

**INDUSTRY STUDIES ASSOCIATION  
WORKING PAPER SERIES**

The Evolving Indian Offshore Services Environment:  
Greater Scale, Scope, and Sophistication

By

Rafiq Dossani  
Asia/Pacific Research Center  
Stanford University  
Stanford, CA 94305

Martin Kenney  
Department of Human and Community Development  
University of California, Davis  
Davis, California 95616  
and  
Berkeley Roundtable on the International Economy

2007

Industry Studies Association  
Working Papers

WP-2007-34  
<http://isapapers.pitt.edu/>

The Evolving Indian Offshore Services Environment: Greater Scale, Scope, and Sophistication\*

October 3, 2007

Rafiq Dossani  
Senior Research Scholar  
Asia/Pacific Research Center  
Stanford University  
dossani@stanford.edu

Martin Kenney  
Professor  
Department of Human and Community Development  
University of California, Davis  
Davis, California 95616

&

Berkeley Roundtable on the International Economy  
mfkenney@ucdavis.edu

\* The authors would like to thank Frank Mayadas and Gail Pesyna for the Alfred P. Sloan Foundation for their generous support of our research on offshoring.

## ABSTRACT:

Since 1995 the offshoring of administrative, technical and software services to India has rapidly evolved from an insignificant curiosity only studied by a few scholars of international development to a major issue discussed by many in the U.S. and Western Europe. India's position has expanded and evolved in terms of numbers of employees, the types of service activities, and the sophistication or value-added of the work. This paper argues that two separate but related ecosystems have recently emerged in India to provide services and, more recently, high technology products for the global economy. The first ecosystem is for service provision. Here we suggest that today the service provision ecosystem is so sophisticated that it can endogenously create new service offerings and attract overseas firms to transfer activities in new industry verticals. The second ecosystem, which is smaller and only recently emergent, is gestating new venture capital-financed, technology-based startups. We provide a typology of these firms and suggest that some have bi-national roots linked to the U.S. Silicon Valley. Finally, we explore the possibility that the leading Indian information technology systems integrators may have created a new business model that is superior to that of the incumbent Western service providers. We believe that the Indian offshore service provision infrastructure will grow in size, complexity, and importance to the world economy.

## **Introduction**

The rapid expansion of services offshoring has sparked a public debate in the U.S. (Hira and Hira 2005), and an unprecedented soul-searching among economists about the formerly sacrosanct belief that trade globalization was an unalloyed benefit (Gomory and Baumol 200; Blinder 2006; 2007; Samuelson 2004). Richard Freeman (2005) has observed that in the last two decades what he calls the “great doubling” has occurred in which approximately 1.5 billion much lower-cost workers have been added to the global economy. The first “phase” of this doubling was the well-documented offshoring of manufacturing to China. Since the recession in the wake of the collapse of the Internet Bubble, the offshoring of information technology-enabled work has garnered much attention in the media and, increasingly, among scholars. If China is the icon for manufacturing offshoring, it is India that is the prime destination for the relocation of service work.

India’s increasing significance as an economic actor on the world scene is remarkable because it is based almost entirely on the export of non-physical goods, such as software and an array of other activities that can be somewhat imprecisely grouped into the catch-all category called “administrative and technical services (ATS).” These exports are almost entirely in the form of data streams (and, of course, Indian professionals that are dispatched abroad to work at their customer’s premises) – be they the voices of telephone operators answering customers’ queries, data entered into a computer, data entry and analysis, sophisticated product designs, or software programming. Exactly the work that Robert Reich (1991) suggested in his concept of the “symbolic analyst” was the future of employment. He prophesied that symbolic analysis would grow in importance in the advanced economies. Little did he foresee that it was the

analysis of symbols on a computer screen that was exactly the type of work that would be the basis of a new globalization wave.

The context and goal of this paper is to provide the outlines of the evolution of the Indian offshored services sector. The analysis is prospective and inductive in orientation, as it is based upon interviews with and a number of firm case studies executed by corporate executives and managers.<sup>1</sup> It is informed by the international business studies literature suggesting that the establishment of offshore facilities by MNCs can help promote rapid learning in formerly less sophisticated environments (Bartlett and Ghoshal 1989; Kogut and Zander 1993) and a more general acknowledgement of learning-by-doing. For the phenomenon under investigation in this article, MNCs had not begun relocating operations to India to access the inimitable local knowledge or markets (Dunning 1994; Malnight 1995), but rather a capable low-cost labor force. The Indian case is of particular interest in the sense that even while developed nations have been expanding global fulfillment of ATS in India, Indian service providers have been building the capability to further penetrate home country markets. The multiplicity of actors operating in India is causing the emergence of a rich ecosystem that is entraining the development of yet further capabilities encouraging yet further ecosystem evolution (Mathews 2003). It is possible that a powerful cumulative causation process is currently in operation, and this may explain recent findings that firms are offshoring certain projects to access talent (Lewin and Peeters

---

<sup>1</sup> In November 2006, we conducted 35 interviews in Mumbai, Hyderabad, New Delhi, and Bangalore from November 1 to 15, 2006 at the following firms: Adobe, Arada Systems, Bhirus Software, Broadcom, Cisco, Citrix, Computer Associates, Dell, Desmania Design, eValueServe, Firstsource, Google, Grant Thornton, I-Flex, Insilica, Marketics (now WNS), Medusind Solutions, Motorola, SAP, Sasken, Sidbi Ventures, Sonoa Networks, Tejas Networks, Texas Instruments, Telsima, TCS, Tutorvista, Wipro, Yahoo!, and Yatra. In two previous research trips to India in April 2004 and April 2005, we interviewed a similar number of firms, though we concentrated more heavily on business process outsourcing firms. In addition, we have organized two conferences on offshoring for which executives provided case studies. At the December 2006 conference the following firms were represented: ABN AMRO, Cognizant, ePLDT, eValueServe, Freeborder, Global Executive Talent, Google, HCL, India Semiconductor Association, IronPort (now Cisco), Infosys, IBM, KPMG, Primavera, Sabre Holdings, Softtek, Symantec, Tensilica, Texas Instruments, TCS, Wipro, and Yahoo!

2006a; 2006b; Maskell et al. 2007). The earlier view of offshoring, as largely or entirely concentrated in routinized work is no longer justified (on routinized work, see Levy and Murnane 2004; see Holman et al 2007 for call centers).

Our motivation is to describe the parameters of the Indian ecosystem for service provision. This ecosystem is evolving rapidly in terms of scale, scope in terms of activities, and the sophistication of those activities. The foreign MNCs are transferring increasingly sophisticated activities to India (Patibandla and Petersen 2002). Simultaneously, Indian ATS provision firms are learning from their customers abroad. Indigenous entrepreneurs and Indians returning from abroad are contributing to the creation of new capabilities in India. In the computer systems integration fields, Indian firms, such as Infosys, TCS, and Wipro have, in less than a decade, matured into serious competitors to the global leaders, such as Accenture, IBM, and EDS. This intense and sustained maturation process is creating an ever richer and more potent ecosystem.

The impact of the relocation of work to India on developed nations is not explored directly in this paper, as there are ample studies whose results conjecture that the impact will range from minimal to suggesting a shift that could range into the tens of millions of jobs (Bardhan and Kroll 2003; Kletzer and Jensen 2005; McKinsey Global Institute 2005; Blinder 2006; 2007). Though measuring the impact on the developed nations is not our goal, the evolution of the Indian ecosystem obviously will impact the types and number of jobs that might be relocated. If the Indian ecosystem continues its current evolutionary trajectory, then work that may not initially have appeared offshoreable may eventually become relocatable. Put differently, work that may have appeared to be solidly place-based could, at least, in part become moveable.

This paper provides an evolutionary perspective on the role of India in providing service labor to the global economy (Lewin and Volberda 1999). We provide confirmation to findings by McKinsey (2006) and Blinder (2006; 2007) that offshoring will not be confined to routine jobs (Levy and Murnane 2003), but rather jobs that do not require in-person interaction with non-remotely accessible factors or consumers, be they human, social, or inanimate are candidates for relocation. The first section provides an evolutionary perspective on the emergence of Indian service labor provision. The second section discusses two related but different ecosystems emerging in India. The first ecosystem is for remote service provision, and a second ecosystem is for entrepreneurial startups. The next section discusses the upgrading that Indian service firms are experiencing. The subsections deal with three types of firms: the Indian service providers, MNC service providers, and other MNCs with subsidiaries of various sorts in India. The next section discusses the emergence of an entrepreneurial ecosystem in India and suggests that some global-class startups are being formed. The concluding discussion reflects upon what the emergence of service and entrepreneurial ecosystems means for the location of work in the global economy.

### **An Evolutionary Perspective**

To understand the current ecosystem and the organizational forms, an evolutionary perspective is valuable. A crude indicator of the growth of Indian ATS provision to the global economy is through employment. As Figure One NASSCOM Employment indicates, the aggregate employment growth in all sectors has been from 232,000 in March 2000 to 1,251,000 in March 2007 (Nasscom 2007).<sup>2</sup> The overall compound annual growth rate is over 23 percent,

---

<sup>2</sup> The Indian fiscal year runs from April 1 to March 31. So statistics announced on March 31, 2007 of fiscal year 2006-2007 refers to 9 months of 2006 and three months of 2007.

with the business process portion growing more quickly. The second dimension refers to the proliferation of industries offshoring portions of their ATS operations to India. The third dimension is the growth in higher value-added activities undertaken in India. This is illustrated in Figure One by the category of R&D services employment, which, though admittedly more development than research, has expanded at nearly 18 percent per annum. One gauge of the rising visibility of R&D services is that not until 2006 did NASSCOM begin treating it separately in its aggregate statistics. This recognition illustrates what anecdotally has been recognized by interview-based observation (Dossani and Kenney 2006). One way to understand the evolution of India's ecosystem as a provider of ATS is to illustrate it through a set of stylized snapshots in its history.

*1995*

The ATS provision ecosystem has grown in size and evolved in terms of activities and value-added. Consider the situation in 1995, which is illustrated in Figure 2. At that time, Indian firms were largely confined to software programming with the majority of their workers being "body-shopped" to the U.S. and Europe (Arora and Athreye 2002; Arora et al. 2003; D'Costa 2003; Heeks 1996; Schwabe 1987). A few MNCs such as British Air, Citicorp, and General Electric Capital had small subsidiaries for software coding and transaction processing services. For example, British Air transported its used ticket stubs to India where they were processed and entered into a computer. In Bangalore, TI and HP had small technology development operations. Patibandla and Petersen (2002) argue that the MNCs were attracted by a growing, though still small, skilled labor force, and that their arrival accelerated the development of that labor force. At the time, there were probably fewer than 100,000 employees providing

work to offshore clients. Bandwidth was scarce and expensive and few overseas customers were willing to trust Indian vendors. Moreover, though changing rapidly, India had a reputation as a difficult environment for foreign investment. Not only was the sector small, but as Figure Two indicates, it was also low value added. However, offshoring was expanding rapidly, and, seen in retrospect, was on the verge of dramatic expansion.

*2000*

By 2000 the situation had evolved significantly. India had deregulated telecommunications, there was a dramatic buildout in domestic and global telecommunications bandwidth and accelerated by the Internet building, and a movement to digitize documents and workflows. This profoundly affected relocatability of service work, as the data was being liberated from the physical media. Also, the Internet Bubble in the U.S. created a significant shortage of IT and software workers in the U.S. The much hyped Y2K problem convinced many corporate customers that they should replace old legacy software with new standardized software packages. This created an enormous amount of work, much of which was routine coding and programming. Here, the Indian software services vendors using low-cost labor could offer dramatically lower prices than their developed nation counterparts. As a by-product, the idiosyncratic firm-specific knowledge was reduced.

Large MNC SIs, such as IBM and Accenture, were exploring the Indian environment for low-cost software talent that they could use to lower cost. The existing MNCs also were expanding their operations. GE Capital International Services was a pioneer in relocating to India corporate activities ranging from credit card back office operations and call center work to its internal finance and accounting operations. As Figure Three indicates, the IT field was the

largest and most active, but financial institutions, such as HSBC, Citigroup, and American Express, were expanding their Indian operations, even as they outsourced more to India. Roughly contemporaneously, and, affiliated with the activities of the existing MNCs, Indian firms were being formed to offer customer relationship management, i.e., call centers, data entry, and medical transcription – this could be termed the first wave of business process offshore service providers. This marked the beginning of an expansion in the scope of activities being considered for offshoring.

2003

By 2003, there was greater recognition that ATS offshoring would change the global geography of work, and this was catalyzed by the alarming February 3 *Business Week* headline asking “Is Your Job Next?” Though *Business Week* was not focused entirely on India, there was little doubt that India was the increasing center of attention. No longer was the discussion of offshoring confined on the threat to manufacturing labor from China and Mexico or even coders from India, now the threat appeared to be aimed at U.S. service workers (for an early formulation of this, see Bardhan and Kroll 2003; with reference to India, see Dossani and Kenney 2003).

The Dot.com Bubble had a double effect upon offshoring. First, the global telecommunications buildout for the Bubble created an enormous over-leveraged infrastructure, which, when the Bubble collapsed, was sold at bankruptcy prices that enabled the dramatic lowering of data transmission costs. Second, the accompanying recession encouraged firms to search for ways of lowering their cost structure. Offshoring to lower-cost environments was an important strategy in this endeavor. So from 2000 onwards, there was a rush to offshore to India both through offshore outsourcing and the establishment of subsidiaries. The experience foreign

firms gained through contracting to Indian firms in the Y2K process also introduced foreign executives to Indian capabilities. As Figure 4 indicates, there was a proliferation of MNC subsidiaries and independent Indian outsourcing firms, especially in the non-software services fields. The leading Indian software services firms were expanding rapidly. The MNC outsourcing firms such as IBM, Accenture, and EDS were until 2003 expanding their Indian operations. Toward the end of this period, they decided that India would become the center of their offshore operations. Though growth was rapid, both the popular press and academic research still believed that Indian ATS provision would be confined to the low-end of the software value ladder (D'Costa 2003).

*2006*

With 1.25 million persons employed delivering services remotely, India had more offshore ATS workers than all the other nations combined. For many IT MNCs, their headcount in India was now larger than in any other nation except their home countries. Whereas earlier firms had transferred selected activities that were parts of larger processes, now increasingly entire processes were relocated to India. The Indian subsidiaries had been given global profit and loss responsibility for entire MNC divisions. This meant that Indian managers were now managing personnel in developed and developing nations. The size of these investments meant that the Indian operation was now a critical link in various firms' global operations. Cisco recognized this most explicitly when, in 2006, it announced that it was establishing the position of a Chief Globalization Officer to be located in Bangalore (Cisco 2006).

The Indian ATS ecosystem had not only expanded, but, more interestingly, was of greater complexity than ever before (Figure 5). The pioneers were now joined by firms from a variety of

industries; many of which had never had ATS contractors or subsidiaries abroad. Also, the diversity of ATS undertaken in India had expanded. For example, General Motors' first overseas R&D laboratory aimed at the U.S. market was established in Bangalore (Dossani and Kenney 2007b). The Indian SIs exemplified developments in the ecosystem. Though not yet in terms of revenues, in terms of employment the Indian SIs now rivaled the large international SIs – this was quite an accomplishment for firms that only a decade earlier had earned the sobriquet “body-shoppers.” The final change was an increasingly dynamic entrepreneurial ecosystem in India. Not only had India become a location of choice for developed nation and, particularly, Silicon Valley startups, but a startup culture is emerging in India, even as a cadre of Indians being trained in the Indian operations of Silicon Valley firms now saw opportunities in India.<sup>3</sup> As in the case of China in regard to manufacturing, India was now in a league by itself regarding services offshoring.

### **The Indian Ecosystems**

By 2007, ecosystems for offshore services provision and for entrepreneurial firms have emerged. The expansion of offshore service provision created the space within which the entrepreneurial ecosystem could grow. The Indian entrepreneurial ecosystem is what the Global Entrepreneurship Monitor terms “high-opportunity entrepreneurship,” to distinguish it from small-scale startups often in the informal retail, agricultural, or manufacturing sectors that have little chance of growing to be significant firms.

The service provision ecosystem encompasses the large established Indian firms, the MNCs, and the entrepreneurial startups. It also includes the central government through the

---

<sup>3</sup> Israel's experience with entrepreneurial spinouts from Silicon Valley subsidiaries is instructive here. For more, see Breznitz (2007).

medium of the Software and Technology Parks of India (STPI); the lobbying arm of the industry, NASSCOM; university and research institutions; and a plethora of facilitating organizations such as real estate developers, lawyers, talent search organizations, training agencies, facilities management firms etc.; all of which ease the establishment and operation of organizations providing services globally. Though the main reason for this ecosystem's existence is to supply existing firms, new startups can also draw upon it. The rapidly expanding entrepreneurial ecosystem certainly benefited and, perhaps, would not have been possible without the service provision ecosystem that predated it.

### *The Service Provision Ecosystem*

The service providers in India are diverse in terms of industry segment, business model, and size (see Figures 2-5). China became the destination of choice for manufacturing and has developed a powerful ecosystem to support manufacturing including global-class ports and a rapidly improving logistic system, India appears to be well on its way to developing the infrastructure, physical and human, for service provision. An excellent example is financial services; even while many financial service firms use Indian service providers, they are also establishing Indian subsidiaries. For example, JP Morgan Chase plans to have 9,000 employees in India by the end of 2007, Bank of America employs 1,500 employees in two different Indian cities, Deutsche Bank will increase the size of its Indian operations to 2,000 by the end of 2007, while Credit Suisse announced the establishment of a 1,500 person subsidiary in India. In the case of Deutsche Bank, part of their Indian operation will be research staff. The elite investment banks Goldman Sachs and Morgan Stanley already have significant research employment in India. The world's largest financial institutions have complicated global offshoring and

outsourcing strategies, but it is in India where they have concentrated their largest offshore operations. The effect of so many activities, an increasing number of which are quite sophisticated, is a rapid maturation of a specialized financial services niche in the larger ecosystem. For other financial service firms deciding where to locate, the growing and increasingly sophisticated labor pool makes it possible to rapidly mobilize a labor force. This suggests that a virtuous circle of increasing attractiveness is now extant.

One sign of the maturation and leadership role India has taken in providing offshore services is the number of the Indian MNC subsidiaries receiving global mandates for the provision of certain service activities. For example, Bangalore is the headquarters for Hewlett-Packard GlobalSoft, which is a globally focused software development and IT services division with offices in Eastern Europe and Mexico. Put differently, the Bangalore headquarters has profit and loss and management responsibility for the global operations. The business process outsourcing (BPO) division providing financial and other services, H-P Global eBusiness Operations, with approximately 6,000 employees worldwide, is also headquartered in India. Another example is SAP Labs India, which employs over 3,000 persons, and is now the largest SAP laboratory outside of Germany. SAP India has been given a leadership role for the development of certain software functions. Adobe India has been delegated global responsibility for PageMaker and Framemaker software.

The result of the intensity and magnitude of this growth is an ATS ecosystem becoming ever more capable as workers, managers, and executives gain experience, and the supporting “soft” infrastructure of intermediaries matures. The sheer density and richness of the ecosystem provides opportunities for “recombinant” innovation in business models (Hargadon 2003). It also creates resources that can be mobilized for entrepreneurship.

## **The Indian Service Providers**

In 1995 Indian-owned service firms were largely confined to the software programming firms. These firms have continued to prosper and matured from being programming houses to being system integrators comparable to developed nation firms such as IBM, EDS, CapGemini, and Accenture in terms of size, depth in verticals, and breadth of offerings; the growth of the established firms has been remarkable (Arthreye 2005). Even the classification as systems integration is becoming imprecise, as they have expanded their offerings to include other engineering services and business process service provision. The common thread here is that all engineering services are about using software, be it in integrated circuit design, product engineering, or back office services provision.

The scale and scope of the Indian ATS industry is no longer largely confined to IT-related activities. Business process provision firms, such as Genpact (a General Electric spin-off), Exl Service, FirstSource, and WNS Global Service already employ in excess of 10,000 persons and continue to grow rapidly (Dossani and Kenney 2007b). Whereas during the 2002-2003 time period they concentrated on call center services, more recently they have shifted their emphasis to other back office services that provide more opportunity to move up the value ladder. In addition to these generalist business process firms, there has been an explosion of specialty service providers. Some firms such as Evalueserve and Office Tiger (recently purchased by R. R. Donnelly) provide higher end services such as equities analysis, patent application research and preparation, and proprietary market research. The sheer diversity of offerings indicates the richness of the ecosystem of Indian service providers.

As Figures 2-5 indicate, in the last decade there has been a quantum jump in the ability of the Indian ATS providers to undertake large complicated projects and sophisticated work. Only a decade ago Indian firms were largely confined to low-level coding and programming (Dossani 2006) and routine data entry. More recently, Indian firms have proven portions of the software services value chain, engineering, and data analysis that are quite high value-added. The first dimension of undertaking larger projects is having sufficient numbers of employees. Whereas, at the end of fiscal year 1999, i.e., March 2000, the largest Indian service provider TCS had 17,000 employees and Infosys and Wipro had approximately 10,000 each, in March 2006 TCS had 63,000 while Wipro had 54,000 and Infosys had 45,000. As of September 2006, TCS had 78,000, Infosys had increased to 66,000 and Wipro had 61,000, and each had ambitious hiring plans. Though still smaller than IBM with its global employment of approximately 330,000 (of which approximately 140,000 are in IBM Global Services approximately 60,000 of which are located in India) or Accenture with 140,000 employees (of which approximately 27,000 are located in India), today the Indian SIs are able to undertake all but the largest outsourcing contracts (Shah 2007).

The large Indian service firms are evolving from IT services firms to engineering services firms. So, in addition to moving up the IT services value-added ladder, these Indian firms are offering other services. For example, Wipro does contract semiconductor chip design. Only three years ago Wipro was largely confined to the two lower value-added steps of Verification and Physical Design and Production and Silicon Production Engineering. Today, increasingly, customers have contracted with them to provide the higher value-added services in digital/analog design and even architecture. The benefit for the Indian vendor is that it can receive improved rates for the project AND it allows its Indian employees to develop new capabilities satisfying

their desire to improve their skills (Personal interviews 2006). All of these service firms are striving for the same goal, namely moving up the value-added ladder.

The Indian service providers are broadening their businesses by offering ever more services. For example, in 2006 TCS announced that it had contracted with Boeing to work closely with its customers to design the interiors of new aircraft they had purchased. This contract for \$30-50 million led to TCS establishing a “laboratory” in Chennai for the design of aircraft interiors (Kurup 2006). Though just an anecdote, it is illustrative of the ability of these firms to broaden their business bases and presumably to increase their value addition.

Finally, Indian service providers are expanding their offshore service delivery operations to provide global solutions for their customers, thereby eroding one of the competitive advantages of the incumbent MNC service providers (for Latin America, see, for example, Mullan et al. 2007).

The Indian firms have developed superb process skills. In many respects, this is due to the necessity they felt to prove themselves to foreign clients. One way to increase confidence was to meet independently developed foreign quality standards whether they were the CMM standards for software process maturity that placed enormous emphasis on creating standardized documentation or various ISO standards. The influence of the General Electric’s six-sigma program is pervasive. Acceptance of these programs forced Indian vendors to carefully examine their service production processes and standardize them, but as important they were constantly experimenting with methodologies for improvement. The result of these standards exercises was a drive to create metrics for measuring efficiency and quality. This has an uncanny resemblance to the Japanese adoption of the Deming/Juran Total Quality Control ethic after World War Two.

The emphasis on measurement and improvement led to Indian firms establishing new standards for software service and quality.

Indian SIs have a number of weaknesses, one of which is that they are Indian firms, and, in many respects, are not fully internationalized, in part due to their current competitive advantage that is based upon their Indian cost structure both at the employee level, but also at the management and executive levels. To become truly global corporations, one challenge will be to globalize their management thinking. This is not unachievable; however it will require migrating the firm's perspective from one seeing the world from an India-centric perspective to a global perspective. The benefits from such a transition are that they will be able to supply customers with globally-aware solutions. This may not be as smooth as the transition was for Japanese leaders that had one of the most sophisticated markets in the world from which to learn. This may be the most serious challenge Indian firms face in their drive to be ranked among the global leaders.

Not only the largest Indian systems integrators, but also the other larger non-software service providers are extremely metric oriented. To use Paul Adler's terms (1996), they resemble learning bureaucracies in that they are constantly benchmarking their processes, and examining them for potential efficiency gains. Anecdotally, there is the belief among some that the Indian vendors have, through their superior performance metrics, placed pressure on other firms to implement metrics (Frank 2006). And yet, even if Indian firms are able to demonstrate superiority on performance metrics in the fast-changing software and IT-enabled space, producing yesterday's solutions or just undertaking the production portion of ATS is not where the greatest value-added is created. A systems integrator must be both prepared and trusted sufficiently to become an advisor or, in the vernacular of this world, an order maker. This is

analogous to the transition Toyota and Honda made during the 1990s from being the purveyors of low-style, high-reliability automobiles to leaders in style, new auto categories (such as crossovers and hybrids) – a transition that has made them the auto industry leaders. There is anecdotal evidence from our interviews with Indian executives and individuals in firms that support the systems integrators that this is a possibility. If the Indian software services and other ATS service firms can make this transition while retaining their cost advantage, then their competitors will suffer not only price compression competition, but also in new ? product competition.

### *MNCs in India*

Nearly every Global 500 firm and many smaller firms now have either a direct presence in India through subsidiaries, through work that it has outsourced to an Indian services vendor, or a developed nation service vendor that delivers at least part of the service from India. The largest firms, such as Citicorp, have services delivered through a complicated global web of ATS providers that includes traditional providers such as IBM, EDS, and Accenture; nearly all of which now have an Indian component in their delivery model, and newer vendors, particularly those from India. Finally, an increasing number of these firms have Indian subsidiaries tasked with providing services internally. For many non-ATS providers, their Indian operations are undertaking ever more sophisticated work. For the ATS providers, India is, outside of their home countries, becoming their single largest overseas operation. In this section, examples of both non-ATS and ATS providers suggest a profound reorganization of the global geography of ATS work fulfillment.

A recent consultant's study by the Everest Research Group (Karthik et al. 2007) suggests that of the world's largest 2,000 firms, 109 now have offshoring subsidiaries in India, and this may be an undercount. Due to the complicated skein of activities, it is possible that even headquarters does not fully understand the scale and depth of their Indian operations. When one includes the fact that these firms are acquiring and divesting operations constantly, their offshoring to India is even more complicated. This section does not address this problem, but does note that a lack of clarity in defining what should be outsourced and what should be retained internally could have numerous adverse effects including the loss of IP, institutional knowledge, and internal capabilities. It can also result in adverse effects on the firm's Indian operations. The focus of this paper is the technology sector; however, the activities of other MNCs in the financial, insurance, travel, automotive, and health care sectors are growing rapidly and deserve attention.

#### ATS Subsidiaries

The rapid growth of MNC ATS subsidiaries operating in India in terms of numbers of employees, breadth of activities, and value-added is remarkable. The pace of employment growth has been remarkable. Today, in terms of size, IBM India rivals the largest Indian SIs, and IBM has more employees in India than in any other nation with the exception of the U.S. IBM's pace has been matched by SIs from Europe such as CapGemini and Siemens Business Services. Given the short-term inelasticity of the labor market, the feverish pace of expansion in India has contributed to wage inflation.

For the MNC SIs, the growth has been organic through hiring and inorganic through the purchase of Indian firms (see Table One). The largest of these, IBM, only reestablished its

operation in India in 1992, but the preponderance of the growth has been since 1999. At the end of 2006, IBM had in excess of 60,000 Indian employees and expected this to grow to 100,000 by 2010. To speed its growth, in 1994 IBM acquired a leading business process firm, Daksh, with 6,000 employees. In 2004, it acquired the 1,400-employee Network Solutions, which specialized in IT infrastructure services. With IBM setting the pace, other ATS firms also rapidly expanded their Indian operations. For example, EDS, which entered India in 1996 as a GM subsidiary, began even later; as of 2005 it had only 3,000 employees in India. In 2006, EDS management decided to rapidly build its offshore operations, so it acquired the 11,000 person Indian business process firm Mphasis, and then followed this in 2007 with the acquisition of the 700-person firm RelQ. Simultaneously, it rapidly increased hiring at its existing Indian facilities. To be sure, it is not only U.S. domiciled organizations that are having to respond, as Table One indicates, the largest European outsourcing firms are also rapidly increasing their presence in India. All of them appear to be scouting for acquisitions, as they seek to expand their Indian presence.

**Table One about here**

The reason these MNC SIs are expanding their Indian presence is not surprising, since competition with the Indian SIs, with their far lower cost base, was increasing. In the 2006 EDS Annual Report, its Chairman and CEO reporting improved results observed, “We continued to realign our work force with strong offshore capabilities, making us more price competitive and responsive to client needs. We more than doubled our presence in high-quality, lower cost locations to 32,000 employees. While India was the primary beneficiary, we also are migrating our work force to other regions such as Latin America, China, Hungary and Poland.” Each of the major MNC SIs faces a similar difficulty, namely a high cost structure that is difficult to sustain in a global competitive environment.

Given their rapidly increasing size, effectively managing Indian operations has become a management imperative. Since most of these firms are firmly rooted in their home nation environment, and many overseas managers see India as significant, largely for its ability to cut costs, integrating their Indian operation into a seamless global strategy is a challenge. Previous MNC globalization initiatives may have been easier to manage because, in general, they were smaller and less hurried. Their smaller size meant that the operations were not as costly in terms of resources and especially management time, and lack of temporal pressure provided greater opportunity for experimentation and recalibration. The MNC SIs must manage their Indian operations well because so many resources have been invested and botched service delivery can cripple their clients. A final question is whether the MNCs will adopt the service quality ethic existing in India or will bring their methodologies from abroad. Put differently, will they learn from the Indian ecosystem or just use it as a source of low-cost labor? Successfully managing their Indian operations may be a determining factor for which SIs survive in global markets.

#### Non ATS MNC Subsidiaries

In addition to the MNC outsourcing firms offshoring to India, a wide variety of firms in the developed nations are establishing subsidiaries in India to discharge their ATS internally. Within these subsidiaries, foreign firms can undertake activities that they are unwilling to outsource either domestically or abroad. Offshoring permits firms to lower their costs while retaining their proprietary and/or higher value added processes.

Firms offshoring to their own subsidiaries has grown dramatically from the pioneering operations that were established in the 1980s. The pioneers were concentrated in IT and finance. They were so successful that today nearly every large IT or finance firm has an Indian

subsidiary. Firms from other industries are joining them. For example, major retailers such as Target Corporation and Tesco have large Indian subsidiaries. According to Robert Kupbens, the Vice President for Technology in Technology at Target Corporation (2007), in August 2006 Target Corporation opened its Bangalore subsidiary, and in mid 2007 employed 500 persons, but expected the Indian operation to grow to 3,000 by 2009. The types of work to be performed in India are indicative of the evolution of these offshore subsidiaries. By the end of 2007, operational responsibility for Target.com will be in India. The spectrum of work will also expand. There will be a finance team to do analysis, marketing projects using CAD systems. The India team even does photo retouching and newspaper circular layouts for the U.S. Walmart has adamantly maintained that it will not offshore work, we doubt that they will be able to resist the pressure.

What is interesting about offshoring is that it is affecting all industries (McKinsey Global Institute 2006; Dossani and Kenney 2007b), and, very often, it will be both low and high value-added positions that will be relocated. For example, old line industrial firms such as General Motors, Caterpillar, and Delphi are rapidly expanding their R&D and design laboratories in India, not for the Indian market, but for the global market. Major travel and hospitality firms such as Sabre/Travelocity also have established Indian subsidiaries (Jones 2006). Given the increasing centrality of IT for every industry, and the digitization of their work processes, the savings by relocating core processes to an offshore subsidiary are likely to become even more compelling.

In the software industry, some MNCs have been pioneers in implementing the business models that allow high value-added work to be undertaken in India. The multinational software giant, SAP, is an example. As noted above, in 2000, they discovered and developed their Indian

subsidiary's capabilities in the programming function. By 2003, India was established as a global development center, meaning that it was eligible to take product ownership while possessing the skills to contribute to projects across the board. As of 2006, only Europe, U.S., and Middle East also had this status. India currently is the global center of excellence for oil and gas, steel, and telecommunications verticals.

The case of Agilent Technologies India (AGI) illustrates the rapidity with which an Indian operation can mature. AGI was established in 2001 to undertake both back office and engineering services. Its initial engineering services work was simple data entry. However, the operation rapidly matured and began doing CAD support the next year. The next task it undertook was QA for product development. In 2003, Electronic Design Automation software development commenced in India. Success in these areas convinced management to add an ASIC design center in India, only the fourth one that Agilent operated globally (Dossani and Manwani, 2005). In April 2006, AGI announced that it had purchased 10 acres of land in the Delhi area to build its own campus. Employment growth was rapid, as it had no employees prior to November 2001, and by November 2004 had 1,200 employees with plans to increase to 2,000 by 2006. Agilent India is growing rapidly in three ways: First, its engineering capabilities are growing rapidly. Second, it is undertaking more of its global back office operations in India. Finally, the Indian market for its test and measurement equipment is expanding rapidly.

Yahoo! has rapidly expanded its Indian operation. In 2003 Yahoo! established its Indian Development Center (IDC) and hired 150 engineers (Seth 2006). It has grown to nearly 1,000 employees in December 2006. But, from our perspective, what is more interesting is how its work has evolved. Initially, the IDC operated entirely as a back office for Yahoo! Palo Alto. In general, the work transferred to India was low value-added and mundane. The result was high

rates of attrition sapping the cost savings. To address this problem, in 2004 Yahoo! moved first-level project management to India, a step that gave the IDC more ownership, but created conflicts with Palo Alto-based managers. The solution was the movement of complete responsibility for major activities such as datamining to India. Now the Indian functional manager reported directly to a SVP in Palo Alto. With the increasing success of the Indian operation, functional responsibility not only for datamining, but also for mobile applications and iPod broadcasting, was moved to the IDC (Seth 2006).

These are all signs of the learning and maturation of the Indian operations. The Indian MNC subsidiaries are receiving global mandates. As the illustration from HP discussed earlier, some firms have gone even further. For example, Adobe India has global responsibility for PageMaker and Framemaker software upgrades that are key products. These anecdotes indicate that at certain MNCs, their Indian operations have matured sufficiently to receive global mandates – a powerful indication of an ability to mobilize talented persons and ascend the value ladder. Possibly the most interesting case is General Electric (2007), which has only four research locations globally. Its New York Research Center headquarters employs approximately 1,900 persons, at the new Munich center approximately 150 persons are employed, and in the Shanghai center another 150 persons are employed. The Bangalore center employs nearly 3,000 researchers, i.e., more than the other three centers combined (General Electric 2007). The size of the GE commitment when measured by employees is remarkable.

It is important to note where the Indian operations are yet to fully catch up. Not surprisingly, it is in the areas of market understanding and global project management that the problems lay. As the manager of a large MNC noted, “It is easy to do cutting-edge work in India and to manage large projects. The difficulty is in launching products from India, especially the

last stage between putting it all together and going live. There is also a gap in capability in conceptualizing projects from India.” It takes time to build sophisticated capabilities in-house. This delay is probably due to a combination of factors, but might be reduced as the Indian operations learn. Despite these difficulties, the Indian MNC subsidiaries are evolving and becoming among their most important overseas operations.

### *Ecosystem for Entrepreneurship*

The evidence for an entrepreneurial ecosystem for ATS (and software products) emerging is, at the moment, only suggestive. Given the increasingly experienced labor force and an increasing willingness on the part of Indians in U.S. high-technology firms to return to manage startups, many of the human resources are in place. These returnees have U.S. networks that can be used to mobilize resources such as venture capital, key customers, and other professionals that can assist a startup. Moreover, the entrepreneurial support network that exists to support startups in Silicon Valley has increasingly globalized (Patton et al. 2007). The returnee to India imparts the Silicon Valley ethos of rapid execution to the lower-cost Indian engineers. They are both the carriers and the translators of socio-cultural values.

Judging a nation’s entrepreneurial propensities or activities is difficult, as can be seen by the 2004 Global Entrepreneurship Monitor rankings that rated Poland above Israel and Canada far above Finland. Peru, Uganda, Ecuador, and Jordan were the global leaders. India and China, the two newest economic giants, were not even measured. For this reason, we do not enter the debate about whether Indians are entrepreneurial (an odd debate considering that the U.S. has hotbeds of entrepreneurship, while there are many other locations with minimal

entrepreneurship). This section has a modest goal; namely, to describe the dimensions of Indian technology-based entrepreneurship and reflect upon its potential to expand.

The most successful entrepreneurial regions in the U.S. are endowed with established firms that can be tapped for experienced management and engineering talent. As late as 2003, such talent would have been scarce in India. This has changed significantly as MNC subsidiaries have promoted Indians to positions of responsibility in which they are learning global-class management and R&D skills. The increasingly sophisticated work is training a cadre of Indian managers that already have or will soon also have the capability to establish and manage startups. With the NRIs and the training Indian managers are getting, a key requisite for creating an entrepreneurial ecosystem, high-quality entrepreneurs and executives that understand global markets and the execution ethics necessary for success on a global playing field, are coming into existence.

Until recently, very few global class venture capitalists deeply knowledgeable about technology markets operated in India (Dossani and Kenney 2002; Dossani and Desai 2006). This is changing, as major Silicon Valley venture capital firms establish Indian operations. In addition, there are an increasing number of domestic venture capital firms, although these have yet to become important actors. These private initiatives are being encouraged by the relaxation of various regulations inhibiting VC firm operation. If Indian entrepreneurs continue to create firms that have successful exits either through listing on Indian markets or merger and acquisition, then more investment is assured. There already have been successful exits on the Indian markets, such as Sasken, a fabless semiconductor contract services firm, and a few on the U.S. exchanges such as Exl, which is a BPO firm. However, acquisition has been the favored exit path. Examples of acquisition include IBM and the BPO startup Daksh (\$160 million), IBM

and an older Indian IT infrastructure maintenance firm, Network Solutions (undisclosed), EDS and the BPO startup Mphasis (\$380 million), EDS and the software testing firm RelQ (\$40 million), the Indian BPO firm WNS and Marketics (\$60 million), and R.R. Donnelly and the high-end BPO firm Office Tiger (\$250 million). It is certain that there will be more acquisitions as foreign and Indian firms pursue inorganic growth. Previous success and the large number of recent startups suggest that an entrepreneurial ecosystem is being established in India and, particularly, in Bangalore.

The role of Indian universities in the development of this ecosystem is limited but evolving. The average Indian university graduate is a motivated worker, while the graduates from the elite universities and Indian institutes are as good as any in the world. In terms of research, the elite Indian institutions are improving, but they are far from the Tier One U.S. research universities in terms of research. Thus far Indian professors have been involved in only a very few global-class startups. An exception is Tejas Networks where one of the founders was a professor at an Indian Institute of Technology. Whether the role of universities will change in the short-term is uncertain. At this point, the most important contribution of the Indian higher education system to the entrepreneurial ecosystem is a graduate that can be trained to work in the global economy.

Until recently, most startups were offering services and thus largely dependent upon labor cost arbitrage, and not particularly unique skills. The emergence of a dynamic, multifaceted entrepreneurial ecosystem creating technology-based product (as opposed to service-based) startups for the international and domestic markets is more recent. This suggests the emergence of a deeper labor market in terms of personnel and more globalized venture

capitalists. If these initial indications are borne out, then an ecosystem for entrepreneurship producing global-class firms may be forming in India and is centered in Bangalore.

Figure Five categorizes venture capital-financed firms by whether they are meant to serve the domestic or foreign market and by the location of their headquarters. Our first observation is that the number of startups in each of the three relevant quadrants is growing. The Quadrant One startups are those established in the U.S., particularly Silicon Valley, but for various reasons, most often cost, establish an Indian subsidiary. In these startups the precise division of labor varies. For some firms, the division is between lower and higher value-added functions. In other cases, Silicon Valley retains only the headquarters, marketing, and/or product architecture functions. The divisions of labor may vary by firm, technology, or simply corporate strategy. Regardless of the reason for offshoring, these startups transfer knowledge through their operation.

**Figure Five about here**

The extant assumption that the Indian subsidiary must necessarily undertake lower value-added work than is done in Silicon Valley should be qualified. In certain respects, this is correct as most of the top executives are in the U.S. And yet, our interviews in 2006 suggest that this characterization fits many, but not all, firms. For example, Insilica's Silicon Valley headquarters has approximately 15 employees, including the C-level executives (all of whom are NRIs), marketing, sales, and operations, the functional heads of imaging and the ASIC SOC groups, and a couple of engineers to support customers (Raghunathan 2006). All the other employees are located abroad. On the other hand, consider the case of Sasken, which was established by a group of NRIs in Fremont, California in 1989. The management team relocated the entire operation, including the headquarters, to Bangalore, India from where it has grown to employ

over 3,000 persons around the world (Swaminathan 2006). These illustrations suggest that a wide variety of arrangements are being fashioned. Most important is that the Quadrant One firms are part of a growing tendency for Silicon Valley startups to establish an Indian subsidiary early in their life-cycle, or even to have an Indian operation as an integral part of their business plan. This is indicative of the more general tendency, which is that all high-opportunity startups in Silicon Valley receiving venture capital funding must have thought through the benefits and costs of early globalization.

Quadrant Two startups, from their inception, have nearly their entire engineering and product development in India. Admittedly, the line between Quadrant One and Two firms is blurred. For example, Arada Systems, a startup aiming to provide software solutions around IEEE 802.11 Wifi solutions to the telecommunications, industrial, outdoor and automotive markets, has its entire development team in India and only a thin staff of nine persons in the U.S. The plan was to expand the Indian team as the firm grew, because it was responsible for product development (Singh 2006). Another firm, TutorVista, which was conceived and launched in India, offers online tutoring to students in developing nations using Indian and Filipino teachers. The firm's venture investment came from the U.S. firm Westbridge Capital (now Sequoia Capital). TutorVista's operations are entirely located in India, but its market is international (Kannan 2006). Quadrant Two is a polyglot category including both firms that were conceived abroad, but have their operations in India, and firms conceived in India for the international market. In both cases, the number of Quadrant Two firms is expanding.

In Quadrant 4, there are two types of firms. One group, 4a, is the increasing number of startups whose strategy has been to utilize specific growing Indian markets to establish their products prior to advancing into global markets. Tejas Networks, which designs and markets

optical telecommunications switches, is an example of this. Established in May 2000 in Bangalore, by 2006 it had grown to 300 employees with 85 percent of its revenue coming from India. It expects to grow by a further 100 employees in 2007 and double its revenues. Tejas plans to increase its foreign sales and make a stock offering on the Indian market (Nayak 2006). The rapid expansion of Indian telecommunications, and particularly wireless markets, offers Indian firms an opportunity to reach significant scale prior to entering the international market. If successful, the Tejas strategy of using the burgeoning Indian market will be repeated by other firms.

In Quadrant 4b there are the startups for the Indian market. This is roughly analogous to the many successful Chinese startups that have listed on the U.S. and other markets (Patton et al. 2007). There are a wide variety of business models. Many are simple translations from the U.S., such as travel, auction, and job listing, etc., sites. While not original, given the burgeoning, computer-literate, middle-income strata in India, these can be successful investments. Other startups serve the burgeoning local cell phone market through offering applications such as ring tone downloads. As was the case with China, the rapid increase in wealth is creating a massive, relatively underserved, market with enormous pent-up demand for services of all sorts. Also, a large underserved illiterate market unable to speak English, or, in certain areas, even Hindi, exists. This provides opportunities for voice recognition/translation software. For local and international venture capitalists, an enormous market is emerging and it will offer investment opportunities requiring small capital investments, but offering very respectable returns.

India has some significant advantages for startups. The most important of these is a deepening talent pool. Certainly, low labor cost attracts foreign investors. The cost differences are remarkable. For example, building a firm comparable to Tejas Networks in Silicon Valley

would have cost between \$100-150 million, whereas Tejas, which in 2006 was on the verge of positive cashflow, cost between \$30-50 million – a dramatic difference (Nayak 2006). In the case of a software/ASIC design firm, the cost comparison for 50 engineers in India with an average cost of \$40,000 per year in Bangalore yields a burn rate of \$2 million per year versus in Silicon Valley where the average salary would be \$180,000 per year for a burn rate, in wages alone, of \$9 million per year. The point being that startup costs are far lower. Of course, there are also drawbacks, including much increased coordination costs and far less experienced personnel.

The startups with global ambitions draw upon NRIs from Silicon Valley as executives and development team leaders, because of their experience and work ethic necessary to deliver a product. When asked to compare Indian engineers and Silicon Valley engineers, the NRIs interviewed stated that the Silicon Valley team, which had more seasoning, typically was superior, but not sufficiently so as to justify the cost differential. The point being that there were significant cost advantages to operating in India, but this is PREDICATED upon there being a skilled and capable work force in India that could be supplemented with trained, “battle-hardened” managers with deep experience and understanding of the U.S. and, in technology, the Silicon Valley management style.

A common assumption regarding the startups aiming at the global market is that their operations are divided between India and the U.S. In our sample, two firms, Telsima and Insilica, also had European operations. Telsima, a startup established in 2004 to develop WiMAX-based broadband wireless access software for data-intensive and mobility applications, had its main development center in Bangalore, but also employed 35 persons in Trzin-Ljubljana, Slovenia. Insilica purchased a Flextronics semiconductor design group located in Slovenia for system-on-a-chip expertise. The final example is Athena Semiconductors, which was recently

purchased by Broadcom. Athena was headquartered in Fremont, California with a 40-engineer design team in Bangalore, India and another 23 engineers in Athens, Greece. At all of these firms, the Silicon Valley headquarters is responsible for overall coordination; however, the Indian operation interacts directly with the European branches. This suggests that, at least, for some startups the Indian operations are one node in a globalized organization.

When considering the three Quadrants together, it is possible to make the following tentative observations: First, there is a profusion of experimentation with business models. Second, returning NRIs are providing Indian startups and the Indian subsidiaries of U.S. startups seasoned professional managers. Third, it is possible to build global-class or near global-class startups in India.<sup>4</sup> Fourth, there is every reason to expect a continuing and accelerating pace of startup formation. Fifth, there have already been some good exits, particularly through mergers. These are having a positive effect on the pace of startup formation. Considering that the pace of startup formation appears to be accelerating, the future for all types of VC-funded startups is positive.

## **Discussion and Conclusion**

Indian success in building a vibrant export economy on the basis of providing ATS to the global economy may have been pioneered by Ireland, but has never occurred at the same scale and scope. In terms of scale, scope, and sophistication, the evolutionary trajectory of ATS work done in India suggests that ideas extant only three years ago are outdated. This paper has argued that India has developed a rapidly expanding and increasingly complex ecosystem for offshore service provision. We argued that within this larger services ecosystem, an ecosystem

supporting globally valuable entrepreneurial activity was emerging, and that this was insufficiently appreciated currently. Finally, we broached the possibility that Indian service providers may be pioneering a new service provision model that provided quality superior to that being offered by their U.S. competitors. Here, the proposition was that their competitive prowess, though, undoubtedly, initially based upon lower cost labor, may be shifting to superior productivity. If this is the case, then Indian firms could compete even as costs equalize. The sustainability of India's strength in ATS will be due to the scale, sophistication, the ecosystem being developed, and whether Indian firms have developed robust business models.

The employment growth in the Indian ATS sectors is certainly remarkable. It bears witness to the underemployment of the work force prior to the expansion beginning in 2000, and the ability to expand the labor force to meet the burgeoning demand. Today, India employs over 50 percent of global offshore employment. In terms of sheer numbers, no other nation is competitive; though it is possible given the speed at which services can be relocated that Indian dominance could evaporate quickly.

The number of industries relocating activities to India has expanded dramatically. The earliest sectors to offshore ATS were information technology and finance. More recently, this expanded to manufacturing firms such as General Motors and Caterpillar that have established global-class R&D, but they are indicative of a wide variety of industries that now have parts of their processes being done in India. Few would have guessed that portions of legal work and marketing campaigns could be done offshore. The scope of what might be offshoreable is limited by the ability to reengineer processes to separate location-specific work from that that does not require in-person interaction or that is legally or institutionally proscribed from

---

<sup>4</sup> We use the term "near global-class" simply because we were unable to undertake a detailed evaluation of the technology these firms are developing, but we are certain that these firms are developing technology for the global

relocation. For us, this suggests that even more work activities will be reengineered for relocation.

The most important phenomenon, however, is the sophistication of the work that is offshoreable. It is remarkable the rapidity with which Indian workers have been able to move up the value ladder. Whether it be technical R&D, sophisticated equity analysis, reading X-rays, statistical analysis of Internet click stream data, or preparation of patents, the workers in these areas are not competing with low-waged workers. This ability to move up the value ladder so rapidly is without a question the most remarkable aspect of the services offshoring phenomenon.

India's ability to grow in terms of scale, scope, and sophistication is path dependent. In the process of this growth a services provision ecosystem has coalesced. This increasingly diverse ecosystem allows and even encourages innovation. Consider the wide variety of organizations active in the ecosystem. There are MNCs, large and small, and from a wide variety of industries undertaking many different activities. There are Indian firms ranging from the large Indian software integrators such as TCS and Wipro and the business process outsourcing firms to small specialty providers of all sorts. This variety is significant in and of itself. Consider further that the ecosystem is IT-enabled and driven by a pressure to automate and create greater efficiency. A rich ecosystem attracts and creates more firms, capabilities in the work force, and more resources.

The ecosystem for entrepreneurship is less mature and far smaller, but it is evolving rapidly. We divided the startups into four groups: First, there were the firms that were established in Silicon Valley, but very early in their life cycles established a presence in India. Second, there are firms born global, often with a presence in the U.S., often Silicon Valley, from their inception. Third, there are the firms that were founded in India but from their inception

---

market, and thus are in competition with firms in Silicon Valley and Israel.

planned to tap the global market. Finally, there are a number of firms that were formed to exploit the rapidly growing domestic market. Thus it is easy to see that the startup environment is also complex and rich. Given the capabilities of the Indian personnel and the rapid growth, an entrepreneurial support network of venture capitalists, lawyers, consultants, and others dedicated to supporting entrepreneurship has been growing in terms of numbers and diverse specializations. There is ample evidence that an ecosystem is emerging.

India is becoming the hub for the offshoring of ATS. MNCs have their increasingly sophisticated and largest operations outside their home country in India. Meanwhile, Indian service providers have demonstrated that they are capable of successfully winning and discharging some of the largest and most sophisticated outsourcing contracts. Their strict adherence to metrics may prove to be a competitive advantage.

Our research suggests that India's advantage has moved far beyond simply having lower cost labor power, though the importance of this advantage should not be underestimated. The now powerful positive feedback effects are an important advantage. The existence of an entire community of indigenous firms whose top management is located in India does much to strengthen the ecosystem. The reinforcement of the indigenous firms by MNCs that have assigned full managerial responsibility for certain global operations to their Indian subsidiary is creating a cadre of globally competent managers. Finally, a dynamic cadre of entrepreneurs has been spawned. The belief that India is still confined to low end services is no longer true. An ecosystem has emerged that is likely to encourage further movement up the value ladder and the provision of an increasing diversity of services from India.

## REFERENCES

- Adler, P. S. 1996. "Two Types of Bureaucracy: Enabling and Coercive." *Administrative Science Quarterly* 41: 61-89.
- Arora, A. and S. S. Athreye. 2002. "The software industry and India's economic development." *Information Economics and Policy* 14 (2): 253-273.
- Arora, A., V.S. Arunashalam, J. Asundi, R. Fernandes. 2001. "The Indian software services industry." *Research Policy* 30: 1267-1287.
- Athreye, S.S. 2005. "The Indian Software Industry and Its Evolving Service Capability," *Industrial and Corporate Change*, 14 (3): 393-418.
- Aspray, W., F. Mayadas, and M.Y. Vardi (Eds.) *Globalization and Offshoring of Software: A Report of the ACM Job Migration Task Force* (New York: ACM).
- Bardhan, A. D. and C. Kroll. 2003. "The new wave of outsourcing." University of California, Berkeley: Fisher Center for Real Estate.
- Bartlett, C. and S. Ghoshal. 1989. *Managing across Borders: The Transnational Solution*. Harvard Business School Press: Boston, MA.
- Bhagwati, J.N. 1984. "Incentives and Disincentives: International Migration." *Weltwirtschaftliches Archives: Review of Works in Economics* 120 (4): 678-701.
- Blinder, A. S. 2006. "Offshoring: The Next Industrial Revolution?" *Foreign Affairs* (March/April) 85 (2): 113-128.
- Blinder, A. S. 2007. "How Many U.S. Jobs Might Be Offshorable?" Unpublished paper (March 23, 2007).
- Breznitz, D. 2007. *Innovation and the State: Political Choice and Strategies for Growth in Israel, Taiwan and Ireland*. New Haven: Yale University Press.
- Brown, J. S. and P. Duguid. 2002. *The Social Life of Information* (Boston, MA: Harvard Business School Press).
- Business Week*. 2003. "Is Your Job Next?" (February 2003).
- Cisco Inc. 2006.  
[http://newsroom.cisco.com/dlls/2006/ts\\_120606.html?CMP=AF17154&vs\\_f=News@Cisco:+To p+Stories&vs\\_p=News@Cisco:+Top+Stories&vs\\_k=1](http://newsroom.cisco.com/dlls/2006/ts_120606.html?CMP=AF17154&vs_f=News@Cisco:+To p+Stories&vs_p=News@Cisco:+Top+Stories&vs_k=1). (Accessed August 29, 2007).
- D'Costa, A. P. 2003. "Uneven and combined development: Understanding India's software exports." *World Development* 31 (1): 211-226.

Dossani, R. 2006. "Entrepreneurship: The True Story Behind Indian IT." In Rowen, H., Hancock, M., Miller, W., (eds.) *Making IT: The Rise of Asia in High Tech* (Stanford: Stanford University Press).

Dossani, R. and A. Desai. 2006. Accessing Risk Capital in India. Working Paper, Stanford University.

Dossani, R. and M. Kenney. 2007a. "Reflections upon 'Sizing the Emerging Global Labor Market'." *Academy of Management Perspectives* 20 (4): 35-41.

Dossani, R. and M. Kenney. 2007b. "The Next Wave of Globalization: Relocating Service Provision to India." *World Development* 35 (5): 772-791.

Dossani, R. and A. Manwani. 2005. Agilent's supply chain: A locational analysis of its Indian operations. Paper presented at the Stanford University Conference on the Globalization of Services (June 17).

Dossani, R. and M. Kenney. 2003. "'Lift and Shift': Moving the Back Office to India." *Information Technology and International Development* 1 (2): 21-37.

Dossani, R. and M. Kenney. 2002. "Creating an Environment for Venture Capital in India." *World Development*, 30 (2): 227-253.

Dunning J. 1994. "Multinational enterprises and the globalization of innovatory capacity." *Research Policy* 23: 67-89.

EDS. 2007. "Chairman's Letter EDS 2006 Annual Report." [http://www.eds.com/investor/annual/2006/downloads/2006\\_chairman\\_letter.pdf](http://www.eds.com/investor/annual/2006/downloads/2006_chairman_letter.pdf).

Freeman, R. 2005. "What Really Ails Europe (and America): The Doubling of the Global Workforce." *Globalist* June 03.

General Electric. 2007. "GE Global Research." <http://www.ge.com/research/> (accessed August 7, 2007).

Gomory, R. E., and W. J. Baumol. 2000. *Global Trade and Conflicting National Interest*, Cambridge, Massachusetts: MIT Press.

Hargadon, A. 2003. *How Breakthroughs happen: The Surprising Truth about how Companies Innovate* Cambridge: Harvard Business School Press.

Heeks, R. 1996. *India's Software Industry: State Policy, Liberalisation and Industrial Development*. New Delhi, India: Sage Publications.

- Hira, R., & A. Hira. 2005. *Outsourcing America: What's behind our national crisis and how we can reclaim American jobs* New York, NY: Amacom Books.
- Holman, D., R. Batt, and U. Holtgrewe. 2007. *The Global Call Center Report: International Perspectives on Management and Employment*. Report of the Global Call Center Network.
- Jensen, J. B. and L. G. Kletzer. 2005. "Tradable Services: Understanding the Scope and Impact of Services Outsourcing." Institute for International Economics Working Paper 05-9 (September).
- Jones, M. (Senior Vice President, Strategic Sourcing Services for Sabre-Holdings). 2006. "Sabre/Travelocity Case Study." Presented at the Globalization of Services - The Second Annual Conference, Stanford, CA (December 12).
- Kannan, R. (Chief Technology Officer, Tutor Vista). 2006. Personal interview R. Dossani and M. Kenney Bangalore, India (November 14, 2006).
- Karthik, H., N. Rajpal and G. Tedakapalli. 2007. "Captives in India: Evolution and Growth." *Global Services* (March 26) Accessed April 10, 2007.
- Kogut, B. and U. Zander. 1993. "Knowledge of the firm and the evolutionary theory of the multinational corporation." *Journal of International Business Studies* 24 (4): 625-645.
- Krishna, V.V. and B. Khadria. 1997. "Phasing Scientific Migration in the Context of Brain Gain and Brain Drain in India." *Science, Technology & Society* 2, (2): 347-385.
- Kupbens, R. (VP, Technology Services – Marketing, TSI, Business Intelligence, EDGE Target Corporation). 2007. "Talent Management in a Global Retail Industry." Presentation at Stephen M. Ross School of Business, University of Michigan (March 6) [http://www.tmi.umich.edu/PR\\_Target\\_Kupbens\\_07.htm](http://www.tmi.umich.edu/PR_Target_Kupbens_07.htm) (Accessed April 15, 2007).
- Kurup, R. S. 2006. "TCS to design Boeing interiors." (October 27) <http://www.rediff.com/money/2006/oct/27tcs.htm>.
- Levy, F. and R. J. Murnane. 2004. *The New Division of Labor: How Computers Are Creating the Next Job Market* (Princeton: Princeton University Press).
- Lewin, A.Y. and C. Peeters. 2006a. "The Top-Line Allure of Off-shoring." *Harvard Business Review*, March: 22-24.
- Lewin, A.Y. and C. Peeters. 2006b. "Offshoring Administrative and Technical Work: Business Hype or the Onset of Fundamental Strategic and Organizational Transformation?" *Long Range Planning* 39: 221-239.
- Lewin A.Y. and H. Volberda. 1999. "Prolegomena on Co-evolution: a framework for research on strategy and new organizational forms." *Organization Science* 10 (5): 519-534.

- Malnight, T. W. 1995. Globalization of an ethnocentric firm: an evolutionary perspective. *Strategic Management Journal* 16 (2): 119–141.
- Maskell, P., Pedersen, T., Petersen, B., and Dick-Nielsen, J. 2007. “Learning Paths to Offshore Outsourcing: From Cost Reduction to Knowledge Seeking.” *Industry & Innovation* 14 3: 239–257.
- Mathews, J. A. 2003. “Competitive dynamics and economic learning: An extended resource-based view.” *Industrial and Corporate Change* 12 (1): 115-145.
- Nasscom. 2007. “Indian IT Industry: NASSCOM Analysis.” (February)  
<http://www.nasscom.in/Nasscom/templates/NormalPage.aspx?id=2374> (accessed April 13, 2007).
- National Academy Press. 2006. *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future* (Washington, DC: NAP).
- Nayak, S. (CEO and Managing Director, Tejas Networks). Personal interview R. Dossani and M. Kenney Bangalore, India (November 14, 2006 ).
- Patibandla, M. and B. Petersen. 2002. “Role of Transnational Corporations in the Evolution of a High-Tech Industry: The Case of India's Software Industry.” *World Development* 30, (9): 1561-1577.
- Patton, D., M. Kenney, and M. Haemmig. 2007. “Legitimizing the Environmentally Challenged: Chinese Entrepreneurial IPOs in U.S. Equity Markets” Working Paper.
- Raghunathan, K. S. (Head - India Design Center, Insilica). Personal interview R. Dossani and M. Kenney Bangalore, India (November 15, 20 06).
- Reich, R. (1991). *The Work of Nations*. New York, NY: Knopf.
- Samuelson, P. 2004. “Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization,” *Journal of Economic Perspectives*. 18, Summer.
- Schware, R. (1987). Software industry development in the Third World. *World Development*, 15, 1249–1267.
- Sen, A. ( 1973), 'Brain Drain: Causes and Effects', in B. R. Williams, ed., *Science and Technology in Economic Growth*. Edinburgh: Macmillan.
- Seth, A. 2006. "Evolution of a Strategic Partnership with INDIA!" Paper presented at The Globalization of Services - The Second Annual Conference, Stanford University (December 12).
- Shah, K. 2007. “Accenture Shifts Growth to India.” *Red Herring* (January 29)  
<http://www.redherring.com/Article.aspx?a=20989&hed=Accenture+Shifts+Growth+to+India>.

Singh, P. (President and CEO Arada Systems). 2006. Personal interview R. Dossani and M. Kenney Bangalore, India (November 13, 2006).

Swaminathan, K. (Chief Marketing Officer, Sasken Communications Technologies ). 2006. Personal interview R. Dossani and M. Kenney Bangalore, India (November 16, 2006).

Table One: Employment in India by Selected Large Non-Indian Systems Integration and Software Firms

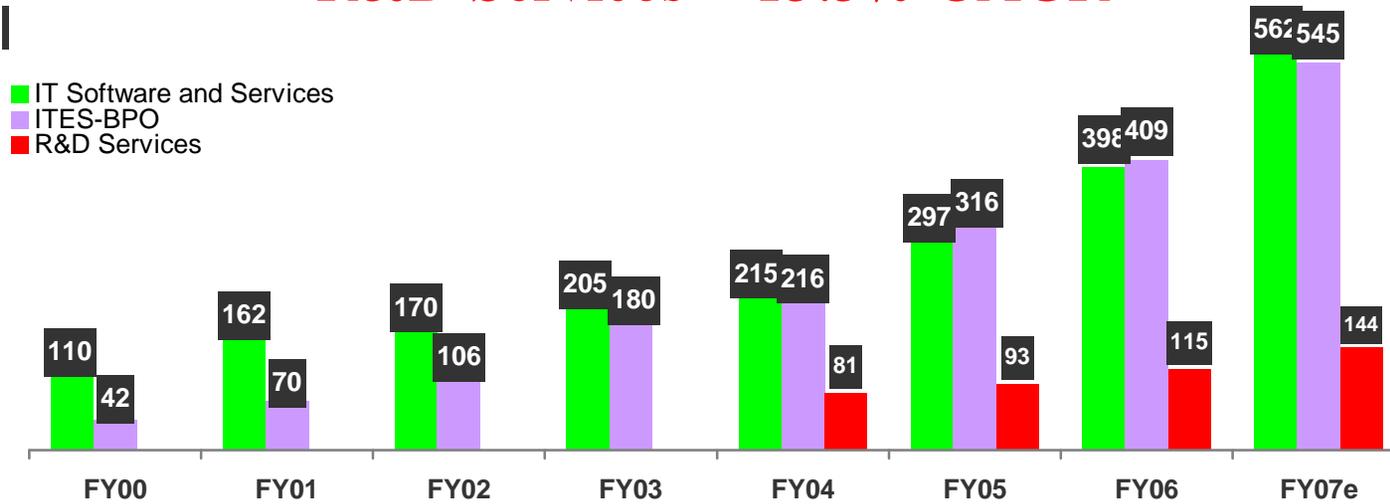
Firm	Date of Entry	Nationality	Employment in India (date)	Global Employment 2006	Percent Employed in India	Acquisitions (Name, Date, # of employees)
<b>Systems Integrators</b>						
Accenture (2)	1987	U.S.	35,000	129,000	27	
CapGemini	2003	France	12,000 (2006)	75,000	16	Kanbay, 2006, 5,000
CSC		U.S.				
EDS (3)	1996	U.S.	17,000 (2007)	117,000	15	MphasiS, 2006, 11,000 RelQ, 2007, 700
IBM (1)	1992	U.S.	60,000 (2006)	369,277	18	Daksh, 2004, 6,000 Network Sol., 2005, 1,400
Siemens IT Solutions and Services	1992	Germany	4,000 (2006)	43,000	9	
<b>Software Products</b>						
Adobe	1997	U.S.	500 (2005)	5,879	13	
Microsoft	1998	U.S.	4,000 (2006)	57,000	7	
Oracle	1994	U.S.	8,600 (2006)	55,000	16	I-Flex, 2006
SAP	1996	Germany	3,500 (2006)	38,400	9	
Yahoo!	2000	U.S.	1,000 (2007)	10,000	10	

1. Reentered India 1992 for domestic market and includes total employment not just IBM Global Services.
2. In 2007, Accenture employed more persons in India than anywhere else in the world.
3. In 1996 served GM India from India.

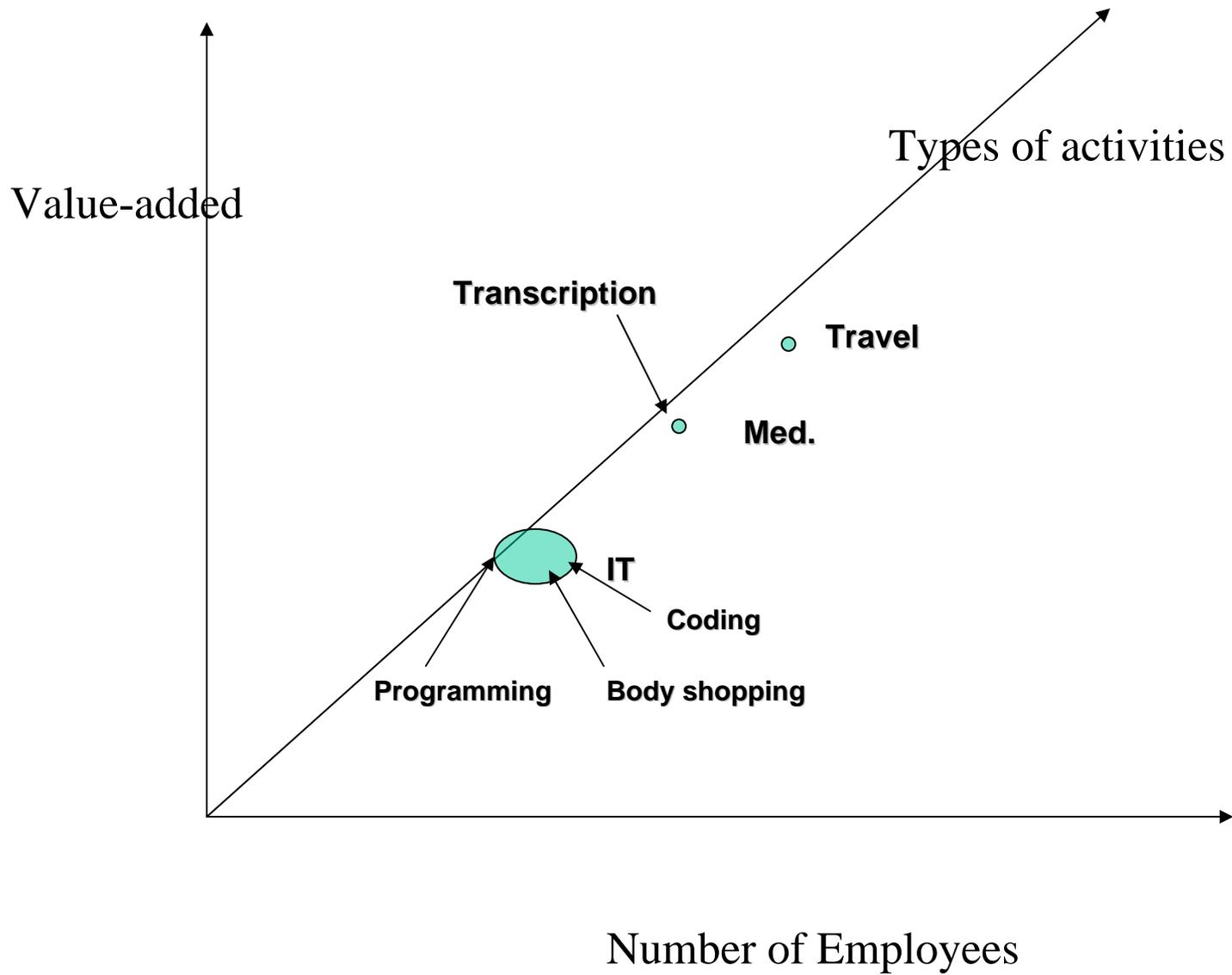
Source: Compiled by authors from various news reports and corporate Securities and Exchange Commission filings.

Figure 1: India IT-Related Export Employment Growth, 99-00 to 06-07e in thousands

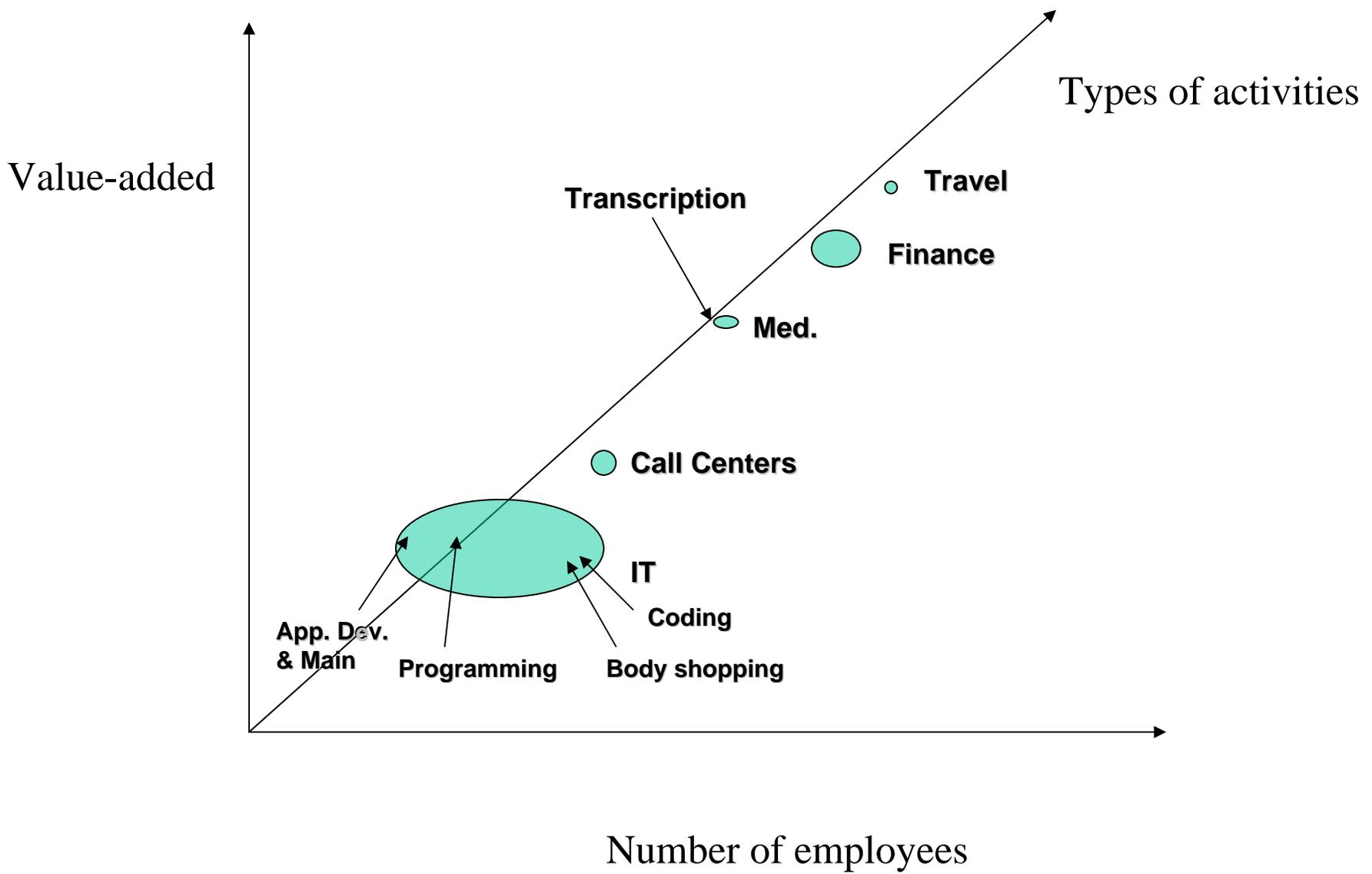
IT Software & Services = 22.6 CAGR  
ITES = 37.7% CAGR  
R&D Services = 15.5% CAGR



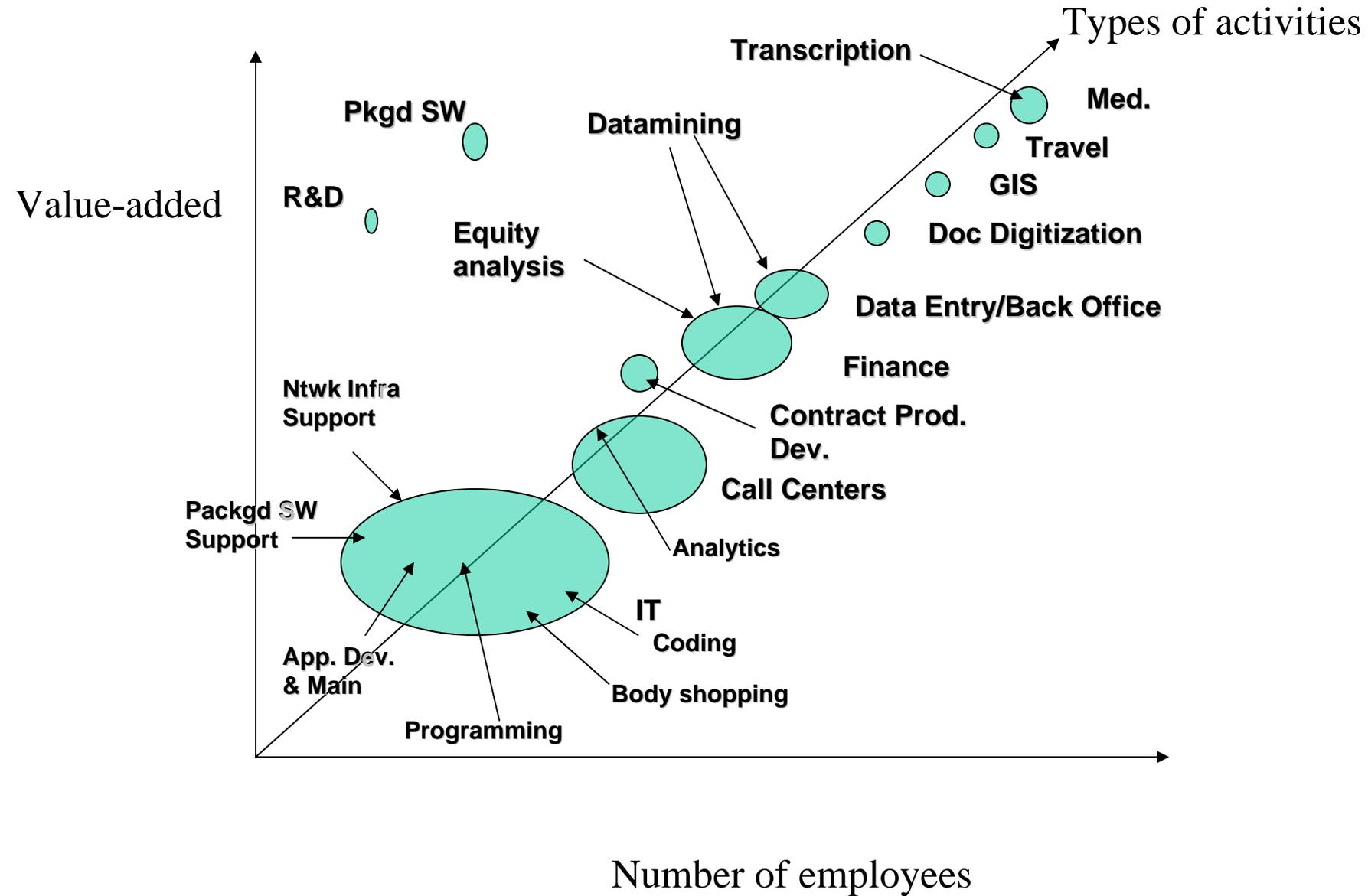
**Figure 1: Stylized Representation of Indian Service Provision  
1995**



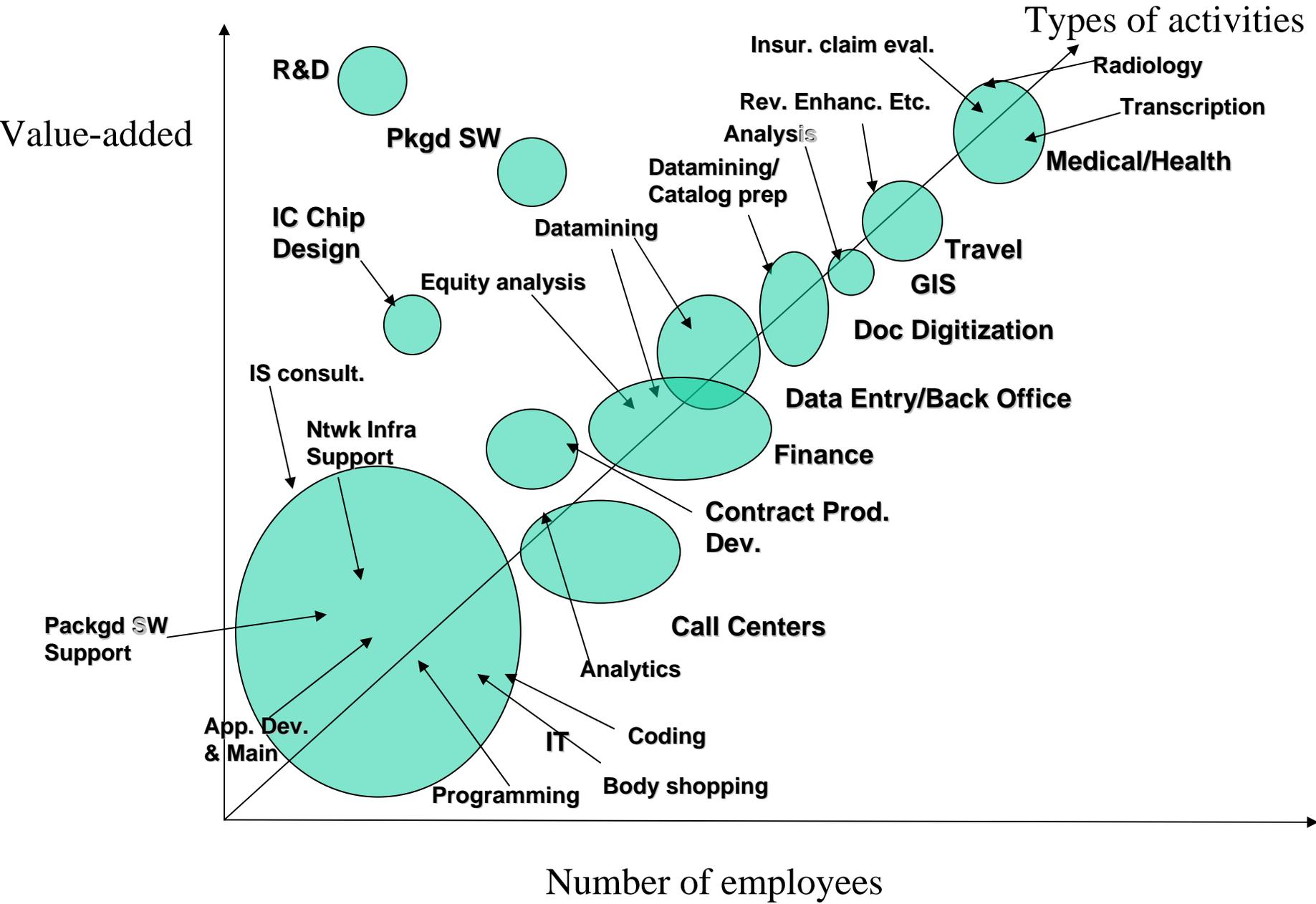
**Figure 2: Stylized Representation of Indian Service Provision, 2000**



**Figure 3: Stylized Representation of Indian Service Provision, 2003**



# Figure 4: Stylized Representation of Indian Service Provision, 2006



# Figure 5: Categorization of Startup Operations in India

Markets	Overseas	<p>1. Indian branch operations: Tensilica Netscaler Sona Systems etc.</p>	<p>2. Firms formed in India for the global market: Arada Systems</p>
	India	n/a	<p>4a. Firms initially addressing Indian market but plan to go global: Tejas Networks etc.</p> <p>sites: Software and content for Indian mobile phones etc.</p>
		Overseas	Headquarters
			India