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Chapter 3

Offshore Outsourcing of Knowledge Based Industry: Software and ITES Sector

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Abstract

India and China have emerged as two of the world's fastest growing economies. While China's fast growth has been based on rapid industrialization, India's recent growth has been lead by the service sector, particularly software and information technology enabled services (ITES). China is now speeding up the development of software and ITES, but nonetheless still at an early stage of sector development. China has strengths and advantages for the growth of software and ITES sector such as strong government support, strong infrastructure, a large talent pool, solid platform for cultivating Asian market and untapped domestic market. By leveraging these advantages, China may take different trajectories from India and become unique global outsourcing destination.

Keywords: China, India, software, information technology enabled service, government policy, human capital, Bangalore, Dalian

1 Introduction

India and China have emerged as two of the world's fastest growing economies. While China's fast growth has been based on rapid industrialization, India's recent growth has been lead by the service sector, particularly software and information technology enabled services (ITES).

Software and ITES are high value-added, environmentally protected and relatively lower natural resource consumption compared to manufacturing sector. Also, the sector absorbs large number of educated human resources. China is now speeding up the development of software and ITES to realize industry strategic adjustment and take advantage of its rich human resources. China has gained the attention as a software and ITES offshore destination. This paper compares the status quo of software and ITES sector in India and China, looks at China's ability to compete with India, and identifies the major contributing factors to their patterns of software and ITES sector developments.

The structure of the paper is as follows. Section 2 provides a brief overview of software and ITES sector in India and China to review the characteristics of the sector in each country. Section 3 examines the factors that support development of the sector. In section 4, we see the sector development process in depth from case studies of Bangalore and Dalian. Section 5 offers a summary conclusion of the paper's findings.

2 Software and ITES sectors in India and in China

The revenue aggregate of the global software and ITES sector in 2007 was estimated at over US$ 940 billion, growing at 7.4%. The revenue in India was estimated to be US$ 52.0 billion, account for 5.5% of the global revenue. The revenue in China was estimated to be US$ 82.2 billion, account for 8.7% of the global revenue. The revenue of the Indian software and ITES sector is smaller than that of China (Table 1).

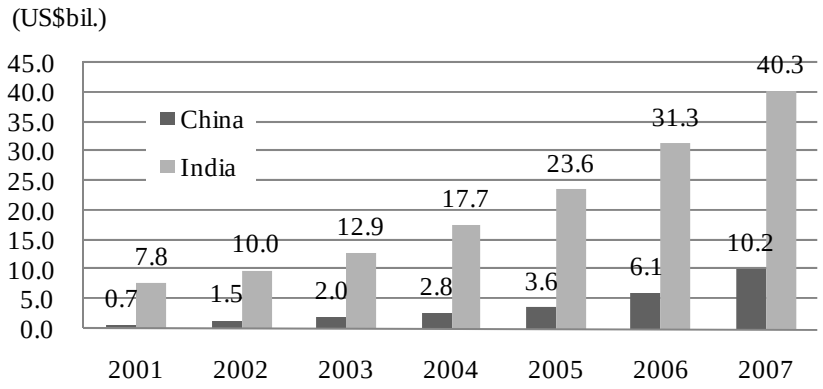
Table 1: Global Software and ITES Revenues (2007)

	USA	EU	Japan	China	India	Others	Total
Revenue in billions (Unit: US$)	343.0	260.0	89.2	82.2	52.0	113.6	940.0
Share (Unit: %)	36.5	27.7	9.5	8.7	5.5	12.1	100.0

Source: CSIA (2008).

Comparing the export revenue, however, the revenue of India was much larger than that of China. The gap is increasing and it is unlikely that the China will catch up India in the foreseeable future (Figure 1).

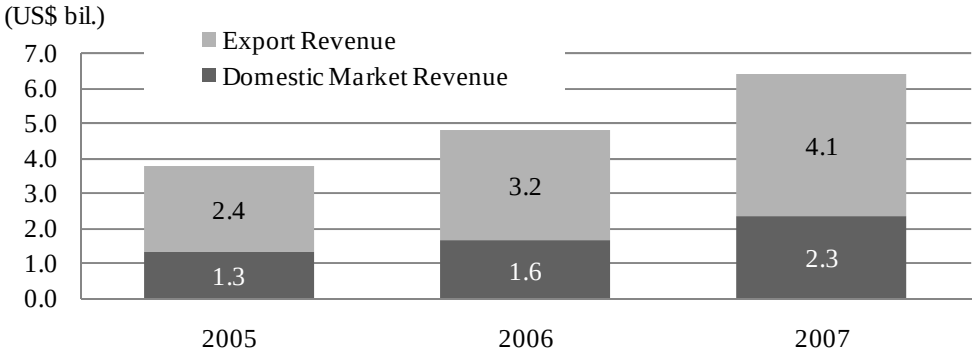
Figure 1: Software and ITES Exports from India and China (2001-2007)



Source: CSIA (2008).

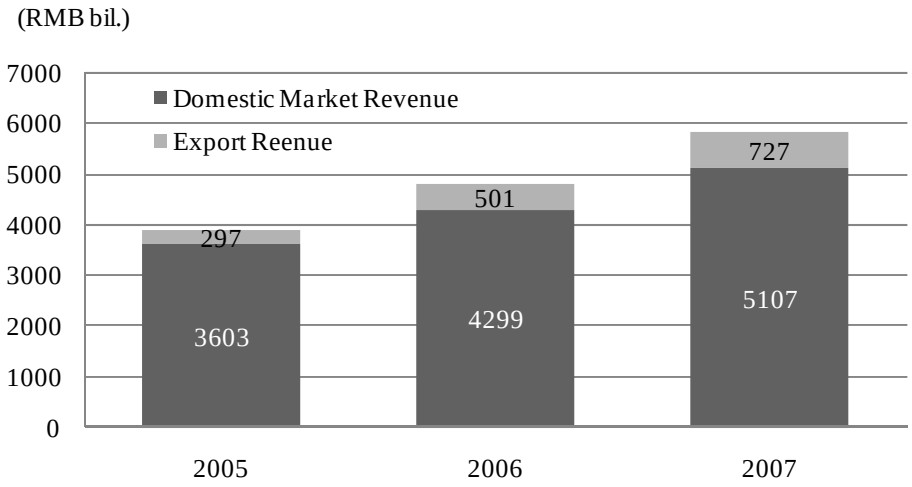
The software and ITES sector in India mainly serves to the export market and its domestic market is small unlike China (Figures 2 and 3).

Figure 2: Software and ITES Revenues in India (2005-2007)



Source: NASSCOM (2008).

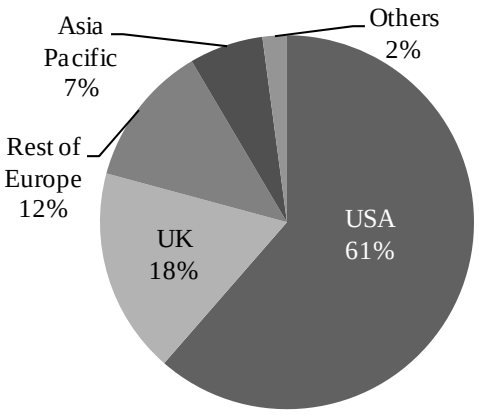
Figure 3 Software and ITES Revenues in China (2005-2007)



Source: CSIA (2008).

The US and UK remain the dominant markets for Indian exports, accounting for nearly 80% of the total (Figure 4). On the other hand, China's software and ITES exports are predominantly serving the Japanese market, which account fore 60% of the total export (CSIA).

Figure 4: Geographic Markets Served by the Software and ITES Sectors in India (2007)



Source: NASSCOM (2008).

India's software and ITES companies are much larger in scale than Chinese companies. The headcounts of the top three Indian companies are around hundred

thousands. On the other hand, the largest Chinese company has recently reached ten thousands (Table 2). China's average headcounts per company in the sector is below 100, which is less than one tenth of India.[1] China lacks scale players and its market is fragmented with many small companies.

Table 2: Top three Indian and Chinese Software and ITES Companies

	Revenues	Headcount
Tata Consultancy Services	$5.7bil.	130,000
Wipro Technologies	$4.9bil.	95,000
Infosys Technologies	$4.2bil.	103,000
Neusoft	$0.5bil.	14,000
HiSoft	-	3,300
Chinasoft International	$0.1bil.	4,400

Source: The author based on companies' reports.

Note: Revenues are of 2007, Headcounts are the latest information available from companies' homepage as of February 2009.

3 Evolution of Software and ITES sectors in India and in China

The development of software and ITES sector has been influenced by a number of different factors. This section compares sector evolution of India and China by highlighting three factors; government policies, role of industry associations, and human capital.

3.1 India

3.1.1 Government Policies

After independence from Britain in 1947, India's development strategy had been characterized by import substitution policies. Until the mid-1980s, foreign investment was not permitted in many sectors unless there would be a transfer of technology. Permitted projects had difficult time from reversal treatment such as to reduce foreign ownership. There was such an incident that IBM, which had been one of the two largest

[1] Based on the ballpark calculation from number of employees in the sector divided by number of companies in the sector. For China, 1,480,000 employees / 18,000 companies = 82 employees. For India, 2,000,000 employees / 2,000 companies = 1,000 employees.

providers of computer hardware in India at the time, chose to leave India in 1978 because of this India's protective policy.

Policy has changed in 1984 when high level policy makers realize the public sector was not able to supply the computer hardware and software that was need by the domestic market. The New Computer Policy implemented in 1984 reduced import duties from 135% to 60% for computer hardware and from 100% to 60% for software. Income tax was reduced from 100% to 50% for net export earnings. Sectors were further deregulated by the Computer Software Export, Software Development and Training Policy (1986). Hundred percent export oriented software companies were allowed to import hardware free of duty. The government encouraged software exports and export-oriented investment.

Texas Instruments is acknowledged as the first foreign software company to establish a 100% export-oriented fully owned subsidiary for offshore development in India. Texas Instruments encountered many difficulties but the government officials were very supportive to succeed the Texas Instruments offshore development project as a sample case.

From the experience of accommodating Texas Instruments' fully equipped software development centre, the government realized the importance of providing investment environment to promote the development of software industry. This recognition brought the establishment of the Software Technology Parks of India (STPI) in 1991. The purpose is to encourage and enhance software exports from the country. Export-oriented companies in STPI are exempted from income tax till March 31, 2010. STPI is an autonomous entity under the Department of Communication and Information Technology, Government of India. STPIs provide infrastructure resources such as office space, computer equipment, access to high-speed satellite links, and an uninterrupted supply of electricity, one-stop service station for statutory services, and train professionals in the field of software technology and engineering. The success of STPI has led to the emergence of India as a global center for software and ITES. STPIs have spread to 29 cities in India. Countries such as Mauritius, Sri Lanka, Nepal, Algeria, Indonesia, etc. are taking the help of STPIs to set up similar technology parks with the same concept.

3.1.2 Industry Association

Industry association has played an important and active role in evolution of software and ITES sector in India.

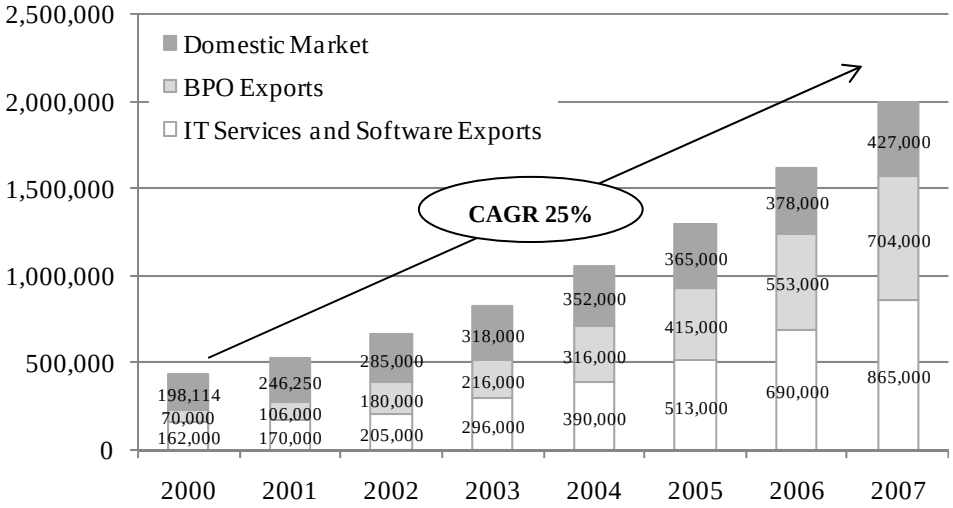
National Association of Software and Services Companies (NASSCOM) was established in 1988 to facilitate business and trade in Indian software and services through lobbying. The memberships are open to companies that are incorporated or registered in India. Not only Indian major companies like Tata Consultancy Services (TCS), Infosys, Wipro, but also multinationals from US, Europe, and Japan such as IBM, Cisco, and Accenture are members. More than 80% of members are small and medium size companies which annual revenues are below US$15 millions. According to an official of NASSCOM, the association's activities are mainly targeting small and medium size emerging companies. Small and medium companies are able to grow more than mature established enterprises. NASSCOM members now account for more than 95% of the revenues of the sectors in India.

In 1980s, software and ITES were relatively small sectors. The government had not taken active industrial policy for supporting software and ITES. NASSCOM was established by 38 software and ITES companies to create and influence government and public policy. One of the major achievements was tax holiday for software companies under the STPI scheme. NASSCOM is also active to enhance graduate employability through appropriate skill enrichment and act as bridge between industry, academia and government.

3.1.3 Human Capital

In 2007, nearly 2 million professionals were employed in the software and ITES sector in India, a CAGR of 25% over 2000 to 2007 (Figure 5). Among those professionals, 80% are engaged in offshore business. According to NASSCOM (2008), India accounts for largest share of 28% of suitable global offshore talent pool.

Figure 5: Software and ITES Employees in India (2001-2007)



Source: NASSCOM (2008).

The rapid growth in industry employment has been enhanced by growing graduate pool. The number of annual graduate in India is estimated to have grown from 2.8 million in the year 2003 to 3.2 million in 2007. Among the 3.2 million graduates, 454,000 are technical graduates and post graduates, comprising engineer diploma and degree, Master of Computer Science, and Master in Engineering (Table 3).

Table 3: The Number of Annual Graduates in India (2003, 2007)

	2003	2007
Engineering Diploma	133,600	133,600
Engineering Degree	127,700	258,800
Master of Computer Science	47,000	47,000
Master of Engineering	14,800	14,800
Technical Graduates & Post-graduates	323,100	454,200
Non-engineering graduates	1,924,587	2,570,500
Non-engineering post-graduates	507,316	218,600
Non-technical Graduates & Post-graduates	2,431,903	2,789,100
Total	2,755,003	3,243,300

Source: NASSCOM (2008).

Human capital of India excels not only for its quantity but also for its quality. India is highly ranked among 134 countries for indicators such as “Availability of Scientists and Engineers,” “Quality of Math and Science Education,” and “Quality of

Management Schools" of the Global Competitiveness Index (World Economic Forum 2008, Table 4).

Table 4: Global Competitiveness Index Ranking of India and China (2008)

	India	China
Availability of Scientists and Engineers	3	52
Quality of Math and Science Education	12	74
Quality of Management Schools	17	38
Global Competitiveness Index 2008-2009	50	30

Source: Source: World Economic Forum (2008).

Note: Rank among 134 countries.

Last but not least, India enjoys an advantage in English, the main language used in the development of software. The majority of the tertiary educations are conducted in English. India has large supply of English-speaking information technology engineers.

3.2 China

3.2.1 Government Policies

Industrial policy in China had been focused on the manufacturing sectors in 1980s and 1990s. The strong government initiative gave support to dynamic growth of China as a production base. China is far ahead of India in the capital-intensive manufacturing sector. The government has provided hard infrastructures such as highways, ports, and electric power-plants that were necessary for the development of the manufacturing sectors.

Chinese government recognizes the importance of strengthening own capacity for innovation and putting much importance to the development of IT sector. The main focus was on hardware production in the beginning; however, it is shifting towards service sector, especially the export of software and ITES. In 2000, the State Council issued "Policies on Encouraging the Development of Software Industry and Integrated Circuit Industry" (No. 18, 2000, by the State Council). The policies have been formulated to encourage the development of Chinese software industry and integrated circuit industry, strengthen creativity and international competitiveness in the information industry, spur the reformation of traditional industries and the upgrading and replacement of products and further promote the sustained, rapid and healthy

development of the national economy. Supporting policy measures for the development of the software industry include preferential tax treatment and refunds for software businesses, favorable interest rates and depreciation policy for software exports, ease for procedures for professionals in the sector regarding foreign business trip and foreign exchange management, and financial support for certification fees for global standards such as GB/T19000-ISO9000 quality management and guarantee series of standards and CMM (Capacity Maturity Model). The "No.18 Document," which provides many favorable policies, is an important milestone in the history of China software industry.

In 2002, the State Council promulgated "Action Outlines of Vitalizing the Software Industry 2002-2005" (No. 47, 2002, by the State Council). Following development goals for software industry by 2005 were set in the Action Outlines:

- Market revenue of RMB 250 billion.
- Over 60% market share of locally developed software and services in domestic market.
- Export revenue of US$ 5 billion.
- Develop globally competitive software products.
- Develop leading software companies with annual revenue above RMB 5 billion.
- Sector employees above 800 thousand.
- Develop indigenous innovative software products and systems.

More than RMB 3 billion funds were prepared to achieve the goals. The Action Outlines also prescribed that the certified software enterprise could immediately receive a tax refund for the part of value-added tax (VAT) 3% exceeding the actual tax after the VAT has been levied at 17% according to the legal tax rate for the sales of self-developed software products. The certified newly-established software production enterprises were exempt from enterprise income tax for the first two profit-making years, and the enterprise income tax will be levied at 50% from the third year to the fifth year.

The 11th Five-Year Plan (2006-2010) determined the service sector, specifically software and ITES as new growth poles which complement the well developed manufacturing sector to strengthen the overall Chinese economy. In accordance with the general direction and guidelines for the development of the service industry as determined in the 11th Five-Year Plan, the State Council set forth "Opinions on Accelerating the Development of Service Industry" (No. 7, 2007, by the State Council). Preferential policies in finance and taxation were adopted for the companies engaged in the development of software, the outsourcing of information technology, and

technical business processes.

Moreover, the Chinese Ministry of Commerce has announced a plan called "The Thousand-Hundred-10 Project." The project set the goal of establishing 10 cities as service outsourcing bases, attracting hundred multinational companies to offshore their services to China, and developing thousand local large and medium-scale service outsourcing companies. The measures include tax incentives, financial support for education of the workforce, quality management, and better protection of intellectual property.

3.2.2 Industry Association

Industry association representing Chinese Software industry is China Software Industry Association (CSIA). CSIA was founded in 1984 by enterprises and individuals engaged in software research and development, publication, sales and training, in research and development of information systems and information service providing, and in the consultancy, market survey, investing, financing and other related agent services for software industry.

CSIA has nearly 700 affiliated members. Adding the corporate members of the branch associations, the total number of CSIA corporate members is over 3,000.

CSIA's role is to function as a bridge between the government and the enterprises. Unlike NASSCOM, which is independent from the government, CSIA has strong government influence. It works under the guidance and support from the government departments in charge. CSIA has done much detailed work in formulating industry development plans and regulations but it was assigned by the government department in charge.

CISA has been compiling "Annual Report of China Software Industry" under the guidance of Ministry of Information Industry.[2] The report covers overall sector information. However, data and analysis are not as rich as the often cited "Strategic Review," an annual report on Indian software and BPO sector compiled by NASSCOM.

3.2.3 Human Capital

By the end of 2007, 1480,000 professionals were employed in the Chinese software and ITES sector, an increase of 15% over the previous year.

Tertiary education plays very important role in innovation. China has made

[2] Superseded by and renamed as Ministry of Industry and Information Technology in 2008.

dynamic advances in the tertiary education since 1999. Tertiary enrollment increased from 1 million in the 1998 to 5.7 million in 2007 and has risen by more than 20% per year. Tertiary enrollment rate in China reached 22%, compared to only 12% in India. China has one of the largest pools of highly educated workforce of 70 million populations that finished tertiary education.

The government has laid special emphasis on software and ITES related education. Among the 1,909 tertiary institutions in the country, more than thousand tertiary institutions have set up software and ITES related courses such computer science and software engineering. In 2007, more than 858 thousand students graduated with software major or software related majors (Table 5). Ministry of Education and National Development and Reform Commission ratified 37 tertiary institutions as "the National Demonstration Software Colleges" to strengthen practical technical and language skill training programs.

Table 5: Number of annual graduates of Software majors in China (2007)

(Unit: person)

	Software Major	Software Related Major	Total
Doctorate	1,217	–	1,217
Masters Degree	15,967	19,878	35,845
Bachelars Degree	72,335	316,713	389,048
Three-Year Diploma	34,759	397,475	432,234
Total	124,278	734,066	858,344

Source: CSIA (2008).

China lags behind India in English language skills but has advantage in linguistic and geographic proximity with Japan. According to the survey report by Japan Foundation (2007), 684,366 people are studying Japanese in 2006 and the number has increased by 76% from previous survey in 2003 (Table 6). China has the largest number of the Japanese-Language Proficiency Test (JLPT) examinees of 202,712 among 51 countries and districts. The number of JLPT level one,[3] highest level, examinees was 68,680 which constitute 62% of total examinees worldwide, excluding examinees in Japan (Figure 6).

[3] The criteria of JLPT level one is that examinee has mastered grammar to a high level, knows around 2,000 Kanji and 10,000 words, and has an integrated command of the language sufficient for life in Japanese society (Japan Foundation 2008).

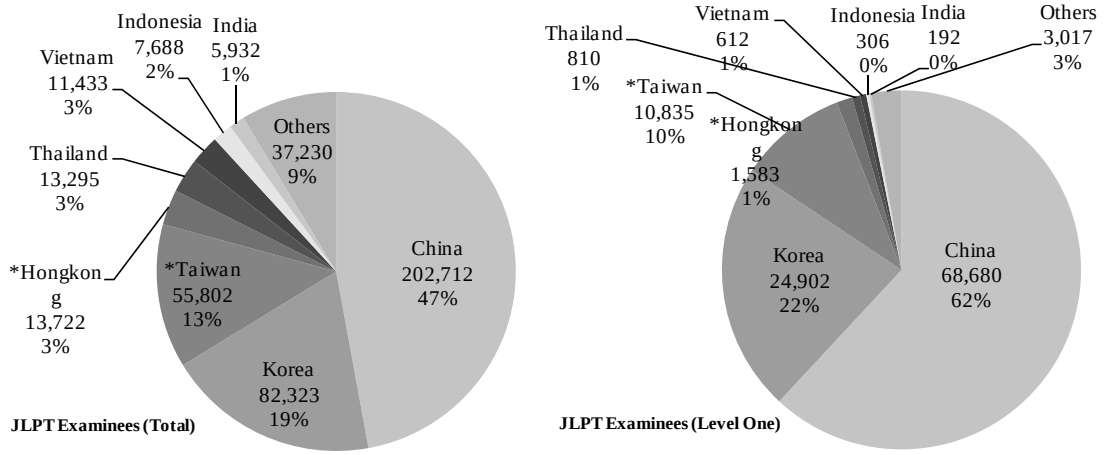
Table 6: Number of Japanese-Language Students Outside Japan by Country/*District (2006)

	Country / *District	Number of	Rate of Change	Share
1	Korea	910,957	1.9%	30.6%
2	China	684,366	76.4%	23.0%
3	Australia	366,165	-4.1%	12.3%
4	Indonesia	272,719	220.0%	9.2%
5	*Taiwan	191,367	48.8%	6.4%
6	U.S.A.	117,969	-15.9%	4.0%
7	Thailand	71,083	29.5%	2.4%
8	*Hong Kong	32,959	80.3%	1.1%
9	Vietnam	29,982	66.3%	1.0%
10	New Zealand	29,904	5.6%	1.0%
11	Canada	23,834	16.4%	0.8%
12	Malaysia	22,920	31.7%	0.8%
13	Brazil	21,631	9.6%	0.7%
14	Philippines	18,199	61.6%	0.6%
15	Singapore	12,076	0.6%	0.4%
16	India	11,011	102.2%	0.4%
	Others	162,678	22.5%	5.5%
	Total	2,979,820	26.4%	100.0%

Source: Japan Foundation 2007, 2004.

Note: Rate of Change is from previous survey in 2003.

Figure 6: Number of JLPT Examinees Outside Japan by Country/*District (2007)



Source: Japan Foundation 2008.

As a second largest economy with shortage of engineers, Japan would be a large market for off shoring. Indian software and ITES companies have been targeting the market but only receive 13% of market due to high barriers for entry in terms of language and cultural compatibility, while China is taking more than 50% of Japanese offshore market (NASSCOM-PricewaterhouseCoopers 2008). China leverages its linguistic and cultural affiliation with Japan and consolidating its position as the destination of choice for Japanese companies for software and ITES off shoring.

4 Software and ITES Sector Development Process of Leading Cities: Comparative Studies of Bangalore and Dalian

Bangalore has experienced rapid growth and international recognition in the field of offshore outsourcing of software development and ITES. Bangalore has emerged as the leader in the Indian software and ITES sector. Leading Indian information service companies such as Infosys and Wipro have their headquarters in Bangalore. The city is preferred location for companies looking to set up their software and ITES operations. Major multinational companies such as Intel, Microsoft, Dell, Hewlett Packard (HP), Siemens, Motorola, General Electric, Fujitsu, Sony, Samsung, and Huawei have IT related operations in Bangalore. Leading Indian information service companies headquartered in other cities of India, such as TCS and HCL Technologies, have set up large scale operations in Bangalore. Bangalore has become so to speak “must go” destination for global software and ITES giants.

Bangalore has established position as global outsourcing destination; however, Chinese cities are ascending the ladder aiming to catch up with Bangalore. In IDC’s Global Delivery Index-Asia/Pacific (GDI-AP) 2007, that objectively compares and contrast 35 cities in 18 countries in the Asia Pacific region which have the potential to be global delivery destinations, Dalian was ranked fifth overall and first among Chinese cities beating first-tier cities like Beijing and Shanghai (Table 7). According to Premier Wen Jiabao’s request, Dalian is making every effort to construct global software and ITES outsourcing base and to become China’s number one and the world’s number one city in software and ITES outsourcing.

Table 7: IDC's Global Delivery Index-Asia/Pacific (2007-2008)

	2007	2008
1	Bangalore	Bangalore
2	Manila	New Delhi
3	New Delhi	Manila
4	Mumbai	Beijing
5	Dalian	Auckland
6	Shanghai	Shanghai
7	Beijing	Mumbai
8	Sydney	Brisbane
9	Brisbane	Dalian
10	Auckland	Kuala Lumpur

Source: IDC 2007, 2008.

Note: There are changes in several key criteria that have impacted the scores of cities profiled in the index between 2007 and 2008.

This section analyzes factors that can explain the success and distinction that Bangalore has achieved and consider whether the same approach is applicable to Dalian.

4.1 Characteristics of Bangalore and its software/ITES sector development

4.1.1 Given Conditions: Locations, Climate, Human Resource, and Industrial Base

Bangalore is the capital of the Indian state of Karnataka, located on the Deccan Plateau. Due to its high elevation of 920 meters above sea level, Bangalore is known for its mild climate throughout the year and regarded as "the Garden City." During the British colonial period, it developed as a center of colonial rule in South India and established cosmopolitan characteristic of the city. Nowadays, expatriates of multinational corporations are willing to live in Bangalore because of its salubrious climate. Relatively low cost of living in Bangalore compared to Delhi and Bombay also makes Bangalore attractive for investment.

In the state of Karnataka, speaker of local language Kannada consists only 30% of the population. Apart from Kannada, English, Hindi, Telugu, and Tamil are other major languages spoken in the city. Compared to the cities in northern India where majority of population speak Hindi, language dominancy is less in Bangalore. The cosmopolitan nature of the city has caused people from other states of India to migrate to Bangalore and settle there. Migration of talented people has positive development

effect for Bangalore that is more or less similar to the development of the United States.

Bangalore is also known as science and technology city. Indian Institute of Science, which was established in 1909 in Bangalore, is the premier institute for scientific research and study in India. Other well-recognized tertiary institutions such as the National Law School of India University (NLSIU) and the Indian Institute of Management, Bangalore (IIM-B) also reside in Bangalore. About 130 engineering colleges in the state of Karnataka annually send out 40,000 engineers. Out of 1,400 engineering colleges across India, 60% are located in the south Indian states of Tamil Nadu, Karnataka, Andhra Pradesh, and Maharashtra. Engineering colleges in the state of Karnataka have long history and famous for their excellence. This is one of the reasons why Bangalore attracts the software and ITES industries.

Since 1950s, strategically sensitive industries were established in Bangalore because of its distance from Pakistan, India's hostile country. Bharat Electronics Limited (BEL), Hindustan Aeronautics Limited (HAL), National Aerospace Laboratories (NAL), Bharat Heavy Electricals Limited (BHEL), and Hindustan Machine Tools (HMT) are such examples to name a few. Bangalore's strong manufacturing and industrial base enhanced its attractiveness for the computer and IT industry.

4.1.2 Government Policies: Industry Clusters and Sector Supporting Measures

The development of software and ITES sector in Bangalore was led by industry rather than government policy. A demonstration effect from Texas Instruments' investment in Bangalore in 1985 leads other multinational companies to acknowledge attractive investment climate of Bangalore. Although the development of software and ITES sector in Bangalore did not come out of an explicit policy decision, three main sector clusters are now formed in the city with some government participation. The three clusters are "Software Technology Parks of India, Bangalore (STPI)," "International Technology Park Bangalore (ITPB)," and "Electronics City."

Electronics City was created by the state government of Karnataka in conjunction with the Department of Electronics in the mid-1980s. The Electronics City was formed to promote investment in the electronics industry by providing necessary infrastructure such as electricity and telecommunications. It now houses more than a hundred companies, including Infosys, Wipro, and Siemens.

ITPB was established under the agreement between the Prime Ministers of India and Singapore in 1992 to replicate Singapore's quality infrastructure in India. A

consortium of Singapore companies then joined forces with the Tata Group to take on the project. ITPB is India's first hi-tech park designed to provide a complete high-quality infrastructure combined with extensive amenities and recreational facilities. Now, more than 145 companies and over 20,000 people are working in the ITPB.

According to a former IT secretary of the state government of Karnataka, the government of Karnataka is leading other states in promoting IT sector. The rapid growth of the sector has led to a surge in demand for qualified talents for the sector. The Karnataka government coped with the shortage of qualified talents by increasing the outturn from the Master of Computer Application (MCA) program. This measure was soon followed by other state governments as well. Moreover, the government of Karnataka together with IT industry and academia established the Board for Information Technology Education Standards (BITES), which is an autonomous non-profit organization fostering high quality industry-relevant IT education to ensure employability of graduates.

4.1.3 Company Operations

To understand the overall picture of the software and ITES companies in Bangalore and their development stage to compare with their counterparts in Dalian, interviews and site visits were conducted with sixteen people in Bangalore in December 2008. The interviewees included managers of Indian and multinational corporations, government related officers, and scholars. Following distinctions and similarities become clear.

China lack scale players as mentioned in the section two of this paper. Even the top three companies in Dalian are still far behind Indian giants such as Infosys and Wipro in extent of its operation and the scale. Sites of Infosys and Wipro, which are called "campuses," are immense and similar to college campus in the developed countries. The facilities on campus include food and beverages outlets, library, health club, banking facilities, supermarket and retail shops, medical and dental clinic, etc. Leading companies have such campuses not only in Bangalore but also in most of software and ITES hubs in India such as Hyderabad, Mumbai, Pune, Delhi, and Chennai.

Software and ITES companies in Bangalore are operating at the higher end of value chain. One of unique examples is Adobe Systems. Its Bangalore subsidiary not only engages in development of products but manages whole business unit from product planning and development to sales. In the area of Business Process Outsourcing (BPO) services, companies in Bangalore engage in high value-added Knowledge Process

Outsourcing (KPO) services. Some of the KPO services already outsourced to Bangalore include services such as transaction of mortgage and insurance and pharmaceutical research. While the low-end BPO services, such as data entry, outsourced to Dalian are mainly processed by junior college graduates, the KPO services outsourced to Bangalore requires professionals with sufficient domain knowledge and experience. In the software development activities, companies in Dalian mainly provide services such as coding, programming, and testing that are at the lower end of the value chain. On the other hand, quite a few software firms in Bangalore are engaged in research and development.

Employee education system is well-developed in leading Indian companies. Infosys is benchmarking companies and educational institutions with excellent leadership development program and improving own program. In case of Wipro, the company established the Talent Transformation Department that is responsible for employee education. The company has developed e-learning courses for soft skills and technical skills upgrading that employees are able to take from any part of the world.

4.2 Characteristics of Dalian and its software/ITES sector development

Dalian shares similar given conditions for the development of software and ITES sector with Bangalore; mild climate famous for summer resort, open and cosmopolitan atmosphere, manufacturing industry base of the heavy and light industries including companies such as Dalian Heavy Industry Co., Dalian Chemical Group, and Wafangdian Bearing Co. and that of high-tech industries such as Intel, Canon, and Toshiba in the Development Zone, concentration of higher education institutions with high tertiary enrollment rate within China.

Dalian was the first city in China to establish the Bureau of the Information Industry in 1998. It is only 10 years since Dalian initiated the strategy to emphasize the development of the software industry. The government has shown active and consistent support and playing a critical role in the development of the industry. Dalian has become the forerunner of China’s software and ITES outsourcing sector.

Dalian Software Park (DLSP), established in 1998 in the western suburbs of Dalian, has played a vital role in Dalian’s software and ITES sector. Unlike software parks in other Chinese cities that are managed by enterprises controlled by local governments, DLSP is run by a private company. This phenomenon unique to Dalian has distinctive advantages of maintaining practicality and efficiency of private company while maintaining strong government support. The software and ITES cluster is

expanding along Lushun South Road based on “Dalian Software Industry Belt Along Lushun South Road Project” unveiled in 2003. Under the government’s city planning, some universities are relocated to the Lushun District recently to build up a closer connection with software and ITES sector. Now, Ascendas Group from Singapore, Shui On Group from Hong Kong, and China’s Neusoft have set up and developing their own software park along Lushun South Road.

In 2008, Dalian achieved the sales revenue of the software and ITES sector of RMB 30.6 billion growing 42% from previous year, with exports of US$ 1.05 billion, up 47%. Over 70, 000 people work in 750 software companies in the city.

5 Concluding Remarks

Industrial policy in China had been focused on the manufacturing sectors. Explicit emphasis towards the development of service sector became apparent only after the 11th Five-Year Plan (2006-2010). Software and ITES sector in China is small and immature compared to that of India. It is still at an early stage of sector development and too early to compete head-to-head with India.

Nevertheless, China may transform into a global leader in software and ITES sector comparable to India in the long run. China has many strengths and advantages for the growth. By leveraging strong government support, strong infrastructure, a large talent pool, solid platform for cultivating Asian market and untapped domestic market, China may take different trajectories from India and become unique global outsourcing destination.

According to an official of NASSCOM, there has been a steady flow of Chinese provincial government delegations visiting NASSCOM to learn from its experiences and replicate its success in their respective regions. NIIT, a computer training and software solutions company based in New Delhi also receives delegations across China that are eager to invite NIIT to level up IT literacy in the region. China developed its manufacturing industry drawing from the experiences of forerunning countries. For the development of software and ITES sector, China is benchmarking India. China could emerge as the “back office of the world” as it did as the “factory of the world.”

References

CSIA. 2008. *Zhongguo Ruanjian Chanye Nianjian 2008 [Annual Report of China Software Industry 2008]*. Beijing: CSIA (Chinese).

IDC. 2007. *Global Delivery Index Asia/Pacific Report*. Singapore: IDC.

IDC. 2008. *Global Delivery Index Asia/Pacific Report*. Singapore: IDC.

Japan Foundation. 2004. *Survey Report on Japanese-Language Education Abroad 2003*. Tokyo: Japan Foundation.

Japan Foundation. 2007. *Survey Report on Japanese-Language Education Abroad 2006*. Tokyo: Japan Foundation.

Japan Foundation. 2008. *Summary of Results for the 2007 JLPT*. Tokyo: Japan Foundation.

NASSCOM. 2008. *Strategic Review 2008; Annual Review of the Indian IT-BPO Sector*. New Delhi: NASSCOM.

NASSCOM-PricewaterhouseCoopers. 2008. *Emerging Market Series - Opportunities for Indian IT industry: Japan*. New Delhi: NASSCOM.

World Economic Forum. 2008. *Global Competitiveness Report 2008-2009*. Geneva: World Economic Forum.