India's IT Services Industry: A Comparative Analysis

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

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

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

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

INDIA-BASED IT SERVICE NETWORKS

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

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

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

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

Table 1. India-based IT service network models.

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

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

Single supply tier

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

Dependency on MNC

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

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

craft Engines and GE Appliances. Global Technology Operations—India, owned by GE Medical Systems, designs and develops products and solutions for several computer platforms. The John F. Welch Technology Center is the company's first and largest multidisciplinary R&D facility outside the US.
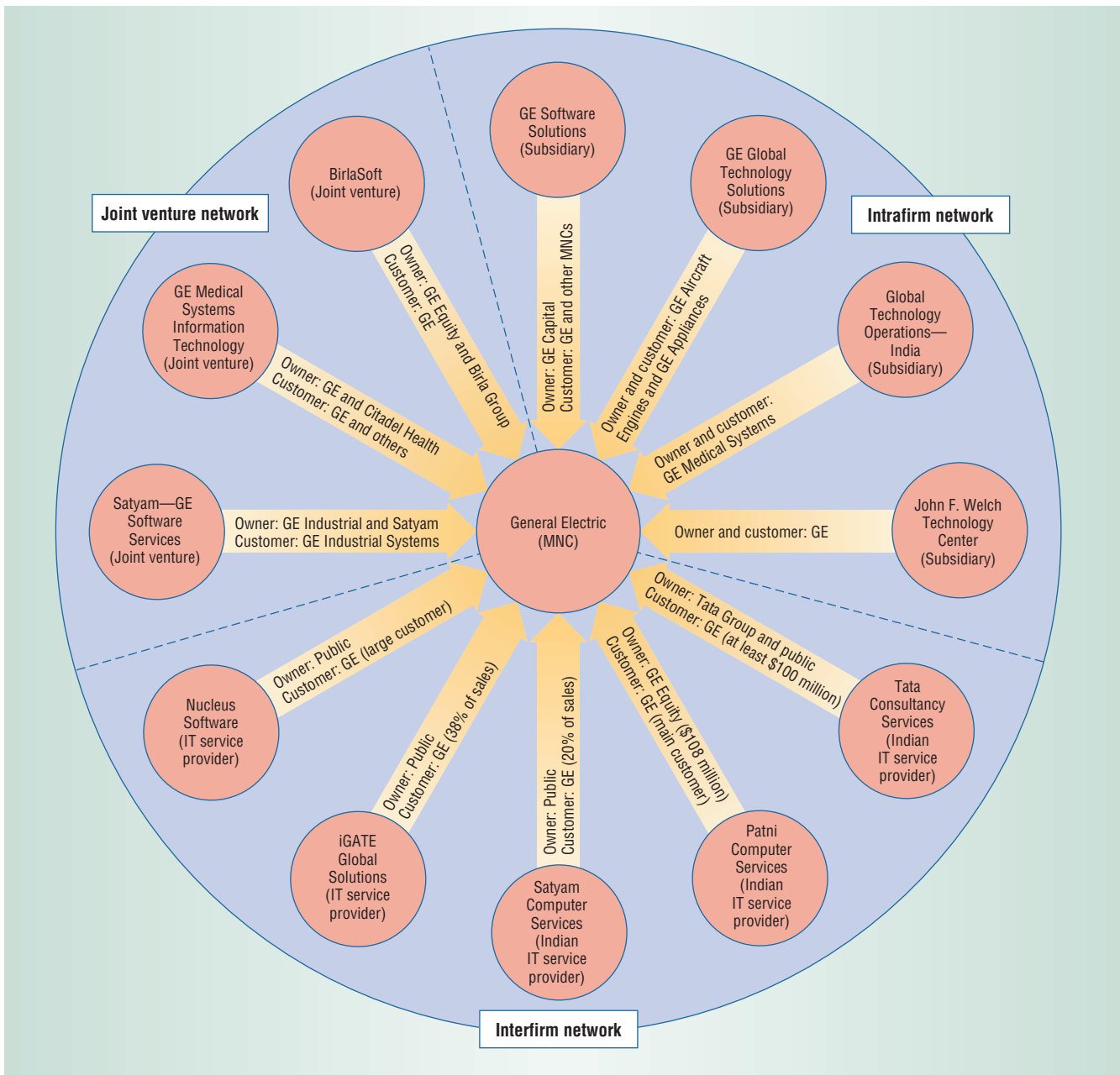
In addition, GE Equity has a $108 million stake in Patni Computer Services. PCS is India's seventh-largest IT service provider with a focus on enterprise application solutions, e-business, implementation, and consulting.

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

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

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

Hong Kong's electronics industry also has MNCs as major buyers. For example, VTech serves as an

Joint venture network

Intrafirm network

GE Software Solutions (Subsidiary)

GE Global Technology Solutions (Subsidiary)

BirlaSoft (Joint venture)

GE Medical Systems Information Technology (Joint venture)

Global Technology Operations—India (Subsidiary)

Satyam—GE Software Services (Joint venture)

General Electric (MNC)

John F. Welch Technology Center (Subsidiary)

Nucleus Software (IT service provider)

Tata Consultancy Services (Indian IT service provider)

iGATE Global Solutions (IT service provider)

Satyam Computer Services (Indian IT service provider)

Patni Computer Services (Indian IT service provider)

Interfirm network

Owner: GE Equity and Birla Group Customer: GE

Owner: GE Capital Customer: GE and other MNCs

Owner and customer: GE Aircraft Engines and GE Appliances

Owner: GE and Citadel Health Customer: GE and others

Owner and customer: GE Medical Systems

Owner: GE Industrial and Satyam Customer: GE Industrial Systems

Owner and customer: GE

Owner: Public Customer: GE (large customer)

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

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

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

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

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

Government support

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

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

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

Quality focus

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

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

Table 2. IT service firms in India.			
Firm	**Firm type**	**World HQ/Stock market listing***	**Global revenue ($billion)**
Infosys	Indian startup	India/Nasdaq	0.75 (2002-2003)
HCL Technologies	Indian startup	India/BSE	0.39 (2002-2003)
Tata Consultancy Services	Indian conglomerate	India/BSE and NSE	1.04 (2002-2003)
Wipro	Indian conglomerate	India/NYSE	0.90 (2002-2003)
BirlaSoft	Joint venture	India/Private	0.05 (2001-2002)
IBM	IT MNC	US/NYSE	81.20 (2003)
Oracle	IT MNC	US/Nasdaq	9.48 (2003)
General Electric	Non-IT MNC	US/NYSE	131.70 (2003)
Citibank	Non-IT MNC	US/NYSE	71.30 (2003)
Syntel	Midsize	US/Nasdaq	0.16 (2003)
Covansys	Midsize	US/Nasdaq	0.38 (2003)

*BSE = Bombay Stock Exchange; Nasdaq = National Assoc. of Securities Dealers Automated Quotation (system); NSE = National Stock Exchange (India); NYSE = New York Stock Exchange

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

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

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

AN INDUSTRY IN FLUX

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

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

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

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

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

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

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

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

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