewals coming up in the next 2-3 years.

From the supply side, India and China will more than double the pool of engineers over the next 4-5 years, and the advantages of labor cost arbitrage will not disappear any time soon. Dozens of companies, especially companies from India, have built deep expertise in their respective domains, achieving process maturity and scale, and have slack resources as well as long-standing relationships with customers (primarily CIOs), who tend to be risk averse and often stick with their existing vendors. The immediate future for IT services companies from India and China therefore looks promising, though they are not likely to be growing at 20-25 percent a year for much longer.

Not every company will benefit from the projected market growth, however. Only companies that continually upgrade their capabilities in line with emerging technologies and market imperatives, build deep domain expertise, extend the scope of the verticals they serve, nurture client relationships, are innovative, and use the right business models can hope to survive and even prosper in this hypercompetitive business environment.

Talent is likely to continue to be a big challenge for companies in India and China. The challenge for India and China is that a large percentage of fresh engineering graduates are simply not quite ready for real jobs. In India, many of them just do not get jobs. For those who do, as we saw earlier, companies have developed intensive training programs to make them job-ready. In China, engineering graduates do get jobs, but in manufacturing and industries other than IT, which is often their second or third career choice. And rising wages is creating challenges for IT companies in both countries. Smart companies have already started moving to Tier-2 and Tier-3 cities, where wages are lower and the war for talent less intense, and to recruit at second-rung schools as competition for graduates from top engineering schools has continued to increase.

The T&M-based offshoring model has been very profitable for Indian and Chinese companies and loved by their foreign clients. With rising costs, companies for which this is the major business model will likely be priced out of market by companies from even lower-cost geographies. Non-linear business models, based on network externalities, will do well in the coming years, as they do now. These business models require companies to develop their own IP-based products and to use platforms for doing multiple jobs for multiple clients on the same platform.

Companies looking for competitive advantages other than cost must look at their approaches for capability building and innovation as well as the quality of their client relationships. For capability building, they should explore avenues other than just training and development, such as overseas joint ventures, M&As, and licensing and technology collaborations. And, as they begin to move up the value chain, offering end-to-end business solutions, they also will need to develop deep relationships inside the CxO suite, not just with the CIOs.

# Appendix.

## Research Methodology

Questions related to "why" and "how" are best answered through qualitative research. Therefore, we utilized a qualitative research methodology to develop an understanding of how Indian and Chinese IT services firms developed the capabilities and innovations that brought them to the forefront in the IT services industry.

Findings in this study pertaining to capability-building and innovation approaches used by Indian and Chinese IT services firms are based on in-depth, personal interviews with about 30 senior executives of almost 20 leading IT services firms and their foreign clients. Each of the interviews lasted one-and-a-half to two hours or more and was conducted onsite at the companies' premises in India, China, and United States. Most of the interviews were conducted during February-May 2013, though some baseline interviews with foreign clients were conducted in December 2010. (Appendix-2 provides the list of companies visited and the job titles of executives interviewed).

Interviewees were asked questions related to their business models, core strengths and weaknesses, specific approaches used for developing and upgrading knowledge, skills, and capabilities, as well as their views on the IT services industry in India and China. Some interviews were followed up with phone calls to get more information from the companies. This information was supplemented with information obtained from secondary sources such as company websites, industry publications, and published research reports. After analyzing interview data, we presented our findings back to some of the research participants for discussion and validation.

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## List of Companies/Executives Interviewed for This Project

All of these companies, except one, were interviewed in person by the author, with each interview lasting one-and-a-half to two hours or more. All companies were interviewed on location in February-May 2013, except for some American multinationals interviewed in December 2010, shown with an asterisk (*) after their name. Cisco was interviewed twice (in India and China), and CSC four times (in United States, India, and China).

**Table 2. List of Companies/Executives Interviewed for This Project**

| Indian IT Services Companies | Chinese IT Services Companies | American IT Companies |
|---|---|---|
| **IT Industry Association, India**<br>NASSCOM<br>President | **Beyondsoft, Beijing**<br>(Phone Interview)<br>Vice President, Outsourcing Group | **Cisco (India and China)**<br>Director, Cisco India*<br>Senior Project Manager, Cisco China |
| **Genpact, Gurgaon**<br>Senior Vice President | **ChinaSoft International, Beijing**<br>CEO, Outsourcing Services Group<br>General Manager, Professional Services Group | **Computer Sciences Corporation (USA, India, and China)**<br>Chief Innovation Officer & President, Global Business Solutions Group (USA)*<br>Global Director, Office of Innovation & Business Practices, CSC India*<br>General Manager, CSC India<br>Chairman, CSC Greater China |
| **HCL Technologies, Noida**<br>Strategic Partnership Manager<br>Deputy General Manager<br>Associate Vice President | **Pactera Technologies, Beijing**<br>Vice President, Marketing | **Google India, Bangalore**<br>Product Manager* |
| **iGate, Mumbai and Bangalore**<br>EVP and Head of Strategy, Planning & Marketing (Mumbai)<br>VP, Human Resources (Bangalore) | | **IBM, Bangalore**<br>Director, Systems & Technology Engineering* |
| **iknowvate Technologies, Mumbai**<br>CEO | | **Insight Enterprises (China)**<br>Lead, Consulting Services |
| **Mastek, Mumbai**<br>Founder | | |
| **MindTree, Bangalore**<br>Chief Marketing and Strategy Officer | | |
| **NIIT Technologies, Noida and Bangalore**<br>Senior Vice President (Noida)<br>Chief Technology Officer (Bangalore) | | |
| **Quatrro Global Services, Gurgaon**<br>Chairman and Managing Director | | |
| **Tata Consultancy Services, Beijing**<br>CEO, TCS China<br>General Manager, Global Business, TCS China | | |

* indicates interview in December 2010

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