Industrial Upgrading in India's Information Technology Enabled Service Industry

by

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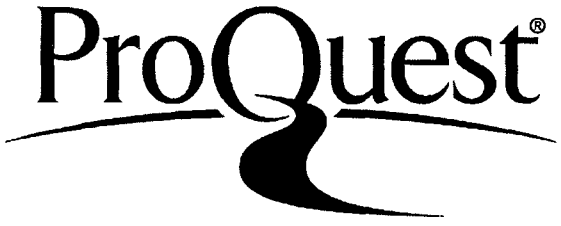

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Where the mind is without fear
and the head is held high;

Where knowledge is free;

Where the world has not been
broken up into fragments by narrow
domestic walls;

Where words come out from
the depth of truth;

Where tireless striving stretches its
arms towards perfection;

Where the clear stream of reason
has not lost its way into the dreary
desert sand of dead habit;

Where the mind is led forward by
thee into ever-widening thought and
action...

Into that heaven of freedom, my
Father, let my country awake.

Rabindranath Tagore[1]

[1] Rabindranath Tagore is considered the national poet of India and his work was influential in the resistance in leading up to Indian Independence. This passage has appeared in two government reports: (Gupta, 2002) And the Introduction from the National Knowledge Commission report to the Nation in 2006: (National Knowledge Commission, 2007).

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Abbreviations & Acronyms

1 crore (cr) = 10 million
1 lakh (1) = 100, 000

ABR: American Board certified Radiologist. Medical doctor that is credentialed and legally able to provide diagnosis for patients in the United State's healthcare market.

ASSOCHAM: Association of Chamber of Commerce: trade association for Indian companies.

BTech: Bachelor of Technology: undergraduate technology-related degree.

BPO: Business process outsourcing.

CII: Confederation of Indian Industry.

DBS: Developmental bureaucratic state.

DNS: Developmental network state.

DoE: Department of Electronics: Indian government department, which oversees policy formation and implementation in all branches of electronics.

DoT: Department of Telecommunications: Indian government department, which oversees telecommunications policy formation and implementation.

EPZ: Export processing zone: designated areas within a country separated from domestic tariff area in which specific export-orientated regulation apply.

ELI: Export led industrialization.

FICCI: Federation for Indian Chambers of Commerce and Industry: trade association for Indian companies.

GoI: Government of India.

GRC: Global Radiology Centre: International teleradiology operation established through the partnership of Wipro and Manipal Hospital.

IIT: Indian Institute of Technology: System of top Indian technical universities.

IIM: Indian Institute of Management: System of top Indian technical universities.

IIIT: Indian Institute of Information Technology.

ISI: import substitution industrialization.

ITES: Information technology enabled services.

KPO: Knowledge process outsourcing.

LPO: Legal process outsourcing.

MAIT: Manufacturers' Association for Information Technology: the main trade association for Indian hardware companies. A separate software industry association split from MAIT to form NASSCOM in 1988.

NASSCOM: National Associations of Software and Service Companies: The primary trade association representing the Software, IT and ITES industries.

PPP: Public-private partnerships.

STPI: Software technology parks of India

Abstract

Industrial Upgrading in India's Information Technology Enabled Service Industry

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This dissertation analyzes industrial upgrading, the process by which industries move to higher value products and services in India's "offshore outsourcing" industry. The dissertation draws upon 101 semi-structured interviews with Indian managers, workers, trade association and government officials, collected during 14 months of field research in India, conducted between July 2006 and May 2009. The study examines how India obtained the knowledge and skills required to move up from low-level back office and call center work into knowledge intensive service delivery within the span of a decade. Four causal mechanisms are identified that enabled this upward move: 1) the role of trade associations 2) firm level knowledge transfer through migration and client interaction 3) firm level training programs and 4) firm level creation of cultural knowledge. Trade associations and firms emerged as the central actors driving industry development, with the state playing an increasingly supporting role. This institutional arrangement represents a departure from the Indian state's traditional approach to development and the

role of the state in other successful developmental models. A key reason why industry, rather than the state, assumed a leadership role in development is based upon the interactive nature of services themselves, which requires closer coordination between firms than manufacturing. The design of the dissertation centers upon the analysis of four firms that provide financial or medical services. Financial and medical services were selected based upon their different propensities to specialize within industries and expand in breadth across industries, thereby addressing the twin dimensions of industrial upgrading, scope and depth.

Chapter 1
Introduction to India's Offshore Service Model

During the early years of the millennium the world increasingly saw images in the media of a new, "Shining India,"[2] with depictions of relatively affluent, educated workers inside gleaming new office parks in urban centers (See Images 1-5 in Appendix). This representation of India was spurred by the rising economic prosperity of India, driven by a transformative shift to a service based economy that is best exemplified by the runaway success of "offshore outsourcing."[3] This industry emerged as India's fastest growing in terms of gross domestic product (GDP) and is the leading developing country provider of offshore outsourcing services, commanding 55 percent of the global market (Dani, Ramesh, & Singh, 2011). The total Information Technology (IT) and Information Technology Enabled Services (ITES) service industry in India reached USD 71.7 billion, accounting for 5.8 percent of India's GDP (NASSCOM, 2009a). India's economic success in this industry has prompted other developing economies (e.g., China, Brazil, Philippines, Poland, Russia and South Africa) to try to replicate the high growth rates associated with India's service export model (Business India Intelligence, 2006).

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[2] "Shining India" was a political slogan used to capture the feeling of optimism in the wake of the IT and ITES service boom in 2003. The slogan was adopted and popularized by the Bharatiya Janata Party (BJP) during the run up to the 2004 Indian central election, which they lost. I, and my interview subjects, use the phrase "shining India" as a symbol of the IT boom, rather than a reference to the 2004 political election it is also associated with.

[3] Offshore outsourcing refers to the practice of hiring an external firm to perform a business function from an overseas country from where the good or service will be sold or consumed. This differs from outsourcing, which refers to hiring an external domestic firm, and offshoring, which refers to hiring foreign labor by a company subsidiary. Offshore outsourcing is theoretically of the greatest interest because it requires domestic firms in developing countries to build technical and managerial knowledge and firm level capabilities.

The ITES industry began in India in the mid-1990s with back office data entry, followed by call centers; buoyed by labor savings of 60 to 70 percent relative to developed markets. Since 2000 India has achieved a measure of success in moving into "knowledge-intensive" professional services, such as radiology, accounting, research and development, and legal services (Aggarwal, 2010a; Evalueserve, 2003; Knowledge@Wharton, 2007; F. Levy & Yu, 2006; Pollack, 2003; Timmons, 2010). India's market share of the "knowledge process outsourcing" (KPO) industry is 70 percent world wide and the industry is expected to grow to $17 billion in revenue by 2013 (Aggarwal, 2010a) (see Table 1.1: Skill Upgrading for Indian ITES Exports).

How did a developing country that was best known for its high rates of poverty, illiteracy, and a "Hindu rate of growth"[4] that hovered between 3 and 4 percent gross domestic product (GDP) give rise to the developing world's most dynamic, high growth, and knowledge intensive service sector? More specifically, how did India obtain the *knowledge* and *skills* required to move up from low-level back office and call center work into knowledge intensive service delivery within the span of a decade? Who are the key *actors* in industry development and promotion? What are the skills and knowledge required for this sector? What are the *sources* of industry capabilities? What are the key industrial *policies* that enabled the sector and how were they crafted? The focus of this dissertation is on the development and creation of the skills, knowledge, actors, and policies that help to explain this transformation.

[4] This commonly used expression is attributed to economist Raj Krishna, although I was unable to determine where he first used the term. A number of studies make reference to this term. See Chibber (2004).

Table 1.1: Skill Upgrading in Indian ITES Exports

Skill	Typical role profile	Emergence	Skill Profile/ Training
Low Skilled Services	Data entry	Late-1980s - mid-1990s	Computer skills required. College education desired, but not required
Medium Skill Services	Call center	Mid-1990s	Command of foreign language & interpersonal skills required. Usually college educated.
Knowledge Intensive Services	Professional work (financial planning, radiology, etc)	Early-2000s	Interpretive abilities, college degree, additional training required. Often post graduate training & professional certification

I. Foundations for Industrial Development & the Shift to Services

Economic development, at its most macro scale, is a sequential shift from employment concentration in agriculture to manufacturing industries and finally to services (Clark, 1940; Fisher, 1935). Yet, such shifts are not inevitable or even likely. Many regions in the world, such as much of Latin America, continue to export extractive commodities and agricultural products to the rest of the world thereby occupying the same low-level position in the global economy that they have occupied for centuries (Bunker, 1984; Cardoso, 1972; Evans, 1979; Frank, 1972; Wallerstein, 1974). While there is a remarkable stability in the economic position of states in the international division of labor, some developing states (China, India, South Korea, Malaysia, Taiwan, and Thailand in Asia; Argentina, Brazil, Chile, and Mexico in Latin America; and Turkey in the Middle East) have moved into increasingly sophisticated manufacturing and technological industries. This industrial shift was instrumental in raising the general standard of living for the citizens of these countries.

The key mechanism that permits these countries to transition into manufacturing and technological industries is "industrial upgrading." Industrial upgrading is defined as a process where economic actors, such as nations, industries, firms, and workers, move from low-value to high-value activities (Gereffi, 2005). Upgrading may occur along two dimensions: specialization within an industry and increased breadth across multiple industries. Industrial upgrading success relies upon a mix of different government policies, institutions, corporate strategies, technologies, and worker skills (Gereffi, 2005, p. 171). A key enabler of this process is what Alice Amsden refers to as the creation of knowledge-based assets, which are firm specific technical and managerial capabilities (Amsden, 2001). Knowledge in this sense is more than mere access to information. Amsden's refinement of the way knowledge is used as a competitive advantage for developing nations builds upon a broad tradition that highlights the centrality of knowledge. The role of information and knowledge has been referred to as the defining feature this stage of capitalism (Bell, 1973; Castells, 1996; NASSCOM, 2006b). Other scholars have argued that knowledge has become the key resource (Drucker, 1969) and access to it shapes the competitive advantage of both firms (Nonaka & Takeuchi, 1995) and nations (Castells, 1996).

Yet, a range of scholarship has also challenged the common conceptions of both knowledge and skills. Knowledge, at its most basic level, is constructed (Berger & Luckmann, 1967). More recently, some scholars have rejected treating knowledge as a commodity, classifying it instead as a "fictitious" or "quasi commodity" (Jessop, 2007). In a similar fashion, scholars from divergent theoretical traditions have problematized positivist conceptions of skill, which tend to define skill in terms of personal attributes or

job complexity (Spenner, 1979, 1983). Neo-classical economists, adopting a positivist orientation, tend to view skill development in terms of investment in "human capital," or number of years of vocational training, formal education, and years on the job (Becker, 1962, 1996). However, neo-Weberian and social constructionist approaches to skills emphasize their *relational* nature. From this perspective skill construction depends upon the relationship between tasks, the supply and demand of people who complete tasks, and those who fill positions or are excluded (Attewell, 1990, pp. 444-445). Credentialism and professional labor monopolies are two ways skills are defined and groups are excluded from job consideration (Abbott, 1988; Collins, 1979). The constructed or potentially fictitious quality of knowledge, and the relational nature of skills, however, does not make either knowledge or skills less important to development. In fact, as this dissertation will suggest, the ability of industries in developing countries to construct knowledge, and perceptions of it, is itself a key capability for development and a crucial piece of building knowledge based assets. Development that creates knowledge-based assets is distinguished from exploitative extractive developmental practices that may lead to economic growth, but not a long-term sustainable advantage.

Scholarly analysis of industrial development and upgrading is concentrated on high-tech manufacturing and retail industries, rather than services. A reason why services received comparatively less attention is that a broad group of social scientists initially did not believe services could be delivered from geographically distant locations. This was because services required interaction between a producer and consumer and were difficult to transport (Lievens, Moenaert, & Jegers, 1999; Lovelock & Gummesson, 2004). Social scientists noted that the manufacturing subcontracting relationships well

documented in manufacturing industries were not possible in the trade of modern services:

> The major difference between a mature high-tech industry and a modern service is that there is no international (or intranational) subcontracting. Foreign firms cannot out-source the provision of many services in the same way that they can out-source the manufacture of certain products (Amsden & Chu, 2003, p. 13).

The empirical realties of a large globally dispersed ITES industry that is increasingly using subcontracting relationships challenge this assertion. The global spread of telephony and Internet technologies made it possible for a growing subset of services to be produced offshore during the 1990s, intensifying during the early 2000s. This scaling up of services in developing countries was in due in part to progress in the communications infrastructure in developing countries, which reduced the costs and difficulty in procuring reliable communication technologies to trade services at a large scale over long distances.[5] Today, the IT enabled service industry is following the basic trend of increasing fragmentation observed in manufacturing production, splitting up activities that increasingly stretch across borders, in order to reduce costs and gain access to the right mix of skills.

An analysis of industrial upgrading in services is warranted because developing countries are now beginning to join developed countries in transitioning to a service-based economy. Services have emerged as the largest and fastest-growing sector in the global economy during the last two decades, providing more than 60 percent of global output (Banga, 2005b). Developed economies tend to have a high concentration of service employment, however, some developing countries, like their developed country counterparts, are also becoming service-based economies. The Indian economy is one

[5] The rise in communication technologies globally helped to challenge Canada's dominance in service trade with the United States.

example of a country now dominated by services. Services constituted 50 percent GDP in 2004, while industry and agriculture were 27 and 23 percent respectively (Banga, 2005a). This global economic shift to service work underscores the need to understand potential upgrading processes within developing countries' service industries. An analysis of the ITES sector, specifically, is important not only because it involves different agents (i.e. skilled white-collar workers) than those found in manufacturing and retail industries, but also because existing theories for understanding outsourcing do not explicitly consider the transmission of knowledge required in the international offshoring of services (Trefler, 2005).

II. The Argument

The major findings of this dissertation complicate the foregoing understanding of upgrading. The Indian model of service development is shaped by the interaction of multiple actors, including the state, trade associations, and firms, who work to upgrade industry skills and to signal industry credibility in higher-level skills to the export market. This model of development emerged only after several constitutive shifts in the Indian state's approach. After independence, India was committed to industrial development and pursued a traditional state-led industrialization policy, which provided key investments in education and created industrial policies that supported subsequent IT and ITES industry development.[6] The state underwent reforms in response to internal and external pressures,

[6] This dissertation focuses on IT enabled services (ITES). IT and ITES are separate industries, but are commonly grouped together by policy makers and in policy documents and represented by the same industry trade association (NASSCOM). The ITES industry was built upon the communication infrastructure and policy frameworks that were established through interaction between the state and the IT industry that occurred earlier. The acquisition of leading ITES firms by leading IT companies, which began in 2002, makes it difficult to analytically separate these industries even while the work differs in scope and skill requirements. As a result, I will often group these industries together, referring to them collectively at

which in turn shaped its role and approach to development. The business association-led developmental model that emerged during this shift addressed constraints facing IT and ITES industry development. Yet, the state and associations were not the only key actors in the rise of this sector. Indian firms also built and gained knowledge through the migration of technical professionals, through client relationships that facilitated knowledge transfer, and through firm level training programs. In addition to technical capabilities, which were required in manufacturing industries, this knowledge included cultural capabilities, which I argue are critical to ITES industry development. These new capabilities are specific cultural repertoires that meet the expectations of customers, who are often located in regions far away from the worker providing the service. Analyzing cultural knowledge as well as other related practices and norms adopted by firms in their interactions with clients, I argue that upgrading depends upon both a deepening of industry skills and an ability to signal credibility in providing higher-level work.

The dissertation advances four central theses that explain the successful upgrading of India's ITES industry into knowledge intensive services:

1. **Emergence of an association-led developmental model**: An industry led, state supported model of development emerged from a more traditional state led (industry-constrained) pattern of industrialization. Trade associations were a key emergent actor, influencing neoliberal state practices, and helping to refine and draft industrial and education policies in key areas that enable industrial upgrading.

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times as the "IT industry," when discussing industry constraints and policy formation. "ITES" is a broad umbrella term that emphasizes a mode of delivery that encompasses Business Process Outsourcing (BPO) and the higher value Knowledge Process Outsourcing (KPO) sub-sectors, which are defined in terms of their function and skill-set respectively.

2. **Inter-firm learning and knowledge transfer**: Knowledge transfer from organizations based in developed countries to those in developing countries is crucial for industry upgrading into higher value services. This transfer of knowledge may occur though two mechanisms: migration of technical labor and through client relationships that facilitate learning. Mediating factors, however, determine the extent and speed to which knowledge transfer occurs. These factors include task integration with client business processes and systems, the authority of professions, and the power of credentials.
3. **Knowledge creation and firm-led employee upgrading**: Industry knowledge is created through high levels of firm investments in skills training, the construction of corporate training facilities, and universities. Firm level investments in employee education supplementing the skills created through the educational system.
4. **Cultural labor and skills**: Interaction intensive services required a new set of skills and capabilities for development, composed of a number of learned distinct cultural skills, scripts, and behaviors that permit workers to mimic the communication style and cultural expectations of their customers and mask (or understate) their national identity from overseas customers.

I will elaborate upon each of these four claims under each of the proceeding sub-headings, offering some background and context for the in-depth analyses in the chapters that follow.

III. Emergence of an association-led developmental model

The appropriate role of the state in the economy is a perennial theoretical and practical question. While previous debates tend to treat the state and economy as distinct and separate entities, contemporary scholars increasingly reject this binary conception (Block, 1994; Block & Evans, 2005). Some writers argue that states and markets are not engaged in a zero sum game where one benefits at the expense of the other (J. D. Levy, 2006). Rather states and markets historically evolved together and markets require the regulation that states provide (K. Polanyi, 2001 [1944]). Yet, the pervasive dichotomous view between the state and the market still prevents researchers from understanding how state and market actors coordinate policy (Krippner, 2007).

Contemporary states are grappling with new challenges posed by the economy, technology, and ideology (J. D. Levy, 2006). A growing body of work argues that state authority is in decline due to the increasing pressures of globalization (Sassen, 2001; Slaughter, 2004; Strange, 1996). Technological innovations and increased access to the Internet have accelerated the movement of capital and jobs across borders, further dispersing production globally (Friedman, 2005). In the face of these technological changes states have lost a measure of power to control capital and firms, which have become more mobile than ever before. While critics insist that arguments about the irrelevance of the state are overdrawn because states retain control over their territorial borders, control their populations, and define citizenship, they concede that states have relinquished some authority to supranational organizations (Hirst & Thompson, 1995).

State industrial policy is constrained by the rise of supranational organizations. Regulatory agreements (e.g. TRIMS, GATS, and TRIPS) make illegal many of the

developmental policy instruments successfully used by East Asian developmental states to nurture their own strategic manufacturing industries (Wade, 2003). The actions of the WTO are emblematic of the policies supported by many supranational organizations, such as the IMF and World Bank, and the "Washington Consensus" more generally.[7] The Washington Consensus widely advocated a shift from state-led governance toward market-oriented policies and also encouraged a re-framing of developmental problems and policy justifications (Gore, 2000). These supranational policy prescriptions imposed upon developing states reflect the neoliberal ideology that guided them.

The ascendancy of neoliberal ideology poses its own set of challenges to state authority and practices. Neoliberalism as a theory lacks coherence,[8] but finds it most coherent expression within the state (Plant, 2010). Despite this incoherence neoliberal policies tends to reflect one or more of the following ideas: free markets, market fundamentalism,[9] deregulation, and the limited role of government (Antonio, 2007). Here it is important to distinguish scholarship that views neoliberalism as an ideological project from scholarship that is more centrally focused on understanding its changing institutional practices.[10] While neoliberalism has changed the "idea" of the state (Bourdieu, Wacquant, & Farage, 1994) it has also shifted the institutional practices associated with the state (Hall & Soskice, 2001; Krippner, 2007).

Successful states are increasingly fostering ties to industry and associated actors to help drive economic development. These ties between state and society, referred to as

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[7] For an in-depth analysis of the IMF see (Stiglitz, 2002). For an overview on the various and sometimes contradictory usages of the term "Washington Consensus" see (Williamson, 2000).
[8] This incoherence is due to its advocates' tendency to incorporate elements of other theories into its own theoretical doctrine (Peck, 2004).
[9] Market fundamentalism refers to the idea that society should be "subordinated to a system of self-regulating markets" (Somers & Block, 2005).
[10] For an overview of scholarship on neoliberal as an ideological project versus those more concerned with its changing institutional practices see (Krippner, 2007).

embeddedness, are a central feature of development (Breznitz, 2007; Evans, 1995; O'Riain, 2000, 2004; Pingle, 1999). Developmental states range from the developmental bureaucratic state (DBS), associated with the industrial success of the East Asian economies, to decentralized developmental networked state (DNS), defined by their ability to nurture local and global technology and business networks (O'Riain, 2000).[11] DNS states represent a diverse range of cases that include Ireland, Israel, Taiwan (O'Riain, 2000, p. 186), the United States (Block, 2008; Block & Keller, 2011), and China (Appelbaum, Parker, Cao, & Gereffi, 2011).[12] The diversity in cases also reflects a recognition that forms of state embeddeness vary, leading to industrial systems that have differing strengths, weaknesses, and ties to the global market place (Breznitz, 2007). This body of work also advances an understanding of the amorphous and unfixed boundaries of the state and its associated institutions (Jessop, 1990). This underscores a shift to new state practices that rely on quasi-state institutions and industries for development and implementation.

Much of the existing scholarship focusing on the influence of neoliberalism on state practices tends to focus on privatization and deregulation. The focus on deregulation as a key component of neoliberalism is problematic, however, because it obscures the current practices of states in two specific ways. First, while deregulation suggests that states exit deregulated industries, it is more accurate to refer to *reregulation* where states continue to be involved in regulating the industry, but in different ways (Majone, 1990). Second,

[11] See (Block, 2008; O'Riain, 2004) for the distinction between the DBS and the DNS. The DBS model allowed East Asian economies to move up into higher value electronics manufacturing through industry incentives and the state's ability to discipline capital in accordance with state planning. India aspired to be a DBS state, but largely failed in its ability to induce and discipline capital to act according to the state's industrial plans and in achieving its stated developmental goals (Chibber, 2004).

[12] China is not an exclusively top down developmental state model. Rather, it combines government agencies, market forces, input from scientific and professional communities (Appelbaum, et al., 2011, p. 225).

Public Private Partnerships (PPP) are an increasingly dominant strategy of development in countries that lack the capital, resources, expertise, and capabilities to implement development projects. These partnerships extend Evans's observation that the state needs business as a source of decentralized knowledge about what is possible and as implementers of developmental projects (Evans, 1997, p. 70). Traditionally, the goal of these partnerships was to provide infrastructure (e.g, transportation, power, and communications), but the scope of these partnerships are broadening to include new domains of the state, such as design of educational policy and the construction of new universities.

The "varieties of capitalism" literature sheds some light on the relationship between the state and market, yet still does not fully account for the role trade associations play in engaging the state. From the perspective of this literature, firms are conceived of as major actors and business associations are acknowledged to play a coordinating role between the state and society. In this respect this literature shares some similarities with state-society approaches, which suggest that market economies are embedded within a civil society that is both structured by and helps to structure the state (Block & Evans, 2005). On this account, civil society includes a variety of nongovernmental associations such as trade associations, social movements, and political parties (Habermas, 1989). The "varieties of capitalism" literature, however, exaggerates the role of the employer along two dimensions. First, while states may adopt certain neoliberal policies favored by employers, states may also initiate the adoption of an expanded scope for decentralized decision making and invite private actors to participate in policy making decisions (Howell, 2006). Second, employers are characterized by

internal divisions that may make consensus difficult to reach (Cowhey & Richards, 2006; J. D. Levy, 2006) and therefore collective action difficult to initiate or sustain. Sector specific industry trade associations, where consensus is easier to produce relative to umbrella associations, may offer a mechanism for employer coordination in this regard. Yet, the "varieties of capitalism" literature fails to show the potential depth of the role these civil society actors may play in setting the agenda of the state, designing state industrial policies, and ultimately taking over state responsibilities. Trade associations, with frequent interaction with the government and a degree of autonomy from the demands of everyday business activities, may have the capacity to sustain interaction with governmental actors over a longer period than firms alone. These organizations may be even more influential in upgrading in developing countries, since developing countries tend to have weaker institutions and less coherent state governments than their developed country counterparts.[13]

The rise of India's ITES service points to a model of development that is driven by private and quasi-state actors that lead industrial upgrading, policy formation, the creation of new skills, industry training, and capabilities for ITES development. This does not mean, however, that the state was absent or uninvolved in skill and knowledge development, industrial policy, and sector formation. In fact, the state was instrumental in creating the initial knowledge base for the emergence of the IT and ITES industries through investments in education, drafting early industry policies that helped support an emerging sector, such as exemptions on hardware import taxes and revenue taxes on software and service exports, creation of communication infrastructure and dedicated

[13] Even coherent Weberian bureaucracies in developing countries may be undermined by bureaucratic rule following, producing a less coherent state (Chibber, 2002).

technology industrial parks, as well as coordinating with and implementing industry and trade associations' recommendations.

The current approach to industrialization in India constitutes a hybrid model of development: firms and trade associations *in partnership with the state* emerged as the central actors leading industrial upgrading. The Indian model of development changed over time from an *aspiring* developmental state characterized by autarky (Chibber, 2004; Evans, 1995) toward a more decentralized and flexible developmental state that relies upon close cooperation with firms to identify and support strategic sectors and innovations. In this way, the Indian state failed to approximate the centralized developmental bureaucratic state (DBS) associated with the industrial success of the East Asian economies, and toward a state more similar to a decentralized developmental networked state (DNS).

The shift in India's state strategy toward development began in the 1980s when the Indian state began to slowly reform (Chibber, 2004; Evans, 1995; Kohli, 2004; Panagariya, 2008; Pingle, 1999). The reform process advanced unevenly across industrial sectors, agencies, and states. The Indian IT sector, the government agencies responsible for promoting IT growth, and leading state governments, were on the cutting edge of these reforms and best exemplify the Indian state's new approach to development. This change in India's approach to development was part of a broader shift in government away from an import substituting industrialization (ISI) model of development and socialist orientation characterized by self reliance and an antagonistic relationship to business, toward one that emphasized an increased focus on exports and a more business

friendly orientation.[14] Yet, it is a mistake to view this shift simply as becoming more business friendly; it was a new way of doing business in India, one that involved new partners, pursuing new capabilities.

Under the "traditional" state-based approach, the Indian state was instrumental in creating the initial knowledge base for the emergence and upgrading of the IT and ITES industry in India. The Indian state was the key initial actor in creating the knowledge base for late industrialization through the development of institutions of higher education capable of producing high numbers of technical talent. Despite the fact that the top end of the Indian higher educational system produced world-class technical talent, the system failed to generate a sufficient quantity of high quality graduates to meet the country's growing industrial needs staring in the 1980s. In addition, the best and brightest graduates produced by the Indian educational system tended to leave the country though a process of "brain drain" that has only begun to reverse in the early 2000s (Saxenian, 2006).

The Indian state was also important in establishing one of the first software policies in the developing world in the early 1970s, although a *coherent* industrial policy focused on software promotion and development only emerged in the 1980s (Heeks, 1996). The software policies from the 1980s onwards were fine-tuned by the involvement of private industry and association involvement and beginning in the 1990s were broadened to apply to the emerging ITES industries. Therefore, state actions in education and industrial policy were necessary, yet insufficient factors explaining the rise of the ITES industry and subsequent industrial upgrading.

The hybrid model of development through which firms and trade associations emerged as central actors (in partnership with the state), leading later stage industrial

[14] For more explanation on India's ISI orientation see Chibber (2004) and Pingle (1999).

upgrading, was prompted by shifting institutional arrangements. Some of these institutional shifts were not specific to India, but constrain an array of states' abilities to use a bureaucratic developmental state strategy to pursue future development. For example, international trade agreements constrained states from protecting fledgling strategic industries through trade protectionism in manufacturing and service industries (Wade, 2003).[15] Some developmental states, such as Korea and Japan, had trouble adapting to decentralized industry structures and shifts in financial markets, as became evident during the 1997-98 Asian financial crisis (O'Riain, 2000).

Other institutional changes affected India specifically. The Indian state's role as the "License Raj," characterized by high levels of regulation, reached its zenith in the mid-1970s. This regulatory approach, in particular, hindered the growth of small and medium sized businesses that lacked the resources and political connections to navigate the system (Chibber, 2004). Beginning in the early to mid-1980s the Indian state began to adopt a more congenial attitude toward business and began to work more cooperatively with them on industrial development. The state shift in orientation was due to the slow liberalization of government policy that began under Prime Minister Rajiv Gandhi in the mid-1980s (Kohli, 2004), the collapse of the USSR, which hitherto provided India with a developmental model and a counterweight to neoliberal hegemony, and India's 1991 balance of a trade crisis that prompted the government to accelerate the structural reforms that were already underway. This shift allowed industry trade associations and private firms emerging during the 1980s to slowly have more leadership and control over industrial development.

[15] TRIMS and GATS limited developing state governments' ability to constrain companies operating in their territory (See Wade, 2003).

A central findings of this dissertation is that trade associations, moving beyond playing a coordinating role with the state, may become quasi-state actors that lead policy formation and implementation in select areas traditionally viewed as state responsibilities, such as education and industrial cluster development. In an era of globalization and neoliberalism, developing market economies have increasingly turned toward decentralized developmental governance models that more explicitly rely upon a variety of civil society actors. Through trade associations, firm level practices in training (technical, industry, and cultural skills) are "pulled-up," aggregated, and disseminated to policy makers to shape the future industry policy agenda.

IV. Inter-firm learning and knowledge transfer

The global value chain (GVC) and the "varieties of capitalism" literature demonstrate that firm-to-firm interactions, especially through supplier networks, are an important source of industry learning (Gereffi, 2005; Hall & Soskice, 2001). Moreover, this work suggests that skills upgrading is particularly important for firms attempting to move into higher value activities (Gereffi, 1999). In turn, sustained interaction through supplier networks leads to knowledge transfer, predominately flowing from firms based in more developed regions to firms in less developed regions.[16] AnnaLee Saxenian (2006) found that US educated immigrant engineers transferred technology "know-how" that enabled their countries of origin develop strategic industries. Yet, mediating factors, such as dependence on clients and professional associations, can place limits on the rate and height of upgrading. The extent to which particular tasks assigned to offshore firms

[16] This literature also recognizes that participation in trade networks may lead some trading partners to decline relative to others (Hopkins and Wallerstein, 1986; Gereffi and Kozeniewicz, 1994). As a result, trade alone may not improve a firm or country's position in the international division of labor.

are integrated with client business processes and systems shape the degree of coordination and learning firms obtain from their clients. In medical services, it is the authority of professions to create labor monopolies over designated tasks through credentialism, thereby excluding some workers, that determines if clients are a significant source of firm learning. Based on the interaction between these mechanisms and mediating factors, knowledge transfer through "reverse" migration results in a faster rate of upgrading, while occupational groups, such as professional associations may place limits on the growth and scalability of professional services in developing countries, despite access to the requisite technical skills. These finding have implications for policy incentives for development.

V. Knowledge creation and firm-led employee upgrading

The developmental literature acknowledges the role of internal firm processes; it is often to highlight the barriers to industry and national development created thorough firm efforts to retain proprietary, firm-specific knowledge (Amsden, 2001). However, firms are also recognized to be a source of decentralized knowledge and implementers of development projects for the state (Evans, 1997), as well as sources of knowledge creation and skills training within the labor force. The varieties of capitalism literature highlights the sphere of vocational training and education as central areas where firms must develop relationships with various actors to resolve coordination problems in the area of job skills (Hall & Soskice, 2001, p. 7). Based on the cases described in this study, firms emerge as key agents in creating knowledge and skills through intensive training and the establishment of corporate universities. Firm-level training upgrades and

complements employee level skills and knowledge acquired through the educational system. In particular, firms developed three types of knowledge. First, corporate training programs develop technical knowledge in particular domains, such as interpretive skill in radiology or the ability to create mathematical models in financial services. Second, firms develop industry knowledge by providing lessons on historic and evolving industry trends. Third, firms provide cultural and soft skills training in order to develop interactive skills to be used in interactive service delivery.

VI. Cultural labor and skills

Extending Amsden's framework on knowledge-based assets, I argue that cultural skills are an important, yet neglected, component of the knowledge-based asset concept. In order to extend Amsden's framework I draw upon three additional strands of work; cultural sociology, the sociology of work, and post-colonial theory. Cultural sociology has been instrumental in identifying how culture shapes skills as individuals respond to their external environment (Bourdieu, 1977; Swidler, 1986). Bourdieu's concept of *habitus* provides insight into culturally-based skills by explaining how individuals within a given culture share an understanding of the tacit "rules of the game" (Bourdieu & Wacquant, 1992). Swidler's "tool kit" model of culture offers a complementary perspective to Bourdieu, defining culture is a resource, or a repertoire of skills that directs individuals' action (Swidler, 1986, 2001). Skills provide the major link between culture and action and are composed of "habits, practices, and other 'cultured capacities,' such as intuitive capacities for perception and judgment, that have to be learned and that people

can't perform with confidence unless they get reasonably good at them" (Swidler, 2008, p. 616).

Cultural skills are particularly important in the trade of services because service work is interaction intensive, difficult to measure, and the production of a service cannot be separated from its consumption. Conversely, manufactured commodities can be produced to fit design specifications, measured to assess product conformity to product design, and then stored in inventory. In services, this process is more difficult because service quality requires more subjective interpretation and production and consumption are more tightly linked. Ultimately, service quality is what the customer says it is. Services are provided through interpersonal interaction that is shaped by one's socialization and cultural expectations. Therefore, the manner in which services are provided shapes the perception of the quality of that service. As a result, a key capability in delivering services across cultural boundaries is the adaptation of the provider to the cultural expectations of their client. I describe this management of cultural repertoire as the performance of *cultural labor*. Cultural labor is embodied in the individual employee; aggregated, it is an important capability that determines upgrading success in the IT enables services.

The cultural labor concept takes a sociological approach to skills being historical situated in broader relations of power and enduring colonial relations between the developed and developing. The colonial system perpetuated binary conceptions between East and West, noting that they were "constitutive;" one could not occur without the other (Said, 1979). The concept of "cultural labor" is a micro-level analysis of the skills required in cross-cultural business. The analysis follows Homi Bhabha's observation

where colonialism was never to liberate natives, but rather to reproduce the colonized as *almost the same but not quite/white* (Bhabha, 1994). The cultural skills valued within the IT and ITES industry, and the training practices that produce those skills, must be also viewed within broader historical relations, rooted in colonialism. The training programs build cultural skills based upon generalizations of how Indian workers behave. Yet, it is dangerous and inaccurate to perpetuate stereotyped impressions of heterogeneous groups (Spivak, 1988). The perpetuation of Indian culture characterized by a "culture of deference" (Nadeem, 2011) is one example of how essentializing characterizations are identified and eliminated through training programs. These practices demonstrate how the very skills valued in the ITES industry are relational and constructed by relations of power.

VII. Design & Case Selection

In order to understand the implications of this shift toward services the category of "services" needs to be further disaggregated. There are two main reasons for this disaggregation. First, industrial upgrading occurs when there is a move from low-value to high-value work and this often occurs within a narrow industry category. An example of this is a move from low-value assembly to high-value design work within technology manufacturing (Gereffi, 1999). Second, the broad industrial category of "services" is notoriously difficult to define because it is a residual category used to refer to any activities that are *not* agriculture, mining, or manufacturing (Banga, 2005a; Dossani & Kenney, 2006). The heterogeneity of services makes theorizing about service upgrading exceedingly difficult. To focus the dissertation theoretically I focus on services that can

be fulfilled remotely through information, Internet, and telephony technologies; commonly referred to as IT enabled services (ITES) by industry insiders, policy analysts, and government officials.

The ITES industry itself contains a wide variety of activities that range from back office (data-entry, transaction processing, technical support); sales and customer care departments (call centers), to professional services (such as legal, radiology, and accounting). This study compares the skills required in two knowledge intensive professional service industries: financial and medical services. It is these higher-level skills that are most important for India's ability to retain a long-term advantage in services, which is critical to sustained economic development in the country. I selected the financial and medical ITES industries based upon their different propensities to specialize within industries and expand in breadth across industries, thereby addressing the twin dimensions of industrial upgrading, scope and depth. Medical services contribute to a greater degree of specialized industry learning since these services are niche products and they require specialized skills. Conversely, financial services are generic and show more potential to expand in breadth by producing services that are used by multiple industries.

The financial services industry is one of the most monetarily significant arenas within the Indian ITES service industry, accounting for 40 percent of the total $4.6 billion gross revenues generated in the country's service sector (NASSCOM, 2006a). The size of the medical services export industry is more difficult to measure because industry statistics are difficult to separate from general hospital services and there are a number of medical services business associations unevenly distributed across the industry. Medical

transcription was one of the first services to be offshored to India in the early 1990s and the business has grown in revenue to USD 220-240 million (NASSCOM, 2006c). Professional radiological services, on the other side of the skill continuum, offer an "extreme" case[17] of offshoring because of the high degree of technical knowledge required combined with the potentially harmful effects of making mistakes, which can result in misdiagnosis of life threatening conditions (F. Levy & Yu, 2006).

This study produces detailed case analyses of four firms. Case-based research strategies are particularly well suited in helping a researcher retain the holistic characteristics of events, such as organizational and managerial processes (Yin, 2002). Cases also regularly imply analytical generalizations and they can serve as the foundation of theory formation (Weiss, 1994). The firms selected for this study were chosen for their longevity and their market leadership in the knowledge process outsourcing industry (See Table 1.2: Summary View of Medical Service Firm & Table 1.3: Summary View of Financial Service Firm). The firms Infosys and Evalueserve specialize in financial services. Teleradiology Solutions and the Global Radiology Centre (GRC) are firms that specialize in radiological services. Infosys, founded in 1981, is a top 10 IT and ITES firms in India in terms of revenue (Dataquest, 2010), has over 100,000 employees worldwide, and is perhaps the firm most closely identified with India's IT and ITES revolution. While the majority of Infosys' revenue is derived from software services, the company's acquisition of leading Business Process Outsourcing (BPO) firm Progeon in 2006 positioned Infosys as a top ten leader in IT enabled services (Dataquest, 2010) and later in knowledge process outsourcing services. Evalueserve, on the other hand, was one

[17] Radiology is an "extreme" case in terms of its skill and educational demands, relative to the low-skill, back office work that dominated offshore outsourcing in India in its early years.

of the first "pure" knowledge process outsourcing firms; indeed, the firm coined the term in order to differentiate its "knowledge intensive" services from the lower skill level call center and data entry work that defined the early years of offshore services in India. Evalueserve was founded in 2000 and has over 2200 employees working on various services, including investment and patent research. Financial services generate 70 percent of revenue in Infosys's knowledge services division and 40 percent of the total revenue for Evalueserve (personal interviews, Infosys, 11/23/07 & Evalueserve, 12/3/08).

International teleradiology is a relatively small niche service industry and the Global Radiology Center (GRC) and Teleradiology Solutions are the longest running firms providing these services from India (Chandran, 2008). The GRC was founded in 2002 as a joint venture between top 10 IT and ITES company, Wipro, and a regional hospital group, Manipal Hospitals, and has approximately 22 employees. Teleradiology Solutions was founded in 2001 and has approximately 350 employees. Evalueserve and Teleradiology Solutions focus on slightly more specialized services relative to Infosys and GRC. The former firms were traditional start-ups, while the Infosys knowledge services division and the GRC were either acquired or incubated by established IT firms looking to diversify into new lucrative service lines.

VIII. Method

This analysis will draw upon three types of primary source data (interviews, observation, and documents) as well as secondary sources in order to explain the processes at work leading to industrial upgrading into knowledge intensive service delivery. Of these, the interviews provide the core foundation of the data collection

strategy. The dissertation draws upon 101 semi-structured interviews collected during 14 months of field research in India, conducted between July 2006 and May 2009 as well as subsequent follow up phone interviews. Interviews targeted Indian executives, managers, workers, employee development training staff, governmental and trade association officials, clients, and western executives responsible for offshoring operations at multinational companies. The study also draws upon ethnographic observations gathered during visits to dedicated training facilities,[18] industry policy meetings, and industry trade events and conferences.

The research also draws upon primary source documents from the Government of India, trade associations, newspapers, trade publications and magazines, as well as secondary sources in order to complement and corroborate interviews data where possible. I focused my investigation on 5 news sources (International sources: *The New York Times,* BBC.co.uk; Indian sources: *The Hindu*, *The Times of India*, and *The Deccan Herald,*) using key search terms and electronic alerts.

I also performed follow up interviews and searches in newspapers, after the emergence of the global financial crisis in September 2008. The destabilization of the global financial system and the collapse of investment banks that bought financial services from Indian companies raised concerns over the long-term sustainability of offshore outsourcing concentrated in financial services. In the short-term, financial executives responded to the uncertain economic climate by delaying purchases and service commitments, causing sales to drop for many Indian companies that provided these services. Overall, the broader ITES industry growth, dominated by lower value

[18] The GRC does not have a dedicated training facility because of its small size and reliance on a one-on-one training model, although some "soft-skills" and management trainings are offered through Wipro, the parent organization.

back office services, stagnated during the crisis and then quickly rebounded. Growth in the higher-value KPO sector dipped causing analysts to revise revenue growth forecasts in India from 16.7 billion in 2010-11 to 17 billion in 2013-14 (Aggarwal, 2010a). The reason was that many firms were fighting to survive and lower-value cost cutting BPO services could help companies cut costs, after they moved beyond the initial fear of approving new deals in the face of such economic uncertainty. KPO services on the other hand are typically value-adding activities that provide additional analysis of data and are used to help guide future company strategy. Value adding activities were simply not on the agenda for many companies in survival mode.[19]

IX. Plan of the Dissertation

In the dissertation that follows I provide a brief overview of the Indian state's post-Independence developmental trajectory. This history is briefly sketched in Chapter 2 "The Indian Developmental State: Interventions in IT& Higher Education Policy." In this chapter I analyze the state's successes and failures in building a knowledge base for industry development through an analysis of the Indian higher educational system and key industrial policies that helped the sector emerge and upgrade. In Chapter 3, "In Partnership with the State," I analyze the evolving role industry trade associations' play fostering development in the Indian IT and ITES industry. This new arrangement is helping to address some of the limitations of the Indian state, such as the under production of skilled workers in the higher education system relative to industrial needs. In Chapter 4, "Skill Upgrading through Client Relationships & Migration of Technical

[19] Neither Infosys nor Evalueserve had banking customers who failed (i.e. Lehman Brothers), although they were affected by the overall market turmoil that lowered short-term industry growth rates across the board in the banking and financial services sector.

Labor" I analyze the organizational practices that transfer knowledge from developed countries to service providers in India. I uncover two central mechanisms, one that transfers knowledge through client relationships and another that occurs through the migration of technical labor. Chapter 5, "Firm Training Programs: The Construction of Upgrading in Offshore Service Companies" focuses on the ways in which firm training programs upgrade worker skills and build firm knowledge. Simultaneously these efforts shape the perceptions of firm capabilities, thereby highlighting the constructed nature of skill upgrading. In Chapter 6, I shift the analysis from the meso-industrial level of analysis to the micro foundations of India's industrial upgrading story, with a particular focus on the new cultural capabilities embodied in the worker. I argue, the performance of "cultural labor" is imperative to firm success in the international trade of services. I conclude (Chapter 7) by arguing that the new institutional arrangement guiding development, led by industry associations in partnership with the state, in the IT and ITES industry is emblematic of India's new approach to development and is being replicated unevenly across other industrial sectors in India and in other developing country contexts. In the conclusion I also assess how the mechanisms identified here can inform policy and the opportunities other developing countries have in replicating India's ITES industrial strategy.

Table 1.2: Summary View of Medical Service Firms

Industry	Less Specialized*	More Specialized
Medical	**Global Radiology Center** (Wipro + Manipal Hospital) **Origin/Type:** Incubation (est. in 2002) between business house, Wipro (est. 1945. IT: 1980), and Manipal Group (est. 1990). **Employees**: 22 total, 5 Indian certified doctors and 4+ full time technologists **Focus** on 3-D Imaging for US Market. Provide Indian certified radiologists for 3-D imaging, which are more highly educated and less expensive on average than technologists used in US. Also provide interpretations of images for Singapore based clients using Indian radiologists (less than 20% of revenue). **Model:** IT service company, Wipro, partnered with Manipal Hospital, in a revenue sharing model that combines the management and delivery skills with technical expertise of respective organizations.	**Teleradiology Solutions** **Origin/Type:** Entrepreneurial firm (est. 2002) **Employees**: 350 total, 13+ US board certified doctors **Focus** on top value services: "reporting" or reads of scans by qualified US Board Certified radiologists working overseas. Also deliver 3D work, clinical trails, and other service lines to US, Singapore, and Indian markets. **Model**: began as a Yale faculty / US Board certified radiologists (ABR) performing radiology reads from house in India. Grew business over time, hiring additional US board certified radiologists – wherever they may live – to provide diagnostic interpretations for US clients through secure technology network.

* Specialization is defined in terms of the degree of interpretation and customization required for work. If work tends to be more routinized, less tailored and customized, it is therefore less specialized. The degree of industry skill and knowledge tends to increase specialization.

Table 1.3: Summary View of Financial Service Firms

Industry	Less Specialized	More Specialized
Finance	**Infosys BPO, Knowledge Services Division** Origin/Type: Acquisition (Progeon est. 2002, acquired by Infosys 2006) by leading IT firm (Infosys est. 1981). Knowledge service work started in 2005. • 1000+ highly skilled professionals, including Chartered Accountants, MBAs, engineers, statisticians and economics graduates • Focus: Large, process oriented engagements that build upon firm's core IT and BPO business. **Model** - grew out of BPO processes into higher-level work as client's confidence in skills increased.	**Evalueserve** Origin/Type: Entrepreneurial firm (est. 2000) • Largest KPO in world • 2200 highly skilled professionals MBAs, Chartered Accountants, PhDs, and lawyers. • Focus: Small, specialized/ customized engagements. Provides a range of custom research, data analytics and Intellectual Property and Legal Process Services Financial Services • Asset Management • Private Equity • Investment Research • Retail Banking • Insurance **Model** – Highly customized research & consulting work that provides 70-80% of tasks traditional performed by investment bank/ consulting companies.

Chapter 2
The Aspiring Developmental State

I. Introduction

The Indian state has slowly shifted development strategies from a developmental state led-model to one that is more fragmented and industry led. This shift began to unfold during the early to mid-1980s, with an opening up of policy reforms, but was accelerated and coordinated through the help of trade associations beginning in 1988. Even as these changes have taken place, the initial role of the Indian state and the continued role of the state in partnership with trade associations and other entities remain important to an overall understanding of Indian development. In the context of the shifts described above, this chapter will focus on the role the state played in establishing the industrial knowledge base, policy coordination, and support for subsequent upgrading.

According to Peter Evans (1995), Indian development in IT was characterized by a lack of public-private coordination. While this describes the state-industry relationship until the early 1980s, this began to change to such an extent during the 1980s and 1990s that by 2000 industry and trade associations were key actors in IT and ITES industry policy and, by mid-2000s Public-Private Partnerships (PPP) were becoming the preferred developmental model. These initiatives were increasingly coordinated and driven through trade associations. There are two underlying factors that caused this change. First, there was a shift in the role of the state from autarky to embeddedness in civil society, which is characterized by close ties to the business community (Evans, 1995). Second, was the rise

and consolidation of the industry association, the National Associations of Software and Service Companies (NASSCOM), to speak and act on behalf of the industry.

Contrary to popular and industry perception, the Indian state helped to support the emergence of the country's software and services industries. The commonly repeated narrative by IT and ITES insiders is that the industry developed, not because of government support, but in spite of it.[20] This narrative, however, neglects three important factors that helped the industry emerge, grow, and eventually upgrade to higher value services. The first was the significant investments the state made in building educational institutions that provided the IT industry with the educational foundation to enable growth and subsequent upgrading. The second oversight is the actual IT policies and programs that the Indian state implemented beginning in 1972 that helped the IT and ITES industries take off and upgrade. Third, it neglects the intervention the state made to discourage continued market dominance by foreign MNCs, best exemplified by the exit of IBM in 1978, which provided emerging domestic producers the opportunity to develop without being overrun by foreign competitors in the late 1970s and early 1980s.

This chapter provides an overview of key economic, political and institutional developments in India contributing to the rise of the ITES industry. First, I analyze the macro-context for the Indian development state since Independence, highlighting along the way key industrial policy initiatives that helped the IT and ITES industries grow. Second, I focus on state formation of a higher educational system that provides the foundation for IT and ITES industry development. In doing so, I challenge 3 commonly held assumptions about development in India. These assumptions are:

[20] For arguments that highlight the role of the state played in supporting the emergence of the IT industry see (Evans, 1995; Heeks, 1996; Pingle, 1999)

1. *The economic turnaround of the Indian economy (as measured by GDP) was the result of economic liberalization.* I find instead that a shift in the role of the state was more important, and predated, the large economic reforms of the 1990s.
2. *The software and ITES industries flourished precisely because the state was uninvolved in these industries.* I find that, in fact, the state implemented a 1972 IT policy and became increasingly involved in promoting the software industry and the ITES industry that followed, due to is interaction with industry.
3. *The higher education system is responsible for India's success OR its failure.* I find that the answer is somewhere in the middle of these two extremes. The state initiated educational system provided a foundation for industry development, but that base was insufficient to meet growing industry demands and the government required new efforts and policies, with the help of industry, to meet growing industry needs.

Given these three challenges to popular and academic narrative of India's IT and ITES industry development, this chapter challenges claims that ITES industries flourished because of state lack of involvement. Instead, I provide evidence that the state was not only involved, but its involvement was key to the take-off and maturation of the sector. Yet, the state alone was unable to meet the industry's evolving needs, requiring various forms of industry input. (Chapter 3 provides a closer examination of the new actors that assisted the state in this process). First, I turn to the economic and political history in order to provide the institutional context for further analysis of the IT enabled service

industry. Then I survey the expansion of the higher educational system, with a particular eye toward the interaction of the state and non-state actors in educational policy reform and the creation of new technical intuitions.

II. Shifting roles of the Indian Developmental State

At the time of independence, India sought to become a self-sufficient developmental state. Yet, the state's attempts to achieve its own *developmental goals* failed (Bagchi, 2000; Chibber, 2004; Herring, 1999) or met with mixed results (Evans, 1995). The general conclusion in the literature is that the Indian state is committed to planning, yet too democratic, soft and embedded to govern the market (Herring, 1999). Yet, this characterization fits a specific historical period when India's "Hindu rate of growth" averaged between 3 and 4 percent, prior to its economic turnaround in the mid-1980s.

In subsequent years India experienced a dramatic economic turnaround. Its broader economic growth rates of 6 percent or higher since the late 1980s and since the early 1990s the rates have ranged between 6 to nearly 9 percent of GDP (Panagariya, 2008). These high growth rates have made a visible impact on the country, particularly in urban centers where commerce and development are most highly concentrated. The economic reforms that followed India's balance of payment crisis in 1990-91 are offered as a common sense explanation for India's economic turnaround, but some scholars have challenged this assertion (DeLong, 2003; Kohli, 2004; Panagariya, 2008).[21] The antecedents of this dynamic shift in overall economic performance require further scrutiny. In order to highlight the political and economic developments that shaped

[21] For an overview of the debates on the causes and effect of Indian economic reform refer to (Corbridge & Harriss, 2000; Joshi & Little, 1996).

overall industrialization since independence, I will use the economic periodization and growth rate estimates provided by Panagariya (2008), which are provided in Table 2.1 and Tables 2.2 below.

Table 2.1: State Roles and Associated Growth Rate

State Role	Year Range	Growth Rate %
Emergent Developmental State	1951-1965	4.1
License Raj State	1965-1981	3.2
Pro-Business State Attitude	1981-1988	4.8
Association Led Developmental State	1988-2006	6.3

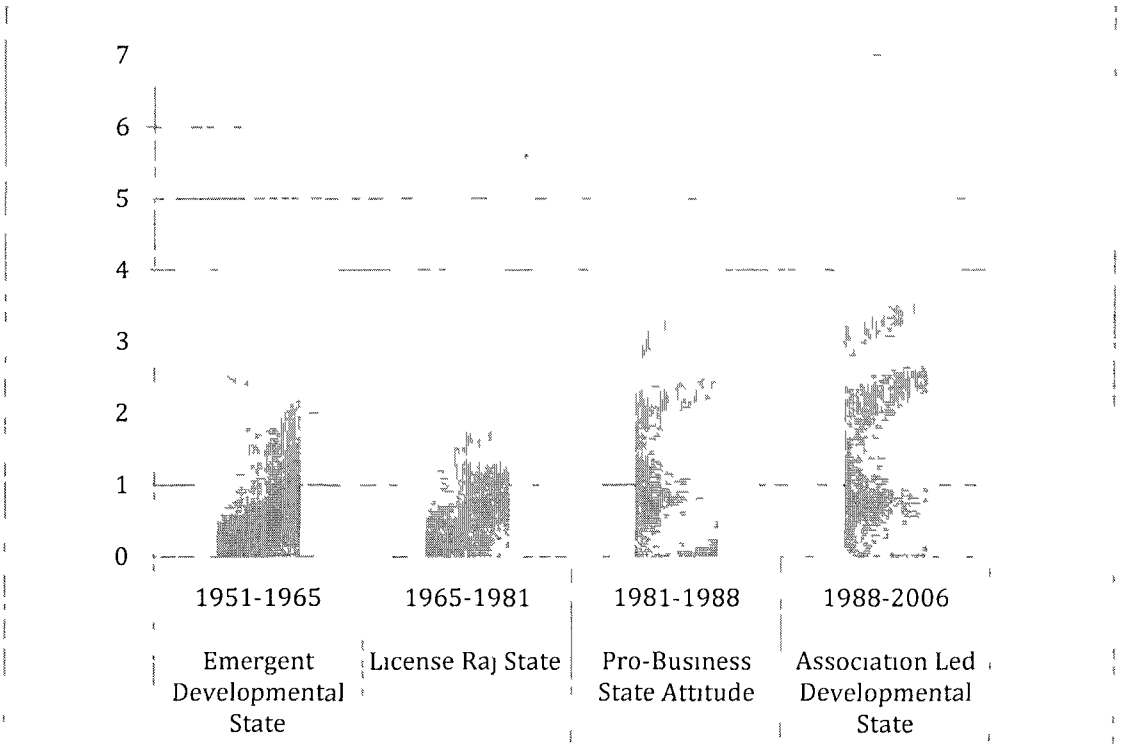

Table 2.2: Bar Graph of State Roles and Associated Growth Rate.

X-axis is the economic and political phase of growth with corresponding date range. The Y-axis is growth rate percentage based on price adjusted GDP. Source: Based on calculations in (Panagariya, 2008, p. 7).

I argue that the state's role shifted in response to internal and external constraints, which shaped the four distinct economic outcomes provided in the graph above. Each role was characterized by a distinctive approach to development and different economic outcomes. I characterize the varying roles of the state over specific periods of time as: The Emergent Developmental State (1947 to 1965); The "License Raj" State (1965-1981); Pro-Business State Attitude (1981-1988); and the Association Led Developmental State (1988-2010).[22] I will describe each of these state roles below, concentrating most heavily upon the latter stages, which most directly affect upgrading in the IT and ITES sectors that is the focus of this dissertation. This analysis of the Association Led Developmental State will continue in Chapter 3, which focuses on developmental role trade associations play in industry growth and upgrading.

i. The Emergent Developmental State (1947 to 1965)

The Emergent Developmental State, which lasted from Independence in 1947 to 1964, was characterized by the state's desire to become self-sufficient in the wake of colonial domination. This self-sufficiency was sought through an import substitution industrialization (ISI) developmental strategy and state investments in strategic industries and in education. Despite the state's inability to create a "strong developmental state" during this early period (Chibber, 2004), the newly independent Indian state achieved self-sufficiency and industrial diversification during its first three industrial plans (1951-66)(Rudolph & Rudolph, 1987). This period achieved an average annual growth rate of 4.1 percent (Panagariya, 2008). Most significantly for later development, state action

[22] Although Panagariya's calculations stop at 2006, I am extending the period associated with the Association Led Developmental State role to 2010, since growth rates from 2006-2010 were in excess of the average 6.3% associated with this period and the state role has become even more reliant on industry associations.

during this period led to deepening of India's industrial and technical base (Chibber, 2004).

During this period, the state created a number of state-owned enterprises that helped develop technical manufacturing industries in cities that would later become IT hubs. In particular, the establishment of large public sector units in Bangalore by the state helped develop an emerging technical talent pool in the area that would foster subsequent industry development (Personal Interview, Secretary to Karnataka Government, 11/15/07). The key public sector units headquartered in Bangalore include Hindustan Aeronautical, Ltd. (HAL) (established in 1940); Hindustan Machine Tools, Ltd. (HMT) (1953); Bharat Electronics, Ltd. (BEL) (1954); and Bharat Earth Movers, Ltd. (BEML) (1964). The concentration of state owned enterprises, along with the creation of leading universities in the Bangalore area (such as the Indian Institute of Science) helps explain how Bangalore, in a less than a generation, was transformed from a relatively small city, known as "a pensioner's paradise," into India's "Silicon Valley." Bangalore became a thriving IT and ITES hub city of 5.7 million commanding half of the state's gross domestic product income derived from the services sector (Business India Intelligence, 2011). One of the major developmental accomplishments of the state during this period was the educational system, which provided a base for subsequent industrial growth and upgrading. I describe the state's interventions in the higher educational field in greater detail in the second half of this chapter.

ii. The "License Raj" State (1965-1981)

This period is most strongly associated with the leadership of Indira Gandhi (1966-1977), the suspension of India Democracy (i.e. "Emergency") from 1975-77, and the peak of government regulatory control of industry. During this period the State

viewed the business community as an object to be controlled rather than supported and promoted. This gave way to onerous regulations that made it difficult for many firms to operate. Licensing for industrial entry or expansion was first established under the "Industrial Development and Regulation Act of 1951" and substantially expanded under "The 1969 Monopolies and Restrictive Trade Practices (MRTP) Act." The MRTP attempted to reserve licenses for small and public sector producers and make it more difficult for large companies to enter certain industries (Heeks, 1996). But the regulation regime actually had the unintended consequence of harming small-scale businesses more than large-scale business, since the latter had the resources and the political ties required to bribe bureaucrats and circumnavigate bureaucratic rules (Chibber, 2004). Despite regulatory difficulties for businesses, the roots of the current economic success in the IT and ITES industry can be traced to this period. The government implemented policies that provided Indian firms with an opportunity to enter the IT market. It was during this period that the government of India first identified IT as a sector worthy of government support, crafted an IT policy, and limited foreign MNC dominance in the IT market; this allowed some of the leading IT companies to emerge in the late 1970s and early 1980s. These developments are discussed in greater detail under Section III on IT policy and firm emergence in this chapter.

iii. Pro-Business State Attitude (1981-1988)

I argue that a key explanation for the rise in economic prosperity in India was a change in the role of the state to become more pro-business during the 1980s. This explanation runs counter to neoliberal explanations that emphasize a roll back of the state, through far reaching liberalization market reforms, which are credited with helping

India to move away from its "Hindu rate of growth." One exuberant commentator providing such an account says,

> [...]in July 1991[...] with the announcement of sweeping liberalization [...][W]e felt as though our second independence had arrived: we were going to be free from a rapacious and domineering state... (Das, 2002, p. x).

Tarun Das, the Director General for 30 years of the national business association, the Confederation of Indian Industry (CII), also credited the 1991 liberalization reforms with India's economic growth in an interview with Thomas Friedman:

> 'Our Berlin Wall fell,' said Das, 'and it was like unleashing a caged tiger. Trade controls were abolished. We were always at 3 percent growth, the so-called Hindu rate of growth—slow, cautious, and conservative. To make [better returns], you had to go to America. Well, three years later [after the 1991 reforms] we were at 7 percent rate of growth (Friedman 2005, p. 50).

Explanations of this kind are overdrawn and fail to grasp both the timing and cause of India's economic growth and the scope of reform. Social scientists have highlighted the fact that India's economic turnaround occurred well before the bigger and more visible reforms during the 1990s (DeLong, 2003; Kohli, 2004; Panagariya, 2008). These accounts suggest that the policy officials' ideological shifts toward more "business friendly" approaches to governance did more than the actual economic policy changes to spur higher economic growth rates. This argument follows Rodrik and Subramanian's distinction between "premarket" and "probusiness" orientations, where the former focuses on removing impediments to markets through economic liberalization, which favor new entrants and consumers, and the latter with focuses on raising the profitability of the established industrial and commercial establishments, favoring incumbents and producers (Rodrik & Subramanian, 2005, p. 195).[23] In a similar vein, Atul Kohli argues

[23] Other scholars who credit the shifting attitude of the state for the economic growth of the 1980s, rather than simply economic liberalization include (DeLong, 2003; Kohli, 2004). This argument runs counter to

that the left leaning officially socialist state experienced a "pro-business drift" beginning in the 1980s that helped produce more cohesive state policy, but he attributes this change to the state's decline in multiclass representation, rather than neoliberal policy reform (Kohli, 2004, p. 278). This shift by the state during the mid-1980s encouraged, rather than discouraged, entrepreneurial activities and promoted integration into the world economy, leading to a belief that the "rules of the game" had changed (DeLong, 2003). The marked effects of these shifts in *state policy* undercut the neoliberal explanation of India's growth as being produced by reforms to minimize government intervention in the market.

The increasingly pro-business stance of the Indian state began under Indira Gandhi's return to power (1980-1984), but is most strongly associated with the leadership of her son Rajiv Gandhi (1984-1989).[24] His government implemented policy reforms that encouraged capital-goods imports, relaxed industrial regulations and rationalized the tax system (DeLong, 2003). Policy liberalizations in the area of state control included delicensing of entry in some industries, reduction in the scope of MRTP Act, greater leeway in firm expansion without license renewal, a greater degree of flexibility in producing alternative products without license renewals, reduction of price controls on some goods, and lowering of corporate taxes (Heeks, 1996, p. 36). Yet, the reforms tended toward reduction of governmental oversight and regulation, rather than the removal of governmental oversight and regulation as neoliberalism would suggest.

iv. Association Led Developmental State (1988-2010)

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the arguments of economists who attribute liberalization reform, rather than a change in state attitude, as explanations for growth. See Panagariya (2008) and (Srinivasan, 2005).

[24] For a more nuanced rendering of the three phases *within* Rajiv Gandhi's administration see (Kohli, 1989)

During this period the state continued to build ties with industry, giving its agents more autonomy and authority over the developmental process. However, changes in state-society relations occurred unevenly across industrial sectors. Factors contributing to this variance in state action by industry are average firm size, the strength of the trade associations, the industries export orientation and potential, and the presence of unions. The IT and ITES industries were more prone to cooperative ties to the state than other, domestically oriented manufacturing industries. This was because the software and services industry in India is dominated by small, resource poor firms that are strongly export oriented, with a cohesive and proactive trade association with linkages to the state (Pingle, 1999), and has no sizeable organized union. The state's continued move to the right and its embrace of economic liberalization, which is particularly pronounced in the software and service industry, does not mean that the state was uninvolved in promoting this sector. It just took on an increasingly supporting role in the development process.

There are number of state policies that have helped the sector grow over time. For example, the state passed legislation that provided a number of financial incentives, including state tax exemptions on profits from software exports, discounted rates on utilities for firms, and infrastructure improvements of special export processing zones dedicated for the industry in IT hub cities (NASSCOM, 2006a; Pingle, 1999). The sector has also actively and increasingly engaged government. Over time, these relations have become formalized into Public-Private Partnerships (PPP) replicated across industries and developmental projects; trade associations, as I discuss in Chapter 3, play a key role in forging industry relationships with the state. PPPs were also facilitated the development of new industrial facilities and the creation of new technical colleges. These

projects are also discussed in greater detail in Chapter 3.

III. Policy Frameworks and the Emergence of Firms

The Indian state created IT policies and programs that helped the Indian software industry grow and upgrade over time. The policy framework emerged in a patchwork manner, incoherent during the 1970s and 1980s, but was increasingly refined during the 1990s, as the state worked more cooperatively with industry and its associations. India has had a software policy since 1972, longer than any other developing country (Heeks, 1996, p. 25; Parthasarathi & Joseph, 2004).

i. The Development of India's IT Policies

The Department of Electronics (DoE), founded in the 1972, was responsible for the software industry and software industrial policy. That same year the DoE launched the "Software Export Scheme" policy, which provided software exporters an exemption from paying import tariffs on IT hardware if the computers were used for the development of software for export markets. In order to qualify for the duty exemption the importer needed to commit to earning the import price of the computer in foreign exchange through software exports within a five-year period.[25] This law was first used in 1974 and benefitted early software companies, such as Tata Consulting Services (TCS) and Infosys. Prior to 1980, however, most software companies were using the "Software Export Scheme" to lease computer equipment for domestic use, rather than the production of software for exports (Heeks, 1996, p. 43). The state attempted to discourage these practices through adjustments to the policy, such as increasing the minimum threshold of export revenue generated, but its success was mixed at best. The

[25] The commitment was later raised to twice the import price (Heeks, 1996, p. 42).

policy efforts made during the 1970s helped build a foundation for the software industry, but more sustained and coherent software industrial policy only emerged in 1985 when software was identified as a thrust area by the government (Heeks, 1996, p. 25) (See Table 2.5: Major Milestones and Events in Indian IT Industry). This lack of focus of the government on software policy was due in part to the biases of the state toward hardware manufacturing and toward the domestic, rather than the export market.

State promotion of and intervention into the software industry, however, operated within a broader Indian industrial policy orientation that privileged domestic producers over foreign producers. The overall import substitution industrialization (ISI) model of development, which guided industrialization within India, also influenced state intervention in the electronics industry. The recommendation of the Bhabha Committee Report on Electronics (Government of India, 1966) prompted the state to shift electronics production away from foreign firms toward domestic ones and to upgrade technology in the state. Policy makers viewed multinational hardware manufacturers as taking advantage of India and dominating industry during the 1960s. With this in mind and the subsequent Bhabha Report recommendations, the state focused attention on getting the wholly owned multinational subsidiaries to dilute their equity by passing Foreign Exchange Regulation Act (FERA), in 1973, which required all foreign firms to dilute their equity (Evans, 1995; Pingle, 1999). Yet the complete domination of MNCs in the Indian market made enforcement difficult for the state and firms, such as IBM, were able to resist state regulation for a number of years (Heeks, 1996, p. 55). The peak in government control of the computer industry lasted from 1976 to 1978 (Heeks, 1996, 56), which coincides with the peak in regulatory role of the "License Raj" state.

During the 1980s Rajiv Gandhi began to repair ties with the broader business community, which were harmed during the License Raj period, and with the IT sector specifically. Rajiv Gandhi was a proponent of IT and sought to promote the sector and technology within the country more generally. It was during this period that Indian policy in IT shifted toward a promotional role. The state began to put together the institutional framework to more substantively support industry (Evans, 1995). The more comprehensive software policy implemented in 1986 was a crucial component of this shift. The policy delinked the software industry from the hardware sector. Previous policies grouped hardware and software together, despite their different market orientations, industry maturities, and requirements.

A crucial policy identified by industry insiders and scholars that enabled industry's emergence and later growth was the creation of infrastructure and export processing free trade zones set up exclusively for software and service companies.[26] In 1988 a Software Technology Parks (STP) of India Scheme was established under the Department of Electronics. The STP initiative provides a number of tax exemptions, such as a 100% income tax exemption on export income during the first 5 years of operation, a 50% exemption thereafter, and exemptions from central and state sales and service taxes (Software Technology Parks of India, 2011). The STP scheme was passed during a the more Pro-business orientation of the state, but was only implemented 3 years later, after gaining some additional input from industry and its association.

The STP scheme was not an absence of government intervention, but rather an intensification of government involvement to support industry. The Software Technology

[26] Multiple industry executives at Infosys and Evalueserve and government officials at STPI, and state and federal departments. Also see (Athreye, 2005; Kennedy & Sharma, 2009)

Parks of India (STPI) was an agency established by the government in 1991 in order to implement the STP Scheme and expand the initiative in regional hubs across the country. A crucial government service provided by STPI was the provisioning of communication infrastructure, such as data communication infrastructure, bandwidth, and satellites, which were particularly difficult for companies to obtain even as late as the early 2000s. Another role STPI played beginning in 1991 was coordinating with other state agencies in order to provide a "single window clearance." STPI, in conjunction with state IT departments, helped facilitate interaction with government agencies and departments, such as the customs department, labor department, industries department, sales tax authority department, and airport authorities (personal interviews, government official, Department of IT, Karnataka, 11/12/07; Director, STPI-Bangalore, 11/7/08). While, some industry members complained, even as late as 2008, that in practice their was no "single window;" firms still had to coordinate with multiple governmental agencies (Executive, Infosys, 12/10/08), STPI still helped to streamline the approval and coordination process to make it less onerous and lengthy. By 2006 procuring business data lines and Internet access in the metropolitan areas became easier for firms less and STPI shifted its focus to incubation services targeting small start up businesses with fully equipped office suites and connections to venture capital funders (Director, STPI-Bangalore, 11/7/08). STPI also helped provide other services like technology assessment and professional training to support operations. The STPI services provided by the government show an extension of the arms of the state into civil society in order to support business needs, rather than a pulling back or roll back of the state.

During the 1990s state governments joined the central government in enacting IT policies in order to promote software. The focus generally was on key issues of infrastructure, electronic governance, IT education and provision of a facilitating environment (Parthasarathi & Joseph, 2004). Additional IT policies and government promotional initiatives, such as abolition of entry barriers for foreign companies, telecommunications and Internet infrastructure improvements, reductions of taxes, duties, and tariffs are discussed in greater detail in Chapter 3.

ii. The Emergency of Industry

A quarter of the top 20 IT firms in 2010 were established or began operations in India during the "License Raj" period. The firms that were founded in 1981 or before were Tata Consulting Services (TCS) (1968), HCL Infosystems (1976), Patni Computer Systems (1978), Wipro (1980), Infosys (1981), and Microsoft (India)(1981) (See Table 2.3: Top 20 IT and ITES Firms with Operations in India). Infosys, Patni, and HCL were pure start up companies that began with a small number of employees. Patni and Infosys had 5 or fewer employees when founded. TCS is part of the larger Tata Group, founded in 1868 and Wipro was an small investment house that started as vegetable oil company in 1945; both were part of larger diversified companies that later moved into IT toward the end of the License Raj period.

Table 2.3: Top 20 IT and ITES Firms with Operations in India

2010 Top 20 IT Firms in India			2010 Top 20 BPO Firms in India		
Rank	**Firm**	**Began IT work***	**Rank**	**Firm**	**Began ITES work****
1	**Tata Consulting Services (TCS)**	1968	1	Genpact	1997
2	**Wipro**	1980	2	**TCS BPO**	2004
3	**Infosys Technologies**	1981	3	**Wipro BPO**	2000
4	Hewlett-Packard (India)	1989	4	Aegis BPO****	1985
5	**Cognizant Technology Solutions**	1994	5	WNS Global Services	1996
6	**IBM (India)*****	1992	6	Firstsource Solutions	2001
7	**HCL Infosystems**	1976	7	**IBM Daksh**	1999
8	**HCL Technologies**	1991	8	Aditya Birla Minacs	1999
9	Ingram Micro (India)	1996	9	**Infosys BPO**	1991
10	Redington India	1993	10	**Accenture (India)**	2000
11	Oracle India	1993	11	**HCL BPO**	2001
12	Cisco Systems (India)	1995	12	EXL Services	1999
13	Dell (India)	2000	13	Xchanging India	2001
14	Intel (India)	1988	14	**Cognizant BPO******	1994
15	**Accenture India**	1987	15	Convergys India	2001
16	Tech Mahindra	1986	16	3i Infotech	1999
17	SAP (India)	1996	17	Intelenet Global	2000
18	**MphasiS**	1992	18	Hinduja Global Solutions	1995
19	Microsoft (India)	1981	19	24/7 Customer	2000
20	Patni Computer Systems	1978	20	**MphasiS BPO**	2000

Source: Dataquest 2010

Notes:

Bold denotes ownership overlap between top ITES and IT firms. The considerable overlap among market leaders between these two industry segments underscores the difficulty in analytically separating ITES from the IT industry.

*Date reflects when company began IT services in India. Founding date may be an earlier date.

**Year organization began providing BPO services or date of key BPO firm acquisition, unless otherwise noted.

***IBM operated within India from 1963-1978, but left due to Government pressure to divest.

****Date refers to incorporation date, rather than the date BPO delivery began. That later date could not be found.

A notable exception in Table 2.3, however, is the case of IBM. IBM began operations in India in the mid-1960s, but left in 1978 when the company refused to

comply with the 1973 FERA regulations, which required all foreign firms to dilute their equity (Evans, 1995; Pingle, 1999). The government of India wanted to stimulate domestic production of an IT industry and sought self-reliance that was consistent with its broader ISI developmental strategy at the time. The departure of IBM from India in 1978, however, provided a market opening for domestic producers, which seized the opportunity to develop in the technology arena without the pressures of foreign domination in the domestic market. According to Wipro CEO, Azim Premji, IBM's departure gave India an opportunity to develop its own firms and technologies:

> I think it [IBM's exit] gave us a huge opportunity. And I think it benefitted the Indian industry and population enormously because IBM at that time was not bringing in current technology. That was a bone of contention between them and the government of India in the late 70s. And when they exited – because they believed at the time that the world cannot exist without IBM and they had a dominant market share in India – it opened up a huge opportunity for Indian companies to really strike out. It opened a huge market for us to identify a position in this market, which we could create a uniqueness for (Rose, 2006, minutes 1:59 – 2:48 on audio program).

The fact that Premji cites the exit of IBM from India as providing the opportunity to local firms is important to note, particularly because the company's exit was due to government regulatory and protectionists policies. In essence, Premji is crediting government protectionist policies with providing domestic producers the opportunity to grow in the IT sector. Contra the neoliberal explanation of growth, it was in fact government protection that gave early domestic firms the chance to flourish.

IV. In Pursuit of Saraswati: Culture, Status, and Knowledge in India

The foregoing analysis of government policy helps to shed light on how the Indian state has in fact played a critical role in fuelling the development of the IT

industry. In addition to the policy frameworks described above, the state also plays a role in developing knowledge through education. In this section, I explore the context within which the state's higher education initiatives, discussed in section V, have emerged. The development of India's knowledge base cannot be explained by state initiatives to grow educational institutions in the country alone. Instead, the values associated with knowledge in India play an important role in this process. Both the cultural values and status associated with knowledge, particularly in certain fields, have played an important role in fostering the development of knowledge in the country.

At a broad cultural level, reverence of education is celebrated in the Hindu religion. Saraswati is the goddess of knowledge and Hindu citizens across the country pay homage to her through religious rituals.[27] The devotion and respect also extends itself to other symbols of knowledge and learning, the most notable of which are books, which are to be kept clean, off the floor, and never touched with the feet, which are dirty and a sign of disrespect. In particular, the country places a strong value on technical education and technical degrees. The technical areas most highly sought after are within the Science, Technology, Engineering, and Mathematics fields (STEM). Of these, engineering is the most popular and it is widely considered the highest status profession in India. This is reflected in the selectivity rating for top engineering colleges relative to other fields. The high status of technical education is even evident in the marriage market. Engineers tend to be highly sought on the marriage market in newspaper advertisements, and on popular marriage websites, such as shaadi.com. After Independence civil engineering was the most popular engineering specialty. With the rise

[27] I do not intend to suggest that all Indian Hindus value education nor do I suggest that non-Hindus de-value education. I am simply calling attention to the ways knowledge has deeper cultural roots in the nation.

of IT industries this interest shifted toward computer engineering, which surpassed civil engineering as the most competitive subspecialty.

The status and prestige attributed to science and math education in India stands in contrast to those emphasized in the U.S., where many students gravitate away from STEM subjects.[28] According to an Evalueserve executive, "here [in the US] if you study science and math you are called 'geeks,' but in India you are called a smart guy . . . you are getting marriage proposals" (personal interview, Evalueserve Executive, 5/22/09). The executive expanded upon this contrast by pointing to the negative effect of American students' peer groups, who often frown upon those who wanted to pursue interests in the science and math fields, including women (personal interview, Evalueserve, Executive, 5/22/09).

Other Indian industry executives have commented that the reason why India has become such a popular sourcing destination for companies is because the country has the raw production of technical talent that the US lacks. The cultural value of knowledge in technical fields has contributed to the emphasis on these fields in education and the availability of talent in India. According to Wipro CEO, Azim Premji, "education in American has never emphasized math at a primary level, while in India it has always emphasized that" (Rose, 2007). The Premji elaborated that technical fields are very popular in India because students are pushed to excel in them, because of the cultural value attributed to them, and they are motivated to achieve in these fields because they provide the best career options, which is particularly compelling in a developing country context (Rose, 2007).

[28] U.S. President Obama's efforts to reinvigorate interest in science and technology fields and rekindle a "Sputnik" moment when American student's gravitated toward science fields in the 1960s speaks to this trend. See Obama's State of the Union address, January 2011.

V. Higher Education and the Development of the IT Industry

Although the cultural foundation that places value on knowledge is an important component of India's successes, it alone is not enough. India would not have become the developing country leader in IT and ITES services without the state's creation of a high quality higher education system capable of providing high numbers of technical talent. State intervention was critical in building a foundational knowledge base that provided the intellectual capital for subsequent industrialization. The state has been fairly successful in generating a top-tier of the higher education system that is capable of serving the needs of industry, producing high quality employable talent. The state's success in education must be qualified in two ways. First, the strengths of the educational system do not sufficiently extend beyond the top tier, leaving a gap in the labor supply available to firms. Second, the country has failed to generate widespread literacy and primary education, which deeply constrains the supply of students that reach the higher educational system.

Despite the recognized strength of the very top tier of higher education a broad consensus stretching across academia, industry and government has emerged that India needs educational reform (Agarwal, 2006; Bhagwati, 1993; Debroy, 2008; Government of India, 2002, 2007a; National Knowledge Commission, 2007; Pitroda, 2008). The country's primary problem in higher education has been its inability to produce a sufficient quantity of quality graduates to meet its own industrial needs. Only about 10 percent of university age students are attending university, while in many other developing countries this figure is closer to 20 to 25 percent (Debroy, 2008). The middle

to low end of the education system fails to meet the country's industrial needs, despite high labor demand (Agarwal, 2006; Panagariya, 2008). The lack of a sufficient labor supply with higher education degrees, particularly in technical fields, such as engineering and computer science, is reflected in overall wage inflation (Panagariya, 2008). Specific problems with the higher educational system, as it relates to the IT and ITES industry, include too few quality teachers and institutions, outdated equipment and curriculum, a lack of real world problem solving skills, creative thinking skills, interactive skills, and cross-cultural sensitivity.

Second, the state's relative success in higher education needs to be viewed alongside its general failure in achieving universal literacy and widespread primary education. The Indian government itself has called this "one of the most disappointing aspects of our developmental strategy," with net attendance in primary level education an unacceptably low 66 percent (Government of India, 2002, section 3.57). India's adult literacy rate is also 66 percent.[29] The unwillingness of the state to legislate compulsory primary level education in India, which is seen as oppressive toward the poor who depend on child labor for survival, helps to explain the state's failure to spread primary education (Weiner, 1991). However, the broader state bias toward tertiary education over primary education has roots in the colonial state, which emphasized higher education over primary education and literacy in order to create a cadre of Indians capable of assisting the British Raj in the administration of the colony. After Independence the elitist political leadership in charge of the state, who had received education under the British

[29] Adult literacy rate is defined as a percentage of persons aged 15 and over who can read and write (UNICEF, 2003-2008). There is variation across states in terms of literacy rates, with the state of Kerala achieving near universal literacy levels (Sen, 2000).

Raj, also privileged higher education in an effort to industrialize quickly (D'Costa, 2005, p. 59).

Below I identify three major periods in the growth of higher education. These three periods roughly map on to the 4 shifting roles of the state identified above, although the first two periods are collapsed into one period; this difference in organization reflects the state's dominance and success in establishing higher education prior to the 1980s.

i. The Foundation of Higher Education: 1947-1980

The Indian state began creating higher educational institutions immediately in the post-independence period. These efforts built upon the educational infrastructure that the British created to develop its Indian administrative cadre. Prior to independence there were twenty universities and 500 colleges (Panagariya, 2008). This number climbed to 110 universities and 6963 colleges in 1980 (Ministry of Human Resource Development, 2010b). However, the apex in quality education in India is classified as "Institutions of National Importance," which until the late 1990s were almost exclusively government institutions. The India government helped set up the Indian Institutes of Technology during the 1950s and 1960s, which were designated as "Institutions of National Importance" under The Institutes of Technology Act, 1961 (see education timeline below). In 1961 the first Indian Institute of Management was founded in Calcutta, which produced among the best management and finance professionals in the country. Despite the technical skills base built through state efforts, additional efforts were needed to keep pace with surging education demand.

ii. Surging educational demand and enrollments: The Rise of Private Colleges: 1980-2000

The 1980s saw a surge in demand for industry relevant higher education skills, which the state was unprepared to meet (Agarwal, 2006). This situation, along with the more business friendly orientation of the state during this period, prompted the state to allow private enterprise into the arena of higher education. During the 1990s educational demand increased based on growing industry, a rising middle class that increasingly had the means to send more children to higher education. Private institutions met much of this increased demand in higher education (Agarwal, 2006). This trend toward private institutions was particularly pronounced with private engineering colleges, especially in southern states, such as Karnataka, Andhra Pradesh Hyderabad, and Tamil Nadu. The inability of the state to build colleges and universities quickly enough to meet rising industry demand along with deficiencies in quality of graduates produced by the middle to lower levels of higher education lead to a tightening labor market. By the end of the 1990s the situation reached a crisis point. In 1989-99, due to the shortage of engineers in the face of dramatic increases in demand for skilled labor, the government declared a state of "educational emergency" (Athreye, 2005). By 2000 India had established 254 universities and 10152 colleges (Ministry of Human Resource Development, 2010b).

According to an Infosys Executive who claimed he has been active in educational reform for 15 years, "if not for private entrepreneurs in technical education, engineering, we would not have been able to get the people we got" (personal interview, Infosys, 12/10/08). However, despite the rise in the production of raw technical graduates, many private institutions were still unable to produce high quality labor. A new collaboration between the state and industry sought to increase technical labor at this high quality level.

In the late 1990s two technical universities, modeled to approximate the rigor of Indian Institutes of Technology (IIT), were established that would serve as a guide for later efforts to scale technical education in the state. These two institutions were the Indian Institute of Information Technology (IIIT)-Hyderabad in Andhra Pradesh (founded in 1998) and IIIT-Bangalore in Karnataka (founded in 1999). Both of these universities were established as National Public Private Partnerships (NPPP) with financial and administrative governance support provided by both Government of India and the IT industry (Ministry of Human Resource Development, 2010a). However, their were some proto-PPP educational models in India that also served as models, such as the Indian Institute of Science (1909) and the Indian Institute of Management Calcutta (1961) that were universities of national importance that were established through private and state collaborations. The Indian Institute of Science, also known as the "Tata Institute," was founded with money from Jamsetiji Tata, of the Tata Business House, and the government. The first Indian Institute of Management in Calcutta was a joint venture with the Government of India in collaboration with Alfred P. Sloan School of Management (MIT), the Government of West Bengal, The Ford Foundation, and Indian industry.

iii. Scaling Higher Education through Public Private Partnerships: 2000-2010

At the turn of the century the Indian government increasingly prioritized higher educational reform, vowing to increase the quantity and quality of graduates, in response to growing demands from industry, and the government's own recognition of the need to increase the supply of labor. The India Vision 2020 Report identifies employment and education as the key thrust areas for India's future economic growth and specified knowledge, rather than capital, as "the most important determinant of development"

(Gupta, 2002, p. 22). The government also recognized the problems in higher education. The Tenth Year-Five Year government plan recognized the importance of IT and ITES to the country, but lamented the fall in the quality of higher education in the country:

> The University and Higher Education Sector also needs attention. . . it is a matter of serious concern that the expansion in quantity has been accompanied by a fall in quality (Government of India, 2002, p. 38).

The Tenth Year-Five Year Plan identified higher education as needing attention, especially in the area of curriculum and examinations reform (Government of India, 2002). The Plan also recognized that the private sector would play an increasing role in education government called for the modernization of laws, rules, and procedures to enable private individuals and organizations to set up universities colleges and schools (Government of India, 2002, p. 2). During this period there was a big increase in the number of technical and management institutions, primarily due to private initiatives.

The National Knowledge Commission was established in June 13th, 2005 as a high level advisory committee to the Prime Minster of India on educational reform. Prime Minister Manmohan Singh declared, "The time has come to create a second wave of institution building and of excellence in the field of education, research and capability building so that we are better prepared for the 21st century" (Speech at the launch of the Knowledge Commission, New Delhi, 8/2/05). In particular, the Commission was given a "mandate to guide policy and direct reforms, focusing on certain key areas such as education, science and technology, agriculture, industry, e-governance etc" (Government of India, 2010, p. 39).

The panel was composed of eight members, including government officials, academics, and industry executives. Industry representation and leadership were

dominated by the IT industry, however, with two-thirds of industry representation from IT industry and the Chairman of the Commission Sam Pitroda, a leading telecommunications professional who also advised Prime Minister Rajiv Gandhi on telecommunications liberalization in the 1980s. The second IT executive on the Commission was Nandan Nilekani, who was then Infosys' CEO and also previously co-founded industry association NASSCOM. The organization NASSCOM also participated actively in the process, providing industry recommendations, shaping the overall form of the plans proposed. (Chapter 3 will provide more insight into how this organization influenced industry policy with the state). One of the key recommendations coming from the panel was a massive expansion of educational institutions. The panel suggested building around 1500 universities nationwide, which would increase India's enrollment ratio to at least 15 percent (National Knowledge Commission, 2007; Pitroda, 2008). Pitroda and other scholars also identified major problems facing higher education, which included the format and frequency of examinations, which test memory rather than understanding; failure to adapt curricula over time; inadequate research and learning infrastructure, such as libraries, research labs, and Internet connectivity; rising property prices, which have inhibited the growth of universities; and the fact that teachers compensation hasn't kept up with the cost of living (Guha, 2008; Pitroda, 2008).

Policy was created based on the recommendations above and the government's increased recognition of the problems facing higher education. Industry was the major driving force behind these efforts. The Eleventh Five Year Plan (2007-08 to 2011-12) stressed, among other things, an emphasis on building higher level technical and

professional education to support the development of technical education and the IT and ITES industries specifically. In the Eleventh Plan it said,

> For India to fully capitalize on the opportunity and sustain its present lead in the global IT/ITES space, there is a need to focus on skill development to enhance the talent pool advantage, strengthening infrastructure to lower the transaction costs of business; and improve the domestic regulatory provisions (Government of India, 2007b, p. 274).

Quality improvement in higher education was initiated through restructuring academic programs to ensure their relevance to modern market demands. There are moves toward a complete revamping of teaching and learning methods, moving away from instruction and rote learning toward interactive processes that encourage creativity and innovation and are based on compulsory seminar-tutorials (Government of India, 2010, p. 36).

The Eleventh Five Year Plan proposed to help meet industry needs by scaling the number of higher education institutions. India had 9653 universities and 18,482 colleges in 2008 (Ministry of Human Resource Development, 2010b). Specifically the Plan proposed to establishment of eight new Indian Institute of Technology, seven new Indian Institutes of Managements, ten new National Institutes of Technology, three Indian Institutes of Science Education and Research, twenty Indian Institute of Informational Technology, and two new School of Planning and Architecture (Government of India, 2007a) (See Table 2.4: Establishment of New Central Higher Education Institutions). The document also states, "the scope for PPPs will be explored" in establishing these institutions (Government of India, 2007a). NASSCOM, the trade association for the IT and ITES industry drafted the plans for the creation of the IIITs (NASSCOM, 2008) that were later adopted by the government of India (Ministry of Human Resource Development, 2010a). What is particularly noteworthy about this process is how the PPP

model went from being an experiment to an explicit policy approach for the government of India. This exemplifies the shift in the state's role away from autarky toward a state willingness to follow industry's lead. This ambitious planning process to radically increase the number of technical institutions demonstrates the increasingly complex social initiatives that are being created through the PPP model. It also shows how the state continues to be involved, alongside private actors, in the development planning process.

Table 2.4: Establishment of New Central Higher Education Institutions

Types of Institution	Numbers	
	Existing at the end of Tenth Plan (3/13/2007)	**Additional Institutions proposed during Eleventh Plan (2007-2012)**
Central Universities	19	16 (in uncovered states) & 14 Innovation Universities*
Indian Institute of Technology	7	8
National Institute of Technology[30]	20	10
Indian Institute of Informational Technology	4	20
Indian Institute of Science Education and Research	2	3
Indian Institutes of Management	6	7
School of Planning and Architecture	1	2

* 14 Innovation Universities aiming at world-class standards proposed across Tenth and Eleventh Plan Period.

Source (Government of India, 2010, p. 28, Table 5.1)

[30] NITs - National Institute of Technology (established through the National Institutes of Technology Act 2007) (Government of India, 2010)

VI. Conclusion

The development of the IT and ITES industries has been fueled by the Indian state, operating in partnership with other entities. Although neoliberal accounts of India's development have focused on the perceived "rollback" of the state, this chapter has highlighted numerous ways in which the state is indeed heavily involved in industry upgrading and its continued support of industrial development. Instead of withdrawing from the market in order to promote the industries success, the state has instead shifted its role over time. From its role as an aspiring "developmental state," to its role as an "industry-led state," the Indian state continues to be involved in development. The shifts in India's IT related policies demonstrate how the government played a key role in fostering the development of industry by protecting industry from foreign competition and imposing regulations that minimized the dominating presence of foreign companies. This protectionist policy made way for Indian innovation and industry development. Supported by a culture that values knowledge, the state has played a crucial role in the development of a higher educational system that has built the knowledge base for India's IT and ITES industries. However, the state's educational policy has not been unwaveringly successful, as the above analysis shows. Over time it has had to adapt to the gaps in its production of a skilled labor force. The increase of PPPs in the educational sector plays a key role in the state's response.

This chapter has provided an overview of the shifting roles of the state throughout different periods of India's development. The chapter focuses in particular on higher education, where the importance of the state *along with* the growing importance of the private actors (particularly trade associations representing firms) is evident. The

following chapter takes a closer look at the role of these private actors and their partnerships with the state.

Table 2.5: Major Milestones and Events in Indian IT Industry

1966 – Bhabha Committee Report on Electronics – seeks to build self-sufficient domestic electronics industry and upgrade technology in the state
1969 – The Monopolies and Restrictive Trade Practices (MRTP) Act limits licenses for large companies in an effort to protect small and public sector companies.
1972 – Department of Electronics (DoE) founded. IT policy established. DoE implements "Software Export Scheme" allowing hardware to be imported for use in software export work on condition that the price of hardware was recouped within 5 years through foreign exchange earnings.
1973 – Foreign Exchange Regulation Act (FERA) limited foreign equity in Indian firms to 40 percent unless the company was solely export oriented. Repealed in 1991 reforms.
1976 – Liberalization of policies related to software industry. Faster clearance of software export applications. Software could take advantage of export incentives including location in Export Processing Zones. Non-resident Indians were allowed to import software for purposes of export. Export obligation was 100% of all output produced.
1976-1978 – peak in government control of the computer industry.
1978 – IBM left India due to failure to comply with Government of India policies concerning foreign ownership liquidity (i.e. FERA)
1981 – Software Export Policy: Import duties on hardware raised to encourage use of indigenous computers. Firms allowed to import hardware to write software for both domestic and export purposes. Software exporters could also import 'loaned' computers.
1982 – DoE initiated a software export promotion policy
1984 – New Computer Policy. Establishes software development promotion agency (SDPA) under the DoE. Import procedures simplified. Import duties on hardware reduced from 100% to 60% for software developers. Access to foreign exchange was made easier for software firms. Income tax exemption on net export earnings halved from 100% to 50%.
1984 – Policy changes under Rajiv Gandhi prioritize IT sector for growth
1985 – Texas Instruments sets up in Bangalore
1986 – Software Policy: Indian government identifies education in software as a focal area and was "delinked" from the hardware industry in government policy.
1987 – Infosys wins first international client
1988 – NASSCOM founded
1988 – Software Technology Parks (STPs) of India, Established under the Department of Electronics to encourage and support small software exporters, by giving 100% export-oriented firms a tax-free status for 5 years within the first 8 years of operation. Firms were provided with office space and computer equipment, access to high-speed satellite links and an uninterrupted supply of electricity.
1991 – One-year waiver on income tax for software exports passed in government-planning budget
1991 – Software Technology Parks of India (STPI) agency established with objective to implement 1988 STP Scheme, set-up and manage communication infrastructure

facilities, coordinate government approval across multiple state agencies, and technology assessment and professional training services.

1992-1995 – Import duties on imported software. Reduced to 20% on applications software and 65% on systems software in 1994. Reduced to 10% on both in 1995.

1993-1999 – Income-tax exemptions: Software exports were exempt from income tax and this tax-free status was confirmed every year till 1995 after which it became open-ended. There is talk of ending this status in 2001.

1994 – General Electric - establishes back office operations in India

1996 – World Network Services (WNS), subsidiary handling British Airways, establishes back office ticketing services operations in India.

1996 – American Express establishes back office operations in India

1996-2000 – Migration of Indian Engineers peaks to developed countries to fix Y2K services, Increase of US H1B visas enable increased technical migration out of India

1997 – Indian IT industry crossed $1 billion revenue mark

1997-2001 – Peak of global Internet & Telecom boom

2000 – Spectramind, first independent BPO firm founded in India

2001 – 2003 – Global downturn in Internet & telecom industries

2001 – Reduction of H-1B visas in US

2001 – NASSCOM President Dewang Mehta dies

2002 – Spectramind bought by large software firm Wipro

2002 – Progeon, large BPO firm, acquired by Infosys

2002 – By end of 2002 most major IT firms had acquired BPO service company (notable exception TCS - 2004)

2005 – Large Indian firms pass $1 billion in revenue (TCS, Infosys, Wipro, etc)

2005 – SEZ ACT 2005, Special Economic Zones

2006 - NASSCOM begins Educational Initiative aimed at skills upgrading

2008 - Global financial crisis (stagnant ITES growth rates, decline in KPO growth)

2008 - NASSCOM submits Model DPR document on education to government

2008 - Indian Government support of industry: IT Act Amendment, extension of tax incentives by a year, removal of the SEZ Act anomalies and the introduction of progressive telecom policies that focus on work from home.

2010 – Government of India adopts aspects of NASSCOM education initiative

Table 2.6: Key Institutes of National Importance & Milestones in Higher Education

1909 – Indian Institute of Science (IIS) in Bangalore established. Early PPP model founded with Private money under government supervision.
1947 – Indian independence & Partition
1951 – First Indian Institute of Technology inaugurated (IIT Kharagpur, 1951)
1956 – Top medical college in India established, All India Institute of Medical Sciences (AIIMS) in Delhi
1958 – Indian Institute of Technology Mumbai
1959 – Indian Institute of Technology Chennai
1959 – Indian Institute of Technology Kanpur
1961 – The Institutes of Technology Act passed (GOI, 1961)
1961 – First Indian Institute of Management Calcutta (IIM-C), Established by the Government of India in collaboration with Alfred P. Sloan School of Management (MIT), the Government of West Bengal, The Ford Foundation and Indian industry. Early PPP model.
1961 – Indian Institute of Management Ahmedabad (IIM-A)
1963 – Indian Institute of Technology Delhi (IIM-D)
1973 – Indian Institute of Management Bangalore (IIM-B)
1984 – Indian Institute of Management Lucknow (IIM-L)
1986 - Government proposal to create four Indian Institutes of Information Technology (IIIT), established only in 1998
1994 - IIT Guwahati
1996 - Indian Institute of Management Kozhikode (IIM-K)
1998 – first IIIT established under PPP model. IIIT (Hyderabad)
1998 - Indian Institute of Management Indore
1999- IIT (Bangalore) established under PPP model.
2001 - IIT Roorkee
2005 - Indian Institute of Management Shillong
2008 - IIT Ropar
2008 - IIT Bhubaneswar
2008 - IIT Gandhinagar
2008 - IIT Hyderabad
2008 - IIT Patna
2008 - IIT Jodhpur
2009 - IIT Mandi
2009 - IIT Indore
2010 - IIM Ranchi
2010 - IIM Rohtak
2010 - IIM Raipur
2012 - 11th Year Plan (GOI) establishes 7 new IIMs by the end of 2012. IIM Ranchi, IIM Rohtak, and IIM Raipur are already operational with IIM Tiruchirapalli scheduled to open in 2011 and IIM Jammu and Kashmir, IIM Rajasthan, IIM Uttrakhand scheduled (to be operational in 2012).

Chapter 3
In Partnership with the State: Trade Associations' Role in Fostering Development in the Indian IT Industry

I. Introduction

How should developing states manage development in industries defined by high rates of innovation and change? The neoliberal answer to this question is that states should not attempt to do so. This view is based upon a belief in the self-regulating power of the market (i.e. market fundamentalism) and the need to restrict government involvement, which may interfere with this self-regulation. Instead, neoliberals suggest a "roll back" of the state that reduces state involvement in the market. On the other hand, critics of neoliberalism argue that states should play an active role in promoting development, suggesting that the achievements of developmental bureaucratic states (DBS)[31] provide evidence of the efficacy states might have in promoting industrial development and raising the living standards of the population more generally.[32]

Yet, in practice, neither complete roll back of the state nor adoption of the DBS model appears tenable today. The neoliberal strategy of state roll back is difficult (if not impossible) to achieve. Karl Polanyi's observation that states and markets historically evolved together and markets require the regulation that states provide (K. Polanyi, 2001

[31] The DBS is best exemplified by the economic success achieved by Japan and South Korea (O'Riain, 2000).
[32] Refer to the following for the achievements of developmental states: (Amsden, 1989; Evans, 1995; Gold, 1986; Johnson, 1982; Wade, 1990a)

[1944]) helps to illuminate the contradictions inherent in striving for markets without states. The practices of neoliberal states may paradoxically extend the reach of the state further into the market rather than minimizing its role. The most recent reminder of this fact is found in the 2008 global economic downturn: caused by risky investment practices within the U.S. financial community and a lack of institutional oversight, this crisis required unprecedented government intervention to stabilize the global economy. The alternative statist approach also presents challenges. This intensification of production networks spanning across borders has caused some country-focused development strategies to falter (Amsden, 1989; Johnson, 1982; Wade, 1990b).

Yet, there are a number of institutional practices that states may adopt to offload key government responsibilities to quasi-state actors. These practices move beyond privatization and deregulation of key governmental services to include developmental partnerships between the state and private interests – Public-Private Partnerships (PPPs). However, the relationship between PPPs and neoliberal state practices in the context of developing states is under theorized.[33] Using a historical institutional approach, in this chapter I detail the rise of industry trade associations in first influencing and then later crafting key aspects of state industrial policy in India. This analysis will focus on the broadening role trade associations play in developing the Information Technology (IT) and IT enabled service (ITES) industries in India.

This chapter is organized in four sections. In the following section, I briefly survey the literature on trade associations and their effect on industry development. Then, I offer a historical narrative of the expanding policy role of one Indian industry trade association, the National Association of Software and Service Companies (NASSCOM),

[33] For exception see (Brenner & Theodore, 2002; 2005, pp. 76-78)

as it and the IT and ITES industries have developed. The third section analyzes the developmental role that trade associations may play in state policy. This analysis emerges from an account of the changing role of NASSCOM in India, focusing in particular on its role in advancing educational reform and developing new industry "clusters."

II. Trade Associations in India's IT and ITES Industries: Historical Development

Previous work on trade associations tends to focus on their role as platforms for collective action and lobbying. However, there is an increasing recognition of the complementary effect trade associations can have in shaping development through its interaction with the state (Hall & Soskice, 2001; Maxfield & Schneider, 1997). Trade associations are voluntary, not-for-profit organizations composed of policy entrepreneurs within firms located in the same industry that seek to collect, share and disseminate industry relevant information and provide a platform for collective representation and lobbying (Lorenzoni & Lipparini, 1999; Streech & Schmitter, 1985; Tucker, 2008).

Yet, mobilizing collectivly to advance common interests may be challenging (Olson, 1965). Three literatures offer influential accounts of the role of trade assocations. The literature on new institutional theory tends to view associations as agents of reproduction, rather than of change (DiMaggio & Powell, 1983; Oliver, 1997). Reproduction of conventions and values is carried out through the associational routines of "licensing, training, and professional development and the monitoring and disciplining of behavior" (Greenwood, Suddaby, & Hinings, 2002). The literature on innovation and cluster analysis goes a step further and recognizes trade associations' abilities to serve as

competitive assets that take "leading roles in the continuing upgrading of industry clusters," beyond mere lobbying organizations and social organizations.[34] The developmental state literature refers to associations as facilitators in state-society relations (Evans, 1995; Pingle, 1999; Saxenian, 2000). This literature tends to characterize associational roles primarily in terms of the forum they provide for policy makers and industry leaders to interact and create state-society linkages (Evans, 1995; Pingle, 1999; Saxenian, 2000), although more recent studies found that patterns of action by business associations can directly affect actions taken by the state (Schneider, 2004; Sinha, 2005).

Building upon these analyses, I argue that in some cases associations may move beyond influence and lobbying activities and become agents of change, in partnership with the state, particularly in select areas that affect their industry. Whereas the innovation and cluster analysis literature does not specify how associations serve as "competitive assets" nor how associations' may contribute to industrial development, I suggest that trade associations take up roles that include serving as brokers between various stakeholders, leading industrial policy formation, urban development planning, and securing public industry goods, such as educational reform. Finally, building on the developmental state literature, I suggest that trade associations may not just provide a forum for exchange between the state and industry to produce "embeddedness."[35] They may also be understood as developmental actors in their own right, shaping, and at times, leading industry policy formation and implementation. Attention to these facets of trade

[34] "Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate" (Porter, 2000, p. 15)

[35] Embeddedness refers to "a concrete set of connections that link the state intimately and aggressively to particular social groups with whom the state shares a joint project of transformation" (Evans, 1995, p. 59)

association roles sheds light on the role of the neoliberal state in the economy, particularly in developing economies.

In this section, I illustrate the shifting institutional practices of the state under the influence of neoliberalism by offering a detailed examination of interactions between the Indian state and the NASSCOM, the sectorial industry association for the IT and ITES industries. The IT industry in India is an important location from which to study changes in state involvement in promoting industrial development and upgrading because industry success has occurred in spite of India's developmental state failures (Chibber, 2002, 2004; Herring, 1999),[36] which have been illustrated by low growth rates in many strategic industries, such as electronics and technology hardware, in the post-independence period. By studying the contrast between IT industry success and other developmental failures in India we can theorize new models of industrial development where other "stakeholders" provide significant input, particularly in emerging economies, where state capacity for industrial development and supporting institutions are often less robust and developed than those in industrialized countries. This shift embodies a broader shift away from a developmental state model and toward a model of "developmental governance" that more explicitly relies on multiple actors based in civil society, including trade associations.

There are three main national level trade associations in India. These are the Federation of Indian Chambers of Commerce and Industry (FICCI), the Associated Chambers of Commerce and Industry (ASSOCHAM), and the CII. These national associations have large direct memberships of companies. Under this broad

[36] Bureaucratic rationality without strategic rationality may lead to state incoherence and developmental failure and the case of India in the post-independence period is the exemplar of this argument (Chibber, 2002).

representational umbrella are a number of regional chamber of commerce[37] and industry specific trade associations (or "sectorial associations") that represent the narrower interests within a specific industry. These associations are typically members in the national level trade associations and information concerning the agenda of these different association agendas may be shared. However, national level associations are less effective than sectorial associations at shaping *industry specific* policy because their diverse membership across various industries means that members have competing interests, which make it unlikely that membership consensus will emerge around specific policies (Pingle, 1999).[38] Sectorial trade associations representing a single industry with narrower interests may be more effective in proposing and pursuing industrial policy and industry specific solutions and programs.

NASSCOM is identified as the most important association representing the software and services industries according to industry managers (personal interview, VP, Infosys, Dec. 3, 2008)[39] and governmental officials.[40] NASSCOM was founded in 1988 with 38 members (NASSCOM, 2009b), but today the organization has over 1300 members comprised of both Indian and multinational companies that have a presence in India (NASSCOM, 2009a). Together, these members account for over 95 percent of the revenues of the software and service industry in India and employ over 2.24 million professionals (NASSCOM, 2009a). The high membership revenue percentage of the total

[37] There are state and citywide associational bodies in India, such as the Bengal Chamber of Commerce and the Indian Chamber of Commerce in Bombay. This paper, however, focuses on those associations identified by government and industry leaders as playing the most central role in industry development.
[38] For a more sanguine view of the constructive role large national business associations may play on the political process see (Sinha, 2005).
[39] Personal interview, Vice President, Infosys, December 3, 2008; Personal interview, Executive, Infosys, December 10, 2008; Personal interview, Executive, Evalueserve, May 22, 2009.
[40] Personal interview, former IT Secretary, October 14, 2008; Personal interview, Director, Software Technology Parks of India, November 7 2008.

revenue generated in this sector in India provides the organization the legitimacy to speak as "the voice" of the industry with a high degree of credibility. The organizational structure of NASSCOM contains both positions filled by rotating company executives and full time staff. The elected company executives typically hail from the largest and most reputable firms in the industry, which skews the organizations' goals toward the interests of larger firms and away from the smaller firms that constitute the majority of the company membership base.

The high growth rates associated with India's IT and ITES industries have prompted other developing economies (e.g., China, Brazil, Philippines, Poland, Russia and South Africa) to try to replicate India's service export model(Business India Intelligence, 2006). In addition, India's IT industry trade association, NASSCOM, serves as a model for other governments, entrepreneurs, and trade associations that seek to grow their developing country's burgeoning IT industries. Some foreign countries, mainly in Asia, Latin America, and Africa, want to replicate what NASSCOM has done in their countries,[41] with some attempting to imitate the NASSCOM industry association model with organizations such as BRASSCOM in Brazil, GASSCOM in Ghana, and SLASSCOM in Sri Lanka (Rai, 2010).

The partnership between the state and trade associations is one important source in helping to facilitate this industry move toward increasing higher value activities. NASSCOM adopted four roles in its interaction with the state to help the IT industry develop and upgrade in India.[42] First, NASSCOM was instrumental in helping the

[41] Personal interview, Indian senior administrative servant, Government of India, February 27, 2009.
[42] I do not argue that the relationships between the state and trade associations in India are the only factor in industrial development. Instead, I argue that it is an important, yet relatively ignored and under theorized factor in explaining industrial development in the IT and ITES sectors in India.

software industry gain recognition as a "strategic" industry from government officials and the general public. Broadening the government's perception of what is considered a strategic industry to include software and services, instead of just electronics and hardware manufacturing industries, was critical in order to build the emerging software cluster, remove industry specific constraints, and provide the basis on which future industrial upgrading could occur. Second, NASSCOM and CII helped remove industry constraints through lobbying and re-regulation. This was achieved in part through lobbying state officials for telecom deregulation, modification of paternalistic labor laws to permit women to work nights, and helping to coordinate government departments at various levels to streamline interaction with industry. Third, NASSCOM provided public relations and impression management services for the industry. This was instrumental in helping to change the perception of India beyond just a low cost labor destination, to one that has higher order capabilities. Fourth, NASSCOM provided the state leadership for further industry development as the industry matured and primary constraints on growth were removed. While each of these four roles arose during different periods to help solve industry specific problems, the adoption of a new role did not mean discarding the previous role. Rather, the association itself consistently increased its capabilities over time, juggling new responsibilities alongside existing ones.

In establishing a more prominent role in industry development, NASSCOM's strategies have shifted in response to evolving industry challenges and the increasing capabilities of the associations. I argue that the cumulative result of these strategies has led to more influence on the state to shape the overall direction of developmental policy in the IT industry. In the most recent stage, NASSCOM has moved beyond policy

influence through lobbying to actually write policy on behalf of the state.[43] In the subsections below, I expand upon the nature of each of the four roles introduced above. Following this historically situated account, in section four I elaborate upon NASSCOM's expanded policy role.

III. Recognition of Software as a Strategic Industry

NASSCOM's primary focus from its inception, in December 1988 until the industry surpassed the $1 billion revenue mark in 1997, was to gain recognition as a strategic industry worthy of attention and support by the government. Without this recognition, the Association had little opportunity to achieve other collective goods on behalf of the industry. The organizational goal of recognition was closely associated with NASSCOM President Dewang Mehta's leadership of the Association from 1991 until his death in 2001. During this period NASSCOM aggressively promoted the industry in order to capture the attention of policy makers and the government and led the Indian government to begin to see software as a strategic industry.[44]

Mehta raised the visibility of the industry domestically and internationally. Under his leadership NASSCOM became strong, financially successful, and "a recognized opinion-maker and leader in the IT Industry," turning the organization into "a major powerhouse, initially in Delhi, then all over India, and by the end of the nineties, all over the world"(Natarajan, 2001). Raising the visibility of the nascent industry was important because the Indian developmental state long held a bias toward manufacturing industries

[43] Saxenian's notes NASSCOM's role in shaping industry policy through lobbying, yet her work neglects the Association's leadership on far reaching programs that position the Association as an agent in industrial development through its partnership with the Indian state (Saxenian, 2000).
[44] Personal interview, former President, NASSCOM, July 7, 2006.

in conceiving and defining strategic industries and for crafting developmental policy (Chibber, 2004). The software and service industry was not an obvious choice for developmental efforts until the outreach and lobbying efforts by NASSCOM started to change governmental attitudes.[45] The organizational success at recognition in these early years was embodied in the recognition Mehta received:

> It would not be an indulgence in hyperbole to say Dewang Mehta transformed an entire industry. His confidence about the ongoing successes of the software exports industry bordered on arrogance, . . . He straddled NASSCOM like a veritable colossus and made it an association that was the cynosure of all business and political eyes, an entity to be admired, sometimes hated and feared, but never ignored! (Natarajan, 2001)

The fact that NASSCOM could no longer be ignored, particularly amongst politicians, points to one of the organization's key successes. Once NASSCOM had captured the attention of policy makers and the Indian public, it was in a position to more effectively push for other industry gains. This period, called the "evangelizing phase" by NASSCOM leadership,[46] was instrumental in creating a forum and voice for the industry and allowed the organization to begin to create enduring relationships with governmental ministries that could help the industry remove constraints on growth.

During the mid-to-late 1990s the organization gained widespread access to policy makers. According to one industry leader, "the doors of every bureaucrat and politician were always open to his [Mehta's] ideas and suggestions" (Natarajan, 2001). NASSCOM's political leadership was reflected in the appointment of Mehta's in 1988 as a member and spokesperson of the IT Task Force established by the Prime Minister to draft a national informatics policy ("Nasscom chief Dewang Mehta found dead in Sydney," 2001). During this period the Association gained formal representation on

[45] Personal interview, former President, NASSCOM, July 7, 2006.
[46] Personal interview, former President, NASSCOM, July 7, 2006.

various government committees, such as the Ministries of Information Technology, Commerce, Finance, Human Resources Development, Labor, External Affairs, and the Department of Telecommunication (NASSCOM, 2006a).

NASSCOM moved from a relatively small and obscure sectorial association of a little known industry to a highly visible association representing a quickly growing industry in less than ten years. The Association's rise provided informal relational ties with individual politicians and formal organizational ties to government ministries that provided it the conduits through which it could influence policy makers on legislation and policies that affected the industry.

IV. Lobbying and Deregulation

NASSCOM's role historically and currently is focused on influencing governmental policy and improving the interaction between various governmental bodies and the industry. NASSCOM began formal lobbying in 1991 around tax waivers and incentives and then focused on deregulation efforts that helped to remove a number of obstacles to industry growth and development. During this time, the trade association continued to argue in favor of free trade, zero tariff protection, deregulation of the telecom market, and the creation of software technology parks (STP), which have helped to improve the growth and profits of the industry. In addition, the Association also urged the state to adopt and extend a number of financial incentives, such as state tax exemption on profits from software exports, discounted rates on utilities, and the infrastructural improvements in the special economic zones (SEZs) dedicated for the industry located in IT hub cities (NASSCOM, 2006a; Pingle, 1999).

A key early lobbying victory that helped the nascent Indian IT industry grow was a one-year waiver on income tax for software exports in the 1991 government-planning budget. NASSCOM President Dewang Mehta received an endorsement from 40 Members of Parliament for the income tax waiver on software exports, which in turn led Dr. Manmohan Singh to provide a one-year waiver in the 1991 budget (Kanavi, 2001). The effect of the income tax break is widely credited with helping the industry grow.

One of the most significant efforts NASSCOM lobbied for, according to industry insiders, analysts, and NASSCOM leadership itself, was telecom deregulation.[47] Before deregulation, it was extremely difficult to procure telephone lines and performance and reliability of utilities were also so bad that operating at a competitive global level was nearly impossible. According to management of leading Indian IT company Infosys,[48] it took "a year to just get a telephone line" (Teather, 2007) and in 1982 "we lost a huge project because of that" (2007). As a result, telecom was identified as one of the main problems limiting the growth for the industry.[49] NASSCOM launched an intense marketing campaign aimed at influencing policy makers and citizens to think of the industrial constraints limiting the growth of the new Indian economy. The marketing slogan used during the 1990s by the association was a play on a popular Hindi slogan, "Roti, kapda, makaan," which roughly translates to "food, clothing, shelter." The slogan referred to the three necessities citizens needed from the state. NASSCOM added two more necessities to that slogan, "Roti, kapada, makaan, bijlee, aur bandwidth," which

[47] Although deregulation is better conceived of as reregulation as noted above, I will continue to use deregulation to remain consistent with data sources. Telecommunications deregulation began in India in 1991 with the removal of most industrial licensing agreements. This process proceeded slowly and unevenly over a ten-year period.
[48] Infosys is one of top ranked IT companies in India. (Dataquest, 2009)
[49] Personal interview, former President, NASSCOM, July 7, 2006.

translates to "food, clothing, shelter, electricity, and bandwidth."[50] With the addition to the new phrase, electricity and bandwidth were given the same importance as food, clothing, and shelter. The slogan was directed at two audiences. One was "intended to catch the attention of the common man that these are essential necessities,"[51] while the other was the state that at the time controlled both of these resources, but had difficulty providing them consistently and efficiently.

Another aspect of NASSCOM's early lobbying agenda included efforts to loosen regulations governing foreign ownership and operations in industry in India. India had a number of restrictions that made foreign ownership difficult. This was due in part to the official socialist orientation of the state and government's wariness toward (foreign) capital and its efforts to restrict multinationals within the country during the 1970s. NASSCOM tried to attract multinational companies (MNCs) back to India during the early 1990s to build the credibility of the country as an IT destination and sourcing location. Attracting MNCs had the important effect of improving industry capabilities in India through training employees and technology transfer. According to a former President of NASSCOM, the strategy during this time was to bring subsidiaries of large MNCs first, then promote independent Indian company delivery second.[52] The first three multinational companies to come to India were GE (1994), American Express (1996), and British Airways (named WNS). NASSCOM lobbied the government to make concessions on laws related to foreign ownership to get all three to come to India. NASSCOM effectively lobbied on behalf of the IT industry securing tax incentives,

[50] See ("A bachelor who romanced with IT," 2001). Personal interview, former NASSCOM President, July 7, 2006.
[51] Personal interview, Vice President, NASSCOM, January 14, 2009.
[52] Personal interview, former President, NASSCOM, July 7, 2006.

deregulation of the telecommunications sector, and entry of foreign MNCs that provided a source of technology and skill transfer to industry.

V. Public Relations and Impression Management

The IT industry began to receive widespread recognition domestically and globally during the mid-to-late 1990s and the early 2000s, which prompted NASSCOM to increasingly manage pubic impressions both inside and outside India. The move toward more aggressive impression management during this period was a response to two main factors. First, in 1997 the IT industry in India surpassed one billion (USD) in revenues, which garnered public attention in India and abroad (Kanavi, 2001). The increasing attention from both inside and outside India required organized and sustained programs to address industry challenges ranging from concern over industry capabilities to the security of data processed in India.

The second factor was the changing nature of the global organization of service work. During the late 1990s there was an intensification of the shift away from the "bodyshopping" model to a global delivery model. "Bodyshopping" refers to the movement of specialized labor, such as software engineers, from their home country, typically a low cost labor market, to another country that usually has high cost labor. During the dot-com boom of the late 1990s American IT companies pushed strongly for increases in the number of H1B visas, which permitted temporary entry of skilled professionals, such as computer programmers (Chellaraj, Maskus, & Mattoo, 2006). The bodyshopping of these IT engineers, often from India, was increasingly used as a solution to address the U.S. shortage of engineering talent. The common practice was a harbinger to the acceleration of offshore outsourcing of IT services as it provided familiarity with

foreign Indian programmers and provided a transfer of technology and "know-how" when these programmers returned to their country of origin. Western firms' experience working with Indian programmers, the economic imperative to cut labor costs in the face of a global technology slump, and large investments made in global telecommunication infrastructure during the dot-com boom led to an acceleration in offshore outsourcing to service delivery locations like India. This changing global organization of work in services brought increased attention from foreign governments and publics that were interested in or worried about the capabilities and the cost advantage of the Indian software and service industry. The rapid global industry adaptation from using "Indian labor" in the late 1990s to using "labor in India" in the early 2000s brought a host of new challenges that required impression management for "destination India."

Two main concerns voiced among western firms and the general pubic were the capabilities of Indian labor and firms and the security of sensitive data processed by Indian labor for western firms. NASSCOM addressed these issues in a number of ways. These strategies included specific marketing campaigns, panels at their annual membership meeting, direct meetings and outreach to western firms and governments, and showcasing exemplary member companies to visitors from western firms and governments.

In the mid-1990s NASSCOM sought to shift the perception of India as simply a low cost labor destination in software and services to a quality labor destination that can deliver high value (and higher profit margin) services. NASSCOM's efforts to shift this perception began as an impression management through marketing campaigns, trade conferences, foreign public relations, but later shifted into increasingly proactive

programs in partnership with the government to build educational capacity, labor quality, and the upgrading of worker skills. These more extensive efforts at upgrading worker skills and higher education will be discussed in detail below.

Data security also became a significant concern as back office services providers in India processed increasing amounts of personal and firm level data in variety of sensitive areas including finance, human resources, and medical claims. NASSCOM responded with a number of events to raise awareness about the problems, while also signaling to the industry that this issue was being addressed (NASSCOM, 2006d). The Association also helped establish the India Cyber Lab, in conjunction with the Mumbai police, which was a unique PPP project that formed out of the first-ever Cyber Safety Week in 2003. Later NASSCOM crafted a "Security Initiatives" programs to address these concerns and push member companies to adopt more stringent security practices. These included creating awareness, setting guidelines, defining standards, creating special training on Information Security, and introducing certifications(NASSCOM, 2006d).

VI. Trade Associations in India's IT and ITES industries: Role as Developmental Actors

In this section I detail the changing strategies NASSCOM has undertaken in order to deal with obstacles arising as the industry rapidly expands. I argue that NASSCOM's role and focus has become significantly broader, making it a key actor in industrial development in partnership with government.

The problems of recruitment, employee attrition, and rising labor costs became major obstacles for the industry as it grew exponentially (See Table 3.1 for employment growth), while trying to keep costs low for foreign customers. NASSCOM pursued two different strategies with the government in trying to expand the labor market and improve labor quality. One strategy that NASSCOM pursued focused on upgrading industry related education in the country. It has pursued this by stepping into the traditional governmental space of educational policy formation. Another strategy NASSCOM adopted was to help develop and promote emerging IT clusters in India. The organization achieved this by consulting with various state governments in India that were trying to replicate the success experienced in the largest IT hubs in India. These strategies demonstrate the ways in which the trade association moved into traditional governmental areas of activity. Yet, it is important to recognize that NASSCOM was invited by central and state governments to partner with them to draft and help implement these industrial policies in areas that were traditionally the sole domain of the state. These practices demonstrate the broadening scope of PPPs, their increasing use as a developmental strategy in developing countries, and the further blurring of the already porous boundaries between the state and civil society.

Table 3.1: Knowledge professionals employed in the Indian IT BPO sector

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
IT Exports	110,000	162,000	170,000	205,000	296,000	390,000	513,000	690,000	860,000	946,809
BPO Exports	42,000	70,000	106,000	180,000	216,000	316,000	415,000	553,000	700,000	789,806
Domestic Market	132,000	198,114	246,250	285,000	318,000	352,000	365,000	378,000	450,000	500,000
Total	**284,000**	**430,114**	**522,250**	**670,000**	**830,000**	**1,058,000**	**1,293,000,**	**1,621,000**	**2,010,000**	**2,236,614**

**Figures do not include employees in the hardware section*

Source: Compiled based upon on (NASSCOM, 2006a, 2009a)

i. Trade Association Efforts at Upgrading Education

The Indian government first identified education in software as a focal area in 1986. At this time, it began to consider the training needs of this industry as distinct from others. These educational reform efforts included updating curricula to take account of new software development methods and technologies. Yet, industry needs have continued to outpace the ability of the government to assess skill gaps and recommend changes in curricula. According to one scholar, by 1996 "skill constraints continue[d] to afflict the Indian software industry including the demand-supply gap (especially for higher-level skills and for domestic-oriented production)" (Heeks, 1996, p. 283). In addition, many of the governmental upgrading efforts in higher education were implemented very slowly. For example, a 1986 proposal to create four Indian Institutes of Information Technology (IIIT) remained unimplemented until 1998, when the first IIIT (Hyderabad) was founded, due to disagreements between government ministries responsible for its implementation.[53]

These policy failures underscore the Indian government's incoherence and shortcomings in preparing labor for industry needs. Due to these continued problems, industry lobbied for educational changes and NASSCOM sought to influence education reform since 1991 (Pingle, 1999, p. 151). Yet by 2001, they elevated this issue amongst its member companies and became increasingly involved with educational policies at engineering colleges. For example, Indian's best known IT entrepreneur, founder of Infosys, and former NASSCOM President, Narayana Murthy, gave a speech on education at the NASSCOM 2001 Conference that was also devoted to education (Kanavi, 2001).

[53] The disagreements were between the Ministry of Human Resources Development (MHRD) and the Department of Electronics (DoE) (Heeks, 1996, p. 283).

This speech delivered by a high status individual in the industry coupled with the conference theme on education signaled to industry members and observers inside and outside India the importance of education on future growth of the industry. In addition, to raising awareness of the importance of education, the Association held serious discussions around the specific task of upgrading the engineering colleges on which the industry in India relies. According to then President Dewang Mehta, "there is serious discussion going on among us on how to raise the standards of the 43 regional engineering colleges to those of IITs" (Quoted inKanavi, 2001). The Association also began to consider ways industry could contribute funds to improve the quality of engineering education. NASSCOM sought to,

> revitaliz[e] the Indian technical and engineering education to provide a high quantity of high-quality engineers to achieve export goals of $50 billion. This is a major initiative and creating a separate industry fund for this purpose is also being considered. (Kanavi, 2001)

Besides discussing how educational upgrading would be paid for, this excerpt also suggests the broad scope of this project as a "major initiative."

Dissatisfied with the pace and content of education policy change, NASSCOM increasingly led developmental efforts by stepping into the traditional governmental space of educational policy formation in order to promote private sector participation in the education system.[54] Although India produces more engineers than any other country in the world, many of them simply do not have the skills and experience to work for foreign companies. According to one industry manager, "there are 16,000 colleges who have more than 400,000 engineers coming out, only 25 percent of whom are classified as

[54] Other associations also contributed to efforts, such as CII's focus on "education, sharing platforms for education, sharing platforms with skill development" (Personal interview, Senior Director, CII, January 12, 2009).

being employable."[55] This statistic of a 75 percent shortage of employable graduates from universities was cited in an industry report that highlighted the mismatch between skills of graduates and the skills required by industry (NASSCOM & McKinsey, 2005). This skill shortfall was used by the organization to justify their efforts to reduce this mismatch through programs focused on training and education reforms and upgrading.[56] Other managers[57] and government officials[58] also noted the shortfall of adequate skills among graduates, which corroborates NASSCOM's analysis and the underlying need to do something to address the shortfall. Further complicating this picture is the fact that not all engineering graduates have the number of years of educational training expected of their counterparts from developed countries. Indian engineering totals include those that received four-year degrees as well as three-year training and diploma holders (Wadwa, Gereffi, Rissing, & Ong, 2007).

One central problem with India's educational system where the industry is concerned is its pedagogical methods. In India, pedagogy historically has focused on rote memorization. In general, however, industry is looking for, "individuals having an ability for problem solving, to be able to think 'out-of-the-box,' to be able to basically communicate, and . . . in the domain space, to have the ability to understand and to apply, because most of the questions or assessments that are done in the colleges usually focus on rote learning and the lower order thinking skills..."[59] The skills that employees lack may be technical, industry specific knowledge, and cultural and interpersonal

[55] Personal interview, Vice President, Infosys, December 3, 2008.
[56] Personal interview, Director, NASSCOM, January 30, 2009; Personal interview, Director NASSCOM, April 7, 2009.
[57] Personal interview, Manager, Infosys, November 23, 2007.
[58] Personal interview, senior Indian civil service officer, February 27, 2009.
[59] Personal interview, Director, NASSCOM, April 7, 2009.

communication skills. Key skill deficiencies included generic technical knowledge or "hard skills" (i.e. IT or accountancy skills), domain skills (knowledge specific to an industry, such as telecommunications or automotive), and "soft skills" (i.e. interpersonal or inter-cultural skills).[60]

In response to the mismatch between graduate skills and those skills needed by industry NASSCOM began its most extensive and coordinated effort at reforming higher education in India with the launch of its "Educational Initiative." In December 2006, NASSCOM appointed a Director of its Educational Initiative, hired staff to support the program, and helped to drive some of the recent educational policy changes in India.[61] The NASSCOM Educational Initiative is composed of a number of different programs aimed at closing the skill gap identified above and at enhancing the upgrading of skills of the workforce through increased education quality, capacity, and tighter linkages between academia and industry. The goal of the Educational Initiative is to increase the number of IT graduates and PhDs and the number and quality of faculty in information technology.

NASSCOM, in conjunction with the Government of India's Ministry of Human Resource Development (MHRD), which overseas educational policy in the country, and with funding by the World Bank, presented a comprehensive PPP aimed at upgrading higher education in India. Several resource rich firms that developed educational outreach programs on their own contributed their insight and experience. For example, one respondent at Infosys "worked quite closely" with NASSCOM in order to "see if some of the education that we do can be taken out to the schools, [and] how we can influence the

[60] Personal interview, Vice President, Infosys, December 3, 2008.
[61] Other industries are also involved in influencing educational reform, but are not taking a leadership role relative to the IT industry (personal interview, Director, NASSCOM, 1/30/2009).

education system of the country . . . at the national level".[62] Despite educational program plan input from members in some areas, it was the trade association that culled these disparate and small-scale activities together, while adding other features, such as plans for expanding the number of engineering colleges, into a scalable national program in partnership with the government.

One element of the overall government plan was to increase the number of IT engineering colleges in the country. NASSCOM was the key coordinating body that drafted and submitted the overarching PPP plan that will create twenty new Indian Institute of Information Technology (IIIT) universities (in addition to the existing six) in order to address the increasing skill challenges of the Indian IT industry (NASSCOM, 2008) The report states that it "entrusted NASSCOM with the responsibility of preparing a Model Detailed Project Report (DPR) for the IIIT initiative" that will serve as a template for each of the twenty individual IIITs "and it is expected that there will be minimal variations" (NASSCOM, 2008). From this document it is clear that NASSCOM is leading the government in India in drafting the policy. The Model DPR document was submitted to the MHRD on May 23, 2008 and NASSCOM is assisting the Ministry and state governments to operationalize the plan that was approved by the central government (Ministry of Human Resource Development, 2010a). The Government of India committed to building 2000 crores[63] for their establishment of the twenty new IIITs in its Eleventh Five Year Plan and budgeted (Government of India Planning Commission, 2009). The DPR focused on the vision for the institutes; the governance structure; operational details like land and infrastructure, courses, curriculum, student admissions

[62] Personal interview, Vice President, Infosys, December 3, 2008.
[63] A "crore" is a unit of measurement in India equal to ten million.

and faculty; the financial model for the institutes and indicative locations for the institutes.

The increased role corporate partners have in higher education in this plan reflects the shift in neoliberal institutional practices in the state sphere of higher education. The governance structure of the IIITs is based upon a combination of state governments, the central government, and corporate partners. Corporate partners are expected to provide a majority of the financial funding of each IIIT, which will likely translate into a greater degree of corporate influence in the operation of the universities relative to the state. The plan specifies that the central government will provide a maximum of 14.9 crores and corporations will provide a minimum of 15.1 crores (NASSCOM, 2008). The corporate partners will also select employees from their firms to serve on the faculty for an "extended period time" rather than the current guest lecturer approach (NASSCOM, 2008).

Another key aspect of the NASSCOM plan includes training faculty at universities and engineering colleges in up to date methodologies and technologies through National Faculty Development Programs. Leading member companies, such as Infosys, have experience developing and running industry outreach programs and provide input into the faculty development programs used by NASSCOM. A manager described how Infosys' own "Campus Connect" Program was used as a model to design the faculty enablement program and the national curriculum in schools and later integrated into the NASSCOM Educational Initiative.[64] The national faculty development program proposed by NASSCOM increases the scope of this effort to target 20,000 professors for training. The "pulling up" of Infosys' "Campus Connect" program by NASSCOM is one example

[64] Personal Interview, Vice President, Infosys, December 3, 2008.

of firm level development practices that are aggregated and incorporated into industry level polices that address skill shortages and upgrading potential in the industry.

NASSCOM increasingly adopted a broader agenda and more comprehensive tactics in its attempt to achieve educational reform. For example, the organization shifted from advocating stronger education to actually developing a plan with the government that seeks to achieve educational goals based upon proven concepts developed by specific firms in its membership and integrating these plans with additional research and policies into a national education plan. Additional effort also went into coordinating industry insiders, government ministries, and universities around this plan. The scope and depth of this plan constitutes something more significant than and distinct from typical trade association lobbying efforts.

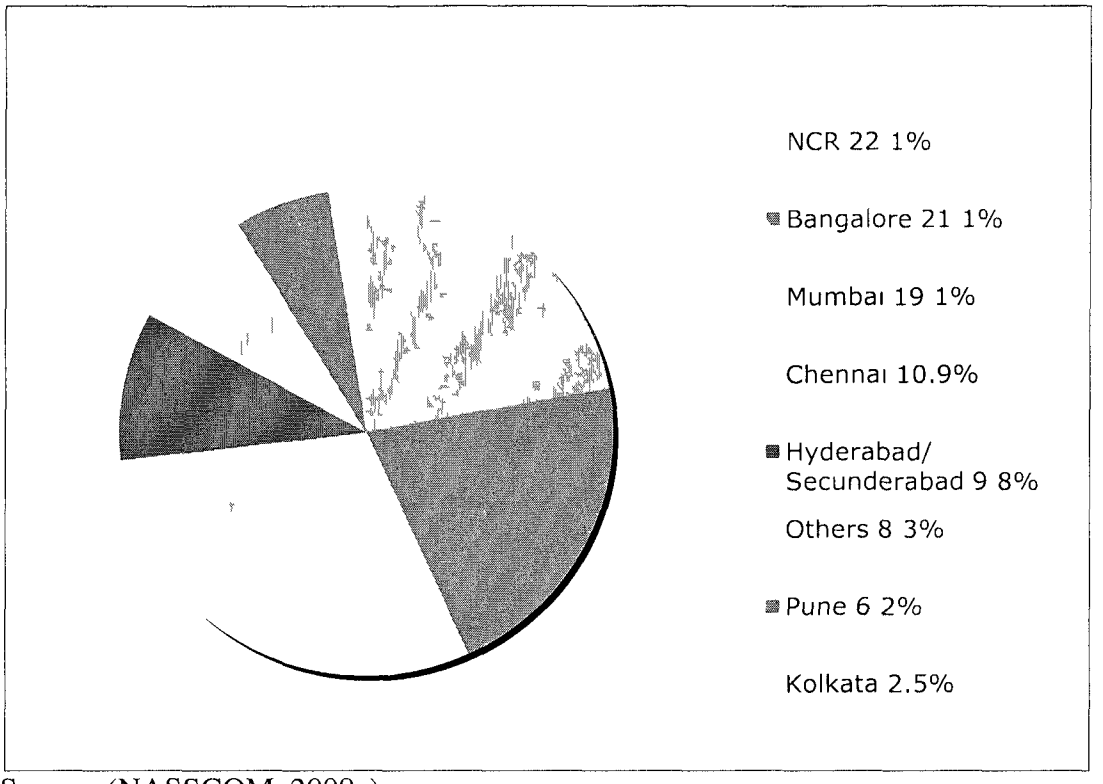
ii. Efforts in Developing New IT Clusters: Tier II and Tier III Cities

NASSCOM worked with state and central governments on a range of infrastructural projects that directly contribute to cluster development. These efforts included advising on industry needs concerning communication and power infrastructure into IT office parks, space requirements for industry, organizing and hosting public meetings with developers, governmental officials, and industry insiders to shape SEZ development (Kannan, 2008; Nasscom miffed with current IT SEZ norms," 2006). NASSCOM also advises on a broad array of city planning issues, such as road access, wireless access to IT commuters stuck in traffic, and consulting on new international airports. For example, NASSCOM worked with the "Civil Aviation Ministry to convert airports in Hyderabad, Bangalore, Ahmedabad, and Pune into international airports so that global movement of IT professionals becomes less of a pain" (Kannan, 2008). The Association's most

significant infrastructural project involvement, however, has been providing city planning recommendations and plans to state governments to help them develop new and existing industry clusters.

NASSCOM undertook an effort to develop less developed IT cities in order to help address growing industry labor and resource shortages in saturated IT hub cities. The offshoring boom that accelerated during the late 1990s and early 2000s lead to a tightening labor market, increased labor costs, low employee retention, and strained infrastructure in booming IT hubs where most of the work was carried out in India. For example, 92.7 percent of industry exports come from the top 7 IT cities in the country (NASSCOM, 2009a). These cities are Bangalore, Chennai, Delhi's National Capital Region (NCR), Hyderabad/ Secunderabad, Kolkata, Mumbai and Pune (See Table 3.2: City wise spread of NASSCOM Membership). Industry, led by NASSCOM, sought to address its shortage in educated labor by shifting some industry growth toward what the industry calls Tier II and Tier III Indian cities.

Table 3.2: City wise spread of NASSCOM Membership



Source: (NASSCOM, 2009a)

Table 3.3: Development of Tier II and Tier III Indian Cities

Location Attractiveness			
←Most attractive			**Least attractive →**
Leaders (Tier I Cities)	**Challengers (Tier II Cities)**	**Followers (Tier III Cities)**	**Aspirants**
Bangalore	Ahmedabad	Aurangabad	Allahabad
Chennai	Bhubaneshwar	Bhopal	Dehradun
Hyderabad	Chandigarh	Goa	Durgapur
Kolkata	Coimbatore	Gwalior	Gangtok
Mumbai	Indore	Hubli-Dharwad	Guwahati
NCR	Jaipur	Kanpur	Ludhiana
Pune	Kochi	Mysore	Patna
	Lucknow	Nashik	Raipur
	Madurai	Pondicherry	Ranchi
	Mangalore	Salem	Shimla
	Nagpur	Surat	Siliguri
	Thiruvananthapuram	Vijayawada	Srinagar
	Tiruchirapalli		Varanasi
	Vadodara		
	Visakhapatnam		

Source Compiled from (NASSCOM & Kearney, 2008)

NASSCOM is helping to facilitate the development of Tier II and Tier III cities by engaging the government and then later directly advising and supporting their efforts. Government officials, particularly chief ministers of local states, are eager to spread the benefits of the IT industry to smaller cities in the country and attract additional revenue and jobs (NASSCOM, 2006e). By helping to attract industry to Tier II and III cities, one NASSCOM director says, "we will get government support because it actually addresses inequity and access to quality life."[65] A government official responsible for promoting the IT industry in the state of Karnataka stated that the problem is that "start-up costs [are] too high in Bangalore and [the] solution is to move to Tier II and Tier III" because ". . . labor is cheaper and land is more available".[66]

NASSCOM began consulting for state governments on developing new industrial clusters after it received "requests from multiple states that we [NASSCOM] should do a study on which locations in those respective states are as close to being ready as possible to become IT hubs."[67] NASSCOM commissioned a study that identified and analyzed 50 potential IT cities in India; seven of which are called the leaders (noted in Table 3.2) and the remaining 43 designated as challengers, followers, and aspirants (See Table 3.3: Development of Tier II and Tier III Cities).[68] The study provided a detailed analysis of industry needs along key parameters, such as labor skill availability, infrastructure, social and living environment, business environment, government support, operating costs, delineated positive and negative attributes in each city, and detailed the tasks state

[65] Personal interview, Director, NASSCOM, January 30, 2009.
[66] Personal interview, Government Official in Department of Informational Technology, Biotechnology, and Science and Technology, State of Karnataka, March 9, 2009.
[67] Personal interview, Vice President, NASSCOM, January 14, 2009.
[68] Personal interview, Director, NASSCOM, January 30, 2009 and (NASSCOM & Kearney, 2008)

governments needed to address in order to attract IT companies to their cities (NASSCOM & Kearney, 2008).

After sharing the report "some of the state governments then wanted us [NASSCOM] to put together a blue print on how to go about bringing those up to speed, so that is again something that one is working with state governments."[69] At this point, state governments wanted more than just an analysis on where Tier II and III cities stood, but also a plan on how state governments could develop the clusters to be more competitive against their peers. Providing plans to state governments on how to develop city infrastructure represents a significant break from the lobbying activities trade associations are recognized for. It also shows how far NASSCOM has come from its early years when it was fighting for government attention and recognition as a strategic industry. Now state governments solicit the Association for their recommendations and plans on how to develop their cities to attract companies.

One approach state governments have taken to attract companies to these cities is to offer new benefits and tax incentives and upgraded infrastructure. A NASSCOM director explained the Association's role in drawing attention to these incentives:

> I think it is very necessary for us to actually see that this [move to Tier II and Tier III cities] happens. So, we would be helping our industry move. So what NASSCOM does is we have 7 regions, [and] regional councils. We advise all our regional council members to actually see why it is good for them to move and how the STPI [Software Technology Parks of India] and SEZ rules permit actually a lot of tax rebates for them to move up there . . .[70]

In this quote, one can see how NASSCOM actively promotes industry to move to these less developed locations by reaching out to firms through its regional council structure. The Association also educates the industry on the tax rebates and incentives that the

[69] Personal interview, Vice President, NASSCOM, January 14, 2009.
[70] Personal interview, Director, NASSCOM, January 30, 2009.

Government of India provides through the STPI and SEZ schemes in order to help facilitate this move.

Although it takes time to develop an industrial cluster there are already signs that the strategy is succeeding. According to the former Secretary of IT in the state of Karnataka,

> IT companies are going [to Tier II and Tier III cities]. They are going to Mysore, they are going to Mangalore. . . . Last year in Mysore, the total exports increased, I am talking year on year 100% in Mysore. It was 74% in Mangalore, year on year. So Mangalore and Mysore are picking up very well.[71]

Thus, NASSCOM and state governments appear to be successfully promoting new cluster formation.

Some firms are attracted to these Tier II and III cities to find alternatives to the competitive labor market in the top 7 IT hub cities. The move toward these less saturated Tier II and III cities provides industry access to new sources of labor, at lower costs, with higher employee retention. It also provides access to cheaper power and more plentiful land for business needs.[72] According to one Senior Manager, in order to help with the shortage of skilled labor and rising wages, they are hiring employees from the Tier II and Tier III cities and are opening more offices there.[73] Despite the attractiveness of labor availability, higher rates of employee retention, and labor skills for some firms operating in Tier II and III cities, some firms remain reluctant to move to these locations because they are worried about the availability of high-level skills.

The shortage in high-level skills in Tier II and III cities is at least partly due to the relatively weak educational levels in these cities relative to more developed cities. IT hub

[71] Personal interview, November 15, 2007.
[72] Personal interview, Director, NASSCOM, January 30, 2009.
[73] Personal interview, Senior Manager, Infosys, January 4, 2008.

cities (Tier I cities) usually have colleges that are much better than Tier II and III cities. This is because they have higher enrollment and fees, which allows them to "pay the teachers a substantial amount, which means they get the best quality teachers and they have a curriculum, which is quite progressive because of which the placement records are almost 100 percent, so most of our member companies usually go there."[74] Although there are a sufficient number of graduates in Tier II and III cities, they have not reached the quality of those produced by colleges in the Tier I cities.[75] The reason for the lower levels of educational quality is because these cities are more economically depressed, the schools have low quality teaching, high student to faculty ratios, and difficulty finding faculty with the appropriate qualifications and training for the subjects that they teach.[76]

In order to address these specific concerns about education and skills in Tier II and III cities, thereby making these locations more attractive to industry, NASSCOM is trying to improve equitable access to education and upgrade labor skills as part of its larger national Educational Initiative.[77] Explains one director, NASSCOM works with universities to identify "what it is that they are deficient in and how they could improve it."[78] The Association is proactively informing each of the state governments about these recommendations and the work the organization and its members are performing with universities in order to improve the educational system to meet future industry needs.[79] Over the coming years graduates from universities in these lower Tiered schools may be more capable of performing more skill intensive and higher value tasks.

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[74] Personal interview, Director, NASSCOM, January 30, 2009.
[75] Ibid.
[76] Ibid.
[77] Ibid.
[78] Ibid.
[79] Ibid.

NASSCOM's recommendations and planning activities on behalf of state and city planners serve to blend the demarcating line between state and industry activities, while also further expanding the role served by trade associations in cluster development. As in the case of educational reform discussed above, NASSCOM's involvement in cluster development demonstrates its growing role in industrial development, which extends beyond lobbying efforts and advising to include highly involved planning.

VII. Conclusion

In this chapter I have argued that trade associations try to develop an industry. In particular, they may play various roles in attempting to facilitate an industry shift from production of low value toward high value products and services through their engagement with the state, firms and developers, universities, and other stakeholders. Drawing on an analysis of NASSCOM's efforts in industry development, I examined some strategies used by trade associations to contribute to industry development. In the case, I argue over time such strategies have come to extend beyond coordinating or lobbying activities to include actual planning and policymaking. Under the umbrella of the neoliberal state, these previously under theorized civil society actors – trade associations – are key actors in efforts to develop industries.

The early years of NASSCOM demonstrate the organization's influence and effectiveness in gaining recognition and concessions for the industry and in managing public perceptions that directly affected the industry. Specifically, NASSCOM established itself as the key associational player in the IT industry, achieved or provided greater access to a number of collective goods for the industry, such as tax incentives and

telecommunication infrastructure, and effectively managed industry impressions domestically and abroad. However, it was the shift toward a global service delivery model, the acceleration in the volume of service over a billion US dollars, the broadening scope of services exported from India in early 2000s, and the new constraints that these industry shifts provided that prompted the Association to adopt a more proactive and expanded agenda.

NASSCOM's policy work on education and its efforts to promote and plan cluster development most clearly reflects the degree to which NASSCOM sought greater participation in areas traditionally considered state responsibilities. I argue that the Association's actions in these traditional state areas approximated a quasi-state role in the industry development process and as a result, represent a qualitative shift from the pure lobbying and coordinating role trade associations traditionally hold in development in the academic literatures.

Yet, trade associations did not replace the state in planning functions or policy implementation. Rather, the state *invited* industry to participate in these partnerships. State officials were eager to work with the IT industry once the industry had attained a degree of visibility and had become a significant export revenue producer. In particular, government officials hoped to attract IT companies to new potential IT hubs in an effort to replicate the success achieved in the primary IT hub cities. The growth in IT simultaneously highlighted the revenue potential of the industry and, under the cumulative effort from NASSCOM and other firms, the educational requirements for future industry upgrading and development. As a result, both the state and industry were motivated to pursue public-private partnerships to address these issues.

The PPPs formed between NASSCOM and the Indian state offer further evidence that the traditional model of development driven by a centralized governmental bureaucracy has given way to a more decentralized model of developmental governance where a number of actors collaborate through recurring interaction in a larger ecosystem. The PPP model requires tighter collaboration with a variety of stakeholders, including departments and agencies at various levels of government at the city, state, and federal levels; firms; associations; developers; and educational institutions.

While this analysis suggests broadly that sectorial trade associations may play a key role in industry development and upgrading, it also acknowledges associations that have broad memberships spanning multiple industries may have a weak or negligible influence on pushing industry in this direction. In this case, the national industry association, CII, played a complementary role to sectorial associations by building consensus behind broad industry positions and programs. One example cited above was the early supporting role CII played in influencing the state to deregulate the telecommunications industry. In this case, broad national industry associations were hindered by the difficulty of forming an industry consensus around such diverse member interests, which made them less focused, effective, and consistent in providing leadership on development and upgrading that directly affected the IT and ITES industries. Industry associations with a broad membership stretching across multiple industries, however, may potentially play a more significant role in upgrading industries by helping firms form business ties that enable firms to develop, test, market, and sell new products and

services that address the needs of underserved domestic markets.[80] These business ties may also provide an emerging industry the opportunity to perform the whole range of activities of a product or service (beyond just the low value, low skill activities typically "offshored" to developing economies), which more quickly facilitate industry upgrading.

Developmental governance driven in partnership with trade associations is a potential mechanism to facilitate industry development in other industries and developing countries. However, it is important to recognize that associations form after an initial cluster of companies is already established and able to collectively organize. As a result, as the Indian IT case suggests, partnership with trade associations may occur after an industry is already formed. For this reason, state partnerships with trade associations are not likely to facilitate entry into completely new industries, as was the case in the DBS. Yet, trade associations, once established, may become key actors interacting with the state to guide, coordinate, draft, help implement developmental policy and help advance upgrading in industries that are already established. This mechanism may in fact operate in other industrial sectors or in other developing countries that have similar state society relations to those found in the Indian IT case; such cases may offer potential areas for future analysis of the role of trade associations in developing countries

[80] CII pursued this strategy by organizing industry to focusing on small to medium sized domestic firms in India that are relatively neglected by IT firms focused on the export market (Observations from CII IT policy meeting, New Delhi, February 20, 2009).

Chapter 4
Knowledge Transfer

I. Introduction

A central question of this dissertation is: how do industries in developing countries "upgrade" to higher value activities? In order for this process to take place, we need to understand different processes of skill development that enable upgrading. One critical process that my data suggest plays a crucial role in industry upgrading in Indian firms is the transfer of knowledge *between* organizations based in developed economies and those firms based in developing economies. This may occur through two mechanisms. One is through the movement of technically skilled workers between developed countries and India, prior to the founding of Indian service firms. The second is through ongoing interactions between India-based service providers and their clients after Indian firms are already established. Because firms in developing countries face higher barriers in accessing the skills and knowledge to compete with firms in developed economies (Gereffi & Korzeniewicz, 1994), both of these knowledge-transfer processes are particularly important in helping firms in developing regions move into higher value tasks.

The fragmentation of global production coupled with the rise of global production networks has resulted in the dispersal of production across country boundaries (Gereffi & Korzeniewicz, 1994; Sturgeon, 2002). This intensification of production networks spanning across borders has caused some country-focused development strategies to

falter (Amsden, 1989; Johnson, 1982; Wade, 1990b). Instead, in a system of dispersed industrial production networks, the transfer of knowledge between firms and via "reverse" migration of skilled workers across country borders are key mechanisms that lead to industrial upgrading (Gereffi, 1999; Saxenian, 2006). My findings suggest that two primary factors facilitate knowledge transfer between firms in developed and developing countries in the outsourcing industry: first, the migration of technically skilled workers back to their native countries and, second, firm-facilitated cross-national learning through the physical movement of their employees to their client site and through ongoing client-vendor interactions through collaboration via phone, email, and the hand off of work. Though knowledge transfer via interfirm relationships and the movement of workers plays a crucial role in the upgrading process, there are two structural constraints that limit these strategies' effectiveness in fostering the upgrading process. It is these mechanisms – both enabling and constraining – that I explore in the present chapter.

In all four of the cases discussed below, I find that knowledge was transferred from developed regions to developing countries through the movement of key employees traveling between India and the US. The sources, methods, and timing of the knowledge transfer varied between companies. A precondition for knowledge transfer in all four cases is a strong background in higher education and post-graduate work. Each firm needs a broad base of "knowledge workers" in addition to whatever training the firm executives may possess, in order to be effective knowledge service providers. This was true even for the Global Radiology Center (GRC) and Infosys, who were more dependent upon the clients for learning how to provide these services than Teleradiology Solutions and Evalueserve.

For Teleradiology Solutions and Evalueserve, the founders' professional experiences with their previous employers allowed them to test ideas and delivery concepts that they later developed into a business model for their respective organizations. In these cases the most important knowledge transfer occurred *prior* to their formal establishment of their respective organizations. For the GRC and Infosys, in contrast, the interaction with *existing* clients were the primary mechanisms for the transfer of skills required to successfully deliver knowledge services. Both firms used the regular movement of workers between the client and the Indian offices as a primary source of learning. This increased reliance on clients can be attributed to two factors. First, the GRC and Infosys lacked experience providing these specific services until they began providing them within the context of their relationships with their customers. Second, the services Infosys and the GRC provided are much more deeply integrated into their client's processes than is the case with Teleradiology Solutions and Infosys. As a result, Infosys and the GRC's relationships with clients were characterized by consistent contact, via phone and email on a weekly or daily basis, to share information necessary for the delivery of work. Below, Table 4.1 provides an overview of the primary sources of knowledge and the mechanisms for transfer.

Table 4.1: Overview of Firm Sources of Knowledge

	Primary transfer mechanism: Learning through client relationship	Primary transfer mechanism: Learning through technical migration
Finance	Infosys Movement of employees to client site to document process & training. Constraint: access to client knowledge	Evalueserve Founders learned knowledge required through education & work abroad with MNCs
Medical	Global Radiology Centre (GRC) Indian doctors trained by client, which in turn train rest of offshore team Constraint: access to proprietary knowledge & US credentialed labor	Teleradiology Solutions Founding radiologist took US credential, medical training & experience back to India. Hired additional credentialed US radiologists who could do the same.

In elaborating on the above-mentioned dynamics, this chapter proceeds as follows. I begin by briefly discussing some critical constraints on upgrading and their implications for our understanding of the structural limitations of knowledge transfer in the existing global market. Next, I identify the primary knowledge transfer mechanisms in each of the four cases that are the focus of this study. In doing so, I also analyze the founding of each firm and/or the service offering it provides, which sheds light on the role of prior (foreign) education and training, and a lack thereof as is sometimes the case under professional authority. As I examine each of the cases, which were briefly introduced in the Introduction to this dissertation, I provide further background on the firms. Finally, I draw these case analyses together in order to highlight the key mechanisms for knowledge transfer for upgrading, given existing structural constraints.

II. Limitations on Upgrading

As noted, industrial upgrading faces significant obstacles, particularly as an industry moves into higher value activities. In the global trade of professional services there are two major constraints on industrial upgrading that determine the scope, method, and extent of learning. These constraints are 1) lack of access to propriety knowledge, data, methods, and systems and 2) professional and legal barriers for upgrading. The lack of access to firm knowledge can be overcome through trade relationships, if given access, but these may constrain or slow learning to the lower skill end of operations, which is a product of the clients' desire to retain a competitive advantage. Yet, through a process of trust and growing capability, upgrading into a succession of higher value tasks is achievable. This is the traditional route of upgrading in manufacturing and apparel industries, characterized by a step-wise move into increasingly complex and higher value activities.

The second of these constraints around professionalization is of particular interest for this study. Both financial and medical industries have occupational and professional groups that define labor qualifications that serve to restrict some tasks to specific groups of laborers, thereby excluding others. The medical profession has been much more effective than finance in enlisting government support to legally protect specified, high value tasks through credentialism. In turn, the interaction between the state and professional associations has a vast effect on the structure of opportunities for professional service offshoring. Of the industries addressed in this study, teleradiology is a much more tightly controlled industry than finance, which makes it particularly difficult for radiologists overseas to practice. The medical industry is characterized by a history of

effective lobbying from the medical profession, which created a professional monopoly over medical services. This particular institutional history constrains international teleradiology services, in general, and limits how knowledge is transferred, in particular.

The constraints on the teleradiology industry in India can be explained with reference to the sociological literature on professions and expertise. Professions are characterized by expertise, power, and authority (Abbott, 1988); they seek to protect this power and authority though the creation of a monopoly over competence, officially sanctioned as "expertise" (Larson, 1977). Professional associations act as representative agencies for individual members, shaping and redefining appropriate practices of interaction amongst their memberships (Greenwood, et al., 2002), acting collectively to lobby government agencies for recognition and protection of professional rights.

The accounting profession, in contrast to medical professions, has been relatively unsuccessful in preventing accounting related corporate jobs from moving offshore to lower cost markets. This is primarily due to the lack of legal protection that the state provides the accounting profession. One does not actually need an accountant credential for most types of U.S. corporate accounting related work. However, one does need a medical credential and license to practice medicine. The legal protections that the medical profession has garnered through its historical interaction with government have made these jobs much less likely to move abroad: significant structural and legal barriers of entry exist for offshore firms aiming to provide these services.

By the 1950s the radiology profession secured exclusive rights to interpret medical images by excluding engineers and physicists from medical radiography, barring other physicians from interpreting images, and by controlling the education and registry

of radiology technologists (Barley, 1986; Larkin, 1978). The interaction of medical professional associations, government regulators, managed care groups, and the increased bureaucratization of the healthcare field have led to a number of constraints on international teleradiology. Specifically, factors such as Medicare's restrictions on paying for teleradiology interpretations outside the country; credentialing by managed care organizations; privileging of teleradiology providers by hospitals and healthcare organizations; licensing by state boards; and malpractice costs and restrictions were most restrictive (Forman, 2006). A mark of just how effective the U.S. radiology profession has been in protecting its monopoly through legislation and regulation is the fact that it has had difficulty increasing staff levels to meet labor shortages and increased service demand.

In medical services, medical credentials establish a ceiling above which firms cannot upgrade even if they have the skills to provide those services. The practice of credentialism in general disproportionately excludes groups who lack access to higher education, reproducing existing social divisions, particularly along class lines (Collins, 1979). An adherence to credentialism also disadvantages those who migrate across borders, where previous professional credentials are no longer recognized. While the rise of IT enabled services has opened up new opportunities for workers in developing countries through offshore work, it also extends professional authority and the potential for labor market exclusion through credentialism and professional authority. This is of particular relevance to the endeavors of foreign trained or certified radiology professionals. The GRC has Indian radiologists that were professionally trained for higher level, interpretive work and are capable of providing those services to India as

well as to other more developed economies. Both the GRC and Teleradiology Solutions provide high value interpretive radiology reporting services legally to practices in Singapore using Indian radiologists. The lack of recognition of an Indian medical credential in the US market creates a ceiling on skill upgrading, locking the GRC into lower value work than their training prepared them for, preventing firm level deepening of skills.

When compared to the less restrictive arena of financial services, the implications of the limitations placed on medical services become increasingly apparent. It is not only the potential for growth and success that are limited by such restrictions in the medical field, but also the conduits available for knowledge transfer, which I have suggested is a key mechanism for upgrading more broadly. In high value financial services, such as financial planning and analysis, the required educational profile is less specialized, requiring a bachelor level degree, although an MBA or Chartered Accountant credential may be preferred. However, due to the more generalist education and training in financial services, there is a need for significant on the job training. This is where the link between the power of credentialism – its ability to set standards and limitations – within a particular industry and the specific interfirm knowledge transfer practices that firms engage in emerges. In order to provide the training necessary for offshore firms operating in the financial services industry, some firms (particularly firms engaged in activities like those of Infosys, described below) commonly visit the client site to learn the skills required for financial processes – a practice I return to in my discussion of knowledge transfer mechanisms below.

Medical services, on the other hand, require medical licensure, federal and state

regulations concerning qualifications, insurance, payment, and privacy regulations. These requirements in medical services impose more significant barriers for finding qualified employees, building trust and credibility, and signing long-term contracts. These constraints, and the potential harm of making mistakes in medical care, mean that that it takes longer to get the commitment of new customers to work with offshore service companies. In order to do business, teleradiology firms must spend significant amounts of time to build relationships and trust. This makes short-term trial runs of teleradiology services prior to a longer-term commitment impractical. Financial services, on the other hand, have fewer hurdles; clients are able to try out short-term or ad hoc projects before committing to a multi-year contract.

While formal post-secondary education may provide only limited preparation for employees of offshore financial service firms, employees in the offshore radiology industry gain a significant portion of the skill required to provide services through their formal educational training, residency, and the credentialing requirements imposed on practicing radiologists. Radiologists become proficient in providing services while undergoing medical educational training and residency, which provides them with necessary experiential and tacit knowledge.[81] Of course, firms providing radiology services to clients abroad still need to learn the requirements dictated by law as well as the particular style and manner of service delivery that such offshore clients require. However, this means that interfirm knowledge transfer is secondary to the credential, training, and expertise that the radiologist gains during his or her training.

A final perceived limitation of note relates to the H-1B visa, which is granted to

[81] Explicit knowledge is easily codified into words and numbers, while tacit knowledge is more difficult to express. Michael Polanyi captures the crux of this distinction in his declaration: "we can know more than we can tell" (M. Polanyi, 1967, p. 4).

skilled professionals from foreign countries who work in the U.S. These visas have been met with criticism in the U.S. for a number of reasons, among which is the perception that this visa is essentially an "outsourcing visa." This critique implies that the primary use of the H-1B visa is to facilitate transitions to offshore outsourcing processes. As a result of this criticism (and other unrelated security concerns follow 9/11), the availability of such visas has been restricted. Although such a restriction could be seen as a potential limitation on upgrading processes for workers and firms from developing nations, in fact the critique seems to be misplaced and thus the effects of the restriction are limited. As noted below, most Indian workers who come to the U.S. to participate in the transition process to offshore outsourcing stay for periods of about two months. As a result, they typically use two-month long business visas, which are much easier to get approval for and take less time to secure. Business visas take approximately three weeks for approval in the U.S. (equivalent visas take only one week for approval in Europe), whereas the H-1B allows for a longer stay but can take up to a year to be approved.

Bearing the aforementioned restrictions and their implications in mind, then, in the following sections I look specifically at the knowledge transfer processes at work in first, financial services, and second, teleradiology services. In each section, I focus in turn on the specific firms with which interviews were conducted.

III. Knowledge Transfer in Financial Services: The Case of Infosys Knowledge Services

Infosys is one of the largest IT and ITES firms in India and has over 100,000 employees, most of whom work on IT related projects. Ten percent of the company's

revenue comes from its Business Process Outsourcing (BPO) business (personal interview, Executive, 12/10/08). Within the BPO group there are about 1000 employees working in its "Knowledge Services" division and roughly 70 percent of the services they provide are skill intensive financial services (personal interview, Manager, Infosys, 11/23/07). Infosys hires employees such as chartered accountants and MBAs, although they also hire some "commerce graduates" that do not have post-graduate degrees.

Infosys' method of transferring knowledge depends on its clients and reflects the company's background in delivering large scale, lower value back office services. According to an Infosys Executive, the "clients are involved in knowledge transfer... [they] train up people and transfer knowledge" of their systems and processes to the firm (Executive, Infosys, 12/10/08). Infosys provides finance and accounting services to a broad range of MNCs, but began moving up into more skill intensive financial planning and analysis services around 2005. The movement of employees between the client and offshore firm is the primary conduit through which knowledge is transferred. This approach is used in both lower value and higher value services. Business processes are highly specific to a client-firm, developed over time through the interaction of specific routines, processes, and the inheritance of "legacy" IT systems and procedures through mergers and acquisitions. In order to learn the intricacies of a firm process, a period of learning through client visits and training is required; during this period, the offshore firm learns client-specific processes. This is necessary even where these processes are later improved or reengineered following an offshore transition.

Infosys BPO uses the traditional "train-the-trainer" approach to transfer knowledge, regardless of the skill intensity or the complexity of the work process. The

company's move into knowledge intensive services grew out of a stepwise movement upward from BPO services into the provision of higher-value and more complex financial services to one of its large and long-term U.S.-based manufacturing clients. In 2006, Infosys formally packaged the knowledge intensive financial planning and analysis services it provided this client to other clients as a new service offering.

Infosys uses a proprietary BPO transition methodology, called "Proton," which standardizes the steps required to move a client's services offshore. This methodology is applied to KPO client engagements as well as lower skill BPO projects. The task of guiding offshored work processes into a "steady state" usually takes two to three years out of an average five-year contract, although the actual transition of services from client to vendor takes about one year. Throughout the knowledge transfer process, Infosys employees manage multiple roles: acquiring knowledge, documenting knowledge, and applying knowledge (personal interview, Project Manager, Infosys, 11/29/07). The five steps involved for knowledge transfer are detailed below in Table 4.2 (personal interview, Project Manager, Infosys, 11/29/07; personal interview, senior manager, Infosys, 1/4/08).

Table 4.2: Infosys Five Stage Project Approach to Process Transition

	Stage	Work performed
1st	Discovery	**Document client work processes**: • Infosys engages in close observation (i.e. "shadowing"), interviews employees, and reviews materials describing work process. • Most intensive part of knowledge transfer process, but incremental knowledge transferred in subsequent interaction. • Send 25-30% of offshore work force to client site for 1 to 2 months. • Relationship building between cross-national teams.
2nd	Transition plan	**Create transition plan** • Codifies information collected during discovery and breaks it into smaller employee-level steps
3rd	Training	**Offshore labor trained on client work process** (i.e. "train-the-trainer") • Transition team returns to India to train the rest of offshore team. Each returnee trains 5 employees over 4-week period. • Variations in model may be used to reduce loss of tacit technical "know-how," during transition and training stage
4th	Parallel run	**Offshore & client teams compare work output for inconsistencies** • Work conducted at the client and offshore locations are compared to monitor for quality and efficiency before client processes are disassembled. (ex. client and offshore firm may run same financial reports to check for irregularities)
5th	"Goes Live"	**Service delivered exclusively from offshore location** • Process run exclusively offshore. • Offshore team held accountable for terms specified in service contract.

The transition process described in the table above usually takes about a year. During this time the client's workers are busy teaching and the offshore workers are busy learning work processes. The second year of service delivery is called the "steady state stage." Now, the offshore vendor works independently and refines the process to address quality issues. During this stage, the client's workers may continue in an oversight role, be redeployed to other projects, or be fired.

An important shift takes place during year three of the relationship. After

completing a year of successful service delivery, Infosys begins the *process innovation and improvement* stage. This stage has significant implications for our understanding of the role of knowledge transfer in upgrading. At this point, the degree of offshore firms' dependence on client firms for knowledge may diminish; this can be compared to the limited dependence-relationship observed during the outset in the case of Evalueserve, discussed in the following section. During this phase, Infosys looks for ways to make the clients' work processes more efficient and reduce the number of full-time employees required for this work. Although reduction of employees means that Infosys may accrue fewer billable hours and therefore less revenue in the short term, the company is not concerned about negative effects on its own viability that may follow because, according to sources, it is confident that it will get more work from the client in the future (personal interview, senior manager, Infosys, 1/4/08). Process improvement and reduction in employees dedicated to providing offshore labor occur in two ways: through automation, which reduces the workload through technology, or through the deskilling of work (for an overview of the deskilling debate see (Attewell, 1987; Braverman, 1974; Form, 1987; North, 1990; Vallas, 1990).

The deskilling process – a process by which the degree of skill or the number of skilled people necessary to complete a task is reduced – is described by a senior manager in the following way:

> [...] we will pick a piece of work and then we will convert that piece of work into such a process that earlier it was 100 people of the same profile running that work and then divide that work into 15 to 20 people in the top notch [level] who are doing that work in a particular way and another 80 doing [the] low-end piece of it. (personal interview, senior manager, Infosys, 11/23/07)

According to the same source, "the pace of this happening will definitely grow much faster [in the future]." Thus, deskilling of knowledge intensive services is a goal for Infosys, which this manager sees as becoming increasingly important to future industry competitiveness. The observation that deskilling is occurring in the industry, however, does not necessarily preclude upgrading. A firm can move to higher value work, while splitting the tasks necessary for upgrading internally into high or low skilled jobs. Yet, the recognition that deskilling within the industry is already underway and expected to intensify suggests that alienation amongst Indian workers, even within firms or divisions specializing in knowledge intensive services, may rise over time. This suggests that knowledge workers, who tend to enjoy higher levels of autonomy, are not immune to deskilling, which is more often associated with lower value service worker.

It may seem surprising, given the potential profit motivations that accompany the deskilling process, that deskilling occurs only after the transition process is over, rather than during the documentation period, when it could be relatively easy to restructure the work process. However, the unique structure of knowledge transfer processes during the offshoring transition points to reasons why such an approach may be less appealing, both for the client and vendor. The potential risk to quality service delivery in the early stages of the relationship makes early deskilling too dangerous a proposition for service providers and clients, alike. One implication of this variation on a more typical pathway to deskilling that takes place in domestic industries is that a greater number of Indian workers end up being trained in processes and practices that require higher skills. Perhaps inadvertently, the slower development of trust and time needed to adapt to the offshore relationships prior to deskilling may limit the potentially deleterious effect of deskilling

on overall skill and knowledge upgrading in a developing country providing offshore outsourcing services.

IV. Knowledge Transfer in Financial Services: The Case of Evalueserve

Evalueserve is a research company delivering customized services in financial, investment, business, and market research.[82] The firm is one of the largest Knowledge Process Outsourcing (KPO) companies from India. The central aim of Evalueserve's business model is to perform the bottom 70 to 80 percent of the work that a traditional investment bank, retail bank, or consulting company does at about one third of the cost. The firm does not handle negotiations or do audit work, as US investment and retail banks traditionally would, nor does it provide recommendations or implementation support, as domestic consulting companies typically would. Even after the global downturn, financial services still constitute roughly 40 percent of the firm's total revenue (personal interview, Executive, 5/22/09). It has over 2200 employees, including over 1700 research analysts, most of whom have advanced business or technical degrees; these include engineers, MBAs, intellectual property lawyers, medical doctors, PhDs, chartered accountants, statisticians and other top-level professionals (Interview, 5/22/09). Among these, chartered accountants and employees with MBAs perform most financial services.

The primary initial source of knowledge for the firm Evalueserve was its founders' education and work experience abroad with top MNCs. In particularly their most recent work experiences prior to the formation of Evalueserve allowed them to develop and test ideas that they later developed into a plan for new business.

[82] Evalueserve also provides Intellectual Property, Legal Support Services, Supply Chain Support Services and Knowledge Technology, but these were beyond the focus of this study.

Additionally, their knowledge and expertise in providing services to former clients and their networks (which include clients) helped them establish themselves in knowledge intensive services. This blend of education and experience is evidenced by the biographies of the following key figures in the company, including:

- The Chairman & Co-founder received his PhD in Computer Science from the Johns Hopkins University and a Bachelor in Technology (B.Tech.) in Electrical Engineering from the Indian Institute of Technology, Delhi. Prior to the formation of Evalueserve, he served as the Director of Emerging Business Opportunities for IBM Research Division Worldwide.

- The CEO & Co-founder of the company received his MBA from INSEAD, France and Masters in Telecommunications from the Swiss Federal Institute of Technology, Zurich. He was a Principal with McKinsey & Co, spending 20 months in the Delhi office in charge of the McKinsey Knowledge Centre.

- The COO of Evalueserve, who was the company's first employee and was designated to be in charge of India's country operations, received his MBA from Carnegie Mellon University and a B.Tech in Mechanical Engineering from the Indian Institute of Technology, Delhi. Prior to starting his own technology startup, he worked at McKinsey & Co.

The importance of these founding members' educational backgrounds and work experience is tied, in part, to the type of work that Evalueserve engages in. Because of the nature of this work, the client-vendor knowledge transfer processes described as central to Infosys's practices are less necessary. Instead, having a strong initial basis for both knowledge and networks with Western clients, such as McKinsey and IBM, as indicated by the brief biographies above, proves particularly important.

The process for transitioning financial services at Evalueserve is significantly different from the process described at Infosys because the scope of work and source of data for the work differs. Evalueserve produces customized research that is distinct and separate from other client work processes and utilizes public databases or its own proprietary databases, rather than the client's databases. Infosys' Knowledge Services

division, on the other hand, specializes in large-scale projects that usually entail taking over a process that utilizes client databases and data. Most of Infosys Knowledge Service customers are clients of other "mainstream" Infosys services in BPO or IT services. This means that the significant work and coordination that needs to occur to gain access to these databases is already done, and Infosys is just adding more analysis to the data they may already be working with. This is in fact how the company moved into knowledge processes services in the first place, by adding more analysis to the accounting reports it was already processing off of an existing client's financial data servers.

A BPO "transition" involves moving a whole process offshore in a step-wise fashion as was described in the Infosys approach above. A senior manager responsible for transitioning services explains that "transition" has a different meaning and associated practices at Evalueserve:

> So here, the use of the word 'transition' when we use that it means sort of working out the scope of whatever activity research that we plan to do with the client . . . but nothing actually physically, like a process, actually moves from onshore to offshore. It is actually a discrete piece of work. The project could be a research piece, could be doing equity research, building a pitch book, it could be any of those tasks (personal interview, Chief Transition Officer, Evalueserve, 2/14/08).

The fact that the work is distinct and separate from broader client work processes means that there is less integration and coordination required between the client and Evalueserve for successful service delivery. The research activities that Evalueserve provides are often "value adding" activities that are not usually part of the daily business activities of the company. One of the primary services the business research division at Evalueserve offers, for example, is market analysis, where the firm studies an industry, "analyzing the market, market size, [business] drivers, estimates, competition, profiles, key trends, news,

so on and so forth" (personal interview, manager, Evalueserve, 2/13/08). This type of analysis helps executives identify future opportunities and craft business strategies. These are important forward-looking functions within the firm, but they are not part of the daily work routine that must continue in order to keep the firm functioning. A senior manager at Evalueserve estimated that about 30 percent of the firm's projects were collaborative efforts, through which it helped the client to figure out a new service or process that was to be delivered abroad. Designing these new services is more difficult because the client, having no experience in the specifics of the services, is unable to offer a "blue print" to base these processes upon. This makes it a more difficult service transition because it requires more skill, analysis, and creativity in figuring how to do the work.

Evalueserve's approach to client service is much less defined than the transition process outlined in Infosys's transition methodology above. This is because it is difficult to standardize the production of research into series of steps, as is common practice in traditional BPO services. Just as adhering to the scientific method does not in itself produce useful research, so too is it difficult to follow a specific method in offering the types of services in which Evalueserve specializes. A scientists' research may be guided by the scientific method, but following the scientific method without additional direction, expertise, methodological training, and data, will not provide the scientist with the substance and knowledge required to produce and execute a viable research project. Evalueserve, then, requires a more flexible and dynamic approach to its service provision, which in turn cannot rely on the same sorts of knowledge transfer processes Infosys employs.

In addition, since Evalueserve does not typically use client-supplied data, it

diverges from a scripted approach to service provision observed at Infosys and other BPO projects (Infosys's five step approach described above is a case-in-point of such a "scripted" approach). Instead, because it typically relies on public or proprietary databases to produce its research, the relations of dependence between Evalueserve and its clients diverge from those of Infosys and its respective clients:

> Most of what we do, we use our information sources are publicly available, right? So, we are looking at company reports, we are looking at other analyst reports, coverage and news, we speak to people, we speak to companies if we are doing equity research. So it is much easier actually in some sense to outsource because most of what we do we are not using any private data. A lot of what we do, actually I would say 95 percent of what we do, uses publicly available data. (Chief Transition Officer, Evalueserve, 2/14/08)

Because Evalueserve uses its own data or public data, the company is much less reliant upon learning from the client. In contrast, Infosys employees must learn a number of sequential steps from clients in order to gain access to and correctly manipulate data from client IT systems. Clients often have old "legacy" technologies and databases that are difficult to integrate across the company. This often forces the company, and any external service provider, to carry out work in accordance with specific firm and technology routines.

For similar reasons, Evalueserve employees do not necessarily or regularly need to visit the client site in order to learn how to serve the client. This is because the work tends to be discrete, narrower in scope, and does not require gaining access to or using client databases. Evalueserve employees have the autonomy to conduct research in a number of different ways that may differ substantially from clients' traditional approaches. In a typical BPO set up this may not be possible due to technical or organizational constraints that make it difficult to adopt alternative processes. Or, such

autonomy may be compromised by the clients' desire to exert a degree of control over the work process, which is documented in call centers (Lloyd & Payne, 2009)

While for Evalueserve, it is not standard procedure to have employees visit the client site at the outset of a project or longer-term relationship, client visits may occur if the client or project requires it. Whether Evalueserve employees visit or not, or when in the business relationship these visits may occur varies widely from client to client; sometimes employees will never visit a client (personal interview, Asst VP, Evalueserve, 2/13/08). A long visit for an Evalueserve dedicate team employee is 3 to 4 weeks, which is shorter than the typical client visit made by Infosys employees, which again suggests that H1B visas are not a necessary route for knowledge transfer in these knowledge intensive services. It is noteworthy that Evalueserve employees visit the client later in the business relationship, rather than the beginning of the project, which is the norm at Infosys and BPO firms more generally. Instead, Evalueserve workers may visit the client site to *help the client* during its annual busy period, rather than to learn a new process that will then be moved offshore. Similar to Infosys, Evalueserve finds that these client visits help employees become "more attuned" or familiar with the personalities of clients, the pressures of their work, and a general sense of the offshore client environment (Asst VP, Evalueserve, personal interview, 2/13/08). Yet, the purpose of such visits is quite different in the case of Evalueserve, where knowledge transfer may travel in the opposite direction from that which takes place in Infosys's case.

Another significant difference between Infosys and Evalueserve is the scale of the client engagement, which has implications for interfirm learning and knowledge transfer. Infosys BPO tends to carry out bigger projects; even in the Knowledge Service division

where projects are smaller, the firm still has projects with up to 300 full-time employees. Evalueserve's projects are much smaller, with a five to ten full-time person team considered a large opportunity. When dedicated teams start, they are generally two to three full time employee teams (Asst VP, Evalueserve, personal interview, 2/13/08). With large teams, diffusing client knowledge becomes more complex and difficult and, as a result, companies that specialize in larger team opportunities need to have a more robust knowledge transfer process.

V. The Politics of Medical Services Offshore Outsourcing

Before discussing the practices of knowledge transfer present in the medical services industry – specifically the teleradiology industry – it is worth noting the complex and controversial context within which firms engaged in these services have been operating. By 2000, the U.S. radiology profession faced an acute shortage of qualified radiologists, which made it difficult for hospitals and practices to adequately staff radiologists, particularly during night and weekend periods when few radiologists want to work. Demand for teleradiology services in the U.S. increased due to this shortage (Sunshine & Meghea, 2006) (See Tables 4.1 & 4.2) and as a result of other factors, including declining reimbursement, increasing demand for services, and the rise of U.S. based teleradiology firms (Yee, 2008). While lower teleradiology costs were attractive to administrators seeking to cut costs, it was the difficulty in staffing radiologists and the proliferation of Internet connectivity globally that made it increasingly possible to solve this labor shortage by using radiologists living abroad.

Despite the increased demand for teleradiology services and the limited supply of

U.S. radiologists, there were a number of constraints that slowed the movement of teleradiology services offshore relative to financial services. One of the biggest constraints was public and professional resistance to international teleradiology. Offshoring medical services has proven to be a particularly contentious form of outsourcing for a several reasons: concerns over service quality, the quality of training and foreign credentials, client privacy concerns, international jurisdiction over malpractice lawsuits, and perceived threats to the U.S. domestic monopoly over radiology services. The rise of Indian teleradiology targeting the U.S. market encountered fierce resistance from both inside and outside the radiology profession. This resistance to international teleradiology surfaced in the news (Pollack, 2003), books opposing outsourcing (Dobbs, 2004), and radiology blog discussions (i.e. AuntMinnie.com). Within the profession in the U.S., such opposition was found in guidelines offered by the American College of Radiology stating that outsourcing should be limited to U.S.-licensed, hospital-credentialed providers with malpractice coverage and, preferably, board certification (Thompson, 2004), and at the 2004 Radiological Society of North America (RSNA) professional meetings (Thrall, 2004). In addition, each teleradiology firm from this study reported receiving "hate" mail. These firms have been caught up in political backlash against outsourcing that particularly targeted teleradiology services.[83] Fears regarding outsourcing, however, began to recede within the radiology profession after peaking in 2003-2004. The primary reason for the decline in concern amongst the profession came after the opening presentation at the 2004 Radiological Society of North America titled "Outsourcing: Threat or Opportunity?," which argued that there were not

[83] Both Infosys and Evalueserve experienced some resistance to offshoring work from developed markets, however, the GRC and Teleradiology Solutions reported much more focused attacks targeting executives, employees and high profile customers of international teleradiology services.

enough U.S. certified radiologists offshore to pose a significant threat to the profession's hold over these services in the US domestic market (Thrall, 2004).

Recent studies of the radiology profession point to increasing adoption of independent teleradiology nighttime services amongst hospitals and practices. One study found that in 2007, 44% of practices used off-hour teleradiology services compared to 15% of practices in 2003 (Lewis, Sunshine, & Bhargavan, 2009). A related study found that 40% of US radiology practices outsourced teleradiology readings in 2007 and that these services constituted an average of 11% of the workload for these practices and 4% of the total workload of radiologists nationally (Huffman, Lewis, Forman, & Sunshine, 2010). Outsourcing of teleradiology has grown, but it still remains a small overall percentage of the total radiology workload. The break down between domestic outsourced teleradiology and international outsourced teleradiology is not reported in available studies. However, Dr. James Thrall, Radiologist and former president of the RSNA, estimated that 85 to 90% of outsourced radiology is domestic, which only leaves 10% to 15% going offshore "to Australia, Israel, a little bit to Europe, a tiny bit to India" (Thompson, 2004).[84] The statistics on the growing adoption of teleradiology point to the larger issues behind industry resistance to *international* teleradiology.

The problem with international teleradiology was not so much about "outsourcing," since the use of domestic "nighthawk" services has become common and was not a major part of the controversy in 2003-04 within the radiology profession.[85] The

[84] In addition, two of the largest domestic teleradiology firms that recently merged suggest that they have secured a significant section of outsourced teleradiology work. U.S. based telerdiology companies Night Hawk and Virtual Radiologic have a combined 325 radiologists serving 2,700 healthcare facilities across 50 states, and reading approximately 6 million studies annually (2010).

[85] There were 3 posts on the radiology message board referring to one domestic outsourcing dispute where the American College of Radiology (ACR) was asked to intervene (Forrest, 2007). No other controversies about domestic teleradiology were uncovered on the message board.

controversy was also not about "offshoring," since international teleradiology firms carried out operations in Israel and Australia for a few years prior to the rise of Indian international teleradiology without controversy; these countries' operations did not capture much attention before or after the news reports on Indian teleradiology began. However, the relocation of offshore teleradiology services to India was part of a perceived broader movement of white collar and professional jobs moving to India. This movement of jobs abroad, specifically to India, whether perceived or real, remains a domestic preoccupation that is often a hot button issue in political campaigns and debate.[86] Because of its "third-world country" status and the assumptions that accompany such a status, Westerners call into question India's credibility as a provider of medical services, despite the growing sophistication of medical facilities and training evident in the country.

Thus, the political realties facing Indian-based teleradiology services forced companies to adjust their business strategies. Moreover, in their first few years of operation, many had difficulties finding, securing, and retaining clients. The GRC and its clients faced political backlash substantial enough to lead the firm to scale back plans from higher value teleradiology reporting services, deciding instead to focus on lower value 3D image processing. 3D imaging does not require an American Board Certified Radiologist credential; this decision, then, eliminated competition with the American Board Certified Radiologists who exert significant control over the profession. With its first customer, Teleradiology Solutions, too, faced controversy over offshoring of services to India. This controversy became so contentious that the firm ultimately lost

[86] The subject of offshore outsourcing was vigorously debated leading up to the 2004 Bush-Kerry presidential election.

their initial customer.

VI. Knowledge Transfer in Medical Services: The Case of Global Radiology Centre

The initial business plan for the GRC was to include offshore radiology reporting. However, the inability to find credentialed radiologists to serve the American market along with the political backlash directed at Wipro, the GRC's parent organization, and their U.S. based customer caused them to scale back the initial plans to offer radiology reporting and to focus on the 3D image manipulation instead:

> We started out thinking that we would establish a center for the actual interpretation of radiographic studies . . . . So ambitiously we thought we would set up our own night coverage service in India because its 12-hour time difference and that premise turned out not to be a good one for the simple reason that we could not find enough American-trained and Board Certified radiologists who were willing to move to Bangalore, and so, having demonstrated that we could create a seamless link between Massachusetts and Bangalore . . . . We looked for other ways to exploit the technology and that is when we came to the idea of training people in India to do the 3D image processing for us (personal interview, Chief Radiologist, large multispecialty hospital, 8/27/08).

3D visualization is a service that is growing in demand because it "enables faster and more confident diagnoses and treatment decisions, and quantitative analysis and computer-aided detection can provide more accurate and reliable treatment planning, staging, and assessment" (Ridley, 2008). According to a Director of 3D Imaging Services at a large multispecialty hospital, 3D visualization can "improve patient care, increase clinical confidence, and reduce time, cost, and invasiveness" (Ridley, 2008). 3D imaging services are growing in demand because they help radiologists diagnose and treat abnormalities uncovered in radiology imaging services, such as in X-ray, CT, and MRI scans.

It was not only the dearth of qualified American Board Radiologists in India that

caused the GRC to abandon the offshoring of radiological reads to India, but also the resistance and political backlash targeting the management of GRC and their biggest client. Two healthcare executives using the GRC's services received a number angry e-mail messages, most of them anonymous, urging them to stop outsourcing radiology work to India (Pollack, 2003) (Personal interviews, Practice Head, GRC, 10/17/07; Radiologist-in-Chief, large multispecialty hospital, 8/27/08). The resistance to radiology outsourcing, and the GRC (and Teleradiology Solutions) specifically, was also particularly virulent on the radiology message board, AuntMinnie.com. The fact that the GRC and its customer were subjected to such angry resistance is somewhat puzzling given the fact offshoring of teleradiology from other locations was already an established practice. Non-Indian international teleradiology practices were not criticized on the profession's message board or in news stories:

> You know, we are not pioneers in teleradiology to be honest. Australia, Belgium, Israel, have all been doing it for fifteen, twenty odd years . . . unfortunately for us we were stuck in this larger political battle about outsourcing to India where we got beaten up badly (Personal interviews, Practice Head, GRC, 10/17/07).

Clearly many professional insiders had a problem with *Indian* companies providing these services, relative to international teleradiology operations in other developed countries. Another primary concern amongst the radiology profession was that "night hawking" would turn into "day hawking," thereby increasing radiology competition over daytime work. According to Dr. Saini of Massachusetts General, "people want to protect their turf, but it's very interesting that that turf battle stops at 5 p.m. on Friday. How many people say they want to do this thing on Saturday and Sunday?" (Pollack, 2003). With this context of controversy in mind, we can now turn to the knowledge transfer processes at the GRC.

The knowledge transfer mechanism that enabled the GRC to provide 3D Lab work to US clients was the training of two Indian radiologists by the client. This included subsequent travel to and from the Bangalore based 3D lab and its client. The GRC was founded in December 2002. After performing pilot projects for a few months, the firm began service delivery at the end of April 2003. The supervising radiologist was the first to go onsite, learn the processes, replicate them at the client site to their satisfaction, and then return to Bangalore to begin providing those services offshore. As in the case of the "train-the-trainer" method used at Infosys, the supervising radiologist used this client-based training to train other Indian radiologists in 3D lab work. After a year of providing services, supervised by the overseeing Indian Radiologist at Manipal Hospital, the GRC was performing 1 to 2 images ("protocols") for their client and experiencing some quality issues from the client's perspective.

In 2004 another Indian doctor who had worked at the client's 3D lab joined the GRC and helped the firm to improve service quality and expand into the manipulation of new types of 3D images. This doctor became the primary trainer for the rest of the GRC medical staff. He had received first hand training from the experts at the GRC's main client as the new company was forming. Having previously been a research fellow in the Gastrointestinal Department of Radiology in the client's research hospital, he decided he wanted to move away from research and instead started to learn 3D lab work. In making this personal professional transition, he was trained by the client's best technologist in the lab for 4 months. He explained, "[W]hatever protocols she had set, she imparted that knowledge to me and I practiced and got good at it and then in about 6-7 months, I was

like as good as one of the technologists over there" (personal interview, Radiologist, 11/28/07).

After a year, the GRC's capacity for 1-2 protocols, MRIs of the head and neck, expanded to include 13-14 new protocols, including CT scans of head and neck, stroke, and perfusion, which all together constitutes the highest volume of services from the client. Quality also improved:

> I knew exactly what they wanted, and how they wanted the image to be, and I just replicated exactly the way [technologist name] used to do it over there. That way everybody got up to speed with the protocol. . . . quality improved much faster once I came back here (personal interview, Radiologist, 11/28/07).

Quality improvement, according to this source, is difficult because it often relies on tacit knowledge that, by definition, cannot be easily conveyed. Thus, the radiologist's direct experience of being trained by the client-expert facilitated this improvement, which otherwise would have been difficult to achieve.

Knowledge transfer from a large-multispecialty hospital was crucial in generating client confidence in the GRC's offshore teleradiology capabilities. According to the key decision maker at the GRC's client,

> What really facilitated this was we were able to find a key radiologist in India who actually came to United States and spent many weeks training to give the 3D processes and he then returned to India and shared that knowledge with his colleagues. So, in the United States, a technologist typically does this work, but in our setup in India, an Indian radiologist actually does this 3D processing, but no interpretation is done. Strictly, computer processing (Personal interview, Chief Radiologist, large multispecialty hospital, 8/27/08).

The GRC depended on its biggest customer to teach employees how to provide 3D visualization radiology services for three reasons. First, Manipal Hospital, which is where the technical labor from the GRC came from, had less exposure to cutting edge technical radiology equipment and methods compared to its largest U.S. based customer. Second,

and more importantly, the Indian Board Certified Radiologists performing 3D visualization did not have experience with this work and needed to learn the practice of manipulating 3D scans. As noted above, the GRC relies heavily upon using Indian certified radiologists who are not trained to in 3D imaging techniques – techniques that are typically performed by lower-skilled and less educated technologists. While technologists are trained on use of radiology equipment, recognizing anatomy (Barley, 1986), and image processing, unlike radiologists, they are not trained to interpret the images that they help capture and manipulate. Currently there are four Indian radiologists and four technologists in the GRC performing 3D scans, but the technologists work is audited by the radiologists who supervise them, which further underscores the importance of the 3D training for the Indian radiologists themselves. Third, the Indian Board Certified doctors also needed to learn how to provide 3D processing in a way that conformed to the established practices of their client, which required training from clients.

Once training was complete, the GRC spent multiple months conducting a pilot project to ensure quality standards were met. During the initial period the supervising radiologist conducted all 3D services, although additional Indian radiologists and technologists were hired and trained in subsequent months and after the pilot program the supervising radiologist moved into a supervisory role. During the pilot program the 3D images were manipulated, but were not uploaded live onto the client servers. Instead, the images manipulated in India were checked against the renderings performed by client's staff of technologists. This stage began at the end of April 2003 and lasted 6 months. Finally, the company took over the night and weekend coverage and began to upload

manipulated 3D images onto the client's server in real time. The GRC has thus far completed over 31,000 cases.

As the relationships between an offshore vendor and its client develop, and as the offshore firm builds upon the knowledge gained through early-on knowledge transfer, the *direction* of knowledge transfer may in fact shift. Though, as noted above the client-vendor relationship provided crucial support to GRC as its employees gained skills and improved the quality of services, eventually knowledge has flowed back to the client. The GRC provides its clients with skills and knowledge by helping to train new employees at the client site and by providing technologists both onsite and offshore access to the advanced medical training of radiologists performing 3D image processing. Hiring a person to train new technologists at the client site is difficult for the client because of a shortage in personnel, the ongoing workload for experienced technologists, and the expense of using onsite labor. As a result, one of the radiologists from the GRC carries out the training for new technologists who just joined the 3D lab at the client site (personal interview, Radiologist, GRC, 11/1/07). While this arrangement is informal, it entails an outsourcing of client training to the GRC, which is already providing night and weekend 3D processing.

The outsourcing of training is superficial, in a sense, because the transfer of knowledge from the offshore vendor to the client only applies to inexperienced employees who are being trained. In fact, the skills and knowledge that the training is meant to impart are skills that already exist at the client site, but are not yet embodied in newly hired employees. The main function of the Indian trainer, then, may not be to impart "new" or previously unavailable knowledge to the trainees, but rather to be a

conduit for recirculation of existing knowledge within the client company, that is encumbered to do so itself due to personnel or time constraints. Moreover, while the Indian radiologist is at the client site for two months for the purpose of training technologists, he often learns new approaches that are taken back and disseminated to his other teammates in India. According to the GRC business manager, there is a,

> rotational training program of people going abroad and coming back and cross training each other. So, it can be a knowledge sharing either ways [sic]. So, when some goes there, he may train a fresh bunch of people, but come back with knowledge about some enhanced protocols and then share it back here (personal interview, GRC, 10/17/07).

In this case, the exchange of knowledge is seen to be an interactional process that occurs back and forth between the client and the vendor, with both learning incrementally through the shared interaction.

The Indian vendor also transfers deeper technical knowledge back to the client by providing the client 3D processing performed by formally trained India based radiologists. The client's own staff of technologists becomes more effective to the client's team of radiologists by gaining access to the clinical expertise of Indian radiologists whom they consult and interact with on a recurring basis:

> The majority of the radiologists [at the client site] . . . view the 3D techs here as a additional set of eyes, looking at the anatomy . . . the techs here can pick up those pathologies and working with the radiologists in India they come trained in the anatomy and pathology. They also become very good at picking up those other oddities. So, one of the hallmarks, I think in the service reports built here is that radiologists can trust that it is not just going to be a pretty picture, its going to be clinically relevant and highlight any pathology that might be seen . . . . to develop that knowledge on anatomy and pathology, so using the radiologists in India really helps them (personal interview, Director, large U.S. multispecialty hospital, 8/27/08).

The Indian radiologists at the GRC effectively provide on the job training in anatomy to the client's staff, which helps the U.S. based technologists become more effective in their

job. According to the client, the client technologists become more effective because they gain access to the in-depth clinical training in anatomy that Indian radiologists have undergone as part of their medical education.

VII. Knowledge Transfer in Medical Services: The Case of Teleradiology Solutions

The primary source of knowledge for the firm Teleradiology Solutions was the firm founder's medical education, training that culminated in an American Board Certified Radiology credential, and his subsequent work experience and radiology practice on the faculty at Yale. The founder of the company (the "chief radiologist") received his initial Bachelor of Medicine, Bachelor in Surgery (M.B., B.S.) degree from India's top medical college, All India Institute of Medical Sciences (AIIMS), New Delhi, India. He also received his post-graduate training as a resident in diagnostic radiology, from the same institution. The chief radiologist then received prestigious internships in the United States before beginning his residency at Yale New Haven Hospital, New Haven, CT (1995-1998). He received his American Board of Radiology Certification in Diagnostic Radiology in June 1998. Between 1998 and 2002 the founder worked on the faculty and practiced radiology at Yale New Haven Hospital. When he returned to his native India for personal reasons he took his education and professional experiences with him. From the beginning, the chief radiologist had the skills and the credentials that would enable him to provide radiological interpretation to US practices from India, even if getting the business established and gaining customer confidence in India as a delivery location was more challenging.

Yale provided the chief radiologist with the option to stay on faculty for a couple of years in case he decided to return to the United States. After moving back to India, he maintained his U.S. state licensure and his medical appointment at Yale, and remained up to date on imaging protocols and practices (A. Kalyanpur, MD, et al., 2004). While back in the U.S. during a routine trip to work and teach at Yale, a supervising radiologist in the Radiology Department at Yale expressed his difficulty in staffing radiologists during the night shift. The chief radiologist volunteered to help out by performing this service from India. According to the Teleradiology Solutions founders, this arrangement was attractive to the Supervisor at Yale because the chief radiologist was already faculty at the University Hospital, which meant they knew he had the qualifications and expertise to do the job remotely. In addition, the hospital was confident of the logistical feasibility of reporting from India, since the radiologist's current status meant that he already had access to the computer system, the Picture Archiving and Communication System (PACS), where diagnostic images were stored. Finally, the radiologist's current employment status with the institution diminished concerns over privacy and security.

To increase confidence in a long-term teleradiology reporting from India, the chief radiologist and Yale conducted three feasibility studies assessing the technical and clinical reliability of sending, receiving, and reading large image files sent from the US to India. The first study helped establish the suitability of international teleradiology using compression technologies that reduced download and upload time and minimized bandwidth usage without impacting the image clarity required for diagnosis (personal interview, Founder, Teleradiology Solutions, 1/31/08). A second study tested the feasibility and reliability of conducting offshore teleradiology operations from Bangalore

by comparing the accuracy of transmission of 212 scans from a Bangalore satellite office against the same reads from radiology staff member at Yale's emergency room at night. The findings demonstrated that teleradiology delivery from India was both technically and clinically feasible (A Kalyanpur, Weinberg, Neklesa, Brink, & Forman, 2003).

With evidence from these studies in hand, Yale began sending 5 to 10 clinical cases a day for interpretation to Bangalore, India. In a third study, the founder read body CT scans in parallel with faculty at Yale, which demonstrated the clinical efficacy of the service already being performed (A. Kalyanpur, MD, et al., 2004). The effect of these studies was to help develop the offshore teleradiology business model, provide evidence of its efficacy, and to lend credibility to the idea that these services could be delivered from India, a developing country.

Despite performing as well or better than the emergency staff on site,[87] within six months, offshoring nighttime scans to India became a controversial issue amongst the Yale staff:

> The residents would say, oh that study it was reported in India and the faculty members would go, "My, we don't have a radiologist in New Haven?" So, there was a lot of kind of brouhaha that began to brew within about six months of this actual clinical project starting (Personal Interview, Co-Founder, Teleradiology Solutions, 1/22/08).

While the Yale project stopped, the reliability of this model from India was established; the founders of Teleradiology Solutions decided to continue the business and began to search for new customers. While it was difficult to find new customers, the feasibility studies, and the relationship and training background with Yale helped. "Based on those [feasibility] studies and the response to those studies, I felt that it was something that

[87] Research studies have shown that radiologists reading scans during the day are more effective than nighttime reads in the Emergency reads (A. Kalyanpur, MD, et al., 2004).

could be of commercial value and that led to the creation of this company and this organization" (personal interview, Founder, Teleradiology Solutions, 1/31/08).

Teleradiology Solutions started in 2002 in a home office in Bangalore, India, with 2 computers and a single radiologist reporting for Yale (personal interview, Co-Founder, Teleradiology Solutions, 1/22/08). By 2004, the company hired another U.S. certified radiologist and performed work for 40 clients. In 2010, the firm had 350 employees located across the world and examined over 2.6 million scans from 75 hospitals in the US and 11 centers in Singapore (Subramanyam & Khan, 2010). Growth of Teleradiology Solutions was constrained by perceptions of India's suitability for such high level services, legal concerns, and the ability to secure ABR employees in India. Despite this difficulty, Teleradiology Solutions was able to secure additional ABRs to work for the company, thereby enabling the company to increase it capacity to service US based customers. Each of these doctors required minimal technical and cultural training because they already had the medical training and credential required to practice.

Teleradiology Solutions most profitable business is radiology reporting to the US, although they also serve other regions, primarily Singapore and India, and are also building up their European service offering. As a result, Teleradiology Solutions' core business requires the hiring of ABR *certified radiologists.* There are a total of 13 ABRs, and number of Indian radiologists, that are serve over 100 hospitals in the US, Singapore and India. All ABR radiologists underwent US residency training and possess an ABR credentials. Over half of these American board certified radiologists have Indian medical degrees, 3 have US medical degrees, and 1 has a medical degree from the Netherlands.

Some of these radiologists received additional internships and fellowships in the US or in India.

ABR radiologists tend to stay in the United States, where they are credentialed and well paid to practice (starting salary for a ABR radiologists begins around 350K annually). The firm has modified their recruitment and staffing strategy from initially trying to find ABR radiologists returning to India, to a "global staffing" model that utilizes ABR radiologists wherever they are located geographically. Most of the 13 ABR radiologists working for the firm are based in Bangalore, or elsewhere in India, such as Delhi or Bombay (Mumbai), but some radiologists work in Amsterdam, Beijing, and from home in the United States (Interview 40, Executive, Teleradiology Solutions, 1/31/08). This flexible approach to work has helped the company acquire additional qualified radiologists in an industry characterized by labor scarcity (A. Kalyanpur, MD, et al., 2004). Despite the firm's ability to secure qualified workers, the firm still invests significant resources, time, and infrastructure toward upgrading the skill and knowledge level of its employees, including and particularly those with medical degrees.

VIII. Conclusion

Knowledge transfer is a key mechanism for upgrading of skills and knowledge in the offshore outsourcing industry. This chapter has presented two mechanisms that transfer knowledge from organizations in developed countries to organizations based in India, which result in skill upgrading. The first mechanism for knowledge transfer is the interaction that takes places within client-vendor relationships. This mechanism is characterized by incremental learning within the context of relationships, resulting in a

"slow-and-steady" upgrading trajectory. The second mechanism relies upon the migration of technically skilled professionals that result in a faster, "hit-the-ground-running" type of upgrading trajectory. Although knowledge transfer is crucial for upgrading of skills, certain barriers to upgrading may limit these possibilities, even where knowledge transfer is achieved. There are two constraints that influence these upgrading mechanisms. The first influences the client-vendor knowledge transfer mechanism, which may be constrained by a lack of access to proprietary knowledge, data, methods, processes, and systems. The second constraint cuts along professional divisions that are more pronounced in certain industries, such as medical services, and less so in others, such as financial services. The different routes for skill acquisition combined with structural constraints shape the trajectory of firm upgrading.

In the cases of Infosys and the GRC client relationships with firms in the United States provided the primary mechanism for skill acquisition. Infosys moved from finance and accounting work in the early 2000s into higher value and more interpretive financial planning and analysis around 2005 through a slow-step wise movement that occurred through close client interaction and highly integrated process that developed over time. Infosys was simultaneously enabled and constrained by its dependence upon client knowledge and access to their data, methods and systems. The company depends upon clients to learn how to perform and replicate daily client business services and to gain access to client databases for each project it completes. As a result, upgrading in this case is dependent upon the client's willingness to share knowledge, provide access to firm data, and methods. This dependent nature of this relationship mean that there could be limits to future upgrading potential.

Within the context of the relationship between the GRC and a large US multispecialty hospital the Indian GRC expanded the breadth of their service offering from one type of 3D image of an MRI of the heart to performing fourteen types using MRI, CT, and X-ray technologies of a number of organs and body parts. This broadening in services unfolded slowly over a 4-year period and was initially constrained by the lack of familiarity the GRC had of client processes when it began service delivery in early 2003. The expansion in service breadth began to accelerate in 2004 when the GRC's Indian radiologist, who was initially trained by the client and received additional client training during subsequent return visits, shared his deep knowledge of client processes and methods with his coworkers.

Evalueserve and Teleradiology Solutions, in contrast, depend on overseas educational background and prior work experience of their founding members and key employees for knowledge transfer. Evalueserve acquired most of its operational "know-how" prior to client interaction, through previous work and educational experience, which allowed the firm to move directly into higher value work from its first project. When the company began its first project in 2001 it was able to complete the work with minimal guidance from the client because the founders worked on similar projects in their previous employment positions at McKinsey & Co. and IBM. In addition, the firm also used publicly available or it own proprietary data sources as the basis for its research, thereby reducing dependence on its clients for learning and data access.

Teleradiology Solutions, like Evalueserve, relies upon the overseas educational background and prior work experience of their founding members and was able to provide these services to its first client. Teleradiology Solutions was able to provide final

interpretations of CT, MRI and X-ray with its first customer from its first day of operations. This was because the radiologist provided the same service from India as he was trained and had experience performing, while he worked in the United States.

Legal, political, and professional barriers to certain industries – particularly in the medical industry, as my study suggests – mean that even where knowledge transfer has occurred – upgrading opportunities in the future may be limited. Nonetheless, it is important to also understand the dynamics of knowledge transfer in these more regulated professional industries in order to understand opportunities in other professional service areas and to better understand the prospects for upgrading in developing countries, and in turn the potential for upgrading within the offshore outsourcing industry to fuel industry development.

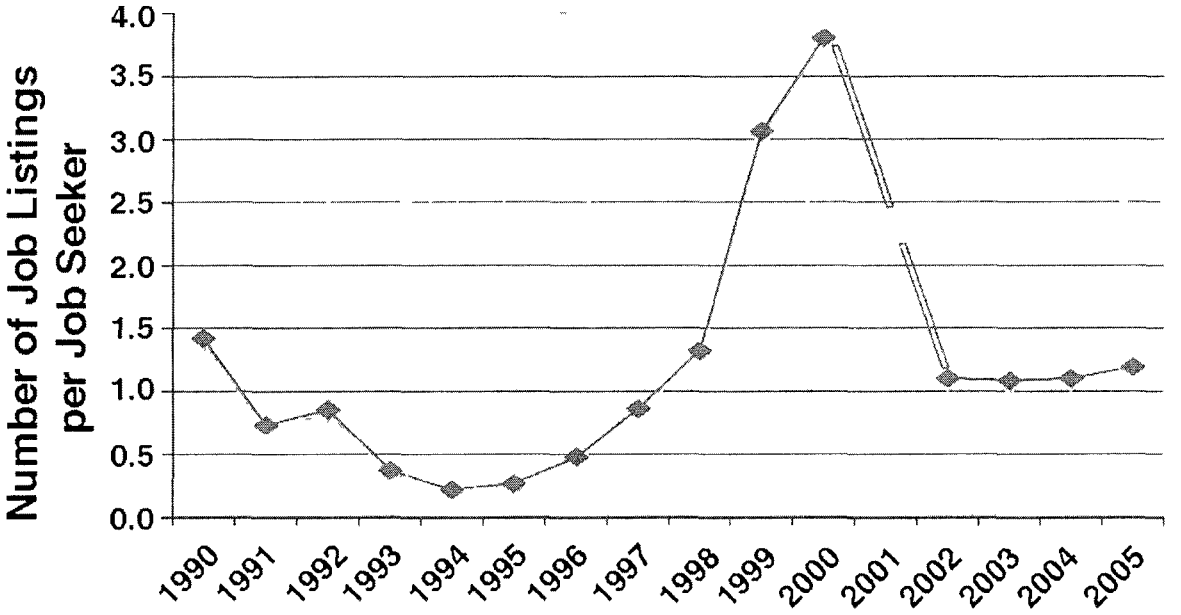
In medical services, access to credentialed labor in a firm's export market, shapes the heights to which a firm can rise into higher value services. The GRC Indian certified radiologists and technologists that provide 3D services lack the credential recognized in the US healthcare market. While the firm has expanded in breadth of services, further upgrading in terms of specialization is constrained by a "credential ceiling." As a result, the company has exhausted its potential to move up into higher value professional services in the US market, unless it begins hiring US board certified radiologists like Teleradiology Solutions. Despite these limitations the GRC does have the potential to increase its volume in 3D services in the US, by hiring more Indian credentialed labor and finding additional US based customers. Teleradiology Solutions, in contrast, is less constrained in further upgrading into other high value radiology services, since it has the credentialed labor recognized in the US.

The lack of a US recognized credential makes the GRC more dependent upon client learning and these services are more tightly integrated with client systems and work processes than Teleradiology Solutions. The 3D images produced at the GRC are used to help radiologists in the US (or elsewhere) make a better interpretation of an image and to help them plan appropriate treatment. This means that 3D images are tightly integrated into the interpretation of the image itself. To make interpretation easier for the client's radiologists, the company is expected to conform its services to fit the clients' expectation in form and content. The scans performed by an American board certified radiologists, like those employed by Teleradiology Solutions, do not require a secondary read by the client, which makes them less integrated with client processes and less dependent on their clients for knowledge relative to the GRC.

These findings on firm mechanisms and their constraints have implications for state policy. If the state wants to build a high skilled service industry as quickly as possible, this study suggests, the state should focus its effort on enticing technically skilled workers to set up business operations in the country. Many developing states, including India, encourage "non-resident" citizens, to channel money back into the country, in the form of remittances and enticements to buy property. The state, however, should also expand upon efforts to help technically skilled labor relocate and establish business in the country. Some countries, such as India, encourage "non-resident" citizens to establish businesses by relaxing ownership rules around foreign business ownership. Yet this study suggests more should be done to entice technical professionals, especially professionals who are trained and certified in professional fields based in lucrative developed markets, like US credentialed radiologists like those who founded and work

for Teleradiology Solutions. The relocation of these professionals and the creation of professional service firms not only contribute to industry upgrading, but can also contribute to innovations that shape economic and social development in the country more broadly.

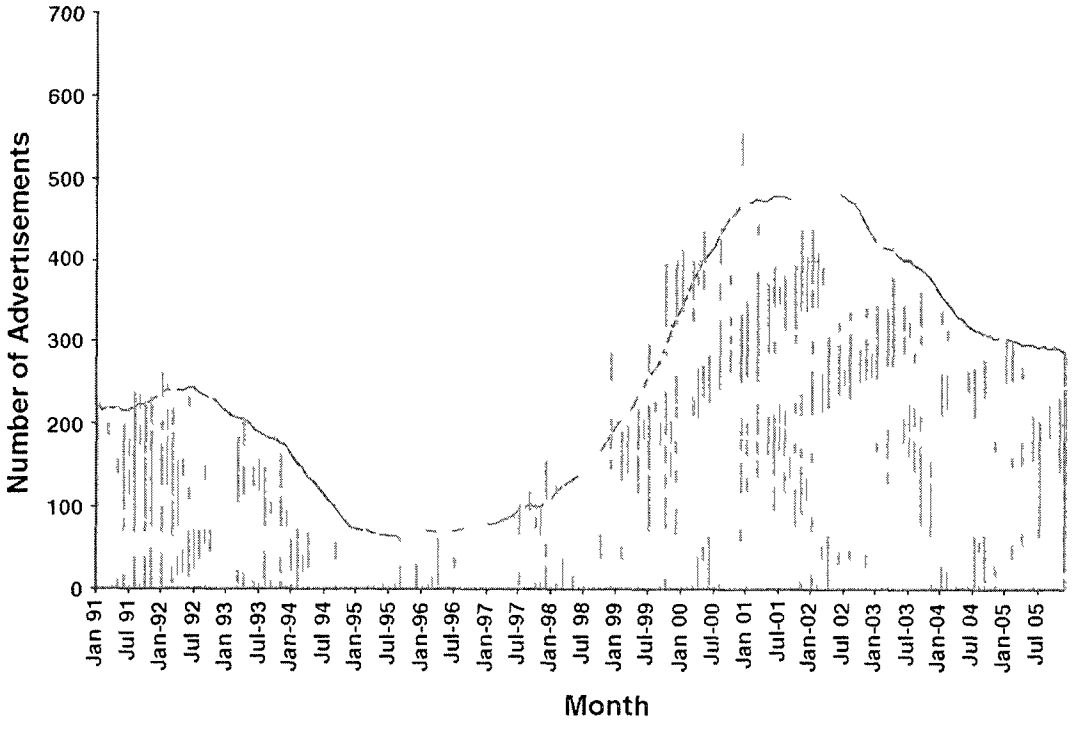
Table 4.3: Number of Job Listings per Job Seeker



From American College of Radiology's Professional Bureau placement service during annual meeting of Radiological Society of North America during years 1990-2005. Gap in line indicates no data for 2001. Source: (Sunshine & Meghea, 2006)

Table 4.4: Advertisements for radiologist jobs

Graph shows actual number of advertisements (*vertical bars*) per month appearing in *American Journal of Roentgenology* and *Radiology* from January 1991-December 2005, with 12-month rolling average (*solid line*) calculated to reduce seasonal variation
Source (Sunshine & Meghea, 2006)



Chapter 5
Firm Training Programs: The Construction of Knowledge in Offshore Services

I. Introduction

The process of upgrading is traditionally understood in terms of the movement from lower to higher value work and the accompanying skill development necessary for such movement. However, my analysis of training programs at the firms analyzed in this dissertation suggests that we should understand upgrading not only in terms of concrete skill development but also in terms of the communication and presentation of firms' skills to their clients in developed countries.

My argument in this chapter examines both of these aspects of upgrading. First, I argue that training programs upgrade the technical skills of firm employees by providing them with increased exposure to "real world" problems and learning opportunities that are underemphasized in Indian higher education. Firm level training programs necessarily build upon the knowledge created in the higher education system described in Chapter 3. However, they also respond to specific and recognized *gaps* in the existing education system and labor market in India. In the previous chapter, I focused on processes of knowledge transfer between firms and clients. Such transfer is insufficient to address the knowledge needs of firms; they must also independently create knowledge, disseminate it internally to new employees, and upgrade workers' skills.

Second, I argue that investments in training are important to firms because they provide them with credibility, which may be as important as the actual skills firms possess. Such investments, both in the outspoken manner of the flashy campus described below and in more subtle forms of training, signify to clients that the firm has the ability to provide knowledge intensive services to firms in developed countries. For Indian firms who face questions about the capacities of developing countries to provide higher-level services the assurances that accompany visible training programs are of vital importance.

The chapter is organized as follows. First, I present three vignettes of firm initiatives that highlight the ways in which training programs perform both skill-building and image-management functions. These examples point to the intertwined nature of these tasks and the difficulties of distinguishing between these two functions even within single initiatives. I then discuss these two aspects of training programs in greater depth, treating the skill focus and image credibility boosting elements in turn. In discussing the skill-based features of training programs, I discuss the factors that make particular types of skill development necessary – the ways in which India's knowledge labor force is insufficiently equipped both in terms of quality and quantity. I also provide an overview of the different approaches to training taken by different firms and across the two industries explored in this project. I then further examine the ways in which upgrading can be understood not only in terms of skills but also in terms of projection of an image designed to garner firms' credibility.

II. Training Programs: Three Vignettes

i. Infosys Mysore Development Center

In 2006, a sprawling 337-acre university campus capable of training 14,000 people a year opened in India. Facilities on the campus include Internet enabled classrooms,

resident dormitories, libraries, a leadership institute, as well as a large spherically shaped 4 screen movie megaplex, sound studio, recreation room filled with games, an athletic center with workout equipment, a massive swimming pool, a rock climbing wall, tennis courts, cricket stadium, and seven restaurants, including one "floating" restaurant in the middle of a pond. One of the newest buildings is modeled on the Greek Parthenon in Athens, although the floor area is bigger. The government did not build this campus. Though education is often thought of as a state responsibility in India, this impressive campus was built not by the state, but by a single corporation, Infosys.

The "Infosys Mysore Development Center" is the largest corporate university in the world. It symbolizes a growing trend in the Indian IT and ITES industry wherein firms invest heavily in employee training and the creation of educational programs. The *spectacle* of the Center, however, signifies more than just an investment in skill development. In addition, it points to the importance of such training programs for firms' image management. The extravagant appearance of the Center communicates something about the capacities and commitments of the firm.

ii. The Knowledge Olympics

Evalueserve has achieved a measure of success in creating firm knowledge through the creation of a company wide competition designed to foster innovation. The "Knowledge Olympics" is designed to help create a number of early stage research ideas that can be further developed into research papers or implemented within the company. In 2006-2007 the firm received 110 concept papers and many of those initial ideas were converted into industry research briefs ("white papers") that are distributed to the industry and public via its website and public relations efforts, while others have been implemented within the company to increase firm efficiency (employee & executive,

2/14/09). The contest encourages participants to form competitive teams across functional, industry, and geographic areas within the company, which helps to span and broker internal networks and may help produce new knowledge and skills.

Some of knowledge created through this program have resulted in a deepening of firm skill and have been translated into new service offerings to clients. One idea that was first incubated in the Knowledge Olympics found a new way of predicting innovations of competitors (employee; Executive, Evalueserve, 2/14/09). The research approach was based upon the analysis of multiple databases that uncovered Google's various patient applications filed with the U.S. government and these results helped the participants predict Google's move into the phone market (Evalueserve, 2007). The research approach that predicted the unveiling of the Google phone can now be applied to new firms and industries in order to predict new innovations. In this way, the research knowledge and skills cultivated in this annual event can serve as testing ground for new approaches that can help differentiate Evalueserve in the market.

In addition to the skills and knowledge that are produced through the "Knowledge Olympics," it is significant that research produced internally are then presented to the outside world in the form of industry "white papers" via the firms website. Here, Evalueserve can demonstrate the innovative work, high-level skills, and productivity of its workforce.

iii. Rad Gurukul

Teleradiology Solutions has built a new educational facility with the express purpose of helping to address India and South Asia's shortage of skilled labor in radiology (See Table 5.1: India & US Radiologists to Population Ratio). In India, there are 10 times fewer radiologists relative to the population in the U.S. (Arjun Kalyanpur,

2008). The radiology training center, called *Rad Gurukul,* which in Hindi means residential training facility run by a tutor, is the first center of its kind in India dedicated to radiology and related IT training (Wrong, 2008). The training center is co-located at the firm's 5-story office building in Bangalore and contains a university style auditorium, complete with sloping stadium seating that can accommodate 100 people, LCD projectors, video conferencing equipment, and the capability to host international speakers, and broadcasting its lectures for later viewing by the radiology profession.

What makes *Rad Gurukul* unique, however, is that it is designed to serve a broader audience than just the firm; indeed, it serves to educate individuals from not only India, but also the surrounding region. Classes on cardiac imaging and emergency radiology have drawn heavy interest. A two-day teleradiology symposium drew students from Singapore and parts of the Middle East (Wrong, 2008). The founder of the program said he will pursue a recognition program with universities to help serve this broader educational role (Wrong, 2008). *Rad Gurukul* increases skills and capabilities of new radiologists, while also helping to disseminate industry knowledge that may help radiologists, despite their country of certification, upgrade their skills.

This farther-reaching educational function has developmental implications for the region, but it also plays a role in cultivating the image of the firm and the industry: the specter of an Indian firm training radiology students and radiologists who travel from outside the country to gain expertise sends a distinctive message about the specialized knowledge and capabilities that characterize not only the firm, but also the Indian radiology industry more broadly. The message is striking: India is a producer of knowledge in this arena.

Table 5.1: India & US Radiologists to Population Ratio

	Radiologist to Population Ratio
India	1 : 100,000
US	1 : 10,000

Data Source: (Arjun Kalyanpur, 2008)

III. Training Programs as Skills Building

In order to understand the approaches firms take to training employees, it is necessary to examine the needs it seeks to meet within its own workforce and the labor pool in India more broadly. Interviews and data suggest that firm training programs attempt to address what are perceived to be the inadequacies of Indian labor with regard to both quality and quantity.

i. Insufficient labor quality and quantity

As discussed in Chapter 2 and 3, India needs reform in higher education to increase both the quality and quantity of graduates. This is particularly true in the IT and ITES services industries where double digit grow rates have lead to a reduction of skilled workers, particularly at the high skill end of the spectrum. In response to a tightening labor market and rising wages, Indian software firms sought to upgrade the skills employees, rather than hiring a succession of under qualified programmers (Athreye, 2005, p. 32). Investments in industry wide training has intensified as the offshoring service industry in India has grown. According to one study, IT firms provide newly hired employees around 60 to 90 days of training, while low-skilled business process outsourcing and call centers offer around 15-40 days of training (Wadhwa, de Vitton, & Gereffi, 2008).

Within financial services intensive training is often required within the firm itself because the educational system does not produce graduates with practical or industry

specific knowledge. According to managers at Evalueserve, there are shortages of skilled people in the country (personal interview, Executive, 2/12/08; personal interview, VP, 2/14/08). At Infosys a manager reported that the industry is facing a "talent crunch" where chartered accountants, MBAs, and postgraduates who tend to have the skills to do this work are hard to find (Infosys, Manager, 11/23/07). Indian firms are increasingly responding to this skill shortage by investing heavily in training in order to bring the skills of graduates up to levels required by industry. According to one executive, "we have no choice" because at many universities, the "curriculum does not turn out candidates with skills we need" (Menon & Mishra, 2009). The skill shortages reported most frequently by industry managers are technical skills, such as financial analysis and accounting skills. According to another Infosys executive, "If our universities upgraded and made the teaching methods more industry and employment-oriented, the IT sector need not spend that much for training" (Special Correspondent, 2008). This lack of skill and knowledge in financial services makes it difficult for firms to offer services that require those skills. Based on these conditions firms in this position invest heavily in training to close the skill requirement gap.

Firms providing teleradiology services face even bigger obstacles in terms of finding qualified workers than those facing financial service firms. International teleradiology firms that provide image interpretations must possess medical credentials recognized in the state where those services are provided. As noted in the previous chapter, finding this credentialed labor source has been difficult to secure at times in the United States (Sunshine & Meghea, 2006) and it is particularly difficult to secure outside the country, where far fewer professionals reside. This entry barrier for teleradiology

firms may decrease the incentive for firms to offer additional training in teleradiology. Some firms exporting teleradiology services, however, offer intensive training for new employees who already possess the required credentials. This training is largely aimed at keeping abreast of new knowledge in the field and reducing potential errors and inconsistencies in service delivery, which could potentially cost not only a business relationship, but also a life. Firms like GRC, which provide lower value 3D imagery teleradiology services, are not constrained by the same credential requirements. However, paradoxically, the GRC's practice of relying upon Indian radiologists, who are a much more highly educated labor force than that used in the US to perform similar tasks, means that additional job training is required to teach these employees how to do lower value work that their educational and previous work experience tended not to provide.

ii. Differences between Industries

There are two broad differences in the skill and knowledge requirements that are based on the capability for breadth and specialization within each industry. These in turn shape the training requirements of firms. First, deeper knowledge is required in medical services relative to financial services. Employees in medical services gain most of their technical expertise through educational and residency training and this takes years of additional training. Educational training to get a business or accountancy education and professional credential is much more generalist, than a highly specialized medical degree. Firm level training programs reproduce these differences in training specialization. Initial firm level training in radiology at the GRC and Teleradiology Solutions are three to six months in duration, while they are around one month long for financial services at Infosys and Evalueserve.

A second difference is that financial services are applicable to multiple industries, while medical services are not. This means that in financial services training is developed to orient workers toward a specific industry specialization. ITES firms, particularly at the high-skill end of their service provision, require in-depth industry knowledge to be able to provide services of value to customers. Financial services can be sold to clients in multiple industries, but the firm needs its employees to have a depth of industry knowledge for each industry it provides services within and training programs at both Evalueserve and Infosys help (new) employees learn industry specific dynamics prior to on-the-job learning. Medical services, on the other hand are focused within the medical professional itself. As result, industry training, when offered, tends to focus on technical developments and trends within the field. Most medical training offered focus on technical skill developments, rather than industry knowledge.

iii. Building Skills in the Financial Services Industry

Infosys shares some similarities with Evalueserve in its approach to training. Both organizations have a month long new hire training program that emphasizes technical skills (financials), industry specific training, and soft skills training. The training program at Infosys focuses on learning client processes and is characterized by a relatively top-down educational structure, focused on "real world" application. Evalueserve, on the other hand, tries to promote knowledge sharing and knowledge creation within the firm through internal programs that foster innovations and "white papers" produced by executives and client projects. (See Table 5.2: Comparison of knowledge creation approaches in financial services.)

Table 5.2: Comparison of Knowledge Creation Approaches in Financial Services

Infosys, Knowledge Services	Evalueserve
Core services: Financial planning & analysis *Skill requirements:* Analytical skills and in-depth financial literacy *Employee profile:* 1000 highly skilled workers; MBAs, chartered accountants, engineers, statisticians & economics graduates *Training Model:* "Right skilling": Hire "under" qualified employees that require additional training New Hire: • 1 month: technical and industry background training Continuous education: • Online training tutorials • Client specific training	*Core service:* Business & Investment reporting *Skill requirements:* Analytical & research skills, in-depth financial literacy *Employee profile:* 1700 research analysts; engineers, MBA's, intellectual property lawyers, PhDs, chartered accountants, statisticians *Training Model:* Hire best employees in technical areas and provide additional training New Hire: • 1-month: functional training (i.e. finance fundamentals, excel modeling, etc) and industry specific training (i.e. oil & gas, financial service industry) Continuous education: • Monthly knowledge sharing sessions • Online training tutorials

Financial services include a number of services from more transaction and rule-based services, such as order processing, accounting, indirect procurement, payment processing, fixed assets, general ledger accounting, and reconciliation, to higher value services that require more interpretation and judgment, such as financial analysis, financial management, and financial reporting. In moving from the former to the latter, Infosys has shifted emphasis away from more general financial skills, proficiency with Excel, and other bookkeeping software programs that permit in-depth reporting and analysis toward the development of more interpretive skills and in-depth knowledge of a specific industry segment or of the particularities of a specific client.

Over time, training at Infosys has moved from a theory-focused program toward a more problem-solving oriented approach. A case study approach helps employees understand how to approach specific problems in an effective manner (Executive, Infosys, 12/10/08). This makes training more applicable to the business needs of customers and compensates for the problems identified in the education system, which, as noted above, tends to focus on rote memorization of concepts rather than application or practical problem solving skills.

Infosys's employee training capabilities are tightly integrated into its hiring practices, which it calls "right skilling." Through this process the company defines the four or five key skills required for a given process and then hires people who demonstrate a basic background in those skills, yet still require further training in order to become competent (Director, 4/23/09). This strategy was adopted because lower skilled employees are easier to find in the labor market and less expensive to hire. However, the "right skilling" hiring and training strategy is also a retention strategy, which reduces the chance "over" qualified employees will lose interest in the work and leave (Director, 4/23/09). The concern over employees becoming bored with the work suggests that even within knowledge services work may be narrow in scope and potentially repetitive. What is particularly noteworthy is that a "right skilling" training and hiring approach would be impossible to pursue in high-end medical services due to the higher degree of specialization, the way skills have been defined by the profession, and the credential requirements. A technologist cannot be transformed into a radiologist with additional firm level training, although the reverse is possible, as the GRC case demonstrates.

At Evalueserve, the training of employees occurs in one of three ways. The first type of training is a one-week orientation program for new hires where they learn a general overview of the company. The second type of training seeks to get newly hired graduates to learn the fundamentals about the specific industry domain they will be working in. After employees are hired according to specific educational backgrounds that the firm seeks (i.e. MBA, Chartered Accountant, etc) are put into a training process, which familiarizes themselves with the specifics of their future projects. Each employee goes through a three-week training program composed of classroom trainings and exercises where their performance is assessed (personal interview, Asst VP, 2/13/08). Industry "vertical training" also helps workers learn trends in specific industries such as pharmaceutical, oil and gas, financial services, Fast Moving Consumer Goods and knowledge of the industry (personal interview, Executive, 2/12/08).

The third type of training, which most distinguishes Evalueserve's approach from Infosys's approach, occurs through internal knowledge sharing sessions and through online training modules. Knowledge sharing sessions are hosted once a month where teams discuss different types of projects or share insights about new things they have done (personal interview, Asst. VP 2/14/08). These knowledge sharing sessions are oriented toward sharing of tacit knowledge of tasks that are difficult to share through "E-learning modules," which communicate more explicit forms of knowledge.

One way of arriving at a better understanding of Indian ITES firms' training programs is to compare them to the training US workers typically receive. Indian companies do share many similar approaches to those employed by Western companies, but they appear to be investing more heavily in terms of dollars and portion of overall

employee time spent in training relative to the US workers. Indian companies are able to invest more heavily in relative dollars because it is less expensive to run training. At Infosys the $6000 investment in employee training would cost $50,000 for an equivalent amount of training in the US. The training in India costs about an eighth of US cost, which makes it more affordable. The fact that Indian workers in IT and ITES tend to work longer hours than average working hours of both US and European labor forces also enables firms to dedicate a larger percentage of employee's time toward training, without significantly impacting overall worker productivity. Evalueserve employees spend 8 to 9 percent of their time working on continuous training.

A recent study found that US workers spent an average of 35.06 hours in formal training and organizations in the top tier of employee hours devoted to training averaged 44.34 hours in 2006 (Paradise, 2007). According to data from the Organization for Economic Co-operation and Development (2009), Americans worked an average of 1,768 hours a year in 2009. Using the US average hours as a basis, American workers are spending an average of 2 percent of their time in training, while workers at training intensive firms spend 2.5 percent of their time in training.

Therefore, Evalueserve employees are spending over 3 times as much time in formal training as American workers. A recent study of the IT and ITES industry suggest Indian workers tend to work longer hours, often 9 to 12 hour days, including Saturdays, which is more than the US counter parts at client organizations based in the United States (Nadeem, 2011). The higher total hours of work suggests that Evalueserve employees are spending more hours in training than Americans even if the percentage of training to overall hours was held constant.

iv. *Building Skills in the Medical Services Industry*

The training approaches for GRC and Teleradiology solutions share some similarities, however they diverge sharply in terms of continuing education. The reasons for these different approaches to training are due to the different niches that these firms occupy. Paradoxically it is higher value Teleradiology Solutions that invests heavily in long-term training, while the GRC does not. Professional access and credentials shape firm incentives to train employees and the ability for employee and firms to upgrade subsequently. Both firms have new hire training that is up to six months in duration, but the training serves different functions at each firm. At the Teleradiology Solutions, training enhances the technical training that radiologists underwent through medical training and residency. At the GRC on the other hand, the training is crucial for reorienting the Indian radiologists toward 3D image manipulation, which they have not been trained in.

Table 5.3: Comparison of Knowledge Creation Approaches in Medical Services

Global Radiology Center	Teleradiology Solutions
Core service: Manipulation of MRI or CT scan from 2D to 3D image *Skill requirements:* Manipulation of technology to produce clinically relevant images *Skilled Employee profile:* 4 Indian certified radiologists & 4 technologists *Training Model:* Hire "over" qualified employees that require low levels of long-term training. One-on-one mentorship, few formal resources. New Hire: • 3 months for radiologists, 6 months for technologists Continuous education: Unstructured • Technical learning opportunities at parent hospital	*Core service:* Radiology reporting *Skill requirements:* Interpretive ability to assess abnormalities in imaging technology *Skilled Employee profile:* 13 US ABR Radiologists + Indian certified radiologists *Training Model:* Hire certified radiologists and provide "academics" New Hire: • 6 months before unsupervised interpretation. Continuous education: *"Academics"* • "Journal club" • Internal professional presentations • Weekly review of difficult/problem cases *Rad Gurukul* – founding of a regional radiology training institution

The GRC's hiring and training approach is diametrically opposed to the strategy adopted by Infosys. Rather than hiring "under" qualified candidates that require further training, the GRC hires "over" qualified Indian radiologists. At the GRC Indian certified doctors perform nearly half of the 3D enhancements coming into the center and review all 3D work going abroad. The GRC also employees technologists who have equivalent qualifications to US based technologists, but all of their work is reviewed by an Indian board certified doctor before being sent to US based clients. The much lower costs of Indian doctors enable the GRC to employee highly educated labor, relative to

technologists used exclusively in the U.S. The lower costs also enable an additional set of eyes to check the quality of 3D imagery.

Continuing education approaches differ dramatically. After completing the initial training process at the GRC, employees may gain additional clinical exposure under the senior radiologist at the adjacent parent hospital. However, these continuing education opportunities appear to be the exception, rather than the rule. The continuing training opportunities are not required, are unstructured, and the onus is on the employees themselves if they want to further upgrade their skills. Rather, the emphasis on training over time at the GRC tends to be client-centric, where employees slowly learn new client processes over time (See chapter 5 on mechanisms for knowledge transfer).

At Teleradiology Solutions on the other hand, continued training, commonly referred to as "academics," is compulsory and occurs on a weekly basis. The firm's co-founder tries to replicate the academic environment he was trained in, while also disseminating the knowledge he and other radiologists have gained through their varied experiences and training. "Academics" at Telereadiology Solutions include presentations by rotating radiologists on new developments in the field every Wednesday evening, "brown bag" lunch review sessions of difficult or novel cases 3 times a week, and occasional industry symposiums (personal interviews, Director of Quality, 1/31/08; Founder, 1/22/08). These activities keep radiologists attuned to recent developments in technology and methodologies in the field and ensure that knowledge within the firm is constantly circulated. The Director of Quality at the firm credits "academics" with drastically improving the service quality of the firm over time (interview, 1/31/08).

The major explanation for the divergence in the GRC's approach to continuous training and Teleradiology Solutions's are the lack of overall upgrading opportunities that are presented to the firm. The GRC has few opportunities to move up, which makes additional training more of a benefit to employees than a strategic imperative. At Teleradiology Solutions, in contrast, they have continued opportunities to expand into high value services and continued training is a key component of firm strategy.

The GRC invests less heavily in long-term training relative to Teleradiology Solutions, for two reasons. First, the GRC already employees higher skilled and more highly educated labor than employees performing these services in the US, which means that additional technical training will have diminishing returns both in terms of technical ability and credibility. Second, the company does not have an added incentive to teach the employees new skills if workers are already proficient in the services they provide to their customers and their are limited opportunities to move into more specialized tasks. This reflects the more commoditized nature of the service the GRC provides relative to Teleradiology Solutions.

IV. Training Programs as Image Management

The foregoing section described the many different tools and approaches firms use to build the skills of their employees. While techniques vary between firms and between industries, overall the goal is to be able to deliver high-level, knowledge intensive services to offshore clients. In order to achieve this goal, however, firms also engage in "image management." While they do this in a variety of ways, some of which are describe elsewhere in the dissertation, the training programs themselves serve such a

function. Firms attempt to build their credibility by making *visible* to clients the training they provide; thus, the setting, structure, and products of various training programs are manipulated to send a message of expertise and capacity to clients.

The first of the vignettes in the second section of this chapter presents a particularly stark example of impression management. Why does the Infosys campus appear to be so over-the-top, almost ostentatiously displaying its features to the world? The Infosys Mysore Development Center not only trains the firm's employees, but it is also part of the management's strategy to project its knowledge and skills capabilities to both current and potential customers and its own employees through its education and training efforts.

Touring the corporate university campus makes one feel as if they are simultaneously on a university campus, at Disneyland, and at Club Med. It leaves one with the perception that if the company can create a place such as this, just imagine what can they achieve in business. The founder of Infosys, Narayana Murthy, justifies the expenses on training, which is over $175 million a year (Interview, 12/10/08), and on the lavish accommodations of the Mysore training facility specifically by referencing the perceptions it has on clients:

> We saw a world-class training facility that could impress our clientele as a necessity of the times. Many of our clients stay at the Mysore campus when they visit us and it is important that they take away a positive view of the company (Menon & Mishra, 2009).

Here the training facilities at Infosys are clearly doing more than just building the capability of its workforce, but also communicating the firm's capabilities to prospective and existing clients. The company also has full time staff members dedicated to showcasing the campus to visiting guests, some of whom drive visitors around in a golf

carts to allow them to experience the facilities, see the sights, such as the seven sex-segregated dormitories that spells out the word "I-N-F-O-S-Y-S." The campus is clearly engaging in impression management, using the educational facility to build the Infosys name brand, by displaying its approach to employee training and education. Yet Infosys also communicates its skill capacities through media to manage to prospective clients that have not yet visited the Mysore campus. *Fortune* magazine's 2006 story "Harder than Harvard" details the selectivity and rigor of the Infosys's training facility in Mysore (Schlosser, 2006).[88] In this case, the impression management extends beyond the boundaries of the campus, to target the company's target customers, business professionals in the US.

Infosys' approach to training also communicates a broader message about firm capabilities and the firm's philosophy behind training, part of a larger firm narrative that portrays private industry intervening in education to compensate for the government's shortcomings. Adding to this perception, President Sonia Gandhi, whose political party leads the current government, inaugurated the 1.44 million square foot mega training structure on the Infosys campus (Menon & Mishra, 2009), further demonstrating the ties the firm has to political elites, the influence they command over politics, and the media attention they get through their training efforts.

At Evalueserve, white papers demonstrate the innovative work, high-level skills, and productivity of its workforce. The team-level knowledge sharing sessions and cross-functional team interaction through initiatives, such as the "Knowledge Olympics," help create firm innovations that are captured in the "white papers" the company produces.

[88] 5% of newly hired employees don't pass the final exams at the Mysore training facility and do not continue their employment with Infosys (Head of Mysore Learning Centre, 12/15/08).

The key purposes of these industry "white papers" is to establish its authority as a source of knowledge and to build firm credibility in "knowledge processes outsourcing." This research is distributed through its website and through its Public Relations department to establish itself as a source of expertise, but also to cement its claim that it has knowledge and skills in the first place.

Teleradiology Solutions helps to build its clinical credibility through its training program, that it calls "academics," and through the construction of its regional radiology-training center, *Rad Gurukul.* In particular, the website for the Rad Gurukul helps promote the "academic" image Teleardiology Solutions seeks to promote. It does this by providing access to many of the firm's continued training programs including tutorials, archived pictures and analysis of difficult review cases, summaries of journal articles covered by the "journal club," and notices of academic presentations hosted at the center. The public displays of these activities, on the *Rad Gurukul* website (RadGuru.net), linked from Teleradiology Solutions and independent industry media coverage, help signal the knowledge capabilities of the firm to clients and potential employees.

The GRC, differs from the other three cases in that it signals its credibility primarily through the hiring of "over" qualified personnel, rather than its approach to long-term training. After initial new hire training, training become less important for the GRC relative to the other cases because the credibility of the labor is established, through the much higher education and professional training, relative to US based technologists. The GRC's manager, commenting on the role the educational profile of the center's workers play in building firm credibility, said "It is a bunch of doctors, but you will be *selling their credibility* [emphasis added] (Manager, GRC, 10/17/07). From this quote, it

is clear that the doctor's credibility was the primary point of differentiation to the GRC's customers. The GRC has the labor to provide a high level of service quality to its customers and with few, higher value opportunities, there are limited incentives to further develop their long-term education program, since their credibility and quality of their processes are already high. The GRC's approach stand in contrast to Teleradiology Solutions, which needs to consistently reassure prospective customers that the firm has the expertise to provide high quality services from India. Teleradiology's Solution's *Rad Gurukul* training center and website are crucial in signaling this technical capability.

V. Conclusion

This chapter has focused on firm level practices in training and knowledge creation as well as the importance of signaling the possession of those skills to overseas clients. Training programs upgrade the technical skills of firm employees by providing them with increased exposure to "real world" problems and learning opportunities that are underemphasized in Indian higher education. Firms also independently create knowledge, disseminate it internally to new employees, and upgrade workers' skills. I also argue that firm training and knowledge creation efforts are simultaneously important in upgrading firm skills and in producing credibility in those skills. The perception of skills is particularly important in services, which are harder to measure and define relative to manufactured commodities, and where those perceptions determine service quality. The investments in training programs that result in skill upgrading are not just an end, but also the means by which firms project that capability. Firm efforts in skill upgrading also build the companies credibility in providing knowledge intensive services.

All firms in this dissertation demonstrate their technical capabilities through investments in training. Three firms in particular – Infosys, Evalueserve, and Teleradiology Solutions – projected the learning that occurred through training and their efforts at knowledge creation to increase skill credibility. The training strategy for each firm grew out of the skill deficiencies in the labor market and produced by the educational system, however, firms responded differently even within the same industry. Teleradiology Solutions and Evalueserve both provided more continuous training and knowledge sharing opportunities that disseminated knowledge within the firm through formal and informal channels. Teleradiology Solutions used interactive journal clubs and an internal rotational radiology speaker series to achieve this goal, while Evalueserve used knowledge sharing sessions within divisions and formal initiatives, such as the "Knowledge Olympics" to circulate and combine knowledge in new and innovative ways. For Infosys and the GRC the training was deeply integrated into the hiring practices, but diverged in opposite directions. Infosys, through its "right skilling" approach, hired under qualified employees that required additional training, while the GRC, due to concerns over the credibility of Indian medical professionals in the US, hired over qualified labor that required low levels of continuous training, especially since opportunities in higher value services were limited. Finally, firms also signaled their skill and knowledge capabilities through various means. Infosys communicates its technical capability through its expansive and lavish training infrastructure, Evalueserve through its "white papers," distributed to clients and news sources, and Teleradiology Solutions through its "academics" and the formation of its radiology training center, *Rad Gurukul*. In the chapter that follows I will take a closer look at how firm level training, along with

client interaction, teach service employees to provide services in a manner that is credible to overseas clients, drawing upon skills that were first developed under colonialism

Chapter 6
Cultural Labor & Industrial Upgrading

I. Introduction

In 2004, in the midst of an intensification of offshore outsourcing of services from Western firms to developing countries, U.S. based Dell Computers reversed its practice of routing customer service calls to India-based call centers. During 2008 and 2009, AT&T, Citibank, Delta Air, and United Airlines also relocated call center operations from India back to North America. In all five of these high profile cases American consumers were dissatisfied with the customer service provided by Indian workers (Castro, 2003; Prada & Sheth, 2009; Thibodeau, 2005). However, what constitutes "good" customer service is rooted in cultural norms that vary geographically. These company experiences demonstrate that declining customer satisfaction with services moved offshore can erode offshore labor cost savings and threaten future earning. It also suggests that industry development requires cultural skills, not just technical and managerial skills.

While Dell, AT&T, Citibank, Delta Air, and United Airlines' experiences were high profile, and outsourcing is often associated with low-level services like those performed in call centers, related issues in knowledge intensive work blur this distinction. In this chapter, I argue that successful industrial upgrading in service exports relies upon the learning of specific interactional skills, attitudes, and approaches to work that are specific to the culture of one's customers. I refer to the management of these skills as

"cultural labor," a category that is analytically distinct from more generalized technical and interactional "soft" skills.[89] Cultural labor requires the learning, adoption, and deployment of specific cultural repertoires that meet the cultural expectations of customers. In order to be successful in service exports, firms based in developing countries must assimilate workers toward an American or European business culture in order to provide services in ways that are consistent and understandable to Western clients' own cultural standpoint. This insight helps extend Amsden's concept of knowledge-based assets, adding a firm level cultural capabilities alongside the technical and managerial skill requirements for industrial upgrading.

This chapter is organized into seven sections. In the following section of the chapter I situate the particular skill requirements service exports into three bodies of literature that theorize skills: post-colonial theory, sociology of work, and cultural sociology. Next I explain that the global shift toward service work, India's leadership in this sector, and introduce the Indian firm cases analyzed in this chapter. Third, I elaborate the theory of cultural labor, exploring how the theory helps us to make sense of the links among culture, skills, and action in cross-cultural interaction. I then turn to an analysis of the cultural challenges firms face in intercultural business transactions and the mechanisms they have turned to in order to surmount these challenges. Next, I analyze firm level mechanisms used to *produce* cultural laborers through firm training programs. In the penultimate section, I identify how these teachings and the constraints of the work process itself may ultimately hinder cultural labor and deployment of the very cultural repertoires taught in firm trainings. I conclude by highlighting how cultural labor may

[89] The term "cultural labor" used here should not be confused with labor in creative industries, such as art and media.

become a more generalized skill in the Indian industry context and to other countries seeking to enter the service export market.

II. Industry Development, Skills, and Culture

Three schools of thought shed light on the question of what specific skills are required for industrial upgrading in high value global services. First, post-colonial theory highlights that the construction of skills occurs within broader relations of power. The colonial system perpetuated binary conceptions between the Orient and Occident, noting that these relations were "constitutive;" one could not occur with out the other (Said, 1979). Within these relations, skills too, were also constructed particularly through the practice of education, which reproduced and perpetuated inequality and differences between the Colonized and Colonizers. According to Homi Bhabha, the colonial project was never to liberate natives, but rather to reproduce the colonized as "almost the same but not quite/white" (Bhabha, 1994). During the colonial period the British wanted to teach Indian subjects to behave like a British citizen, but the Indian would never actually be British. In a similar fashion, the ITES industry is characterized by skill upgrading that rests in part upon training that produces modern day "mimic men"; workers who emulate western business practices that approximate those performed by their western clients. Firm training programs, and increasingly the post-colonial educational system as it is reformed to integrate soft skills and cultural sensitivity training, are playing a role similar to those of colonial schools that produced the colonial subject. However, it is the workers and managers in businesses located abroad, rather than the colonial state that identify the cultural deficiencies of Indian workers. A consistent "problem" identified with Indian

workers, according to western clients and increasingly Indian managers, is a "culture of deference" (Nadeem, 2011), or an inability to assertively resist unrealistic client demands. This is one example of how essentializing characterizations persist in contemporary global work spanning east and west. While Indian workers are often seen as overly "deferential," deference points to structures of power that are not unique to India. For example, retail sales work within China found deference to be a common behavior toward customers (Hanser, 2008).

The literature on the sociology of work articulates the non-technical interactive skills and emotional management required for service work (Hochschild, 1983; Wharton, 2009). Work in this tradition recognizes that the manipulation of emotions is required in a wide variety of "interactive service work" (Leidner, 1993). Arlie Hochschild, in theorizing her influential emotional labor concept, recognized that culture influences emotional displays in service work and that some groups may regulate their emotions more than others (Hochschild, 1983, p. 57). However, culture may not simply impinge upon emotional expressions as Hochschild claims, but they can also be manipulated and managed in work, just as emotions are. Cultural behavior, scripts, and tropes are culturally specific and vary across geography and time, yet they can also be learned and deployed strategically within the context of differing work environments.

Scholars working within the sociology of work also highlight, often critically, the role "soft skills" play in hiring preferences, management, and job competence in service work (Moss & Tilly, 1996).[90] The definition of soft skills varies, but one study defines them as the "skills, abilities, and traits that pertain to personality, attitude, and behavior rather than to formal or technical knowledge" (Moss & Tilly, 2001, p. 44). This

[90] For a critical overview of the soft skill concept see (Lloyd & Payne, 2009).

conception, however, conceives of soft skills as a broad residual category that contains diverse behaviors such as general business skills and etiquette, communication skills, embodying a certain approach to work, and understanding the norms associated with clients' culture. I argue that "cultural skills" are analytically distinct from soft skills, as well as emotional labor described above, even if in practice the three may be deeply intertwined and difficult to separate in practice.[91] When used in the analysis of cross cultural labor, the broad category of soft skills does not adequately take up the relations of power, learning processes, and tensions between cultural norms that are specific to this context. Although the role of soft skills in low-wage services has been highlighted by scholars focused on work (Grugulis & Vincent, 2009; Moss & Tilly, 1996; Pager, Bonikowski, & Western, 2009), few studies focus on these skills in an international context (Otis, 2008) or analyze these soft skills in high skilled services. This lack of scholarly attention to the role of soft skills in international contexts means that definitions of soft skills fail to theorize the unique cultural interpersonal skills that are central to the international trade of service work.

Third, a body of theory focuses on how culture shapes skills as individuals respond to their external environment (Bourdieu, 1977; Swidler, 1986). Bourdieu's concept of *habitus* provides insight into culturally-based skills by explaining how individuals within a given culture share an understanding of the tacit "rules of the game" (Bourdieu & Wacquant, 1992). Swidler, critiquing the habitus concept, argues that the concept implies that skills are more or less unitary to a given culture (Swidler, 2008). If this critique is valid, then applying the habitus concept in an intercultural work

[91] Asaf Darr analyzes technical sales work and finds that technical and social skills are intertwined and interdependent (Darr, 2006), thereby blurring the boundary between technical and social skills.

environment suggests that workers must learn a new habitus to augment or supplant an existing one. However, the actual culturally based skills learned or adopted may be narrow in scope and deployed strategically in specific work contexts, rather than deeply rooted in one's cultural identity, guiding action in multiple arenas, or diffused throughout society. Yet, the more unitary nature of a habitus is less of a problem than Swidler's critique may suggest for two reasons. First, the habitus is not necessarily coherent and unified, but may contain varying degrees of integration and tension (Wacquant, 2004). Second, the habitus is always oriented toward a particular field (Bourdieu, 2000). This means that the habitus may be internally varied even while oriented toward a specific field of international business services.

Swidler's "tool kit" model of culture offers a complementary perspective for an analysis of intercultural work environments. On her account, culture is a resource, or a repertoire of skills that directs individuals' action (Swidler, 1986, 2001). Skills provide the major link between culture and action and are composed of "habits, practices, and other 'cultured capacities,' such as intuitive capacities for perception and judgment, that have to be learned and that people can't perform with confidence unless they get reasonably good at them" (Swidler, 2008, p. 616). For Swidler, individuals draw upon conflicting cultural motifs to guide their action. Yet individuals operating within an environment with highly differentiated cultural motifs face compounded challenges, especially when that interaction is expected to produce collaborative work. Swidler's theory does not explicitly address the challenges that arise when multiple cultures are involved in guiding individual action. Cross-cultural collaborative work is guided by differing cultural skills and interpreted through different cultural logics and schemas.

This may introduce novel variation into the work process leading to innovation, but it simultaneously increases the chances of cultural misunderstanding between workers of differing cultures, which may lead to a breakdown in collaborative work processes. These cultural misunderstandings, aggregated to the firm level, threaten the confidence in firm capabilities and stymie opportunities for industrial upgrading. The "cultural labor" concept presented below will synthesize the "tool kit" model of culture with the habitus, by differentiating specific behaviors along a cultural repertoire continuum ranging from surface to deep acting.[92]

III. Theorizing Cultural Labor

i. Variations in Skills: Call Center Workers and Knowledge Workers

A variety of offshore service workers ranging from call center agents to knowledge intensive service professionals are expected to embody a Western approach to work. Call center workers servicing western clients are required to learn a number of distinct cultural skills, scripts, and behaviors in order to mimic the communication style and cultural expectations of their customers and mask their national identity from overseas customers. The specific behaviors include "accent neutralization"; adopting an anglicized name (i.e. Suresh becomes Stephen); ability to engage in local small talk (such as the local weather, news, sport teams, etc); and evading questions about the call centers true location or the employee's citizenship (Nadeem, 2009; Poster, 2007). Yet, the depth at which cultural skills are enacted and embodied depend upon the labor process.

In general, lower value interactive service work requires more surface acting than higher value service work, due to a more tightly regulated labor process. Hochschild

[92] For an explanation of deep and surface acting see (Goffman, 1973; Hochschild, 1983).

(1983) argues that the speed up of flight attendant work cause workers to engage in more surface acting, using their smiles, rather than deeper, more genuine forms of emotional display. Similarly call center work requires similar surface acting, since the work is characterized by high call volumes, brief and scripted interaction with customers (Taylor & Bain, 2005). Outbound call center workers may be told to "smile-and-dial" and "customers can 'hear' your smile on the other end of the line."[93] Workers are told to act upbeat and cheerful, regardless of their own true feelings. However, in cross cultural call center work, workers must not only manage their emotional displays, but also their cultural expressions.

Yet, high value, offshore services, such as IT and knowledge intensive professional services, also require cultural skills. Higher value cross-cultural service work presents an interesting contrast, since it is characterized by higher levels of autonomy and interpretation, which is more difficult to script, relative to call center work. In this context skill requirements emphasize deeper acting, communicating in a Western style that facilitates long-term collaborative work and approximates a client's own approach to work. Offshore professional services require interpretive skills that are more difficult to standardize; target business clients, rather than general consumers; and involve interaction that is longer in duration, iterative, and with the same group of individuals. The nature of this interaction means that it is not feasible for offshore knowledge intensive service workers to pretend that they are domestic workers, as call center workers do. The requirement of cultural skills persists even in highly technical services characterized by comparatively low levels of interaction, such as international

[93] I heard these phrases repeated by managers in sales and call center environments in multiple US companies between 2000-03.

teleradiology. Training in knowledge intensive professional services emphasizes the clarity of written and verbal communication with clients and embodying the attitudes possessed by business clients in the West.

ii. A Colonial Legacy

The ability of a firm exporting services to be successful and move into higher-level services depends upon firm employees' ability to perform American or European cultural repertories. This is due in part to the fact that the majority of offshore services exported from India go to US based clients (61 percent) with the United Kingdom ranked as the second largest market (NASSCOM, 2010). However, its not just that western client are the customers, but that the style and manner those services are provided to customer is itself shaped by behaviors, modes of speaking and interacting that are culturally dependent. Therefore, the cultural skills taught in offshore call centers in India are reminiscent of and build upon repertoires learned during the British colonial period (Mirchandani & Maitra, 2007). These skills include familiarity with the English language, Western dress, some Western business practices and cultural norms, and Western socio-political institutions, such as the legal system and educational system. The skills and behaviors valued in both the colonial and the contemporary periods are those possessed by the dominant trading partner.

Despite the imperial, one-sided nature of skill learning and adoption in India, the contemporary offshore outsourcing service industry in India differs from the effect colonialism had on earlier Indian development. Under British colonialism India's share of global income declined from 22.6 percent in 1700 to 3.8 percent in 1952 (Maddison, 2007) and skill levels and industrial capabilities in leading industries, such as textiles,

also declined.[94] Today, the offshore service industry is growing and characterized by a definitive deepening of skills and capabilities moving from exports in back office and call center services into a variety of knowledge intensive professional services.

While India's British colonial legacy has provided India with some skills that help its modern workforce perform intercultural work, differences in cultural repertoires between India and the West remain. There is also considerable internal variation in cultural repertoires amongst both "Indians" and "Westerners." Within India, for example, cultural practices differ significantly between the north and south, urban and rural, and even between and within individual Indian states, which tend to be organized along specific linguistic and cultural lines.[95] Despite the diversity of the Indian citizenry, Indian knowledge professionals are a much more homogenous group because they predominately live and work in urban areas,[96] are educated in higher quality urban schools with stronger English language instruction,[97] and generally hail from middle to high caste positions (Upadhya & Vasavi, 2006). These employee attributes ensure the industry retains high levels of cultural capital required by the offshore outsourcing industry.

iii. A Theory of Cultural Labor

I use the term cultural labor to refer to the management of individuals' cultural repertoires that are deployed to create the sensation for the client or customer that they are interacting with somebody from their same culture. Jobs requiring cultural labor have

[94] Prior to colonization, India was one of most advanced textile producers in the world. Much of this artesian skill was lost when Britain flooded the Indian market with cheap, mass produced textiles. See (Patnaik, 1999).
[95] Southern Indian states in particular were formed according to the dominant regional linguistic communities residing in the area.
[96] 92.7 percent of IT and ITES industry exports come from just 7 cities in India (NASSCOM, 2009a).
[97] Personal interview, Director, NASSCOM, April 7, 2009.

three basic characteristics. First, they require interaction with customers. This interaction may occur face-to-face, voice-to-voice, or virtually through emails and other collaborative technologies. Second, they require that workers make customers feel "at home" by utilizing skills and repertoires that minimize or erase cultural difference and the misunderstandings that may result from those differences. Third, they allow the employer, through training, to regulate and shape the outward cultural expressions of employees.

Cultural laborers are produced through the teaching of specific cultural repertories using a combination of various methods operating at different levels of analysis. At the macro and meso-levels, cultural repertoires may be diffused through a history of colonial domination, through popular consumption of Western or Western inspired media (i.e. cultural imperialism via the culture industries), and through educational institutions that teach Western modes of interaction, often through instruction in English. These mechanisms diffuse these repertories unevenly along class and urban-rural divisions.

At the micro level intercultural repertoires are built through iterative intercultural interaction. However, learning the skills required to perform cultural labor through "trial-and-error" on-the-job training in the workplace is too slow and risky for many firms specializing in global services. Making costly mistakes that are the result of cultural misunderstandings can cost firms their clients and reduce future opportunities to move into higher value services. As a result, many firms first pre-select job candidates that have comparatively high levels of cultural capital, intercultural and interpersonal skills, which are developed through a combination of the mechanisms outlined above. Firms then supplement those skills with new hire induction training and follow-up "refresher"

trainings. These firm training practices build upon the macro and meso-level mechanisms and *produce* cultural laborers capable of performing offshore work. Below I identify the different ways cultural labor is deployed in lower-level call center work and in higher-skilled knowledge intensive professional services.

IV. Cultural Labor and Upgrading

i. The Effects of Cultural Skills

The need for cultural skills is common in a wide variety of offshore service work ranging from call center, information technology services, and knowledge intensive professional services, despite significant differences in the technical skills required. The skills required to perform cultural labor achieve three goals: 1) they send signals of quality; 2) they increase effective communication required for collaborative work; and 3) they conform to clients preferred work style. Using the data collected for this study, I draw upon the discourse Indian executives, managers, workers, soft skill trainers, and Western managers use in discussing the challenges resulting from cultural differences between offshore Indian workers and their Western clients as well as their discussion of the solutions to these challenges. Analytically I separate the three goals cultural labor achieves, although in practice these goals may be reached simultaneously.

First, cultural skills affect the perceived quality of services. The need for signals of quality is particularly important for the trade of services due to the variable nature of services and their dependence on interaction to be produced. According to a training consultant, employees that have insufficient cultural sensitivity and understanding cause clients to lose confidence in what the employee is capable of technically and this sentiment is reflected in the interaction with the client and in customer satisfaction

surveys (interview, 5/24/10). Some managers went so far as to remark that cultural and soft skills are as important as technical skills in providing knowledge intensive professional services (GRC, 6/3/10). This is because an employee's work may be technically correct, but if the employee is unable to communicate this to the client then the perception of the work, the relationship, and client confidence in the firm's capability for future work is harmed. This demonstrates the interdependency between technical "hard" skills and "soft," interactive, social and cultural skills. In cross-cultural work, cultural skills shape the perception of technical skills, therefore demonstrating the centrality these skills have in industrial upgrading, even for relatively services that have relatively low levels of interaction with clients, such as 3D Lab work.

Second, cultural skills increase effective cross-cultural communication. The failure of a worker to respond or communicate in the manner that the client is familiar with results in miscommunication of varying degrees (training consultant, 5/24/10). A recurring cultural challenge identified by respondents is that Indian workers tend to be indirect communicators, while Western clients tend to be direct communicators. This shares similarities to what Nadeem refers to as India's "culture of deference" (Nadeem, 2011). According to respondents, Indians live in a society that is more culturally sensitive to status hierarchy; it is generally considered overly direct and rude to tell a superior "no" in reference to a specific request. When Indian employees are asked a difficult question, they may be evasive and verbally agree with their client in order to avert conflict with a perceived superior. These differences in communication styles between North American clients and Indian workers are difficult to bridge. A training consultant, originally from

Scotland, described her biggest challenge as trying to teach Indian workers to communicate more directly:

> They weren't used to it. . . . [a call could be] going on 20 minutes longer than it should have gone because the engineer should have said, 'No, that's just not possible. We'll just do it another way' . . . But he won't say [that]. So it was trying to get them just to realize that it's okay just to say, 'I don't know' . . . . they find it really difficult to just be direct, I think, and that led to lots of confusion, lots of frustration on the customer side (training consultant, Microsoft, 5/17/10).

In the quote above, the trainer is trying to teach the Indian employee to say "no" or "I don't know," but found it extremely difficult to get the worker to adopt that more overt communication style. The disconnect between the two communication styles causes lower customer satisfaction and lower confidence in the Indian workers abilities. Indian workers' may also be frustrated that Western clients' fail to pick up that something cannot be done.

Another example where differing communication styles can lead to serious problems in cross cultural business relationship is setting and adhering to deadlines and other expectations around work. For example, when a client asks if a specific service can be implemented by a specific date and hears "yes," from an Indian offshore worker the Western client will expect that the service will be implemented by that date. This is because in the United States people tend to take explicitly articulated statements at face value. If that implementation date is not met, however, the client will be upset, believing that the vendor did not meet work expectations and may have deceived him or her. However, the Indian worker who was asked to follow through on a difficult request may be unaware that the client views the verbal commitment as binding. This is because the subtext of what the Indian worker communicates, which the Western client may fail to pick up on, is "we will try." Consistent with these observations, another North American

manager commenting upon his Indian offshore workers wrote that, "People say 'yes' to requests; however it requires constant follow-up for them to deliver" (Manager of North American multinational, personal email correspondence, 11/8/09). Failure to meet client deadlines and other explicit work expectations may be terms for ending a relationship or at the very least cautiousness in allowing the offshore team to manage more critical business tasks. This, in turn, may have a detrimental effect on the future offshoring relationship, especially as it relates to moving into higher value tasks.

Third, cultural skills allow workers to emulate Western behavioral styles that embody an individualized approach to work. Offshore service workers are expected to show "initiative," be "assertive," take "ownership of work," demonstrate "leadership," and "drive customer value." Indian training consultants, firm managers, employees, and western business managers reported that Indian workers often lack these skills. A challenge with some of these ideas, such as taking "ownership of work," demonstrating "leadership," and "driving customer value," is their abstract nature. These ideas are connected to a particular western business context that is difficult to translate outside that context. Workers may not intuitively know what these ideas mean and may not know how to model them without tangible examples or practice. Westerners, such as managers and firm employee trainers, also face challenges in trying to explain these behaviors. According to an Evalueserve manager providing business research services, employees need guidance and training to embody the approach required by clients:

> You have to really guide them [employees] extensively and [a] lot of times, *even how to interact* with clients, how they should structure their e-mails, *what kind of questions they are free to ask,* and how they should think, rather *than 'taking' work, they should 'own' work* . . . you don't get [these skills] in less than one year [emphasis added] (personal interview, Manager, Evalueserve, 2/13/08).

This quote shows the manager's perception that his employees need help learning to act assertively, by learning the appropriate questions to ask a client. The manager also emphasizes the importance of ownership, when he says employees should not passively accept work, but "own work," by actively take responsibility for work output. The quote demonstrates the individualized approaches that Indian firms need to possess in order to gain the acceptance and confidence of their clients. Finally, this quote also illuminates the significant time and experience employees require in order to develop and internalize these skills. The fact that workers need a year or more of experience to develop these more interpretive and assertive modes of acting, underscores the deeper level at which these behaviors operate at, relative to more superficial Western cultural scripts that call centers employees may employee.

A senior manager of a North American multinational company responsible for offshoring services to India wrote about the performance problems that may result from cultural differences and the inability to internalize western business norms toward work:

> The test team is the weakest part of the organization in terms of efficiency and effectiveness. [The group is characterized by a] very strong focus on metrics (execution rate, pass rate, etc.) with no real understanding of the impact or what really needs to be done to report on quality and customer value . . . *The biggest obstacle is [a] change in culture . . . The rituals are followed religiously, but some of the spirit is lost* (Personal email correspondence, emphasis added, 11/10/09).

In the above quote the manager sees the team as utilizing explicit metrics measuring productivity, yet fail to deliver customer value, which is not captured by these metrics. When later asked to clarify what this manager meant, he said he thought that the team was "simply going through the motions," rather than following through by delivering true value to the customer (North American Manager, 6/10/10). In this case, meeting metrics

and following rules did not translate into the desired labor output or quality, and in fact was indicative of the perceived lower technical competence of the team. The manager was frustrated by his perception that the Indian team produced work that was superficial and needed a high degree of guidance from management in order to meet work expectations relative to the three other teams he manages across North America. This experience suggests management required a deeper level of acting than the superficial performance that the worker provided.

The manager's perceptions that his offshore Indian workers are unable to take "ownership" and deliver customer value led to his decision that the Indian team should manage a mature product line, rather than the new strategic one under development. This decision was in contrast to his initial view when he took over management of the offshore team, at which point he considered broadening the Indian team's responsibilities from low-level maintenance work to include "ownership of a whole product" (Manager of North American multinational, personal interviews, 2/1/09; 6/10/10). Yet, the manager decided to put the Indian team in charge of a mature service line performing low-level maintenance work. Working on a mature service line requires lower skill levels and offers fewer opportunities to develop new skills that can be used on higher-level future projects. While the manager views this as a step up in responsibility, what is noteworthy is his scaling back on his initial plans of utilizing their technical skills on high-value strategic products based on his perception that the team lacked the ability to deliver "high value" work.

Performing western behavioral styles, such as showing "initiative" and being "assertive," may overlap with the previous stated goal of advancing effective

communication required for collaborative work. One example is encouraging workers to proactively ask clarifying questions around the details of work. A manager at Infosys involved in starting up a large employee project emphasized the importance of developing interpersonal communication skills and an understanding of what norms are expected in the U.S. business culture in her employees:

> I want . . . [employees] extremely comfortable talking on the phone with the client, I want them to get attuned to an American accent because the minute they come on the floor, the day they join me, there is going to be trainers from the US here for the next eight weeks. They need to be able to understand them. They need to be able to be comfortable with them and ask the right questions. They need to be able to speak up, for example, which is a huge issue with lot of Indians (personal interview, Director, Infosys, 4/23/09).

The quote above highlights the difficulty that India workers may have in understanding American clients, both in terms of their accents and cultural norms. As indicated above in the discussion of indirect communication, Indian workers face challenges adopting the communication style of their American counterparts. Here, the respondent notes the importance of learning to proactively ask questions when something is unclear. American businesspeople expect to hear clarifying questions if employees are unclear about instructions, instead of looking for more tacit cues that employees may not understand the instructions provided. If Indian workers do not assimilate these Western norms of communication there is a danger of miscommunication, since Western workers are not taught or expected to learn Indian communication practices.

ii. Cultural Skills Over the Course of the Relationship

There are particular periods in offshore outsourcing relationships when firms and employees possess fewer soft skills and weaker cross-cultural skills; at such times, there is a higher propensity for cultural misunderstanding with clients. These periods are when an Indian firm first begins to offshore services, adopt new clients, expand into new

services, and when employees are newly hired or promoted into positions with increased responsibility for managing customers interaction.

During the initial founding of an independent offshore service firm, cultural expertise of clients in the new organization is particularly low. Executives and managers at all 4 firms reported the highest level of difficulty in adopting new cultural repertoires during the founding period of company or division. However, cultural labor was particularly important for firms that are more dependent upon their clients for learning, such as the GRC and Infosys. The GRC reported that during the first 8 to 12 months the company encountered many "cultural problems," but after this phase they were no longer regularly occurring issues (personal interview, Manager, 6/3/10). This is because repeated interaction tends to reduce the level of cultural misunderstandings and improves the nature of the interaction.

Another period when firms are vulnerable to cultural misunderstanding is during the initial stages of an offshoring relationship either during a short-term ad hoc project or during a transitioning of service from the client site to a full-time offshore dedicated team. Both varieties require the offshore firm to learn a number of new skills, while also gaining the client's trust in the their capabilities. A transition manager at Infosys reported that those employees working on transitioning services from one-country to another need industry specific knowledge as well as good people skills and soft skills (personal interview, 11/29/07). The full-time dedicated team format is characterized by more one-on-one interaction between onshore and offshore workers, which speeds up the learning of cultural skills required to manage this interaction. Offshore firms, however, are much more likely to secure a full-time equivalent dedicated team contract only after first

providing services successfully in an ad-hoc short-term trial run. Client-vendor interaction in the ad-hoc set up is more tightly controlled by offshore management and team leaders and it occurs less frequently, with conference calls occurring only once every two weeks around key service milestones, rather than on a daily basis.

Another critical period is when a new employee joins the team servicing offshore clients and when employees are promoted into positions in which they are responsible for managing client relationships. While firm training programs accelerate the cultural learning, the threat of new employees doing or saying something damaging to the relationship still exists. For this reason, companies routinely funnel interaction with the client through managers and team leaders who have more experience interacting with specific clients from specific cultures. This client management structure is particularly true in ad hoc or one-time projects (personal interview, Group Manager, Evalueserve, 2/13/08). Some clients, especially those using dedicated offshore teams, which rely on full time offshore labor, often want to have one-on-one contact with offshore and onsite workers, rather than having all information filtered and delivered through managers. In both circumstance, however, there is additional training and observation that must occur after new hire induction training, but prior to full client interaction:

> We would love to have all our people interact with clients on [a] day-to-day basis. But we would *generally train them for 6 to 8 months* in the *finer aspects of client communication.* A) There is the way you communicate things. B) You try and improve your accent, right? How do you introduce yourself, so on and so forth? So there is a training period of 6-8 months where they join client calls, see how the processes [works] and then they start interacting (Group Manager, Evalueserve, 2/13/08).

Learning the style of communicating is important. This manager also emphasizes that employees need to learn to speak in the "right" accent style – just as call center workers

are trained to do – before they are permitted to manage because they spend significant time managing client relationships. This demonstrates that even in high value services, such as financial research, require convincing performances of surface acting, such as the presentation skills on a call or on a client visit and speaking in an accent that sounds less "Indian."

V. Producing Cultural Laborers: Training Processes

Firms produce cultural laborers through intensive soft skill and cultural training. These training programs are part of a broader trend in India to invest heavily in upgrading workers skills. These relatively high investments in training in India are due to two factors. First, there is growing consensus that there is a shortage of employable skilled workers in the IT and ITES industry and cross-cultural skills were a key skill deficiency identified by studies and by interview respondents (NASSCOM & McKinsey, 2005). Second, a tightening labor market in services has caused firms to increasingly recruit employees who have lower levels of English linguistic and cross-cultural skills than earlier recruits. This is true across the Indian service export market, but is most pronounced at the lower end of the skill spectrum, which has experienced the highest increase in the recruitment of employees hailing from rural areas that have lower quality English education, less exposure to Western culture, English language media and speakers, when compared to more cosmopolitan urban centers. As a result of the changing demographic of workers in this sector and feedback from customer satisfaction surveys, outsourcing firms have increased investments in cultural sensitivity and soft skill training more generally. Soft skill and cultural sensitivity trainings are a widespread

industry practice that not only target lower skill employees, but also highly educated urban employees with high levels of cultural capital.

Firm training is focused on producing laborers that fit the cultural expectations for a global workforce. Many of the goals and skills training sessions purport to teach in knowledge intensive professional services and call center work are similar, however, in practice there are differences in the cultural skills emphasized, learned, and developed. For example, one training course targeting call center employees sought to teach "etiquette, willingness to take responsibility, grooming, consistency, time management, attentiveness, emotional quotient [measure of emotional management], ownership, team spirit, initiative" (See Table 6.1: Goals and Skills from Business Process Training Course). In practice, however, the two-week training schedule did not focus on developing many of these skills, such as "ownership" and "team spirit." Instead, with the content of the training focused on material and exercises that emphasized the practice of those skills that will most easily help Indian agents "pass" for employees from the West. The majority of the actual time in training is spent learning grammar and language mechanics (i.e. subject verb agreement), pronunciation, eliminating "Indianisms" from English speech (i.e. substitute the Indian phrase "out-of-station" for "out-of-town"), teaching forms of American and British humor (sarcasm, etc), geography, sports, and other "local" small talk. These relatively short training sessions focus on providing workers the skills and practice to provide more convincing surface acting performances of cultural labor.

Knowledge process outsourcing training sessions may touch upon these linguistic skills, but the major emphasis is on learning western cultural repertoires that reduce

miscommunication and embodying western behaviors, such as leadership and presentation skills. That is to say, in knowledge intensive services, workers are expected to develop the cultural skills to provide deeper, more embodied forms of acting. Knowledge workers are expected to use higher-level thinking skills, interpretation, and analysis, and are expected to act with more autonomy. For example, Evalueserve encouraged employees to present power point presentations that were video taped, in order to practice providing presentations for clients and evaluate their performance.

Managers and workers reported valuing these trainings, which suggests that workers may not feel the forms of alienation and disenchantment associated with performing emotional labor in lower value interactive services work.[98] A manager from an offshore teleradiology center emphasized the importance of learning these cultural and interactional skills because,

> Technical aspects, to my mind, are easier to practice and pick up. The soft skills, where you have limited [opportunities to practice] interactions, and you have to get those interactions right with the customer, plays a very important role in terms of the relationship, in terms of enhancing business (Manager, GRC, 6/3/10).

The passage above shows the limited opportunity workers have to master these soft skills within the everyday work routine, but also how important it is to have those skills in order to build the business relationship.

Indian firm managers, employees, and firm trainers from this study reported that cultural sensitivity trainings helped improve interaction and reduced cultural misunderstandings that could have a negative impact on cross-cultural business relationships. Firm managers reported that their firm's customer satisfaction surveys

[98] See (Hochschild, 1983; Leidner, 1993). My ethnographic observations and interviews did not uncover the "games" workers sometimes use to resist management control (Burawoy, 1996; Sherman, 2006). The absence of these games may be due to the relatively high levels of autonomy and class position occupied by higher value service workers relative to low value service workers who often engage in these games.

reflected the efficacy of their firm's training programs. If these training programs in fact help improve cross-cultural interaction as respondents claim, it is curious that only Indian employees undergo this training. Training of both "onshore" Western clients and Indian "offshore" labor would further increase the effectiveness of communication and collaborative work, yet cultural sensitivity training of western workers rarely occurs. The one sided nature of this training reflects power difference between client and vendor; developed nations and developing nations. The effect of this one-sided cultural training results in cultural assimilation of the Indians into Western cultural modes of behavior.

VI. Labor Process Control and Constraints on Cultural Labor

The cultural repertoires taught through intensive soft skill and cultural training produce cultural laborers, yet the ability of workers to deploy these repertoires is partly constrained by an emphasis on pleasing customers and increasing management control over the labor process. Workers are taught to produce "customer delight," and treat the customer as "king" during employee induction trainings and within the context of on-the-job training. These messages are at odds with the cultural values workers are expected to embody with customers, such as initiative, assertiveness, and saying "no" to difficult to achieve requests from clients.

The offshore model, particularly in knowledge intensive services, is dependent upon securing repeat business with existing customers. In financial services, both Infosys and Evalueserve reported that at least 75 percent of their business was derived from repeat business from existing customers. In teleradiology this figure is closer to 100 percent, since the significant entry barriers and time investment required to document that

medical, legal, and privacy standards and regulations (i.e. medical credentials, malpractice insurance, appropriate state medical licenses, compliance with privacy regulations) are met and on record makes short term business relationships impractical. Firm dependence on repeat business with existing customers makes customer satisfaction a very high priority. One of the gauges firms use to determine a client's willingness to continue to do repeat business is through customer satisfaction surveys. As a result, all firms from this study reported detailed processes of monitoring customer feedback to ensure clients' are happy with their services. At a financial service firm, customer satisfaction surveys that are returned with a rating lower than a 4 out of 5 requires the operations team responsible for the project to provide a formal explanation of what went wrong:

> The feedback form, once it is filled [out] by the client, *it goes to every one in the top management*. We generally get ratings of about 4/5 so we are not happy with anything, which dips [below] . . . . 3 is 'meets expectations,' 4 is 'exceeds', and 5 is 'delighted.' Anything at 3; then the top management gets involved because feedback on each project goes to the top management and then we basically discuss what went wrong and then we call the client to understand why (group manager, Evalueserve, 2/13/10).

Another Senior Manager discussed the process for handling ratings that were satisfactory or below by upper management:

> If we get ratings of satisfactory or below, then it goes to the entire top management, including [individual names omitted], and then there is *lots of internal fire* as to why?, what happened?, what went wrong?, so that we got a rating lower than meeting expectation rating (Assistant VP, Evalueserve, 2/13/08).

The high visibility of these customer satisfaction surveys to executive management means that there is a considerable top down pressure on middle managers and workers to ensure that these customer survey reports come back with high ratings. I argue that this

pressure puts limits on the resistance a worker can make on customer demands around work requests and delivery timelines.

In high value offshore professional services, the level of management oversight is higher than traditional professional work, which further constrains workers expressions and behaviors. Professions are generally characterized by expertise, power, and authority (Abbott, 1988) and professionals are expected to use high-level thinking skills, interpretative skill and possess a degree of autonomy. Offshore professional work is not scripted like call center work, yet professionals operating in an offshore work environment have lower levels of power and authority relative to traditional professionals due to the way the labor process has been constructed. These changes in the labor process are driven by perceptions that services from lower cost labor markets are characterized by lower quality and a lack of familiarity with training and educational norms.

The delivery of teleradiology services is an area characterized by high levels of management oversight. According to the supervising Indian certified radiologist at a teleradiology services company, professionals working overseas are subject to more oversight, both by the Indian service provider and the client:

> A new radiologist joining there [at the client site] would say this is how I see it and seeks no approval. Unfortunately, since we are doing it from a distance, the kind of checks, which are put in are more stringent and so we have to comply to an individual who is a standard and then we move on from there (supervising radiologist, GRC, 4/16/08).

The quote above shows that the client defines the acceptable standard, embodied in the judgment of a designated person, who offshore workers must conform to. Comparing the work processes at the client site to the work process in the offshore arrangement provides evidence of increased management oversight, which in turn constrains the expression of

cultural labor taught articulated in firm training. Turning a two-dimensional radiological image into a three-dimensional image helps radiologists see and diagnose abnormalities affecting patient health. This work process used to produce these images at a large US based hospital has two basic steps (see Table 6.2). First, a U.S. technologist manipulate the two dimensional CT scan or MRI they receive with computer software. Second, the technologist electronically sends the enhanced image to an American Board Radiologist in the hospital for interpretation. To produce the same finished product for the same US hospital, however, the offshore team at the GRC must conduct two to three additional steps (see Table 6.3). After the Indian technologist produces the three-dimensional image an Indian certified radiologist and the supervising Indian radiologist review the image. The client's team of technologists audits 1 out of 10 image from the offshore facility before it is sent to the American Board Radiologist for an interpretation. The additional oversight of offshore work erode the professional autonomy and control over work and further suggest the difficulty in taking complete "ownership" of work.

VII. Conclusion

Success in offshore service work is dependent on firms and their workers to perform cultural labor. Performing cultural labor requires interactional skills, which are culturally specific to a western business context. In practice, the performance of cultural labor is one-sided, mirroring the unequal power relations that this trade takes place within. Firms that successfully hire and train employees with Western cultural skills are at an advantage in retaining satisfied customers and gaining their confidence to do higher value work. The skills required to perform cultural labor help send signals of quality,

increase effective communication required for collaborative work, and conform to clients preferred work style. The ability for cross-cultural teams to communicate together without misunderstanding each other is central for the delivery of knowledge intensive services because it is through these client-vendor interactions that clients clarify and modify work requirements and provide feedback on service quality.

Firm level training produce cultural laborers that in turn help Indian firms deliver services in the style that their customers require. Training in knowledge intensive professional services emphasizes the clarity of written and verbal communication with clients and embodying the attitudes held by Westerners. This differs from the training used to produce cultural laborers in offshore call center, which is designed to mask employees' true identity and calling location through the training of Western language pronunciation and manner of speaking.

The adoption and expression of western cultural behaviors are hampered to a degree through firm emphasis on creating "customer delight" and increased control over the labor process relative to traditional "onshore" professional services. Further control of cultural labor occurs through the structuring of client-vendor cross-cultural interaction through management with more developed cultural repertoires. Restructuring the offshore labor delivery with more oversight, both by the Indian firm and on the client site, further constrains the opportunities to embody certain western behaviors such as ownership, assertiveness, and worker autonomy. In the future, the articulation of the required cultural skills within the offshore service market will likely change as the geographic distribution of offshore service continues to shift to other markets.

Table 6.1: Goals and Skills from Business Process Training Course

BPO finishing school Course Outline	• Effective Business Writing in English • Expanding Active Business Vocabulary • MS Outlook & Typing • Business English Idioms & Expressions	• Cross Cultural Communication Techniques • Global Business Etiquette • Telephone Etiquette & Active Listening • Email Etiquette
10 Corporate Skills	• Etiquette • Grooming • Consistency • Time Management • Emotional Quotient [measure of emotional management]	• Ownership • Attentiveness • Team Spirit • Initiative • Willingness to take responsibility

Table 6.2: GRC US based client's internal process for performing 3D scans

Initial read		final sign off authority
U.S Technologist	→	American Board Radiologist

Table 6.3: Offshore service delivery work process for same US based client

Technologist →

Indian certified Doctor →

Supervising Indian Radiologist →

Audit check from client technologists →

Final sign off by American Radiologist

Table 6.4: Cultural Labor Continuum of Surface and Deep Acting

Depth of Acting	Continuum of Cultural Behaviors in Offshore Service Work
Surface More consistent with Swidler's "toolkit" model More consistent with Bourdieu's habitus **Deep**	• Ability to engage in regionally specific "small talk" (weather, sports, etc) • Email and phone etiquette • Accent neutralization • Adopting more assertive behavioral style • Adhering to goals associated with western business culture (creating value, etc) • Overcoming "culture of deference" – ability to say "no" to superiors • Internalization of western business logic, mode of thinking

Chapter 7
Conclusion

This analysis in this dissertation identified four causal mechanisms for industrial upgrading in India's ITES industry. These are 1) the role of trade associations 2) firm level knowledge transfer through migration and client interaction 3) firm level training programs and 4) firm level creation of cultural knowledge. In India, trade associations and firms emerged as the central developmental actors driving industry development in IT enabled services, with the state playing an increasingly supporting role. Upgrading occurred through a number of association and firm level mechanisms that built skills and bolstered perceptions of the industry over time. Trade associations in particular played a key role in industry development by taking up four evolving roles in their interactions with the state, firms, and other entities, both inside and outside India. First, trade associations engaged in lobbying and made direct interventions in policy making. In filling these two roles, trade associations fostered the creation of developmental policies that removed constraints on growth (i.e. infrastructure and labor limitations) and increased profitability. Second, trade associations engaged in industry promotion and image management. In filling these latter two roles, trade associations shaped perceptions of industry capabilities both within India and abroad. In addition to the efforts of trade associations, firms helped build both technical and cultural skills through client relationships, migration of technical professionals, and firm level training programs.

The analysis of the trade association and firm roles described above suggests that upgrading is not only about the deepening of industry skills, but also signaling credibility in higher-level skills. Credibility is important in any industry, but it takes on a particular significance in the service industry, because services are more difficult to define relative to manufactured commodities. It is precisely because service quality is difficult to assess that credibility in service delivery becomes an important indicator of service capability. Further still, credibility takes on even greater importance in the context of offshore outsourcing work, wherein developing countries must prove their capacities to deliver high-level knowledge services to markets in developed countries.

I. Institutions and Mechanisms for Upgrading

State investments in higher education and the creation of early industrial policies were necessary, but an insufficient condition for the establishment of the ITES industry and subsequent upgrading. In Chapter 2 I described the significant leadership and investments that the state provided in higher education, which were instrumental in creating a foundational technical base for later industry development. The state also crafted early industry policy framework that enabled development, even if these policies required significant improvements to meet evolving industry needs. While the state was the key actor through the 1970s, things began to shift as the state began to open up during the 1980s to cooperate with industry.

Industry associations, emerged as key actors working alongside government to help the facilitate upgrading over time. State efforts alone around higher education were insufficient to meet the growing industry needs, particularly as industry growth accelerated during the 1990s. The formation of NASSCOM in 1988 and its growing

capability over time, which I described in Chapter 3, was crucial in helping to fine-tune industrial policy and remove constraints on growth. Trade associations were also important channels of information to the state, performing this function through lobbying efforts and interaction with government across functional areas of the state. During the late 1990s and early 2000s, trade associations began disseminating firm level practices in technical and cultural sensitivity training to other firms, sharing industry research with member companies and hosting conferences and panels on technical and interactive industry skills and practices. Trade associations were also "pulling up" firm level practices to the state level, providing industry level recommendations on approaches to training and higher education reform. The state, at both the local and federal levels, approached trade associations for recommendations to guide further industrial development. The state went on to ask NASSCOM to write policy recommendations that were later implemented at the local and federal level.

Government and industry coordination within the IT and ITES industry, facilitated by NASSCOM, is part of a broader shift away from centralized government that exclusively financed, managed, and led development toward a more decentralized form of industry development that requires the interaction of the state and non-state actors. This shift in state roles is reflected in new state strategies and practices, such as the increasing adoption of public-private partnerships. This increased coordination between state and civil society actors constitutes a break from the more insular and autonomous approach of the state prior to the 1980s (Chibber, 2004; Evans, 1995). The findings of this dissertation suggest, however, that state-society ties alone are not enough to carry out the increasing complexity of private-public partnerships. Leadership is also

required and this leadership has increasingly come from an active trade association that moved beyond a facilitator role of state-society relationships, to also design, draft industrial policies, and manage development projects on behalf of the state. Examples of partnerships where trade associations have provided significant leadership range from spurring industrial development in smaller Tier II and Tier III cities to drastically increasing the production and quality of highly technical workers through educational reform generally and the creation of 20 new IIIT institutions of higher education specifically (2009, p. 10; NASSCOM, 2008). Development is occurring though a *partnership* between the state and industry, providing a sharp contrast to both top-down statist models *and* neoliberal theories of the role of the state. While NASSCOM fulfilled a key role in facilitating state and industry partnerships and in upgrading skills more generally, the association was also instrumental in projecting industry capabilities.

NASSCOM's role in "public relations and impression management" was also a key enabler for upgrading. The organization performed this role through its interactions with several different audiences at key points during the industry's history. First, the trade association prompted the state, which was historically biased toward the manufacturing sectors, to provide similar support to the software industry. By capturing the state's attention, NASSCOM lobbied and helped secure tax breaks on exports and deregulation of the telecommunications industry, which enabled growth. These policy changes sent an important message to foreign firms about the opportunities and potential available to them in India's IT industry. NASSCOM also focused on impression management in its interactions with India's own public, using slogans with mass appeal to gain their attention and later garner support for infrastructure projects, such as those in

telecommunications and power, that directly affected the industry's ability to provide services to foreign customers. As the industry grew, NASSCOM increasingly focused on managing the impressions of publics and governments outside India. It focused on improving the international image of the capabilities of Indian labor and firms and the security of sensitive data processed by Indian ITES firms.

i. Firm level mechanisms

Shifting the unit of analysis from trade associations to firms, I find inter-organizational knowledge transfer is a key source of firm level upgrading. In Chapter 4 I identify two principal mechanisms that facilitate knowledge transfer, professional migration and skill upgrading through client interaction. Upgrading through the migration of skilled technical professionals results in much faster and higher level of upgrading than upgrading through client interaction. This is because workers are often performing that work prior to migration and the migration brings their skills and "know-how" into the country. Previous educational credentials and work experience at well-known international firms and hospitals act as a signaling device about the quality and credibility of the founders and, by extension, their firms. Skill upgrading through client relationships deepens skills slowly over time. Within the context of client relationships, onsite visits to clients were important relationship building periods, with employees learning from these clients, but also building their own credibility with the firm through that interaction.

Evalueserve, which primarily gained the knowledge needed for financial services *prior* to the organization's first client engagement, still engaged in such client visits. Here the function of visiting clients was clearly more than just knowledge transfer, since these visits usually occurred after service delivery to clients was already in process and much of what was required for service delivery was obtained through the migration of technical

professionals who were trained and educated abroad. Instead, the primary purpose of these visits was to enable Evalueserve and its employees to form closer relationships with clients, while demonstrating their capabilities as those relationships grew. Client visits and employee movement between developed and developing contexts also provided "cultural" learning opportunities, which are the focus of Chapter 6.

Firms create knowledge and upgrade skills through investment in firm orchestrated employee-training programs, but these programs also send signals to prospective and existing clients that serve to build firm credibility as knowledge service providers (Chapter 5). Firms simultaneously build skills and communicate their capabilities through the building of "universities," distribution of "white papers" that provide analysis and innovative approaches to research, running "academic" training sessions including hosting symposiums with industry professionals. Another way that technical capabilities are communicated is through the term "knowledge process outsourcing" itself, which was a term coined by an Evalueserve executive to differentiate the firm's services from lower value and more commoditized back office and voice services, such as data entry and call centers. The various firm level efforts to build technical and industry knowledge increases firm capabilities, but this process is not just about obtaining and building knowledge, but also makes a claim that one possesses "knowledge."

Cross-cultural service work requires technical as well as non-technical skills (Chapter 6). In particularly, IT enabled services require cultural labor, which I define as the management of individuals' cultural repertoires that are deployed to create the sensation for the client or customer that they are interacting with somebody from their

same culture. At its core, the performance of cultural labor is meant to manage client impressions and signal firm credibility in services. The manner in which services are provided to a client shape the overall perception of the value of that service. Cultural labor operates on a continuum ranging from surface to deep acting. Lower value work tends to use more surface acting, such as engaging in small talk specific to a client's location and the adoption of western accents and pseudonyms in call center work (i.e. Steve instead of Suresh) to disguise one's national identity as is common practice in offshore call center work. Higher value services tend to require deeper acting, where workers need to internalize "business cultures" that are rooted in the West by relying on explicit rather than tacit communication strategies and abandoning so called "cultures of deference," enabling workers to assertively resist unobtainable requests from superiors and clients.

In India, cultural skills build upon a tradition of colonialism and colonial education, but may also be generated and augmented through other means. India-based firms incorporate cultural awareness and interactive soft skills training into broader training programs that also build technical skills and industry specific knowledge. Cultural knowledge and soft skills are screened for in hiring practices and then further developed through firm training programs and through interaction with clients. The firm level screening processes and programs were in turn aggregated by NASSCOM at the industry level. NASSCOM developed an industry wide skill assessment tests, called the NASSCOM Assessment of Competence, that is used to screen industry job candidates, testing cultural rooted "soft" skills, such as an ability to read, write, and listen effectively in English and demonstrate command of western business etiquette. NASSCOM also

communicated to government officials the lack of preparedness Indian graduates had in interactive cultural skills and the need to address these deficiencies in higher education curriculum reform. Curriculum changes have already been adopted in many private colleges and universities and the central government is in the process of implementing these changes into its program to improve technical higher education. Elements of firm level training programs that teach cultural sensitivity and soft skills have been incorporated into national educational policy in "The Technology, Education, Quality Improvement Programme," which is a local and central government program, being rolled out across India emphasizing improvements of "soft skills" alongside improvements in technical education (Department of Higher Education, 2008, p. 13).

II. Challenging Development Paradigms

Trade associations and firms emerged as the central developmental actors in the development and upgrading of India's IT enabled services industry. This approach to industry development contrasts with both the approach of the state in previous periods of development in India and the role of the state in successful developmental models based on other country cases. The developmental model theorized in this dissertation diverges from the central mechanism identified by Vivek Chibber (Chibber, 2004). According to his account the developmental model that regimes choose to adopt shapes the role of the state and its relationship to industry. Chibber argues that India's embrace of import substitution industrialization (ISI) provided industry an incentive to resist state authority and protect domestic markets, which had an adverse effect on development and innovation in the country, while Korea's adoption of export led industrialization (ELI)

created incentives for industry to accept the state's lead and their authority to discipline capital.

My analysis finds the development in the IT and ITES industries followed a very different pattern that diverges from the route identified by Chibber. From the emergence of the software and services industry, both the state and industry were focused on the export market. The Indian state incentivized exports of software in 1972 with concessions on import duties on IT hardware if the machines were used for export purposes.[99] With a developmental focus on export markets rather than internal domestic markets, Indian capitalists may have had new incentives to work with the state, but the Indian state never gained the ability to discipline capital, as was the defining feature of South Korea's developmental model. Instead, firms and their trade association emerged as developmental leaders in their own right, gaining more authority over the state and the state's developmental projects. Rather than the state disciplining capital in accordance with the state's industrial developmental plan, as in Korea, the Indian state solicited industry for their recommendations for planning and gave industry the authority to design developmental plans on behalf of the state. This developmental authority was centralized in trade associations, which emerged as the central actor driving industry development.

The emergence and dominance of trade associations in the industry development process simultaneously reaffirms the importance of "embeddedness," while also showing the limitations of an understanding of the emergent actors that can help produce embeddedness. The developmental state literature refers to associations as facilitators in state-society relations and tends to characterize associational roles primarily in terms of

[99] Financial incentives are a classic strategy, used by developmental states, to entice entrepreneurs and firms to invest in nascent markets.

the forum they provide for policy makers and industry leaders to interact and create state-society linkages (Evans, 1995; Pingle, 1999; Saxenian, 2000). More recent studies have found that business associations can directly affect actions taken by the state (Schneider, 2004; Sinha, 2005). While the developmental state literature recognizes that trade associations can be a source of state-society relations, they have not been found to be *the* source of leadership in development. Yet the analysis in this dissertation demonstrates the ways in which trade associations may move beyond their traditional lobbying role to become developmental actors in their own right. This institutional arrangement differs drastically from the developmental bureaucratic states of South Korea and Japan, where the state was the authoritative and leading force behind industrial development.

The Indian approach to development also differs from the developmental network state (DNS). The DNS is more "hands on" than the DBS and involves public sector officials working closely with industry to identify and support new strategic industries (Block, 2008; O'Riain, 2004). However, in India, the "hands on" work of development is initiated and largely performed by industry, led by the trade associations, rather than the state. It is associations that identify new strategic opportunities for industry, based on their connections to member firms and their own research of the market, and then coordinate with the state to enlist their support for developmental projects benefiting industry. The role of the Indian state has generally been reactive to industry problems, rather than proactive. The state's slow response in addressing the growing technical skill shortage in higher education during the 1990s and 2000s and key role trade associations and firms played in coordinating policy to address this problem illustrates the difference from the DNS.

A key reason why industry, rather than the state, assumed a leadership role in industry development is based upon the qualities of services themselves. There are three major points of differentiation between services and manufacturing that have implications on the institutional arrangement that foster industry development and on the state's ability to provide leadership for industry development specifically. First, the intrinsic qualities of services themselves mean that industry, rather than the state, has access to knowledge for development. In high technology manufacturing the state's knowledge may be limited, since it too also does not have access to firm level processes (Amsden, 2001). In services the state has even less access to production knowledge. This is because services are interaction intensive and production and consumption are difficult to decouple. The technical and cultural expertise required for service delivery is also enmeshed within service relationships themselves. This is particularly true in services that are highly integrated into clients' work processes, such as those provided by the GRC and Infosys, which make knowledge relationally dependent and difficult to extract. The interactive nature of services mean that the firms engaged in these relationships are the best source of information about what is needed for service delivery and the state does not have access to this knowledge.

In manufacturing, in contrast, knowledge required for development is less embedded in relationships. Technology transfer is a major source of industry learning in manufacturing and while technology is tacit and never completely codifiable, even when copying it (Amsden, 2001, p. 51), it is still much easier to learn production insight for manufacturing process independent of customer relationships than is the case in services. This is due in part because developing countries may also gain insight into production

requirements for high technology commodities through the process of "reverse engineering." The manufacturing success of Korea and Taiwan depended upon the ability to reverse engineer products designed in developed markets (Lall, 2003). Reverse engineering does not require interaction and is performed *within* the developing country itself. In services, however, it is difficult to reverse engineer an interactive process and learning is difficult outside of service relationships.

Second, the relatively low capital intensiveness of services, relative to manufacturing, makes firms less reliant on state leadership. Manufacturing usually requires large investments in physical machinery, while services; particularly at the lower skill level, require few capital investments beyond phone and computer equipment.[100] Manufacturing is capital intensive, requiring more state help in mobilizing capital to spur development. For example, the creation of a semi-conductor manufacturing industry with its requisite "cleanrooms" is an extremely capital and technologically intensive process. Under these circumstances, initial state investment and coordination are key components of creating a fledgling industry as the semi-conductor industry in Taiwan demonstrates. The lower relative costs associated with services suggest that this industry has lower barriers of entry for competing firms and nations. It also means that the service industry is less dependent upon the state's ability to mobilize capital to help support entrepreneurship and reducing financial risk in new strategic industries. The lower capital intensiveness of services, relative to manufacturing, offers a qualification to the historic role developmental state's play in mobilizing capital. Charles Lindblom observed that

[100] The lower physical capital requirements of services, however, are partially offset by higher total labor costs due to the general labor intensity of services. At the higher end of services "knowledge workers" may be particularly difficult to find and relatively expensive. Nonetheless, start-up costs in services remain generally lower than in manufacturing.

states have strong thumbs, but clumsy fingers (Lindblom, 1977). By this he meant that states have strong thumbs that mobilize capital and affect structural transformation, but clumsy fingers that often lack the dexterity to fine-tune industrial policies. The lower capital intensiveness of services, however, suggests that states may not need as strong of thumbs, at least in the short-term, although state investments in education over the long-term remain crucial in upgrading in services.

Third, manufacturing requires more state-level interaction to coordinate the inward flow of raw materials and the outward flow of exports, relative to services. Material inputs and exported finished product pass through state owned and operated sea and airports and are strictly controlled by custom agencies. For example, a manufacturing company in India that requires steel for production will need to coordinate with governmental officials on import and export regulations. Services that cross national boundaries through telecommunications technologies, in contrast, largely bypass state control. The state does helps create telecommunications infrastructure for service transmission and also monitors transmissions for security and safety, yet these oversights are much less restrictive than the infrastructure and custom constraints for the movement of physical products. The interactive nature of service work, its lower initial capital intensiveness, and the decreased scope of state involvement in coordinating the flow of inputs and outputs in services relative to manufacturing serve to marginalize the state in the industry development process.

III. Broader lessons for policy makers

Finding from the dissertation point to key recommendations for policy makers in developing countries that seek to emulate India's service model. Policy makers should adopt an approach to industry development that focuses on skill development as well as credibility building efforts. Policy ought to develop incentives and policies that develop both technical and cultural skills oriented to a specific export market. Skill upgrading takes place most centrally through long-term investments in higher education. However, continued interaction with firms and their representative associations are crucial in order to evaluate the quality and quantity of graduates and their ability to meet changing industry needs.

Policy makers should also entice foreign credentialed professionals to return to their "home" countries to establish business operations to help foster development in skill intensive professional industries. Encouraging returning professionals provides two benefits when compared to more traditional, step-wise approaches to industrial upgrading. First, industry operations can be more quickly established in high value services by attracting highly trained technical professionals when compared to a slower knowledge transfer process taking place through relationships with firms based in developed countries. Second, attracting highly skilled credentialed professionals permits a higher upgrading trajectory. Attracting foreign trained and educated professionals helps bring new skills into the country, but it also "brings in" relationship ties. Entrepreneurs who return "home" bring back with them their network ties with other professionals and to organizations. These ties are important resources that may lead to trade relationships, but the ties abroad also signal credibility in the capabilities of the firm itself.

In order to attract technical professionals additional incentives may be necessary to help overcome the difficulty professionals may have in establishing business operations. Professionals that have credentials from a foreign country are not typically recognized in their own country, which makes earning money in the domestic market illegal and the business venture potentially more risky in the short-term. The state can help ease this burden by relaxing credential requirements in their home market for "pre-approved" credentials from select countries that pass minimum standards. This would enable recent returnees a potential source of income, through domestic consulting, that could help bridge the period from return migration to firm profitability. The state could also provide additional exemptions or deferments that reduce start-up related expenses, such as waived fees for establishing utilities, down payments, and move in expenses for leased space in designated industrial parks.

IV. Looking Ahead: Emerging Upgrading Opportunities in India's ITES Service Sector

The Indian knowledge intensive service sector is continuing to both broaden in scope and deepen in skill intensity. One area within high-skill professional services that this study sheds light upon is legal process outsourcing (LPO). Offshore legal services are the fastest growing sub-sector in knowledge process outsourcing (KPO) area. In the midst of the global economic crisis, which pushed down overall growth rates of knowledge intensive services, the LPO sector grew by 40 percent and revenue growth from 2010 to 2015 is predicted to be 26 percent annually (Aggarwal, 2010b). There are over 5,200 legal professionals providing offshore services in India and the Philippines, contributing an annual revenue of approximately USD 300 million, and this is expected to reach

18,000 professionals with an annual revenue of USD 960 million by the end of 2015 (Aggarwal, 2010b). Both Evalueserve and Infosys have moved into the legal outsourcing market and provide support in litigation, contract analysis, and legal research. Infosys, in 2009, secured a 300-person project for a well-known legal research company, which constitutes a particularly large project in KPO services, where more typical engagements, such as those at Evalueserve, are 5 to 10 people and a large project has no more than 25 employees.

Despite the current and predicted growth in the volume of offshore legal services, similar professional constraints that made it difficult for upgrading in teleradiology services also apply to legal services. Upgrading opportunities in professional teleradiology services are shaped by the access to professional credentials that are recognized in a firm's target export market (see Chapter 5). At the lower value end of teleradiology services, such as those conducted by the GRC, the scope of work was also reduced relative to the activities conducted by typical technologists. At the GRC, radiologists and technologists focused on 3D lab work and did not interact with patients or capture images with radiology equipment (such as a CT or MRI scanners) as typical technologists do. GRC employees only performed the back-end 3D processing of images. Thus far, LPO services appear to be similarly constrained in scope and ability to upgrade. Offshore legal service providers are prevented from providing high value advising activities to clients without a state license. According to the legal services team lead at Infosys, legal services are, "very specific, restricted to the 'play book'... Right now, we would not advise on any law because we are not entitled to practice law, say in the US, where our clients are" (Infosys, 4/23/09). Legal services in an offshore model are highly

specialized, high in volume, but low in scope, restricted to a predetermined set of activities. Attorneys with Indian law degrees are not allowed to provide legal advice. As a result, they can do the kind of work paralegals do, such as legal research, but they are legally prevented from performing the broader and higher value activities typically completed by US lawyers. Speaking with the Director of LPO services at Infosys (4/23/09):

> Respondent: We wouldn't go and mark up a contract based on what we think is good for them. We would tell them that this is what we believe is good for you [the client], but it is left to you [to decide].
>
> Interviewer: That is because you don't know the intricacies of US law?
>
> Respondent: No, I would know, but since we are not allowed to practice law in the US unless we are a registered lawyer there, we cannot provide legal advisory services, so I would not do it.

Based on the Director's response the problem is not the lack of expertise and knowledge by firms, but a lack of access to do higher value work. This underscores the significant professional barriers to upgrading that have less to do with skill acquisition than access to markets. A way around this constraint would be to follow Teleradiology Solutions' lead in hiring professionals who have US credentials. If offshore firms hire US lawyers with the legal credentials recognized in specific state, as Teleradiology Solutions does with its American board certified radiologists, then the company would in a fact be able to provide those higher value-advising services. However, neither Infosys nor Evalueserve appears to be pursuing this strategy.

V. Industry focus on India's Domestic Market

Until recently, India's IT and ITES domestic market has been relatively ignored by firms who tended to favor an export strategy, primarily focused on the US market. The

market focus is becoming more balanced in response to changes in the Indian domestic market and currency markets; IT and ITES firms became more domestically oriented due to the rising economic prosperity of Indian firms, increased domestic familiarity with technology and services and how these can improve organizational efficiencies, and the volatility in currency exchanges, particularly against the dollar, which causes the costs of offshore services and reported firm profits, which were often reported in US dollars, to also fluctuate (See Table 7.1: Dollar to Rupee Currency Exchange 2006-10).[101]

The increased focus on India's domestic market has implications for industrial upgrading. Some scholars have highlighted that the domestic market presents an opportunity that may lead to additional upgrading (D'Costa & Sridharan, 2004). A major benefit to developing services for the Indian domestic market is that it has fewer entry barriers, both in terms of building credibility and recognition of domestic credentials, and will likely provide new upgrading and innovation opportunities in the future. Reduced entry barriers can provide industry a higher level of control and added opportunities to expand service delivery in terms of both scope and potentially more specialized at the higher skill end. A domestic focus on service delivery may also create innovations in process delivery. This is because the Indian domestic market is a much different operating environment, with a different set of challenges, when compared to developed export markets. But the Indian domestic market will also require new approaches from

[101] Fluctuations in currency exchanges, particularly against the dollar, prompted the IT and ITES industries to concentrate on the domestic market as way to diversify risk away from the US market and as a way to increase revenue. On October 31, 2006, 45.25 Indian Rupees equaled 1 US Dollar; but one year later the rupee appreciated by 14.7% and 39.46 Indian Rupees equaled $1 US Dollar (Evalueserve, 2007). While a rising rupee made US imports cheaper, it also had the effect of making Indian exports more expensive, thereby eroding the labor cost advantage that India provides. IT and ITES service firms sought to mitigate the risk of these currency fluctuations by diversifying into other markets. They focused increasingly upon two other export markets: the European market, which had a strong Euro currency valuation at the time, and Asia, which was characterized by high overall growth rates. The industry also increasingly saw India's domestic market as place to focus their efforts.

those that work in developed markets. Those studying and working at the level of the mass market in developing countries have found that methods of product development, marketing, and pricing schemes that work well in western and developed markets may not work as well in a developing country context (Hart, 2005; Prahalad, 2005). This new operating environment may lead to new service innovations.

The Indian based IT and ITES firms are strongly positioned to grow services in the Indian market, given their familiarity with the marketplace, relative to foreign competitors, and the learning they have acquired or built through knowledge transfer and firm knowledge creation and training. Nonetheless, additional efforts appear to also be necessary, especially to help devise products and services for the less sophisticated small to medium sized Indian business customers. To aid IT and ITES firms in their penetration of the Indian domestic market, each of the major business associations (CII, FICCI, ASSOCHAM) as well as the industry trade association (NASSCOM) developed programs between 2005 and 2006 targeting the domestic market for IT and ITES as a focus for future growth.

Despite the difference between the domestic and export markets, synergies between the markets exist, and what is learned in the export market can be applied to the domestic market resulting in upgrading and expanded scope of service delivery. These synergies are already occurring within the knowledge process outsourcing service sector. Teleradiology Solutions is a clear example of how a firm focused on export markets can use their knowledge and skills to expand services domestically, providing access to more highly skilled and trained technical personnel. Teleradiology Solutions uses the medical expertise that they have acquired and built and the delivery platform they constructed to

also provide remote teleradiology services to rural areas that lack access to radiologists. Teleradiology Solutions is not the only company providing remote teleradiology services within India, but they likely have the deepest expertise due to their knowledge transfer from US institutions and their ability to hire specialists in radiological subfields. Teleradiology Solutions obtained world-class technical expertise from top ranked international universities, then offered additional training through its firm-level "academic" training programs, and made that expertise available through the equipment and delivery capacity that it built to service international customers. All of the necessary investments, both in technical training and infrastructure, were paid for from international teleradiology profits and continuing profits are used to subsidize reduced cost or free services to the domestic market. This practice provides India a clear and direct developmental benefit in attracting foreign trained technical labor to India and also shows how a firm focused on international markets can simultaneously address technical shortages in a developing countries domestic market. The actual radiologists providing services in India's domestic market are Indian radiologists, rather than US radiologists, but the Indian radiologists have also benefited from Teleradiology Solutions aggregated expertise, which has been disseminated across the firm through its knowledge sharing "academic" sessions. The company also helps rural clinics and hospitals set up the infrastructure to receive patient medical diagnostic images, such as X-rays, MRI scans, CT scans, and ultrasound scans, over the Internet.

Telereadiology Solutions has also built a medical facility on the ground floor of the company's 5-story office building to treat general patients. The clinic uses a similar cost structure used in the firm's main-line international teleradiology business, where the

firm uses services targeted at a more affluent population to build a technical and physical expertise to offer subsidized or free services to populations that lack access to medical professionals. The hospital specializes in providing medical services to the sizable "expatriate" community and Indian IT executives and managers that work for nearby multinational and offshore service companies. The hospital uses its technical credibility,[102] new infrastructure, and proximity to IT industrial parks and affluent gated communities to position itself as a preferred medical center for patients that have the means to pay high margins for medical services. These higher margins help offset free and reduced services to poor patients and children in the community.

VI. Replication of the Indian model?

India is the leader of offshore outsourcing and has upgraded beyond low-level back office and voice services, but the field is becoming increasingly competitive with a number of new entrants, concentrated in specific regions, that are seeking to follow India's offshore service delivery model. Below I assess the potential of these challengers to replicate the Indian model of service development, based on the factors identified in this dissertation, and the long-term opportunities for each challenger to upgrade beyond low value services. This assessment is based upon a combination of industry and scholarly sources and my own analysis of the factors identified in the dissertation. These factors are:

1. Educational system capable of producing high level of technical skills
2. Proactive trade associations able to lead state and industry policy

[102] The hospital is managed by the Co-founder of Teleradiology Solutions who was trained as a pediatric cardiologist at Yale.

3. Domestic environment able to attract return migration of foreign educated and experienced technical professionals
4. High level of firm investments in training
5. Development of cultural skills (language, deep cultural understanding) oriented toward to a sizable export market

The Indian model of IT and ITES services demonstrate the benefits of a large, technically skilled work force. Based upon absolute numbers, the "BRIC economies" (i.e. Brazil, Russia, India, and China) have a clear advantage. Yet, based on the analysis in this dissertation, China appears to be the only BRIC country that has a strong opportunity to challenge India lead in services. Russian lacks the state-industry relations that industry growth requires and Brazil lacks the language skills required to export ITES to Latin American countries or English speaking markets. However, there are some smaller states that also seek to follow Indian's lead into services that have at least some of the factors identified in the Indian service model. The Philippines sizeable ITES sector, low labor costs, and relative English fluency position the country as a strong challenger to India in higher value services. Below I will briefly analyze the major challengers in Asia, Russia and Eastern Europe, Latin American, and Africa in terms of the factors that lead to India's success.

i. Asia

China is a late entrant to the offshore service market, but their strong manufacturing base, deep pool of technical talent, and a supportive state provide them with one of the best opportunities to replicate the Indian model of service development. China's technical talent is the result of consistent and growing state investments in building higher educational institutions capable of producing a massive amount of

technical labor. The educational system produces over three million graduates including 600,000 engineers a year. Industry in China is also characterized by strong government support. While the Chinese state model of development differs from that of India, it does not preclude the state from fostering the ties with the emerging service industry required for growth and upgrading. In addition, recent work suggests that China's approach to development is less top down than many suggest (Appelbaum, et al., 2011), which suggests that the state has the ability to interact with industry and trade associations to get industrial policies fine-tuned. The country has also been successful in courting technical professionals trained and educated abroad to return to establish entrepreneurial ventures there (Saxenian, 2006).

China does have some challenges in following India's lead in services with respect to cultural and soft skill oriented towards the US export market. China has roughly 10 million English language speakers (Gott, 2007), yet these language skills are generally insufficient to meet the expectations of US based customers. Students graduating from the top schools, however, tend to have proficient English language skills and continuing state investments in building English language capability mean that China English language capability will continue to improve. However, the country has already achieved success in providing technical and engineering services to Japan and Korea, which it has a closer cultural affinity with, and these markets could offer China significant future opportunities in upgrading potential. Korean is one of the non-Chinese languages widely spoken in the northeast part of the country (U.S. Department of State, 2010). The shared script between Chinese and Japanese mean that Chinese learn Japanese more easily than other languages. China is relatively

underdeveloped in services, although complementary services, such as remote engineering services and manufacturing design services, can be linked to its robust manufacturing sector. Labor costs are comparable to India's, where it is still possible to find a BPO employee for US $5000 per year (Manimala, 2008; Vedala, 2007).

The Philippines has created an educated labor force with good English skills. It is strong in lower value-ITES, especially voice services, which command 70 percent of the country's ITES revenue, with medical and legal transcription a sizeable second. The countries strength in services can be an advantage relative to other labor markets, when trying to move up into higher value services. The country's biggest shortcoming, however, is the lack of a strong technical skill base, which will take significant time and large investments to build relative to other Asian labor markets. The higher educational system produces 2.3 million students, 10 percent of which are from technical fields, from 1600 institutions (Kennedy & Sharma, 2009). Salaries are slightly higher than India and China. An entry level call center employee costs roughly $5,457 a year, while a team lead earns an average of $9,153 (Kennedy & Sharma, 2009).

ii. Eastern Europe & Russia

The USSR's long history of investments in technical education provides Russia and other Eastern European countries a strong technical base in IT and R&D capabilities. While Russia has 1,100 higher educational institutions and over 160,000 technical workers in science, math, and engineering, and expertise in research and development (Kennedy & Sharma, 2009; Vedala, 2007), the country suffers from poor government support and a lack of constructive ties between government and industry. Brain drain and lack of conducive of environment for industry operations also makes enticing foreign trained and educated professionals back to Russia difficult. Russia's service orientation

has been weak, and oriented toward IT, rather than the BPO sector, which is undeveloped, although opportunities to move into high-value non-voice related processes exist given its technical expertise. The country lacks strong English skills or cultural orientation to other large export markets.

The former USSR republics in Eastern Europe are much more favorable offshore service providers than Russia. The expansion of the EU to include potential offshore service challengers, such as the Czech Republic, Poland, Romania, Hungry in 2004, and then Bulgaria in 2007 has made these lower cost destinations attractive for three reasons. First, Eastern European destinations have more cultural similarity to clients based in the European markets, including a wide range of European language skills with capabilities to serve multiple western European countries. The shared culture and languages will likely reduce errors and mistakes that are the result of miscommunication and cultural misunderstanding. Second, the integration into the EU legal framework may translate into the ability to transition professional work between countries that are traditionally blocked through credentialing and laws. Third, travel between Western Europe and Eastern Europe requires only a short flight relative to those required to get to other offshore delivery locations, such as India.

Despite relatively high technical skills and the attractiveness of close cultural proximity to European markets, Eastern European countries suffer from higher labor costs and in ability to scale. Labor costs in Eastern European countries are low relative to Europe, but they are nearly double the labor costs for comparable skilled labor in India and China, making these destinations relatively unattractive outside of Europe, although the recent European economic crisis has pushed down currency valuations, which makes

this labor cheaper. The Czech Republic produces 100,000 graduates, 22,000 of whom are engineers or IT graduates and the country has a strong and growing presence in both IT and BPO services, and has adequate infrastructure (Vedala, 2007). Romania is one of the strongest regional players in terms of technical education, ranking 13th in the world in terms of IT graduates, with about 62,000 employed in IT (Vedala, 2007). Its strength in IT could help bolster upgrading in the nascent ITES service industry. Poland produces 400,000, technical and non-technical graduates a year. The country's high level capabilities in the ITES industry are demonstrated by its overwhelming concentration in R&D (35 percent) and finance and accounting (24 percent) (Kennedy & Sharma, 2009).

iii. Latin America

Mexico and Chile are the two strongest Latin American challengers to India's lead in ITES. Mexico's proximity to the US and its language competence in both Spanish and English has made it a growing destination for Spanish and English voice services in the US, yet the country lacks the technical skill base and the state-society relations that proved effective in the Indian case. Chile has an emerging niche IT and ITES service market, buoyed by a supportive state. The country has about 65,000 students, with around 12,000 studying engineering and science. The industry has created a strong niche in R&D and analytics services that is upgraded in part from state mining taxes (Kennedy & Sharma, 2009; Peterson, Gott, & King, 2011). Both Mexico and Chile have English language capability.

Brazil has a large overall labor pool, although the technical labor pool is weaker than India's and the workers tend to have weaker English language skills relative to India. The industry is heavily concentrated in IT and the ITES sector has grown slowly. The country produces a total of 420,000 graduates each year, with 55,000 of them

graduating from engineering and science fields (Kennedy & Sharma, 2009). The Brazilian government's designation of IT and ITES as a strategic industry in 2000 has translated into strong government support of industry, further strengthening a history of government partnerships with private sector. Brazil has an active trade association, the Brazilian Association of Information Technology and Communication Companies (BRASSCOM) that was founded in 2004 that could serve as a source of industry advantage. The Brazilian association was modeled on India's business association, NASSCOM, which hosted visiting Brazilian industry officials, shared their organizational approach to industry promotion in India and approach to interaction with the government (personal interview, executive, NASSCOM, 7/10/06). The country has approximately 10 million English language speakers, much less than the 90 million India has (Gott, 2007). The government and industry are providing opportunities for expanded English instruction but the country's lack of capability in English and Spanish hurts its opportunities to export service work outside the country. Salaries in the IT and ITES industries in Brazil are 50 percent higher than those in India.

iv. Africa

South Africa is the strongest challenger in the Africa region and with a large English language speaking population, now has hundreds of contact centers serving clients in Europe and the US, which could provide a sufficient base to help the country move from lower value into higher value services. Yet, significant challenges facing the country is further developing the technical skill base, which is small scale and requires further state directed effort to increase the numbers in the technical labor pool. The country has 21 universities and 15 "technikons"(Kennedy & Sharma, 2009), but educational reform is badly needed to improve educational quality and output, which is

exacerbated by a large gap in student enrollment between white and non-white students. Labor costs are relatively high, with the average salary in the IT industry estimated at $31,957 (Kennedy & Sharma, 2009).

In conclusion, trade associations and firms emerged as the central developmental actors driving industry development in IT enabled services, with the state playing an increasingly supporting role. Upgrading occurred through a number of association and firm level mechanisms that built technical and cultural skills over time. At the industry level, trade associations assumed more proactive developmental roles in its interaction with the government to gain recognition for the industry, lobby for tax breaks and deregulation of telecommunications, and finally drafted industry plans in educational reform and the development of new industrial hub cities. Firms also played a developmental role through significant investments in training in both technical and "cultural" skills. Organizations obtained industry knowledge through two key mechanisms. One was knowledge transfer and learning within client relationships, while the second was through the migration of technical labor educated and trained abroad. This interaction of multiple institutional actors in the development of the ITES industry demonstrate that rather than a withering away of the state, development requires the state's continued involvement, in partnership with other agents in civil society. The arrangements of these relationships constitute a new step in Indian development and in the service development more generally.

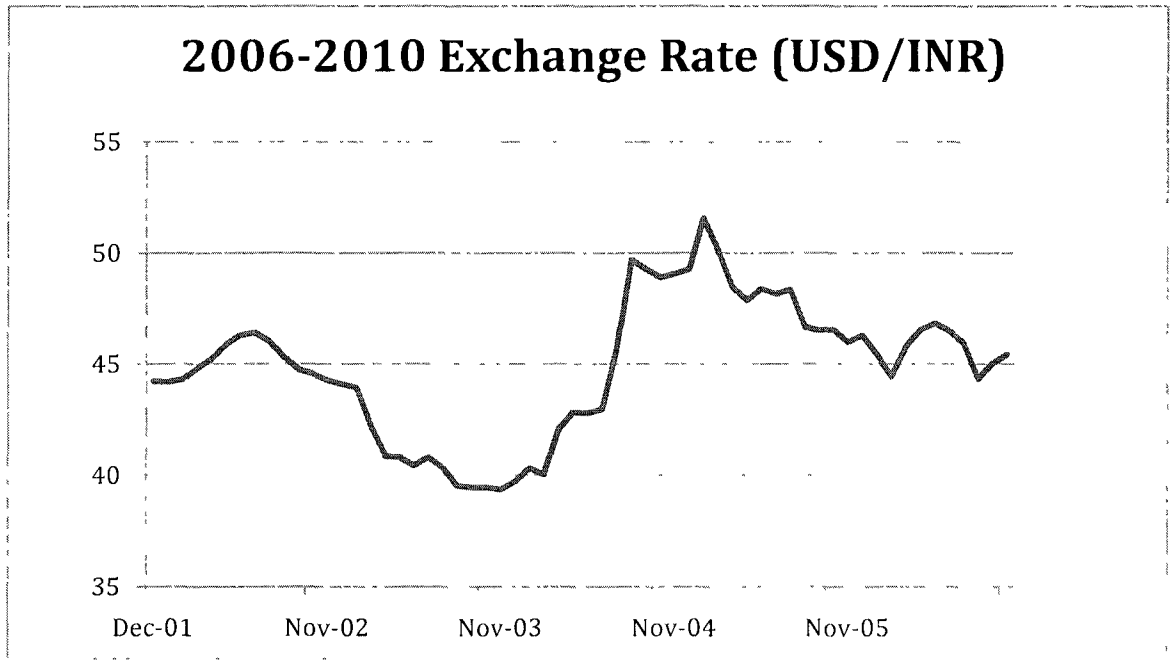


Table 7.1: Dollar to Rupee Currency Exchange January 2006-December 2010

Source: (OANDA Corporation, 2011)

Appendix

Image 1: India - basic country level data

Population:
1.13bn (mid-2007)

Largest Cities: Population in millions, 2001 census
Mumbai (Bombay): 16.4
Kolkata (Calcutta): 13.2
Delhi: 12.8
Chennai (Madras): 6.4
Bangalore: 5.7
Hyderabad: 5.5
Source: (Business India Intelligence, 2011)

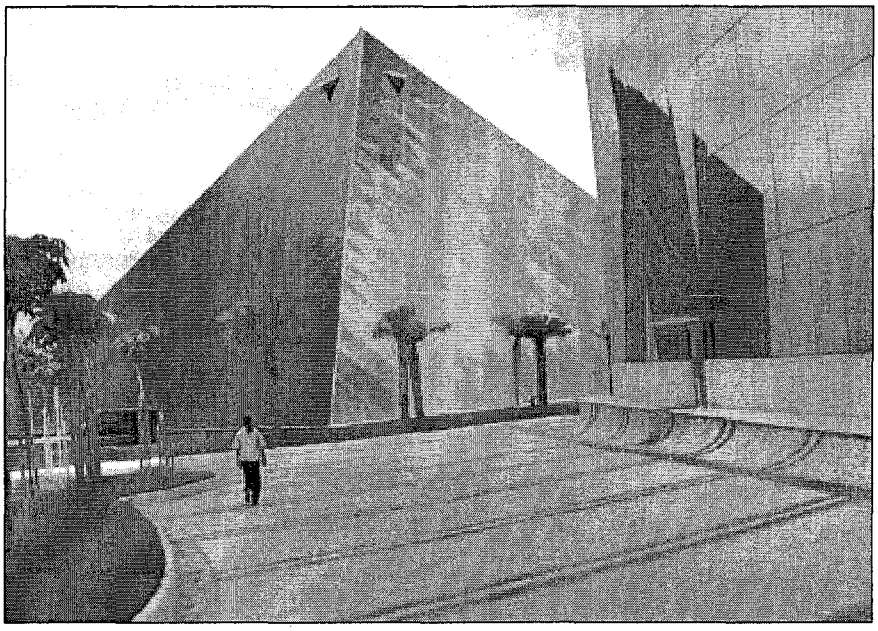


Image 2: Infosys campus

Pictures of sprawling IT and ITES campuses became ubiquitous in the media in early 2000s and are emblematic of "Shining India." This photo is of the Infosys Campus in the software industrial park, Electronic City, which sits on 43 acres that are walled off from the rest of the city, houses 50 separate office building where over 20,000 employees work. Other amenities offered at the Infosys Electronics city campus include shops, banks, restaurants, a health club, a basketball court, a golf course, swimming pools, and a visa processing office. Photo source: (Schifferes, 2007).

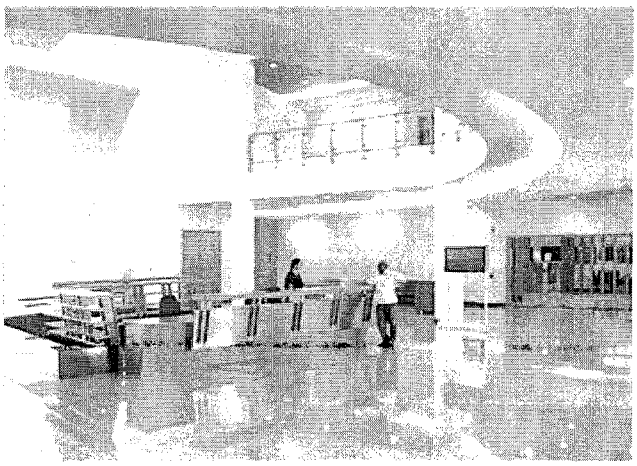


Image 3: Lobby of Infosys development center

The clean lines and the reflection of lighting off of smooth services in the image suggest cleanliness, efficiency, and modernization, values that software and service firms seek to promote to potential clients. Photo source: ("The lobby of Infosys development centre in Mysore," 2004).

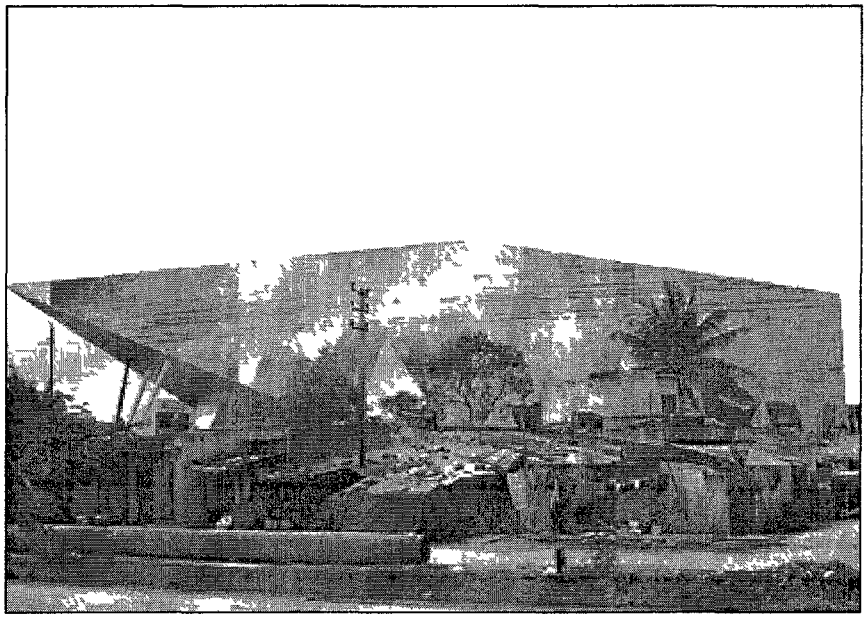


Image 4: Infosys's business process outsourcing center

In this photo Infosys's glittering Business Process Outsourcing (BPO) center in Bangalore is juxtaposed with make-shift housing for the poor that have arisen next to the road bordering Electronic City's IT industrial park This image is atypical in that it includes symbols of "Shining India" fore grounded by scenes of poverty Source (Schifferes, 2007)

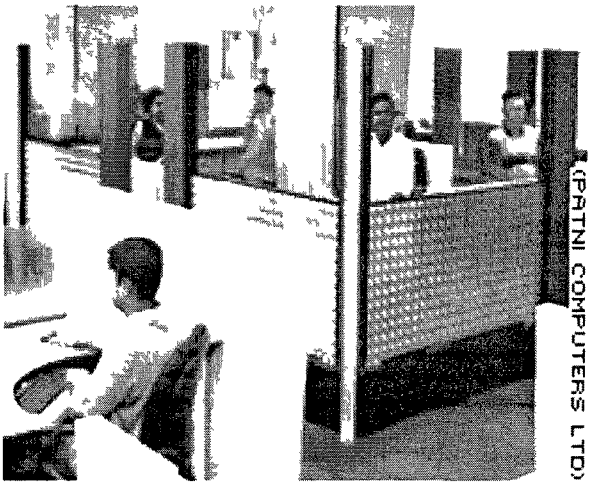


Image 5 (left): Call center workforce and workers.
Photo Source (Bray, 2005)
Image 6 (right): Call center office cubicles and workers.
Photo Source (Sharma, 2004)

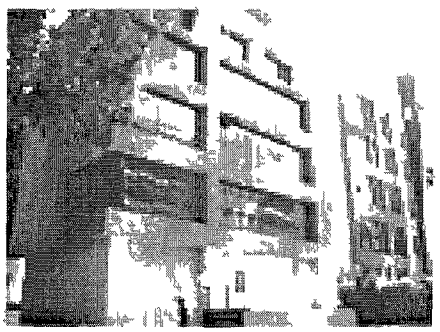


Image 7: Teleradiology Solutions office

Located ın Whıtefield on the outskırts of Bangalore Source www RadGuru ne

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