

NTU017**TATA CONSULTANCY SERVICES: SUSTAINING
GROWTH MOMENTUM IN CHINA 2010**Publication No: ABCC-2010-002
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In 2002, Tata Consultancy Services (TCS) set up operations in China, following its major client, GE Medical Systems. TCS China operations also supported the software needs of multinational and regional companies expanding in China, while providing the company with a platform to grow its local clientele base.

In 2006, TCS announced a new global business initiative which included plans for large-scale operations in China. The aim was to grow its China operations to become TCS' second global delivery centre after India, functioning as its offshore IT outsourcing hub for the Asia Pacific region. In addition, China's growing domestic software market presented attractive opportunities for IT services. TCS shifted its focus to China's financial sector, as many of China's domestic banks were then undergoing a period of major organisational transformation.

Given this, in 2007, the company set a target to increase its China-based manpower strength from 800 to 6,000 by 2011. However, the tight supply of IT talent in China was a major challenge and in early 2010, TCS' manpower strength reached 1,100. The company set a new target to more than quadruple its manpower strength to 5,000 by 2014.

Product/service innovation was an essential catalyst to sustain its growth momentum and to maintain a competitive edge in the Chinese market. What steps should the company take to tap the rising demand for outsourcing services while tackling the problems of achieving service excellence in a resource-tight situation?

Associate Professor Wee Beng Geok, Associate Professor A. Lee Gilbert and Ivy Buche prepared this case based on public sources. As the case is not intended to illustrate either effective or ineffective practices or policies, the information presented reflects the authors' interpretation of events and serves merely to provide opportunities for classroom discussions.

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INTRODUCTION

Worldwide, technology and related products and services spending (estimated) reached US\$1.5 trillion in 2009, a decline of 2.9 percent over 2008. Due to the global economic slowdown, the sector experienced heavy revenue reduction in the first half of 2009. Global corporations cut back discretionary spending and focused on leveraging IT spending, resulting in both pricing and volume pressures for IT service providers. However, in the second half of 2009, early signs of a rebound surfaced, largely driven by a revival in North America, and the Banking, Financial Services and Insurance industry (BFSI), along with increased adoption in emerging markets such as Asia Pacific and retail/healthcare industries. Full recovery was expected in the first two quarters of 2010.¹

Over the first decade of the new millennium, the Indian Information Technology (IT) and Business Process Outsourcing (BPO)² sector had become the country's premier growth engine crossing significant milestones in terms of revenue growth, employment generation and value creation. However, in 2009 the industry's performance was affected as clients cut their IT budgets, cancelled deals, delayed payments, and even went bankrupt while others renegotiated pricing, looking for severe pricing cuts and stretching the dollar. The sector had to re-engineer itself to face the challenges presented by the macroeconomic environment as currency fluctuations further dented their competitiveness.

The Indian IT-BPO sector reached aggregate revenues estimated at US\$73.1 billion in Fiscal Year (FY) 2009-10.³ As a proportion of national Gross Domestic Product, the sector revenues⁴ had grown from 1.2 percent in FY1997-98 to an estimated 6.1 per cent in FY2010. Direct employment was 2.3 million with an addition of 90,000 employees made during the year.⁵ Software and services exports (including BPO) remained the mainstay of the sector.

TATA CONSULTANCY SERVICES

Tata Consultancy Services Ltd (TCS) was headquartered in Mumbai with 142 offices (18 offices in USA and Canada) and a work-force of more than 160,000 employees operating in 42 countries worldwide, as at March 2010.⁶ (See **Exhibit 1A** for TCS' employee strength from 2002-2010 and **Exhibit 1B** for Composition of TCS' international workforce in FY2009-10.) Its services covered the entire IT value chain, including IT services, IT infrastructure services, enterprise solutions, asset-based services, consulting, BPO, business intelligence, performance management, and engineering and industrial services. TCS served 1,034 clients in 2010, encompassing a broad range of industries – BFSI, engineering, manufacturing, transportation, government sector, retail, telecommunications and healthcare.⁷

Among Indian companies, TCS was a pioneer in China, setting up a wholly-owned subsidiary in Shanghai in June 2002. This was in response to the industry-wide trend of 'near-sourcing', bringing operations closer to client locations, following many multinational companies (MNCs) moving into China. While successful in serving its MNC clients and in expanding the scope of its clients to the Chinese financial services industry, TCS China had recently failed to meet its human capital growth targets.

Company Background

Tata Sons started in 1868 as a trading firm, grew rapidly, and by the end of 20th century had interests ranging from locomotive and vehicle manufacturing, iron and steel, electricity, consumer goods, aviation, chemicals, textiles, hotels, watchmaking, software services, telecommunications to insurance. (See **Appendix 1** for Overview of the Tata group.)

TCS was set up in 1968 to serve the Tata group's internal needs for management consulting, data processing and other IT services. However, in the 1970s, it began soliciting for external business,

1 NASSCOM Strategic Review 2010. Executive Summary. The National Association of Software and Services Companies (NASSCOM) was India's trade body for its IT and BPO industry.
2 BPO is the transitioning of specific business processes or functions to third party providers. BPO providers offer economies of scale, category expertise, and infrastructure that many firms lack the resources to develop. BPO that is contracted outside a company's own country is sometimes called offshore outsourcing.
3 The fiscal year for the Indian economy follows a twelve month cycle spanning April – March.
4 The IT-BPO sector reported revenue of US\$4.8 billion in the FY1998.
5 NASSCOM. Strategic Review 2010. Executive Summary.
6 Tata Consultancy Services Ltd. *Annual Report 2009-2010*, p. 35.
7 Tata Consultancy Services Ltd. *Annual Report 2009-2010*, p. 9.
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mainly in the provision of IT application development and maintenance services to customers in developed markets, such as the US and the UK.⁸

Within a decade, TCS became the largest software service provider in India, and continued to grow in line with developments in global computing technologies. As companies in the West accepted UNIX as a programming standard, Indian IT service providers were on hand to offer cost-effective solutions for migration. TCS moved to the forefront by pioneering its 'remote project management' outsourcing model.

In the 1970s and 1980s, TCS exported IT talent, sending Indian programmers to serve overseas clients for short assignments. By the 1990s, advances in telecommunications and the availability of a large pool of low-cost and skilled technical manpower in India were major impetuses for the development of the global IT outsourcing industry led by Indian firms.

By the early 1990s, TCS' IT services (including system integration solutions, migration and re-engineering, application development and management services and testing solutions) for overseas clients from India rose sharply, relying on India's huge supply of low-cost skilled engineering talent. As more MNCs jumped onto the outsourcing bandwagon to improve efficiencies and cut costs, TCS led the pack of India-based service companies in reaping the benefits of this shift.

As the IT outsourcing boom continued, TCS' sales revenue in 2003 exceeded US\$1 billion (i.e. 5,102 crore⁹ rupees), and the company consolidated its position as Asia's largest software and IT services company. Buoyed by good growth prospects, in August 2004, the company launched its Initial Public Offering (IPO) on the Bombay Stock Exchange. TCS made a major impact on listing with the offering then billed as India's largest IPO.¹⁰

TCS' sustained growth over the last four decades mirrored advances in the field of computers and IT and the impact of these developments on global

industry and commerce. TCS and other India-based software/IT service providers, were well positioned to ride these technology shifts and to eventually build a global industry, centred on intensive development and effective deployment of India's large pool of engineering talent, to service the IT needs of global companies.

TCS' Business and Operations

Originally, TCS performed most of its IT services for MNC clients through delivery centres in India. However, it became increasingly clear by the late 1990s that the company had to move closer to the customer to deliver locally. TCS built up its operations in North and South America, as well as in Europe, UK, Middle East, South Africa, the Asia Pacific, and Australia. By 2006, this evolved into its 'near market' strategy.

For TCS, this demanded flexible global delivery of IT services, and its strategy was to deliver value to its customers through a Global Network Delivery Model (GNDMTM) designed to ensure 'One Global Service Standard'.

The GNDMTM enables our delivery centres to collaborate on projects, leverage all assets, work on a 'follow-the-sun model' if necessary, and through their homogeneity in terms of quality, skills as well as look-and-feel, give customers the same experience of certainty, irrespective of whether they work in Chennai, China or Chile.¹¹

S. Ramadorai¹²
CEO and Managing Director, TCS (2007)

Under this model, TCS' solution centres were categorised into three groups – Global, Regional and Near Shore, based on scale, breadth of skills required and proximity to customers (see **Figure 1**). The aim was to "do the work where it can best be done by the right people", and provide the ideal mix of competency capability, cost and country mix for each client across the world.¹³

8 Retrieved May 15, 2008, from http://www.ibef.org/download/tata_consultancy_29june07.pdf

9 A crore is a unit in the Indian numbering system equal to 10 million. One crore rupees equals about US\$215,1000 (at exchange rate of Rupee 1= US\$0.02151 as at 30 July 2010).

10 TCS' market capitalisation more than quadrupled from around US\$8 billion at the IPO to US\$34 billion at the end of March 2010.

11 Tata Consultancy Services. Management Discussion and Analysis. *Annual Report 2006-2007*. p. 51.

12 In October 2009, S. Ramadorai stepped down after 13 years as CEO, upon reaching the retirement age of 65 years and continued as non-executive Vice Chairman and a member of the board of directors. N. Chandrasekaran assumed the role as CEO and Managing Director (he was previously COO and Executive Director).

13 Tata Consultancy Services. Management Discussion and Analysis. *Annual Report 2006-2007*. p. 54.
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Figure 1
Global Network Delivery Model™

Global Solution Centres	Regional Solution Centres	Near Shore Solution Centres
India, Brazil, China	Argentina, Chile, Colombia, Ecuador, Hungary, Mexico, Morocco and Uruguay	Canada, Luxembourg, Singapore, South Africa, UAE, UK and US
– Very high scale – Serves large customers – High depth and breadth of skills – Matured processes	– Medium scale – Serves local customers – Select capabilities – Addresses language and cultural challenges	– Smaller scale – Customer geography and time zone – Helps to build customer comfort

Source: Adapted from TATA Group Brochure. (2010, March). p.15

By July 2010, TCS had 106 solution centres located in 20 countries across the world which were at the heart of its delivery process. (See **Exhibit 2** for the spread of GNDM™ solution centres worldwide). Each solution centre could be likened to a shop floor, where client work was performed and internal training was conducted. GNDM™'s multi-continent and interconnected global development centre network (local, regional and global) also allowed for better risk management. This lowered the total cost of ownership of the technology by managing different service streams (such as consulting, IT services, IT infrastructure services), through a unified delivery framework.

TCS also set up specialised facilities and offices in various locations around the world. These included:

- Centre(s) of Excellence (COE) - development facilities where specific application skills (such as Oracle) were developed, proposals were written for projects that would utilise those applications and technical support was provided for resulting projects. A COE was also a place for promoting best practices and disseminating relevant software application tools and templates. To set up these facilities, TCS formed strategic alliances and joint ventures with technology and e-business leaders, including IBM, Netscape, Microsoft, SAP, Oracle and Compaq. These arrangements helped TCS to further strengthen its own product and service offerings.
- Tata Research Development and Design Centre (TRDDC) located in Pune, India, was responsible for the creation and development of advanced proprietary software tools for application in TCS' commercial projects.

- Innovation labs were set up in India and globally since 2000 to develop domain-specific solutions using new technologies. In 2010, TCS had 19 such labs worldwide.
- Co-Innovation Network (COIN™) was set up in 2007 in collaboration with external parties such as academic institutions, start-up companies, venture funds, strategic alliance partners and key clients to develop joint solutions – e.g. next generation software methodology, utility computing and bio-informatics. (See **Exhibit 3** for TCS' COIN™ framework.)
- Marketing/Business Support Offices around the world undertook marketing activities and covered client relationship management, public relations and local legal matters for the firm.

At the turn of the century, TCS had set its target to be in the global top 10 IT services by 2010. The firm achieved this vision in 2009 based on parameters such as revenues (ranked 8th), profits (ranked 6th), number of employees and market capitalization.¹⁴ In FY2009-10, TCS recorded sales revenue of US\$6.34 billion with a net profit of US\$1.46 billion. (See **Exhibit 4A** for Growth in Revenue and Net Profit from FY2002-03 to FY2009-10 and **Exhibit 4B** for Services Mix in FY2009-10).

In terms of markets, North America continued to lead, contributing 52.8 percent of revenue; the UK grew to 16.18 percent but the rest of Europe remained stagnant. Emerging markets in Latin America, China, Middle East and Africa contributed over \$1 billion in revenue but this was largely project based and not annuity. (See **Exhibit 5** for Revenue breakdown by geographic segment.)

¹⁴ Tata Consultancy Services Ltd. Annual Report 2009-2010.

BENCHMARKING

The Capability Maturity Model (CMM) was developed under the guidance of the Software Engineering Institute of Carnegie Mellon University, US – organised into five maturity levels with CMM Level 5 being the highest. For quality assurance, TCS benchmarked itself against these assessment standards. In August 2004, it became the first company in the world to achieve maturity Level 5 for both Capability Maturity Model Integration (CMMI) and the People CMM (P-CMM) qualifications, on an enterprise-wide basis. TCS' training programme as a *Key Process Area* received special mention under CMM assessments as a fundamental strength of the company. The company's quality management system (iQMSTM) melded elements of various quality standards and frameworks to integrate the various components of managing quality – the company's technologies, processes and people. These standards and frameworks included IEEE, ISO 9001:2000, CMMi, P-CMM, SW-CMM and Six Sigma.

By 2005, only 5 Chinese companies had achieved CMM level 5 certification, compared with 42 companies in India. The number of Chinese companies that had achieved CMM level 2 certification was less than 50.¹⁵

TCS IN CHINA

When a major client, GE Medical Systems, began producing medical equipment in China, TCS followed suit and founded its first service delivery operation in China to support their software needs. A marketing office was soon set up in Beijing to support clients in northeast and northwest China, followed by an Off-shore Development Centre in Hangzhou to service clients in the Asia Pacific region, in coordination with TCS delivery centres in India.¹⁶

It became apparent to TCS (as well as other Indian outsourcing firms) that China's domestic software market, estimated to be worth US\$50 billion in 2007, was potentially very attractive. Furthermore, by exploiting China's low-cost labour and large pool of engineers, China could become a profitable offshore IT outsourcing hub for East Asia: Japan, South Korea and Taiwan.

TCS' management saw China's potential as their second global delivery centre after India. Girija Pande, Director of TCS Asia Pacific, explained:

*This is a business of skill and scale. There aren't many countries with both. In Asia, you have India and China... TCS is already employing tens of thousands of Indian engineers. That leaves China as an untapped talent pool.*¹⁷

In July 2006, TCS announced the formation of a Joint Venture (JV) with three Chinese IT companies owned by the local governments of Beijing and Tianjin. Microsoft also became an investor and took up a 10 percent stake in the JV. The new JV was formally established in February 2007 and was folded in with TCS' existing Chinese operations to create a single, stronger entity which would provide IT, BPO and engineering services to China's domestic outsourcing market.

Over the next two years, TCS set up four service delivery centres in China located at Beijing, Shanghai, Hangzhou¹⁸ and Tianjin, followed by a marketing office in Shenzhen in 2008.

Competing in China – Focus on the Financial Sector

TCS' initial approach to China focused on demand from MNCs and regional players expanding in the country. In 2007, it found a niche in the domestic financial sector. Chinese banks were going through a period of transformation as many domestic banks still used older, proprietary core banking systems built from various software products and internally developed features. Those systems were no longer able to support the growing transaction volumes or strategic innovations, such as mobile and internet banking.¹⁹

15 David I. Cleland, D. I. & Gareis, R. (2006). Global project management handbook: planning, organising, and controlling international projects (2nd ed.). New York: McGraw-Hill.

16 Ganapati, P. (2003, June 26). TCS has big plans for China. Retrieved January 31, 2008, from www.rediff.com/money/2003/jun/26tcs.htm

17 Einhorn, B. (2006, March 8). India turns to the Middle Kingdom. *BusinessWeek*.

18 TCS operations based in the Hangzhou Binjiang Hi-Tech Industry Development Zone had been awarded the 2007 Hangzhou Best HR Award for excellence in HR practices and Best Performing Company Award by the District Personnel Bureau of the Hangzhou Hi-tech Industry Development Zone.

19 Perez, B. (2009, December 28). Tata tech unit targets 20pc expansion on mainland. *South China Morning Post*.

In late 2006, TCS won a landmark deal worth US\$100 million from the Bank of China, the first major domestic IT contract with a Chinese firm secured by an Indian company. This was followed by another multi-million dollar contract to implement a comprehensive international trading system for the China Foreign Exchange Trade System, a unit of the People's Bank of China in 2007.²⁰

*We are finally able to make real inroads into the banking and financial sectors in the domestic market in China. In banking, insurance and finance, we can take over the majority of the market. So far, we have been walking; now it is time for us to run.*²¹

Jonathan Lam, CEO, TCS China

Software outsourcing projects from international banking customers served by TCS was the second key growth driver. By end-2009, TCS provided offshore outsourcing services to about 40 banking customers, mostly based in the US.

TCS' financial offerings such as core banking systems²² were well received in China. In 2009, Beijing-based Hua Xia Bank, Bank of China and Guangdong Rural Credit Union²³ successfully went live with TCS BaNCS Core Banking²⁴ solution. In April 2010, its banking system implementation for Hua Xia Bank won the Asian Banker's Best Core Banking IT Implementation award. TCS also won the Asian Banker award for the development of a trading platform for the China Foreign Exchange Trade System. According to Pande:

*We've made lots of investments. Now, we need to grow the business and... we've decided financial solutions are a good area where we're strong, so we will focus on that.*²⁵

Scaling Up

As TCS faced slowing revenue growth in 2009 amidst the global economic downturn when major customers (based mainly in the US and Europe) shelved projects and negotiated lower rates for products and services, the company sought to reduce its dependence on these markets. TCS wanted to increase its presence in growing markets such as Asia Pacific and the Middle East and Africa. China, Australia and Southeast Asia would continue to drive the company's growth in the Asia Pacific region. However, China was expected to have the fastest growth rate of more than 20 percent in 2010 as the revenue base was still small and IT spending was climbing quickly.²⁶ Pande stated:

*We are still at an early stage in China. But the country is on our top five list as we try to capture the opportunities beyond the Western markets.*²⁷

The Chinese software industry registered strong growth of more than 30 percent in 2008, indicating that the industry has not been impacted by the ongoing global economic crisis. The government's continuous efforts to make China a 'hi-tech' service-based economy had fuelled growth in the domestic software industry.²⁸ (See **Appendix 2** for Overview of China's IT industry.)

Factors encouraging the software players (both domestic and foreign) to enter the Chinese software industry included:

- Government support in the form of IT investment
- Provision of quick approvals to secure international investment
- Construction of software parks
- Easy access to rapidly developing IT infrastructure
- Availability of low-cost resources

20 Aiyer, P. (2007, September 17). China joint venture, advantage Tata Consultancy Services. *The Hindu*, India.

21 *ibid.*

22 Depending on the scale of a project's implementation, the cost of adopting TCS' financial system could range from US\$10 million to US\$100 million.

23 Guangdong Rural Credit Union was the largest provincial credit union in China with 6,686 branches, 57,000 employees and more than 700 billion yuan in deposits as of November 2009.

24 TCS BaNCS Core Banking was ranked as the leading core banking solution in China for three years in a row since 2007 by IDC, a leading provider of global IT research.

25 Yeo, V. (2010, April 21). TCS gears Shenzhen facility for more China business. *ZDNet Asia*. Retrieved July 28, 2010, from <http://www.zdnetasia.com/tcs-gears-shenzhen-facility-for-more-china-business-62062775.htm>

26 Perez, B. (2009, December 28). Tata tech unit targets 20pc expansion on mainland. *South China Morning Post*.

27 India's Tata sets sights on China. (2008, January 15). *China Daily*.

28 China Software Market Forecast to 2012, Market Research Reports. *Marketsmonitor*. Retrieved July 28, 2010 from <http://www.marketsmonitor.com/China-Software-Market-Forecast-to-2012-Report/IM005.htm>

By 2008, TCS China served over 30 clients, half of which were MNCs like Eaton, Motorola, Cummins, Johnson Controls, with operations in China.

Scoping Up

In this context, TCS launched a three-pronged strategy to ramp up its mainland business:

- Moving into Guangdong to tap the vast and thriving manufacturing and financial services sectors. Huawei Technologies (largest maker of telecommunications equipment) and Ping An Insurance (China's second-largest insurer) were the first major customers in Guangdong to sign contracts with TCS.
- Penetrating the country's telecommunications sector – TCS was keen to get involved in the IT development plans of China Mobile, China Telecom and China Unicom – three fixed and mobile communications carriers under the mainland's restructuring programme.²⁹
- Broadening its client base – TCS was striving to enter the energy and utility, aviation and automotive industries of China. Chinese companies in recent years had been increasingly willing to turn over some tasks to external service providers to reap economies of scale and lower costs. They were also looking for support in IT services as they globalised.

To support its growth strategy in South China, TCS China's fifth delivery centre was expected to open in Shenzhen in August 2010. This centre would also service Hong Kong companies doing business on the mainland or inclined to outsource to Shenzhen, as well as regional companies located in Hong Kong.³⁰ However, the company did not have plans to enter the tier 2, 3 and 4 cities in China.

KEY COMPETITORS IN CHINA

Strong competition existed among Indian and global IT service providers for the Chinese market and the local IT talent needed to serve this rapidly growing market.

Infosys Technologies

Bangalore-based Infosys Technologies Ltd, with revenue of over US\$4.6 billion in 2010 (second-largest IT services company in India), was another pioneer in China. Infosys China had started with an initial capital of US\$5 million in 2003 and a subsequent additional investment of US\$18 million with a vision to build a world-class delivery hub. It had two development centres – Shanghai (focused on IT services such as Application Development and Maintenance, Enterprise Solutions, Independent Validation Services and Finacle Solution³¹) and Hangzhou (which specialised in BPO services). Infosys China combined global offshoring best practices of its parent company with local Chinese talent. In early 2006, the company employed 450 people in China and aimed to ramp up recruitment to meet a target of 6,000 employees in China by 2010-11. However, in 2010, Infosys China had 2,000 consultants and planned to add another 1,000 during the year. The company achieved CMMI Level 5 (V 1.2) in 2007.³²

In May 2010, Infosys announced the establishment of a China Education Centre to develop software talent in research and education institutions at Jiaying Science City (JSC). Infosys would train 1,000 university engineering graduates for entry-level positions, and conduct soft skills and leadership training programmes for its employees annually at the China Education Centre. In addition, the Centre would train the Computer Science faculty of Chinese universities in new and emerging technologies.³³

Wipro Technologies

In 2004, Wipro Technologies (India's third-largest software exporter) incorporated a subsidiary in China and set up a 50-seat development centre in Shanghai to address the requirements of global clients in the first phase and also to serve as a regional hub for the company's global operations. Most of the basic research and development (R&D) work was done in India, and the China development centre worked on localisation of software and provided implementation and support services. In 2008, the company had about 200 staff working in China and a further 200 working in India supporting its China-based operations, but

29 Perez, B. (2008, July 22). Tata Consultancy expands Guangdong operations. *South China Morning Post*.

30 Yeo, V. (2010, April 21). TCS gears Shenzhen facility for more China business. *ZDNet Asia*. Retrieved July 28, 2010, from <http://www.zdnetasia.com/tcs-gears-shenzhen-facility-for-more-china-business-62062775.htm>

31 Finacle, Infosys' core banking solution could be deployed at large and medium-sized banks.

32 Retrieved July 28, 2010, from <http://www.infosys.com/china/english/pages/index.aspx>

33 Infosys' China Education Centre taps into a reservoir of talent. (2010, March 31). Retrieved July 28, 2010, from <http://www.infosys.com/newsroom/features/pages/china-education-center.aspx>

this was expected to rise to 2,000 by 2010. Wipro saw the potential to set up other development centres leveraging on China's talent pool and thereafter seek Chinese clients. In late 2009, Wipro announced the inauguration of its global delivery centre with a capacity of 1,000 seats in Chengdu, China to provide IT and BPO services to its customers.³⁴ The company was strong in the Asia Pacific and the Middle East and was diversifying the geographic mix of its business by pushing expansion into markets outside the US, mainly in Europe and Japan.³⁵

IBM Global Services

IBM, the world's largest IT company, offered end-to-end solutions ranging from hardware to software services and high-end consultancy in China. China was IBM's second largest global delivery centre worldwide.

- IBM China Global Delivery (GD) Shanghai Centre was established in 1999 providing application services to clients worldwide, especially in Japan.
- IBM China GD Shenzhen Centre was established in 2002 providing technical support, call centre and command centre services to clients worldwide.
- IBM China GD Dalian Centre was established in 2003 as the strategic Centre for IBM Business Transformation Outsourcing (BTO) businesses in Asia.
- IBM China GD Chengdu Centre was established in 2007, providing development, operation and maintenance of application systems to clients.

IBM China was certified CMMI V1.1 Maturity Level 5 in 2004 and was renewed as CMMI V1.2 in 2008. IBM had a presence in 27 cities in China through branch offices and representative offices.³⁶

BUILDING CRITICAL HUMAN CAPITAL CAPACITY IN CHINA

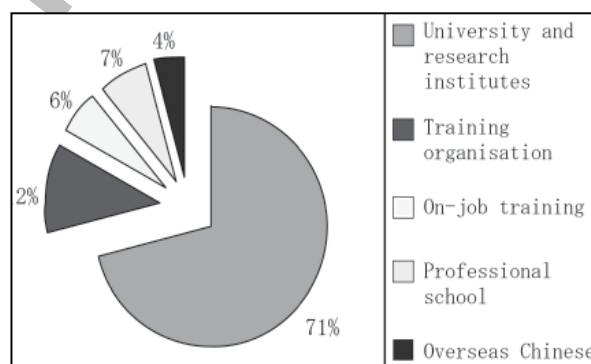
TCS' outsourcing model for developed countries tapped India's large IT talent pool. However, in China,

salaries for programmers in Beijing, Shanghai and Shenzhen were only half the salaries for similar positions in India.³⁷ Other issues such as working visa requirements and processing costs, local language and culture proficiency requirements set by clients, along with the added costs of expatriation and repatriation of Indian IT consultants, meant that TCS would have to tap on China's low-cost IT talent in a big way.

China's IT Talent Pool

Educational institutes were the major source of software engineers, with 71 percent trained in universities or research institutes in 2003 (see **Figure 2**).³⁸ About 650,000 engineers graduated each year from China's tertiary institutions compared to 450,000 in India.³⁹ By December 2005, China produced 400,000 computer science graduates a year, compared to 181,000 IT engineering graduates in India.⁴⁰

Figure 2
Source of Software Engineers in China



Source: CISA, 2003, Annual report of China software industry (2002-2003). p. 153

Despite this, the demand for skilled software engineers in China outstripped supply. For example, in 2002, China needed about 120,000 entry-level software engineers per year, whereas there were only 60,000 available.⁴¹ Furthermore, a 2005 report by McKinsey & Co highlighted that China's education

³⁴ Williams, M. (2008, February 26). Wipro Plans Major Expansion in China. *International Data Group News*.

³⁵ Wipro Ltd. (2009, November 26). *Wipro Inaugurates Development Centre in Chengdu, China* [Media release].

³⁶ Retrieved July 28, 2010, from <http://www-07.ibm.com/employment/cn/zh/gdc/introduction.html>

³⁷ InformationWeek China survey. Cited in McDougall, P. (2006, July 31). Indian outsourcers acquire a taste for Chinese fusion. *InformationWeek*.

³⁸ Liu, X. (2004). Technology Policy, Human Resource and Chinese Software Industry. *National Research Centre for Science and Technology for Development*. Retrieved January 29, 2008, from http://www.iipi.org/Conferences/Hawaii_SW_Conference/Liu%20Paper.pdf

³⁹ Aiyar, P. (2007, September 17). China joint venture, advantage Tata Consultancy Services. *The Hindu*, India.

⁴⁰ Einhorn, B. (2006, March 8). India turns to the Middle Kingdom. *BusinessWeek*.

⁴¹ Kharbanda, P.V. & Suman, Y. (2002, December 25). Chinese initiative in the software industry – Quest to leap. *Current Science*. 83(12).

system emphasised theory over practical solutions, leaving fewer than 10 percent of job candidates suitable for work in foreign companies as engineers, accountants, analysts and other careers. This over-emphasis on theoretical subjects produced graduates with limited practical experience, who were unlikely to be immediately productive in a commercial environment.

Responding to this, China's Education Ministry established 35 national pilot software colleges (each with an annual student enrolment of 800) to produce industry-oriented graduates.⁴² Cities like Shanghai and Jinan were also actively developing software engineering curricula for training centres and enlarging existing training institutions to support the demand from local industries.

Another trend, with China's entry into the WTO, was the emergence of training centres set up by foreign software companies to provide specialised software and IT training. For example, IBM had a joint training programme with Shandong University (Shandong-IBM software training base); Microsoft collaborated with China's Education Ministry to implement a "Great Wall Plan", while Oracle and Sybase also set up similar training platforms.

Indian IT training companies also moved to China to tap the potential demand in the manpower training space. India-based Aptech Ltd entered China in 2000, through a joint venture with Beijing University – Aptech Beida Jadebird IT Co Ltd. By 2006, Aptech had over 250 centres in 57 Chinese cities and had since trained over 200,000 students, adding another 131,789 students to its rolls during the year.⁴³ Aptech not only ran IT training classes through local centres, it was also redesigning curriculum for several universities (about 50 colleges). By 2010, China was seen as Aptech's most successful overseas venture, with 270 centres across the country.⁴⁴

Another Indian company, NIIT Technologies launched its first training centre in Shanghai in 1998, in cooperation with Pudong Continuing Education Centre, the education arm of the municipal government of Shanghai. In 2001, the Chinese government permitted NIIT to set up a Wholly-Owned Foreign Entity, enabling it to become the first Indian company to set up wholly-owned professional education centres in China.

NIIT worked in partnership with local companies, leading universities and software technology parks, and customised its education offerings (available in Mandarin) to target all segments of IT training in China.⁴⁵ By 2006, the company's training centres numbered 120, which grew to 183 across 25 provinces and cities in China by end-2009.⁴⁶

Attracting Software Engineering Talent in China

In India, TCS and the Tata Group in general were consistently rated among the top employers. In China, the Tata brand name was largely unknown before 2002.

A 2007 survey⁴⁷ by ChinaHR.com, one of China's leading web-based recruiters, revealed that seven out of the top 10 best employers were indigenous Chinese companies (see **Figure 3**). The survey reported that university graduates considered training and development opportunities, brand impact, favourable salary and welfare package as the

Figure 3
Ranking of Best Employers in China

Rank	Company
1	Lenovo China
2	China Mobile
3	Haier Group
4	Huawei Technologies Co Ltd

42 O'Leary, C., Lawless, D., Gordon, D., Li, H. & Bechkoum, K. (2006). Developing a software Engineering Curriculum for the emerging software industry in China. IEEE Computer Society.

43 Aptech Limited. (2007, April 24). *Aptech captures 32 percent market share in China* [Press release]. Retrieved February 11, 2008, from http://www.aptech-worldwide.com/press-release_2007/24042007.htm

44 Duttagupta, I. (2010, April 4). JV model is the way to go in the Chinese market: Aptech. *Economic Times*.

45 As per the International Data Corporation (IDC) report, the top five players in the Chinese IT education and training service market made up 51.8 percent market share in 2007 - Aptech with 32.1 percent (retaining its No.1 position in China for the 5th consecutive year), NIIT with 7.6 percent, Xinhua Computer Education with 4.6 percent, Qinghua Wanbo with 3.8 percent and Si Yuan IT Education with 3.7 percent.

46 NIIT is top IT trainer brand - in China! (2009, October 1). Retrieved July 28, from <http://www.indiatechonline.com/niit-top-trainer-in-china-144.php>

47 About 50,000 graduates from 656 domestic universities took part in the survey.

three most important employer criteria. In competing for top talent, indigenous Chinese companies emphasised employees' career growth and building their own employer brand.⁴⁸

DEVELOPING IT CONSULTANTS FOR TCS CHINA

By mid-2003, 74 out of 100 employees at TCS China-based delivery centres were locals.⁴⁹ The rest were Indians, mostly at the managerial level. By February 2007, of the more than 800 consultants and project managers employed by TCS, 90 percent were local Chinese staff.⁵⁰ TCS had set a target of growing its workforce strength in China to 6,000 by 2010/11.⁵¹ However, by early 2010, TCS China employed 1,100 people⁵², failing to meet this target. To achieve the strategic goal for the China operations as a global delivery centre and to tap on domestic clients, its Chinese IT talent pool would have to be increased substantially. TCS set a new target to more than quadruple its work force in China to 5,000 by 2014.⁵³

TCS took various steps to establish a presence in Chinese campuses as it felt that it was important to understand "the pattern of education in a region".⁵⁴ The company collaborated with leading universities to carry out joint applied R&D projects. Seminars were conducted at many leading schools on topics such as Six Sigma, CMMi and Open Source, which were not taught as part of the regular curricula. The company also sponsored students and faculty to conduct research at its R&D centre in India.

At the local community level, TCS Chairman Ratan N. Tata was appointed as Honorary Economic Advisor to the government of Hangzhou, while CEO S. Ramadorai was appointed as Honorary IT advisor to the governments of Hangzhou and Qingdao.

To achieve TCS' assurance and commitment to customers of homogeneity in terms of quality, skills as well as look-and-feel in its global service delivery, the Chinese IT recruits were put through TCS' training regime.

The first few batches of recruits were trained by instructors from India, the curriculum closely following the Indian Initial Learning Programme (ILP) with English as the medium of instruction. However, to build and sustain a China-based training programme, beginning with the fifth batch of local recruits, some ILP training was conducted by Chinese TCS consultants and project managers who had acquired the requisite expertise and experience. Eventually, ILP China had its own faculty and Chinese trainers conducted all business-oriented classes and many of the technical sessions. The Trivandrum team oversaw the curriculum and tracked overall progress.⁵⁵ (See **Exhibit 6A** and **6B** for TCS' Training Programme and Causal Loop Diagram for Training, respectively.)

Given TCS' 'follow-the-sun' global service delivery, it was important to encourage collaboration across locations and regions. One of the tools used was its technology platform designed for senior management to access business developments and monitor costs across projects and global locations. The use of this technology encouraged collaboration among cross-location teams and helped improve assimilation of new employees in remote sites.⁵⁶

TCS also integrated Human Resource (HR) Management systems and processes into its global enterprise resource planning (ERP) system, drawing employees in its locations all over the world into the global TCS family. The aim was to make its IT talent pool aware of the "possibilities across geographies".⁵⁷

48 Chinese companies are better employers. (2007, June 29). Retrieved January 29, 2008, from <http://www.recruitment.advertising.cn/news/132.html>

49 Ganapati, P. (2003, June 26). TCS has big plans for China. Retrieved January 31, 2008, from <http://www.rediff.com/money/2003/jun/26tcs.htm>

50 TCS inaugurates new JV in China; clinches deal to set new currency system trading system. (2007, February 13). Retrieved March 15, 2008, from <http://www.tcs.com/ics/releases/20070213.htm>

51 Tata to set up Asia banking technology centre here. (2006, April 24). *The Business Times*, Singapore.

52 92 percent were locals.

53 Luk, L. (2009, October 14). India's TCS said it will expand staffing in China. *The Wall Street Journal*, Asia Edition.

54 Talgeri, K.N. (2008, February 23). United colours of TCS. *Outlook Business*. Retrieved December 15, 2008, from <http://business.outlookindia.com>

55 Rodrigues, C. (2006, September 7). Grooming global managers. Retrieved April 17, 2008, from http://www.tata.com/0_our_commitment/employee_relations/articles/20060907_grooming.htm

56 Talgeri, K.N. (2008, February 23). United colours of TCS. *Outlook Business*. Retrieved December 15, 2008, from <http://business.outlookindia.com>

57 *ibid*.

Managing a Globally Diverse Workforce

As a knowledge-intensive business, TCS needed to tap on and disseminate the knowledge and expertise accumulated in its delivery centres all over the world in order to enhance the competency capital of its global human capital pool. To achieve this, the company's learning and development activities had to move from a functional support role in the organisation to become a business partner working with TCS global operations at all levels, and ensure the "co-creation of learning experiences continuously and consistently."⁵⁸ (See **Exhibit 7** for TCS' competency development model.)

To build a global perspective, TCS' policy was to send staff from diverse geographical locations to India to work on projects as a means of understanding how TCS functioned.⁵⁹

To feel the pulse of local sentiment, the company periodically assessed employee-inclusiveness across its delivery centre networks, with the aim of monitoring specific cross-cultural nuances or reasons that might impact on employee satisfaction or dissatisfaction.

Similarly, for its China operations, given TCS' promise to customers of seamless service delivery, the challenge was to manage and balance local and global cultures:

*We have to appreciate the traits of each and every culture, but also ensure that certain values of TCS are overlaid at the top.*⁶⁰

N Chandrasekaran
COO and Executive Director, TCS (2008)

TCS management realised that when it came to project implementation, the China team had the potential to execute perfectly. Pande explained:

The execution capability in China is absolutely outstanding. Over the years, the Chinese have realised

*the value of delivering on time. You don't miss deadlines whether they are building a bridge or they are building an IT system. Customers expect it. That's how they build large organisations and cities – with an amazing amount of military precision.*⁶¹

TCS' CHALLENGES IN CHINA

TCS' GNDMTM model meant that a global perspective was critical for TCS China. The value proposition for the company's multi-location strategy included corporate clients' language preferences, operating cost considerations, tighter security and disaster-recovery options, regulatory compliance, and a 'follow-the-sun' model for handling transactions and services (such as round-the-clock call centre operations).

To develop TCS China into a major IT offshore outsourcing hub, next in size only to India, TCS had to build a sizeable local IT workforce. However, the availability of technical and language skills and other resources in China varied greatly from one location to another. Furthermore, finding local IT managerial talent in China was also a challenge:

*While it is easy to find code writers with competence levels and salaries at par with Indian equivalents, qualified middle-level managers are in short supply. They are, thus, more expensive and more difficult to retain than their counterparts in India.*⁶²

Jonathan Lam
CEO, TCS China

For TCS' talent management initiatives to succeed in China, it meant adapting its HR practices to local customs as well as economic and social conditions in China, while attempting the global integration of its Chinese IT human capital pool. TCS encountered significantly higher staff costs and turnover in China

⁵⁸ Simple is beautiful. (2007, October). *Training and Development*. Retrieved December 15, 2008, from http://findarticles.com/p/articles/mi_m4467/is_ai_n21297014

⁵⁹ *ibid*.

⁶⁰ Talgeri, K.N. (2008, February 23). United colours of TCS. *Outlook Business*. Retrieved December 15, 2008, from <http://business.outlookindia.com>

⁶¹ Tata Consultancy Services' Girija Pande: China and India Are on Different Roads to a Common Destiny. (2010, July 15). *Wharton India Economic Forum*.

⁶² Aiyar, P. (2007, September 17). China Joint Venture, advantage Tata Consultancy Services. *The Hindu*, India.

than in its home market. For certain senior positions, engineers could command 50-70 percent more pay in China than in India. Obligatory non-wage costs such as social security added 45 percent to pay in China, twice as much as in India.⁶³ Ramadorai explained:

*For some skills, China is very expensive... We were quite surprised by these numbers because the issue is not just the cost of the individual but also welfare costs borne by the company.*⁶⁴

Pande stated:

*TCS must also contend with annual staff turnover of 18 percent in China, compared with 10 percent in India (in 2007). We're not used to such a high attrition rate but that's the way the market is.*⁶⁵

In addition, scalability - the ability to grow quickly when circumstances warrant - posed a challenge because of the scarcity of good English speakers and experienced managers in China. TCS' service delivery required frequent communication with overseas offices, and the inherent uncertainty in developing complex software placed a heavy burden on managers.

Another key challenge was to develop qualified leadership and management ranks, which would take time. Cross-cultural issues in managing two different management styles were also highlighted by Pande:

Confucian thinking, which dominates Chinese mindset in everything they do, has a lot of respect for authority and a lot of respect for a certain restraint on leadership. It is a very top-down driven issue.

I always have a challenge when I am with our Chinese team. I want them to argue. I encourage them to argue.

*I say to them, "All knowledge does not reside in me. In fact, the least resides in me. I am here to listen and hear from you." In India, you open a room full of young people and you don't have a chance to talk. It is not to say that there are not great ideas coming out in China. It's just that the way you have to address, is different.*⁶⁶

GOING FORWARD

To meet its growth targets, TCS China would have to achieve a balance between supply and demand, while meeting increasingly tough cost competition and client quality expectations. Cost was no longer the main issue for outsourcing projects, as clients learnt how to seek other values, such as unique domain expertise and experience, in their specific industries.

In catering to the US, Indian outsourcers dominated high-end services, such as consulting and systems architecture, while Chinese competitors currently delivered less skilled tasks such as coding and program testing. India's annual IT outsourcing exports were estimated at US\$50 billion in FY2009-10.⁶⁷ In comparison, China captured about US\$2.72 billion of the offshore software development market in 2009. IT consultancy firm, IDC, expected this to more than double in five years to US\$6.78 billion in 2013.⁶⁸

Japan and Korea had been the main contributors to China's offshore software development industry for the past 10 years accounting for about 50 percent of the market in 2007. However, major US companies, such as Coach, Motorola, and Target, had also contracted IT or IT-driven business process work to China, accounting for about 15 percent of the country's outsourcing contracts.⁶⁹ China's outsourcing market grew as it created a niche in writing software for Japan and other East Asian nations. The key challenge for TCS was to make the most of the complementarities of the Chinese and Indian markets.

⁶³ Ribet, S. (2007, December 12). Outsourcing lead eludes China. *South China Morning Post*.

⁶⁴ TCS Challenges in China. (2007, April 25). *Financial Times*.

⁶⁵ *ibid*.

⁶⁶ Tata Consultancy Services' Girija Pande: China and India Are on Different Roads to a Common Destiny. (2010, July 15). Wharton India Economic Forum.

⁶⁷ NASSCOM Strategic Review 2010. Executive Summary.

⁶⁸ Luk, L. (2009, October 14). India's TCS Said It Will Expand Staffing in China. *The Wall Street Journal*. Asia Edition

⁶⁹ McDougall, P. (2006, July 31). Indian Outsourcers Acquire a Taste for Chinese Fusion. *Informationweek*.

As TCS would not be able to serve all sectors of the emerging Chinese economy, one key issue was to select the most suitable market segments over time. The most attractive segments were likely to be a moving target. Slowdown of the global economy and the outbreak of the international financial crisis had driven three shifts in Chinese economic policy:⁷⁰

- From encouraging investment in foreign demand to boosting domestic demand
- From emphasising the “bringing in” of overseas enterprises to the “going out” of domestic enterprises
- From emphasising offshoring and exports to focusing on domestic demand and independent innovation for development

In view of the above, strong growth was expected in the domestic sector.

While manpower would continue to be a factor limiting the growth of TCS, it was far from obvious how to develop sufficient human resources to meet demand, or even which skills would be critical in the next era. As new enabling technologies such as mobile data services emerged, they created the potential for new business models, and whatever Chinese technical staff might lack in applications knowledge, they made up in their scientific training. And as TCS China grew with the market, its need for management skills at all levels would grow exponentially.

⁷⁰ Qi Zhijun, (2010, January 27). Analysis of and Suggestions on China's Domestic Outsourcing Market. *ChinaSourcing*. Retrieved July 28, 2010, from <http://en.chinasourcing.org.cn/content2.jsp?id=3957>

APPENDIX 1

THE TATA GROUP

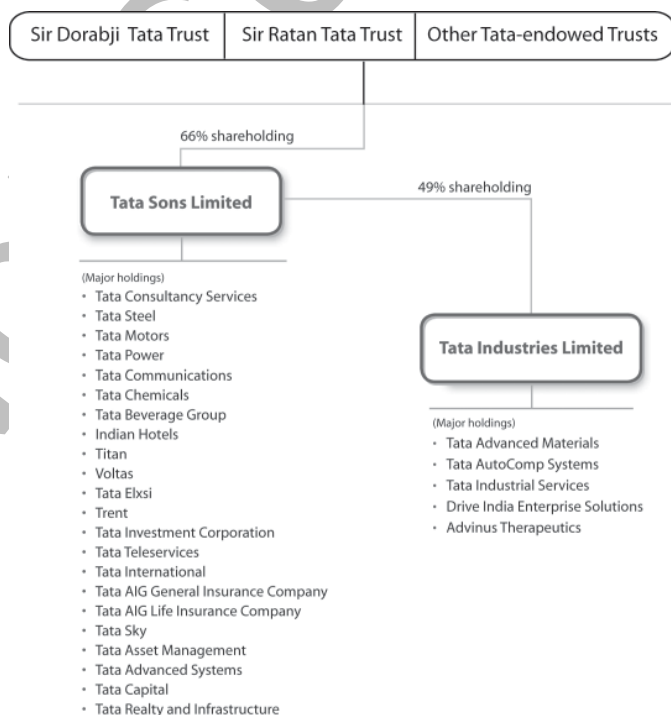
The Tata Group was one of India's oldest, largest and most respected conglomerates. It traced its origins to 1868 when Jamsetji Nusserwanji Tata founded a private trading firm. In the 14 decades that followed, the venture grew and diversified into a variety of industries such as textiles, hotels, iron and steel, electricity, consumer goods, aviation, chemicals, locomotive and vehicle manufacturing, watchmaking, software services, telecommunications and insurance.

In 2010, the Tata Group comprised about 100 operating companies in seven business sectors: Communications and Information Technology, Engineering, Materials, Services, Energy, Consumer Products and Chemicals. They were active in over 80 countries and exported products and services to more than 85 countries. The Group achieved consolidated revenue of US\$70.8 billion in FY2008-09 and 64.8 percent of this was from businesses outside India. The Group employed over 363,000 people worldwide.

Twenty-eight of the operating companies were publicly listed, with a shareholder base of 3.5 million. Their combined market capitalisation of US\$76.5 billion (as at 22 July, 2010) exceeded that of any other business group in India, in either the public or private sector.

Philanthropic trusts endowed by members of the Tata family controlled the Tata Group (see **Figure 1**). These trusts held approximately 66 percent of the share capital of Tata Sons, a holding company and promoter for the Group's companies. TCS was a division of Tata Sons. Tata Sons also controlled Tata Industries, which promoted the Group's entry into new and high-tech industries.

Figure 1 – TATA Group Holding Structure



Source: TATA Group Brochure. (2010, March). p. 4.

The Tata Group had a philosophy of aligning business practices with nation-building and for the benefit of Indian people. The Group's companies adhered to strong values and business ethics, and were committed to corporate social responsibility. Business decisions were guided by five core values: Integrity, Understanding, Excellence, Unity and Responsibility.

APPENDIX 2

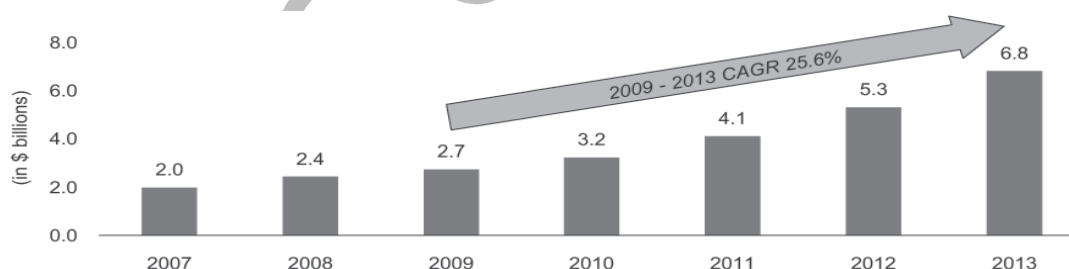
CHINA'S IT INDUSTRY

In 2000, China's IT industry had emerged as the third largest in the world, according to the Ministry of Information Industry (MII), China. The average growth rate of the IT industry was 31.4 percent while the national economy grew at an annual rate of 8-10 percent. At the national level, government attention had been skewed towards the hardware sector of the IT industry and China had become an established manufacturing base for computers, mobile phones and information products.¹ Many of the hardware firms went on to establish software arms. Another major group of software firms originated from enterprises involved in the systems integration of software and hardware in customised arrangements.

An important development since 2003-04 was the gradual movement from low-value outsourcing work towards mid-end outsourcing work, involving greater levels of consultation and design. This was driven by the improving technical competence of Chinese outsourcing providers, the rising pressure on margins for low-end work resulting from Renminbi appreciation as well as rising human capital costs.

In 2006, the Chinese IT sector had an aggregate revenue of over US\$150 billion with hardware accounting for over 90 percent of the total, while revenue from software and services segment was US\$12.3 billion (up from US\$2.4 billion in 2000). In 2006, the domestic market accounted for over 86 percent of the total IT software and service revenues at US\$10.5 billion while IT software and services exported from China was US\$1.8 billion.² China's offshore software development industry grew at a Compound Annual Growth Rate (CAGR) of 30.7 percent from 2005 to 2009 to reach US\$2.7 billion. IT consultancy firm, IDC, estimated it would grow at a CAGR of 25.6 percent through 2013 to reach US\$6.8 billion (see **Figure 2**).

Figure 2
China's Offshore Software Development Market



Source: IDC, 2009. Published in HiSoft Technology International Limited. (2010). IPO Prospectus. p. 103.

Despite the double-digit annual growth rate of the industry, the supply side remained fragmented and lacked scale. In 2005, it was estimated that there were 8,000-10,000 firms operating in the IT software and services sector in China. Of these, about 70 percent consisted of small players with less than 50 employees each and with operations predominantly restricted to their respective cities and provinces. The top 10 providers accounted for a combined share of 17.5 percent of the segment revenue. Global MNCs accounted for half of the top 10 and contributed two-third of the revenue aggregate in 2005. Top Chinese companies, had fewer than 20,000 staff and therefore were only able to execute deals worth about US\$20 million.

Beijing had the largest concentration of software firms. Although Shanghai had fewer software firms, it was China's premier commercial and financial centre with a high concentration of overseas investments and the most developed finance and high-tech industries. Other cities with a higher concentration of software firms included Xian (a leading industrial centre in the western part of China), Jinan (in the Shandong province), Shenzhen (near Hong Kong) and Guangdong (in the south Coastal area). By early 2009, there were 20 cities designated as 'window cities' to house software outsourcing companies.

1 Kharbanda, V.P. & Suman, Y. (2002, December 25). Chinese initiative in the software industry – Quest to leap. *Current Science*, 83(12).

2 Tracing China's IT Software and Services Industry Evolution. (2007, August). White paper prepared by NASSCOM Research.

EXHIBIT 1A

TCS' EMPLOYEE STRENGTH

Fiscal Year	Number of associates
2001-02	23,089
2002-03	27,536
2003-04	33,774
2004-05	45,714
2005-06	66,480
2006-07	89,419
2007-08	111,407
2008-09	143,761
2009-10	160,429*

*Overseas nationals formed over 10,400 or 6.7 percent of the total employee base

Source: Compiled from TCS Annual Reports

EXHIBIT 1B

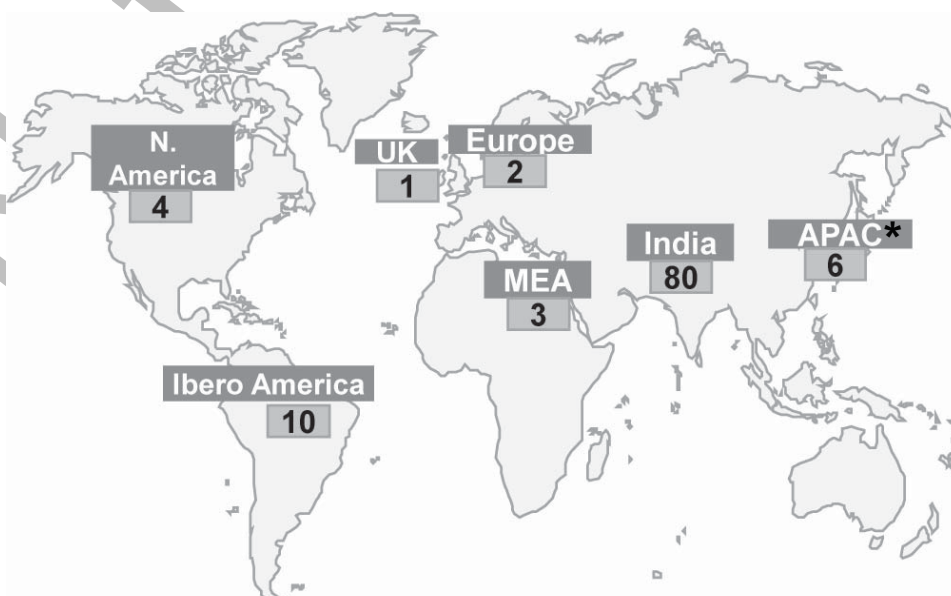
COMPOSITION OF INTERNATIONAL WORKFORCE FY2009-10

Nationality	FY2009-10 (%)
Chilean	13.4
Brazilian	10.4
British	5.8
Ecuadorian	11.9
American	11.9
Chinese	8.6
Uruguayan	8.4
Mexican	8.0
Hungarian	5.5
Others	11.3
Argentina	2.4
Colombia	2.3

Source: Tata Consultancy Services Ltd. Annual Report 2009-2010.

EXHIBIT 2

GNDM™ - 106 SOLUTION CENTRES WORLDVIEW (JULY 2010)

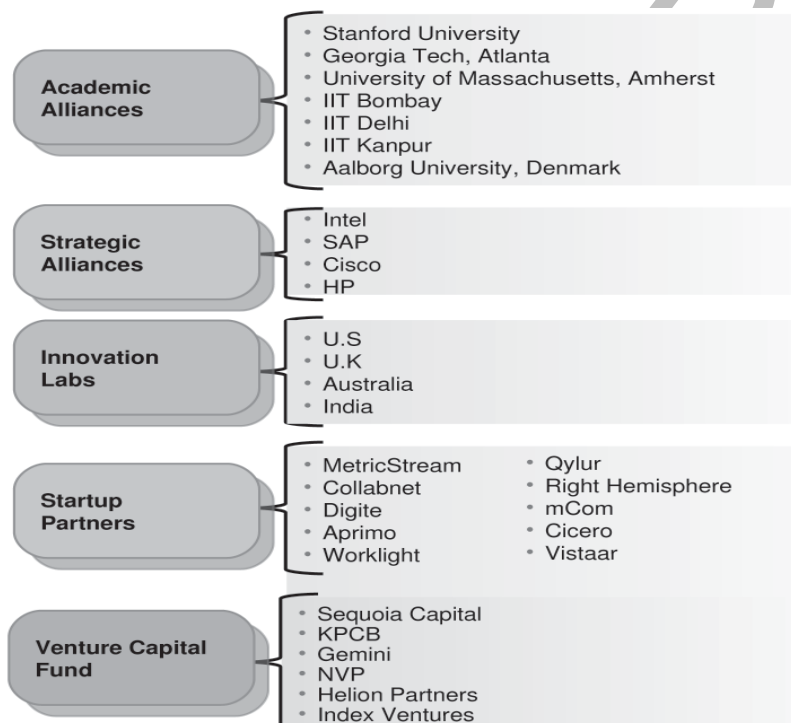


* TCS Asia Pacific or APAC includes the following countries - Australia & New Zealand, China, Japan, Hong Kong, Korea & Taiwan and Singapore & ASEAN (Indonesia, Malaysia, Philippines & Thailand).

Source: Tata Consultancy Services. (July, 2010). Investor Relations Presentation.

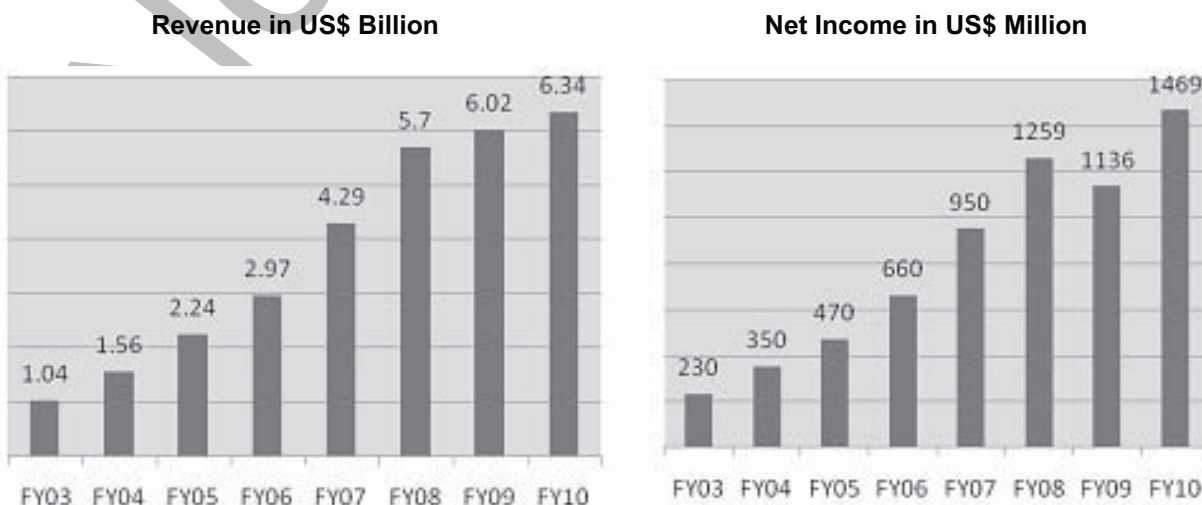
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EXHIBIT 3 TCS' COIN™ FRAMEWORK



Source: Mande, S. (2010, June 4). Innovation at TCS. CTO Presentation.

EXHIBIT 4A OVERVIEW OF TCS' FINANCIAL PERFORMANCE



Source: Compiled from TCS Annual Reports.

EXHIBIT 4B

SERVICES MIX IN FY2009-2010

Services	FY2009-10 (%)
Application Development & Maint.	48.73
Business Intelligence	5.69
Enterprise solutions	10.47
Assurance services	5.04
Engineering & Industrial services	4.98
Infrastructure services	8.36
Global Consulting	1.91
Products	3.29
Business Process Outsourcing	11.53

Source: Tata Consultancy Services Ltd. Annual Report 2009-2010.

EXHIBIT 5

REVENUE BY GEOGRAPHIC SEGMENT

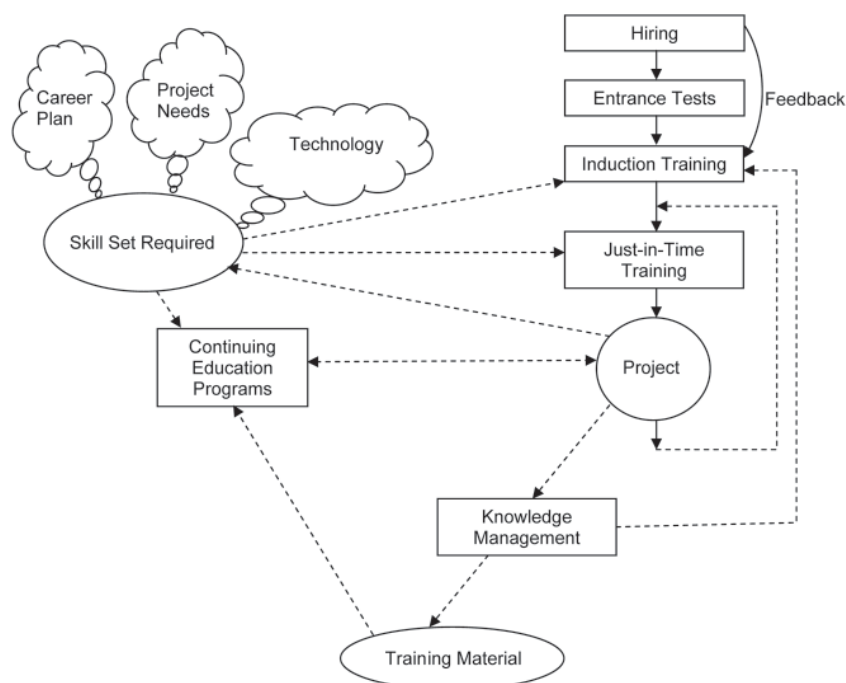
Geographic segment	2009-10 (%)	2004-05 (%)
North America	52.80	59.20
United Kingdom	16.18	-
Europe	10.49	*23.08
India	8.65	12.18
Asia Pacific	5.24	-
Ibero-America	4.72	-
Middle East and Africa	1.92	-
Others	-	5.54
Total	100	100

*United Kingdom included.

Source: Compiled from TCS Annual Reports 2004-05 and 2009-10.

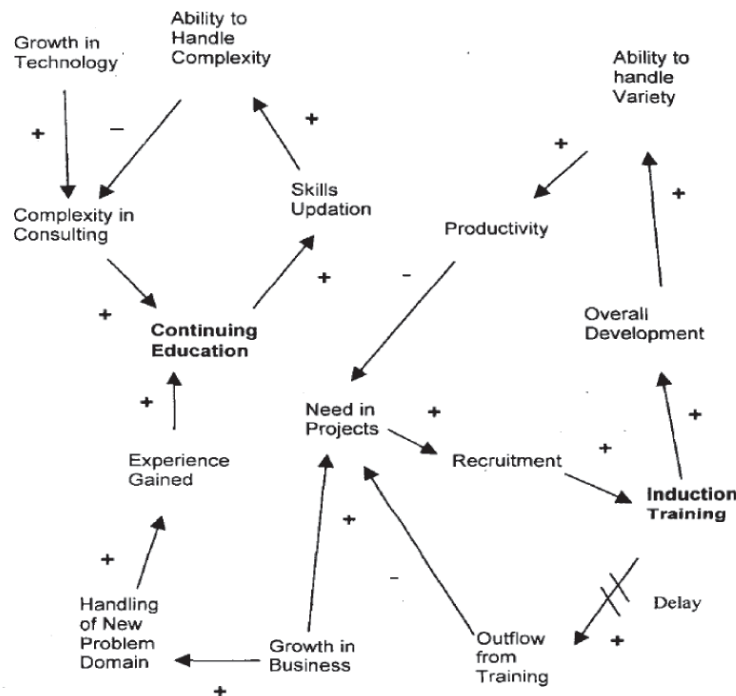
EXHIBIT 6A

TCS' TRAINING MODEL



Source: Narayanan, R. & Neethi, S. (2001). Building Software Engineering Professionals: TCS Experience. Software Engineering Education and Training, 2001. Proceedings. 14th Conference. © 2001 IEEE.

EXHIBIT 6B CAUSAL LOOP DIAGRAM FOR TRAINING



Source: Narayanan, R. & Neethi, S. (2001). Building Software Engineering Professionals: TCS Experience. Software Engineering Education and Training, 2001. Proceedings. 14th Conference. © 2001 IEEE.

EXHIBIT 7 TCS' COMPETENCY DEVELOPMENT MODEL



Source: Dr Gargi Keeni. (2004, September). Evolution of Quality processes at Tata Consultancy Services. SEPG Japan. Retrieved May 15, 2008, from <http://www.jaspic.jp/event/2004/SepgJapan/proceedings/ISA1.pdf>

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