

India's emerging competitive advantage in services

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Executive Overview

We examine the business opportunities created by the economic and political changes underway in India. Despite short-term political volatility, we believe India's deep-rooted democratic institutions give it systemic resilience and stable economic growth, at rates that will reach 8 to 10 percent within a decade. The early evidence following economic liberalization suggests that India's emerging international competitive advantage—and the corresponding opportunities for multinational corporations—lies not in natural resource industries or low-skill, labor-intensive manufacturing (as in much of Asia), but in skill-intensive tradable services, as exemplified by software. We analyze India's virtual diamond in software and argue that this success will generalize to other knowledge-based services. As a result, India is likely to emerge in the short to medium term as the back office of global corporations and in the medium to long term as a leading provider of knowledge-based tradable services. We also explore the contribution of overseas Indians to India's skill-intensive service exports, contrasting it with the contributions of overseas Chinese to China's manufactured goods exports. We recommend that foreign firms enter India sooner rather than later to seize the emerging opportunities, and that in doing so they pay attention to the considerable differences in business environments among Indian states, rather than focus simply on the policies of the central government.

The real treasure of India is its intellectual capital. The real opportunity of India is its incredibly skilled work force. Raw talent here is like nowhere else in the world.

—Jack Welch, CEO, General Electric¹

India has not yet caught the fancy of foreign investors—even though its population exceeds one billion and its gross domestic product (GDP) of half a trillion dollars ranks it as the 11th largest economy in the world. In purchasing-power parity, India is the fourth largest economy, behind only the United States, China, and Japan. Yet India's integration into the world economy has been limited, as measured by such indicators as exports and foreign direct investment (FDI). (See Table 1.) But all this is about to change—not overnight, but through a slow revolution that will probably take another decade to run its full course.

Meanwhile, what can one glean from the changes under way about the sectors in which India is likely to be internationally competitive?

And how can foreign firms take advantage of the emerging opportunities? Our conclusion is that India's competitiveness does not lie in the same fields as other low-income developing countries. Rather than enjoying competitiveness in natural resource industries or low-skill, labor-intensive manufacturing, India is revealing surprising strength in skill-intensive tradable services, including software development, information technology (IT)-enabled services, product/project engineering and design, biotechnology, pharmaceuticals, media, entertainment, and healthcare. New clusters are emerging in these activities in cities like Bangalore and Hyderabad, where vibrant Indian firms are being joined by well-known multinationals. One interesting example is General Electric (GE), which is investing \$100 million in Bangalore to build its largest R&D lab in the world, employing 2,600 scientists, including more than 300 with Ph.D. degrees. It was while inaugurating this lab that GE's CEO Jack Welch made the remark quoted above.

Similar investments have been made in research and development centers by dozens of other well-

Table 1
India vs. Brazil and China

Indicator	India	Brazil	China
Population (millions)	998	168	1,250
GNP (US\$ B) (rank), 1999	442 (11)	743 (8)	980 (7)
GNP at purchasing power parity (US\$ B) (rank)	2,144 (4)	1,062 (9)	4,112 (2)
Exports, 1998 (US\$ B)	44.7	58.2	207.8
FDI inflows, 1998 (US\$ B)	2.6	31.9	43.7
Share of FDI flows to developing countries (%)	1.5	18.6	25.6
GDP growth rate, 1990–99 (%)	6.1	2.9	10.4
World competitiveness scoreboard ranking, out of 47 countries, May 2000	43	34	31
Per capita income (US\$)	450	4,420	780

Sources: World Bank 2001. *World Development Report*. New York: Oxford University Press; International Institute for Management Development (IMD). 2000. *The world competitiveness scoreboard*. Lausanne, Switzerland: IMD.

known firms, including Lucent, Hewlett-Packard, IBM, Microsoft, Cisco, and Eli Lilly. Indian manufacturing is not showing similar dynamism, although in the medium run it may do so as India's physical infrastructure improves. However, in the short run, services will be the engine of India's export growth. In that regard, India's international competitiveness—and the corresponding opportunities for multinational corporations—will differ from those in high-performing Asian economies that have emerged as manufacturing powerhouses.

We begin this article with a brief overview of the changing economic and political landscape of India and its implications for the business climate. Then, using Porter's "diamond of international competitiveness," we explain why clusters have begun to emerge in India in such tradable services as software. However, we relax Porter's requirement that all elements of the diamond be physically co-located. Instead, we argue that social networks, connecting India-based participants with U.S.-based customers, have created a virtual diamond, with some of the same advantages that collocation would have bestowed. We highlight the role of overseas Indians in building and sustaining the virtual diamond. We conclude by arguing that India's success in software services will spill over into other IT-based services, and, more generally, into knowledge-based services, such as design, engineering, and research in diverse industries and in education and healthcare. India is likely to emerge as the back office of global corporations in the short to medium term and as a leading pro-

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These conclusions have important implications for managers. Within this decade, India will probably figure in the global portfolio of leading multinationals, but firms that enter now will be in a better position to profit from the emerging opportunities than firms that wait longer. In manufacturing, the main opportunity for MNCs will be that of serving the large and growing domestic market, because in the near term India is unlikely to become an attractive platform for exports. But for service sector firms, and for the service activities of manufacturing firms, India is already emerging as an attractive location for global operations.

India's Role in the World Economy

From 1950 to the 1980s, India pursued import-substituting industrialization aimed at achieving economic self-reliance. In these decades, India's international trade shrank to as little as 8.5 percent of GDP. The economy grew at only 3.5 percent annually for three decades, and foreign direct investment was an anemic \$300 million annually. Economic growth accelerated in the 1980s, following the onset of gradual economic reforms. Major reforms followed the balance of payments crisis of 1991. Since then, international trade has more than doubled in importance, FDI inflows increased 10-fold by 1998, to \$3 billion annually, and the economic growth rate has been a robust 6.1 percent annually. Commenting on India's macroeconomic performance, the IMF in a 2001 report has argued that, "since the 1990s, India has been among the fastest growing economies in the world, inflation has been relatively well contained and the balance of payments has been maintained at comfortable levels."²

Nonetheless, despite these improvements, India's exports are only three-fourths those of Brazil and barely a fifth those of China. India's share of world trade is less than one-third of China's. And both Brazil and China receive FDI that is an order of magnitude greater than India's. Both countries also fare better than India in rankings such as

IMD's World Competitiveness Scoreboard or A.T. Kearney's FDI Confidence Index, which is based on a survey of one thousand global companies.

Making too much of the backward-looking statistics in Table 1 is a mistake, however, because the economic and political changes underway in India are capable of changing those indicators significantly. Even surveys of senior managers of MNCs can be misleading to the extent that they might reflect a herd mentality rather than independent assessments. Looking more carefully at the circumstances in India reveals an improving climate for FDI and exports, especially in the field of services.

Political Environment: Complexity and Bright Spots

Indian politics is cacophonous and fractious, playing itself out in one of the most socially heterogeneous societies in the world, with sharp social inequities, a corrupt and inefficient bureaucracy, and poor accountability of political actors. India's material resources are relatively modest and its poverty levels are quite high, although income inequalities are much lower than Latin America or even China.

Accentuating these problems is political instability in New Delhi, resulting from the multiplicity of regional parties and the necessity of forming coalition governments to cobble together a majority in parliament. As a result, there have been four general elections and six prime ministers in the last decade. In such an environment, economic reforms have been predictably slow and uneven. Although the Vajpayee government that came to power in 1999 was more stable than the three before it, it was still a coalition government of 24 disparate parties with differing agendas, and was considerably weakened by an arms scandal in March 2001.

But the headline-grabbing manifestations of political instability mask a deeper systemic stability, anchored by deep-rooted, democratic institutions. An array of powerful and independent institutions, ranging from the judiciary, the election commission, and the media, have all ensured that the Indian system has multiple veto points that slow decision making but underpin its systemic resilience. Multiparty coalitions at the center have resulted in unstable governments at the central level, but have also contributed to strengthening India's federalism. Another stabilizing factor has been that, unlike many other low-income countries, India's military has been apolitical and very much under the thumb of its civilian leadership. Finally, India's relations with Western nations, particularly the United States, have become much

warmer, despite the strains cast by India's 1998 nuclear tests. U.S.-India relations were bolstered by reciprocal visits by the leaders of the two countries in 2000. An important lubricant greasing this relationship is the growing economic clout of the people of Indian origin in the United States.

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Economic Environment: Achievements and Challenges Ahead

On the economic front, the good news is that in the last decade India has opened up greatly to private participation and global competition. Tariffs have come down from an average of 100 percent or more to 30 percent, with commitments to the World Trade Organization (WTO) for further reductions. Most forms of import or industrial licensing have gone. FDI is automatic, and 100-percent foreign ownership is permitted in many sectors, including software. The rupee has been made freely convertible on the current account. Corporate income taxes have been reduced to 45 percent. Foreign portfolio investment and venture-capital financing have been encouraged. Many other structural reforms, requiring new legislation, were underway in 2001. As Finance Minister Sinha notes in his interview in this issue, these second-generation reforms are harder to push through than those undertaken in the 1990s. Implementation is slowed by the need to work in a democratic framework, by coalition politics in Delhi, and rivalries between parties in power at the center and in the states.

Yet in both Delhi and the state capitals, economic growth and effective governance are becoming more important concerns of politicians in power. The country's 10th five-year plan aims for 9-percent annual growth, which, if achieved, would see India growing faster than China. We believe that sustained annual growth of 7 to 8 percent by the end of this decade is quite realistic, with still faster growth possible thereafter—if painful reforms, such as privatization, cuts in public spending, and redirection of government expenditures towards developing human and physical capital, are implemented. To be sure, even with these reforms, India's poor physical infrastructure—from ports and internal transportation to power and water—and its bureaucracy will continue to pose challenges for business. However,

with current growth projections, India's GDP should double by 2010 to about \$900 billion, and growth itself is likely to ease some of these bottlenecks.

Expect Gradual Reforms

These features of the Indian situation have several implications for investors. First, periodic short-term governmental instability will remain, but like Italy of the not-so-distant past, this will affect the pace of policy reform rather than the trend. A silver lining has been that the different parties rotating through power in Delhi have all signed off on opening up India to greater internal and external competition. Consequently, political rhetoric notwithstanding, economic reforms had more broad-based support in 2001 than at any time in the past.

Second, India's growth has been one of the least volatile among developing countries. Because India's external accounts have been managed cautiously and prudently, its foreign-debt-to-GDP ratio and debt-service ratios have been low and declining, and it has escaped damage from international events like the Asian financial crisis.

Third, a more robust federalism has meant there is increasing variance in strategies and policies at the subnational level, with states increasingly competing with one other to attract investment. With the central government having considerably liberalized its policies towards foreign investment, an understanding of the considerable differences in business environments among Indian states is becoming more important for private investors. As in China, coastal states have been the locomotive of India's expanding economy.

India's Success in Software

India has received much attention recently on the prowess of its software industry, prompting Bill Gates to proclaim that "India is likely to be the next software superpower." How has a country whose economic achievements were otherwise modest, managed to develop a reputation for excellence in this rapidly growing high-tech sector? Before answering that question, India's accomplishments in software need highlighting.³

For the better part of a decade, India's software industry has been growing at 50 percent annually. By 2000, the software sector's output had grown to \$8 billion and exports had risen to \$6.2 billion. More than 800 firms, located in cities like Bangalore, Hyderabad, Pune, Chennai, and New Delhi, provided a range of software services, mostly targeted at foreign customers. The United States accounted for nearly 60 percent of Indian software

exports, followed by Europe with 23.5 percent, and Japan with just 3.5 percent.

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India's software industry grew out of the pioneering efforts of companies like Tata Consultancy Services (TCS), in the aftermath of IBM's departure from India in 1977 over policy differences with the government. These firms undertook small projects overseas for multinational firms, and slowly climbed up the value chain as their reputations were established. Although low-end work, such as maintenance of legacy systems or projects associated with the Y2K millennium bug and euro conversion, accounted for about 20 percent of export revenues in 2000, the Indian industry has moved up the technology ladder over time. One indicator of that shift is that more than half of the software development centers in the world with Carnegie Mellon University's CMM Level-5 rating are located in India. The first company in the world to obtain this distinction was an Indian company, Wipro, and companies like Citicorp, GE, Honeywell, IBM, and Motorola had their only CMM-certified operations in India rather than the U.S.⁵ By 2000, more than 200 of the *Fortune* 1000 companies were outsourcing their software requirements to Indian software houses,⁶ and in software services "made in India" was becoming a sign of quality, according to an MIT expert.⁷ By 1999, 41 percent of software services were provided in India rather than on-site at the client's location, compared with only five percent in 1990, indicating a growing confidence in India-based service provision. Indian software companies also became the darlings of the stock market, accounting for seven of Asia's top-20 growth stocks, according to *Asiaweek*.⁸

Two recent analyses of India's IT industry underline the country's potential. A study by Goldman Sachs in 2000 projected that India would capture five percent, or \$30 billion, of the \$585 billion of the IT services market by 2004, up from just 1.6 percent in 1999. Another study by McKinsey & Company projects the Indian software and services industry's output to rise to \$87 billion in 2008, of which \$50 billion would be exported.⁹ Two-thirds of the increase is projected to come from new growth opportunities in IT-enabled services, such as call-center operations, transcription, and design and engineering services. The number of Indian software companies listed on the stock exchange in 2008 is

projected to quadruple to 400, with a combined market capitalization of \$225 billion. By then, software and IT-related services are expected to employ 2.2 million people. However, as in the past, McKinsey expects Indian firms to account for most of the future growth: only \$5 billion in FDI is anticipated to achieve the 2008 projections for IT-sector output and exports. Fueling new-business formation in 2000 were more than 50 venture-capital firms, compared with only half a dozen in 1998. The dot-com bust in the U.S. will not affect the Indian IT sector's growth, which relies mostly on the outsourcing of existing activities rather than on future growth of e-commerce. Even if McKinsey's growth projections for 2008 are met, India's share of the U.S. software market will be only 4.1 percent, although Field observes that "India enjoys first-to-market advantage and owns anywhere from 80 percent to 95 percent of the U.S. offshore market [for software services]."¹⁰

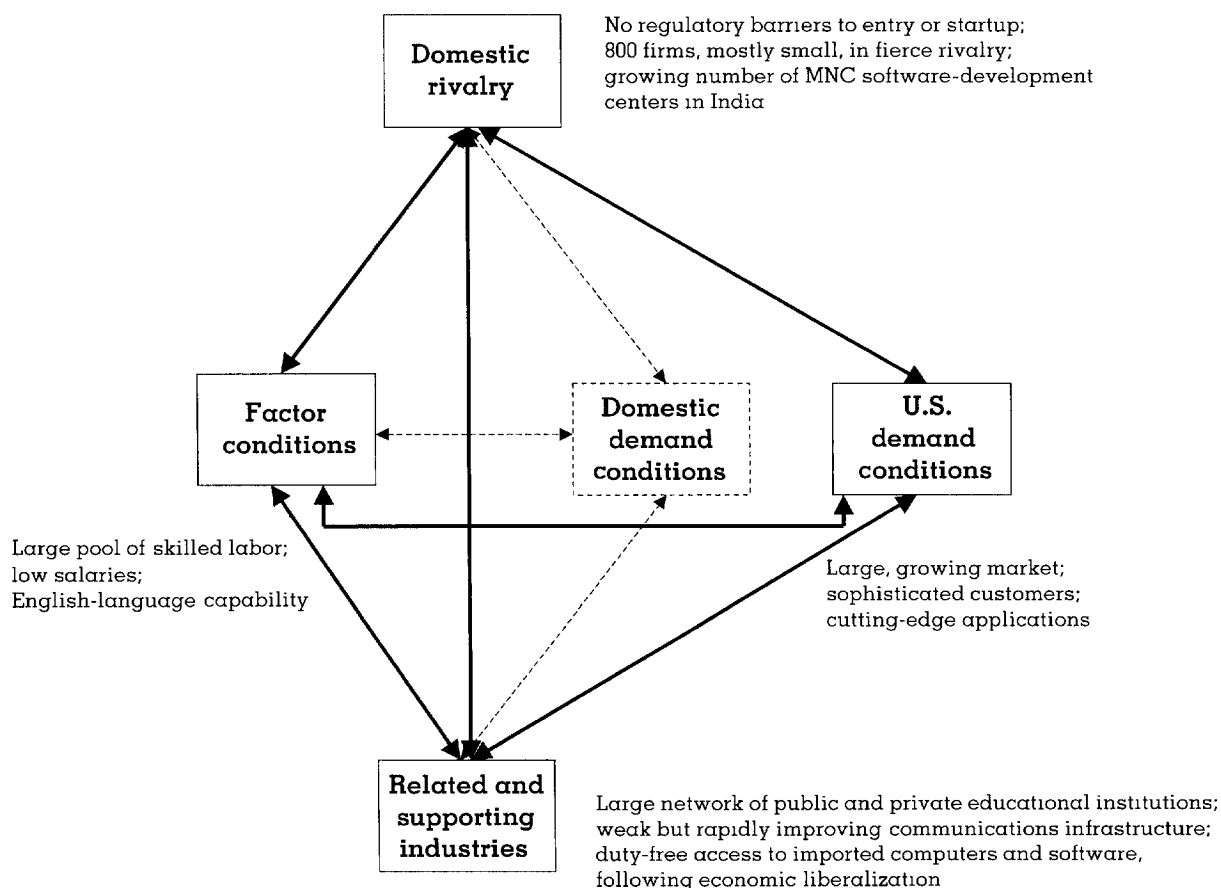
Why is India Competitive in Software?

India has done well in software because that industry makes intensive use of resources in which

India enjoys international competitive advantage, while making less intensive use of resources in which India is at a comparative disadvantage. Figure 1, drawing on Porter, depicts India's diamond of competitive advantage in this sector.¹¹

Software makes intensive use of human capital, and India has several advantages in this regard. India produces the second largest annual output of scientists and engineers in the world, behind only the United States. This labor pool is relatively cheap. Even with the rapid growth of the last few years, an Indian software engineer costs one-half to one-fourth that of an American software engineer. The English-language capability of Indian graduates facilitates interaction and collaboration with programmers in the United States or Europe. In this respect, Indian graduates enjoy a decisive advantage over their Chinese counterparts, who are otherwise nearly as numerous and cost competitive as Indian programmers.

A large and sophisticated network of educational institutes supplies the human capital required by the software industry. The Indian Insti-



Note: Dashed lines represent weaker interactions.

FIGURE 1
India's Virtual Diamond in Software

tutes of Technology, which admit one student for every 100 applicants, churn out first-rate graduates, who today are sought out by firms from all over the world. Many of its graduates migrated to the United States for higher education and jobs and form part of the social network that nurtures the Indian software industry. Other institutions include the Indian Institutes of Information Technology, the Indian Institute of Science, a network of regional engineering schools, and the Indian Institutes of Management. These public institutes have been joined by private institutes, such as NIIT and Aptech, that together produce nearly 100,000 IT professionals annually, a figure that is projected to increase to a half-million by 2006. Thanks to economic liberalization, private schools are augmenting the government's efforts to expand the supply of students to meet the anticipated needs of the software industry.

Just as important as what software needs is what it does not need—namely capital, and a well-developed physical infrastructure. Rapid declines in IT hardware prices and import tariffs in the 1990s sharply lowered capital barriers to entry. This allowed a new entrepreneurial class to commence bootstrap operations and then to rapidly scale up. Rapid technological change in IT hardware meant that latecomers like India were not locked into older-generation technologies, and could instead leapfrog technologies. And in terms of infrastructure, all that is necessary to connect the Indian software worker with foreign customers is a telecommunications hook-up and an occasional overseas trip. Many state governments have created software technology parks in which the necessary infrastructure is readily available and is vastly superior to that found elsewhere in the country. Notable examples include Bangalore's Electronic City and Hyderabad's HITEC City, which offer not only office space and communications links, but housing and other social amenities, as well.

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Improving telecommunications links and air-transport services has been much easier than upgrading India's roads, ports, power supply, and rail transportation—all of which are necessary to boost Indian manufactured exports. Ghemawat

and Patibandla note that Indian garment exports are hampered by the lack of high quality local suppliers, and the inability to respond quickly to foreign customers.¹² The other leading goods export sector, gems and jewelry, seems also to have hit a plateau, with limited prospects for rapid growth. The Indian government has begun only recently to create special economic zones, similar to those in China, that lie outside the country's customs territory and enjoy full flexibility of operations. That is why we expect tradable services like software, rather than manufactured goods, to be the engine of India's export growth in the coming decade.

The third node of Porter's diamond—rivalry—has been strong in the Indian software industry, possibly because the industry was not subject to industrial licensing by the central government, and by and large the India government's policies have been facilitative, at least relative to other sectors. Although firms like TCS, Infosys, and Wipro have become large, they were quite small only five years ago, and aspiring to catch up with them are dozens of small and mid-sized companies. New venture formation is fueled by overseas Indians, who return to start new companies, supply venture capital, or act as angel investors. It is also fueled by the many state governments that have attempted to replicate Bangalore and Hyderabad's success in software by creating their own software-technology parks. Recognizing the possibility that more Indian firms will want to list on foreign stock exchanges, Nasdaq has opened only its third foreign office, in Bangalore.

However, Porter's diamond model does not readily explain India's software success in terms of demand conditions—if one takes that to mean domestic demand, which is not nearly as large or sophisticated as overseas demand.¹³ Although many Indian software firms cut their teeth in the domestic market after IBM left India, their success today comes from serving foreign customers, especially in the U.S. To understand how the Indian software could become internationally competitive despite being 12,000 miles away from Silicon Valley, one must recognize the unique features of software that make co-connection a good enough alternative to co-location, and the many bridging mechanisms that link supply and demand.¹⁴

The Virtual Diamond: Linking Indian Supply with U.S. Demand¹⁵

One key difference between software and the industries that Porter studied is that software can be digitized and therefore moved back and forth be-

tween different locations instantaneously through telecommunication links. In manufacturing industries, on the other hand, physical co-location is necessary for similar hand-offs between firms in the value chain. Given the ease of moving software work-in-process, physical distance has turned into a time-zone advantage for Indian firms, allowing for 24-hour development by teams in India and the U.S.—an advantage unavailable with co-location.

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But physical co-location also promises other advantages, such as face-to-face interaction between firms, suppliers, and customers that can spur innovation. How can India-based organizations be competitive if they don't enjoy those advantages? The answer is that some of the work done in India is not at the cutting edge and can therefore be uncoupled from U.S. activities; examples include software maintenance or the upgrading of legacy systems. In such cases, occasional visits by Indian programmers to the United States and by U.S. customers to India may suffice. As Azim Premji, chairman of Wipro, explains in his interview in this issue, Indian software firms internationalized by initially seeking low-skill work in the United States. Indian programmers visited the U.S. for several weeks or months to carry out these assignments at the customers' premises—what is known in the industry as body shopping. This strategy was then mimicked by other Indian firms and by overseas Indians, who started their own body-shopping outfits in the U.S., staffed with Indian programmers. An important benefit was that this led to rapid skill upgrading through learning-by-doing in the most sophisticated IT market in the world.

As the reputation of these software service organizations grew, more and more of the actual work was done in India, to take advantage of lower costs there. Simultaneously, as Indian firms gained experience and software salaries rose in India, they moved up the value chain to more technically complex assignments. Several mechanisms emerged to bridge the physical distance between Indian suppliers and U.S. customers, so that the necessary supplier-customer interactions could take place.

One important mechanism was the social network connecting people of Indian origin in the U.S., often working in Silicon Valley, with engineers and managers in India. Indian technology professionals working in the U.S., who had upgraded their skills through learning-by-doing, sometimes returned to India, while others circulated between the two countries, thereby diffusing technology and skills. More than 40 percent of the H1-B visa petitions approved recently in the U.S. have been for nationals from India, with China and Canada a distant second and third, respectively. This is enhancing both the network effects of the Indian IT sector and the human capital of this segment of the workforce. Just as Korea climbed up the technological ladder by importing capital equipment of recent vintage, which embodied frontier technologies, India has moved up the software ladder by importing human capital, in the form of U.S.-trained Indians. Another bridging mechanism was American companies that opened software centers in India to strengthen interaction between their organizations and Indian suppliers or to do development work in wholly owned R&D subsidiaries. By 2001, that list included Cisco, Hewlett-Packard, IBM, Lucent, Microsoft, Motorola, Oracle, and Sun Microsystems. At the same time, Indian software firms like Infosys and Wipro opened offices in the U.S., or acquired U.S. companies, to better serve their clients on high-end projects and to have listening posts in Silicon Valley. To facilitate this process, the government made it easier for Indian firms to raise capital abroad and to make foreign acquisitions. Thus physical distance was bridged by the strengthening of cross-national, intrafirm networks and by interfirm social networks among Indians and overseas Indians. The head of the U.S. firm's software development center in India was often an American of Indian origin, as was the head of the U.S. subsidiary of an Indian software company. Overseas Indians helped enrich and cement the ties between India-based supply and U.S.-based demand.

Geographic Spillover

Even as India's software industry migrated upwards to higher value-adding activities, its target markets broadened beyond the United States and its success spilled over into other knowledge-based services. (See Figure 2.)

The geographic spillover occurred because of positive brand-name externalities—that is, because "made in India" became a signal of quality in software, just as "made in Japan" is a signal of quality in consumer electronics. As a result, more

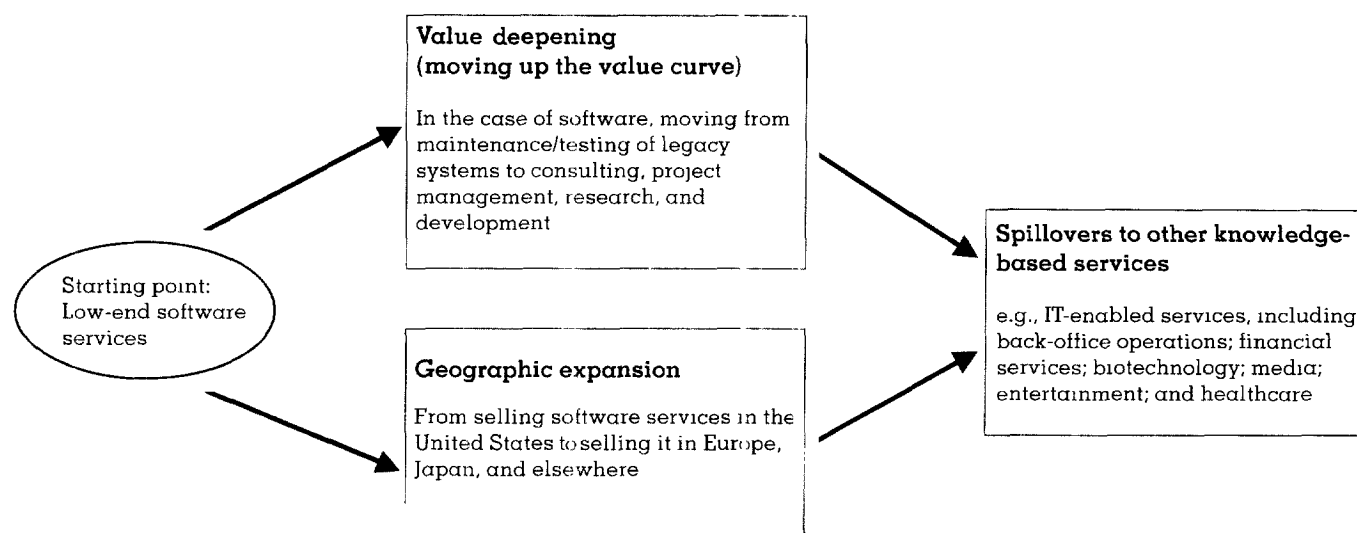


FIGURE 2

Competitiveness Building: From Low-End to High-End Software, to Other Knowledge-Based Services

countries began to court Indian IT talent and outsource software development to Indian firms. Among these are countries like the United Kingdom, where Indian emigration had slowed to a trickle, and countries like Finland, France, Germany, Ireland, Japan, New Zealand, and South Korea, where Indian emigration was small to begin with. Indian IT experts accounted for 20 percent of the green cards issued by Germany for non-EU computer specialists in 2000.¹⁶ Singapore has set a goal of attracting 250,000 Indian IT professionals over a five-year period.¹⁷ Leaders of these countries, as well as of Britain, France, Japan, and China, made official trips to India in 2000 that invariably included a half-day visit to a software cluster and initiatives to strengthen ties with India in the IT sector. Within software and IT-based services, a virtuous cycle has been set in motion, with success in the U.S. leading to a global expansion of demand for Indian IT experts and a corresponding expansion of the social network of overseas Indians.

Spillover into Other Knowledge-Based Services

India's success in software is spilling over into success in other knowledge-based services for several reasons. Software success has enhanced India's reputation and credibility as a provider of skilled services, given that software is seen as a sunrise, high-technology sector rather than a mature, low-technology sector. It is no longer improbable for MNCs to consider India a location for such services.

Other knowledge-based services leverage many of the same strengths India enjoys in software—namely, access to a large pool of skilled, inexpen-

sive, English-speaking talent, except that these sectors require doctors, scientists, chartered accountants, consultants, or mathematicians, rather than programmers. As in the case of software, public educational and research institutes nurture talent in these fields too, and increasingly they will be supplemented by private institutions as demand grows.

Software and IT are general-purpose technologies with economy-wide applications: capabilities built up in software can be leveraged in other high-technology fields such as bioinformatics, pharmaceuticals, media, and entertainment.¹⁸

Indian professionals are well represented in the United States, not just in software and Silicon Valley but also in other high value-added services, such as education, management consulting, technical consulting, medicine, and finance. Some of them have also reached the upper rungs of management in *Fortune* 500 companies, such as Arthur Andersen, Citigroup, Computer Associates, McKinsey, PepsiCo, United Airlines, and US Airways. These factors may increase the propensity of these companies to do business in, and with, India.

Finally, Indian-Americans have also become more active in promoting startups in the U.S. and elsewhere. The IndUS Entrepreneur (TIE), founded in 1992, is a network of Indian entrepreneurs and professionals with 25 chapters, including five in India, several in the U.S., and one each in countries like Singapore, Switzerland, and the United Kingdom.¹⁹ At TIE's core is a group of angel investors, who got rich by starting companies in the U.S., and have been recycling their wealth as venture capitalists in the U.S. and in India. While most of their wealth goes to U.S. companies, they are also fun-

neling funds into a new generation of start-ups in India, as well as into hybrid companies and investment funds that operate in both India and the U.S.²⁰

For all these reasons, India has begun to attract foreign contracts and investments in other knowledge-based industries, which, while modest in FDI terms, have significant economic effects in the long term. In a sign of things to come, between 1990–91 and 1998–99, India's foreign exchange earnings from inward remittances and service exports grew more than twice as fast as the exports of manufactured goods.²¹ By 2000, India's exports of services exceeded the total exports of her two leading manufactured goods—textiles/garments and gems/jewelry.

Emerging Services

One set of emerging activities leverages the IT revolution to provide such lower-skill services as call-center operations and medical transcription. An example is GE Capital's call-center operation, which grew from two employees in 1997 to a \$30 million business in 2000, employing 2,500 people who examined medical claims, car-loan applications, and credit-card debt.²² Another example is accounting services, whose exports are projected to grow rapidly within a few years. Towards that goal, the association of Indian public accountants is negotiating mutual recognition agreements that would allow Indian accountants to provide book-keeping services for companies in the European Union and the United States. The first such agreement was signed with Italy in March 2001.²³

A more advanced knowledge-based service is doing design and engineering work for industrial and construction projects. The Indian firm, Satyam Computer, has formed a strategic alliance with TRW to provide a range of IT-related and engineering services for automotive applications. Even more advanced work is planned in GE's R&D lab in such areas as basic chemistry, polymer science, mechanical engineering, ceramics, and metallurgy. Other foreign investors with similar aims include Ford, AOL Time Warner, and Advanced Micro Devices.

Another area holding enormous potential is biotechnology and pharmaceuticals. Indian firms, such as Dr. Reddy's Lab, Ranbaxy, and Shanta Biotech, have developed new molecules and drugs, sometimes funded by MNCs like Bayer, Unilever, and Pfizer. Hoping to replicate the success in software, the Karnataka government is setting up a Biotech City and an Institute of Bioinformatics and Applied Biotechnology. Not surprisingly, the government's strategy replicates many elements of the

strategy that worked in software services. A neighboring state, Tamil Nadu, announced in January 2001 plans to set up its own biotechnology research center in collaboration with Cornell University, well-known for life-science, agricultural, veterinarian, and healthcare research. For its part, the central government has extended a 10-year tax holiday for research and development companies on their royalty income and fees, and has created a new Department of Biotechnology.

India is also becoming an attractive site for conducting clinical trials of new drugs—a procedure that makes up one-third of the cost of introducing a new drug. Not only are Indian technicians cheap, but the country's large and heterogeneous population is an advantage, as is the sad fact that its people suffer from numerous ailments. With improvements in the institutional and regulatory infrastructure for trials and pharmaceutical research, India's exports of services in this sector should grow.²⁴ In a sign of things to come, by 2001, Quintiles Transnational and Covance, two leading U.S. contract-research organizations, had started operations in India. Eli Lilly and AstraZeneca had bought out their Indian joint venture partners, and the latter was planning a "super-duper research center," according to one of its executives.²⁵ Pfizer was doing biometrics in its Indian facility, Novo Nordisk was testing two new diabetes drugs, and GlaxoSmithKline was sourcing components for its ulcer, hepatitis B, asthma, and AIDS drugs in India. To encourage knowledge-based investments of this sort, the Indian government is rapidly becoming much more receptive to the idea of protecting intellectual property (IP). Leading the crusade for tougher IP laws and enforcement is Nasscom, the Indian association of software and service companies.

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Finally, India has vast potential in media and entertainment as well. Apart from the technical synergy between software and media—for instance, in producing animation—India enjoys a home-market advantage in this sector, as the world's largest producer of movies (ahead of Hollywood, with 800 titles annually). It also has a very large installed base of subscribers to cable TV, through which 60 channels of entertainment are

available, a lot of it local fare. Given the large population of overseas Indians, foreign distribution rights alone have become sufficient to cover the cost of making movies. Recognizing this potential, Sony Entertainment recently announced plans to invest \$250 million in India over the next three years, developing two new TV channels, and getting into film production and distribution. To leverage India's resources in export markets, the Andhra Pradesh government has created Film City, a studio complex with advanced filming and editing facilities.²⁶ Arthur Andersen predicts that by 2006, Indian exports of movies will reach \$3 billion annually.

Spillover Effects on Indian Business Climate

India's success in IT has had positive spillover effects on the general business climate in India. For one thing, it has helped unleash entrepreneurship in a country whose cultural and bureaucratic ethos was long regarded as inimical to capitalism. It has boosted the confidence of the younger generation that they could make good money in India, and ethically too. Success in software and IT has blunted domestic political opposition to India's integration with the world economy. Equally important, the IT sector has affected Indian capitalism, because the corporate culture and business practices of India's IT firms are vastly superior to those of India's traditional business houses, which honed their business practices in a closed, state-dominated system. Indian IT firms have been at the forefront of improving corporate governance.²⁷ India's high-technology firms have also been at the forefront of corporate philanthropy, particu-

larly in education and civic improvement, through innovative public-private partnerships. Furthermore, the IT revolution has substantially enlarged India's entrepreneurial pool, bringing new social groups, particularly from South India, into the business mainstream.

India vs. China

We conclude with comparisons between India and the other large Asian country, China, whose GDP growth, exports, and inward FDI have all been much higher than India's. Economic reforms began in earnest in India about a decade after they did in China. Therefore, India's performance improvement can be expected to lag China's by at least a decade. The surge in China's inward FDI occurred several years after the surge in the 1980s in China's annual growth rate to 10 percent. The implication is that in India, too, the surge in FDI is likely to occur after her growth rate rises to 8 to 10 percent in this decade. The institutional foundations of India's capitalism—be it the legal system, accounting practices, working language (English), or the democratic context—are more compatible with those in the United States than are China's foundations, because of the common British legacy in India and the U.S. Nonetheless, the annual FDI inflow into India is unlikely to exceed \$10 billion, compared with \$40–50 billion in China. To understand why, one must recognize another important difference between the two countries, namely, the differing contributions of overseas Chinese and overseas Indians to their respective home country's development.²⁸ (See Table 2.)

Overseas Chinese—the so-called Chinese dias-

Table 2
Overseas Chinese vs. Overseas Indians

Characteristic	Overseas Chinese	Overseas Indians
Number and location	50 million (including Hong Kong), concentrated in countries close to China such as Taiwan, Singapore, Indonesia, Thailand, Malaysia	15–20 million, dispersed across Southeast Asia, Middle East, North America, United Kingdom, Australia
Assets	High net-worth individuals Manufacturing and distribution networks in Asia Contacts and reputation in rich-country export markets	Low-skill guest workers with modest incomes and savings, partly remitted home (e.g. in the Middle East) Salamed professionals in North America, positioned in high-tech companies, universities, consulting, and financial services—the "knowledge diaspora" Senior positions in <i>Fortune</i> 500 companies Only a few high net-worth individuals, but with more likely in the future
Competencies	Entrepreneurship Light manufacturing Trading Export marketing	Technical know-how Knowledge-based services High-tech startups Venture financing

pore—are about 50 million, but concentrated in countries close to China, with Hong Kong and Taiwan accounting for more than half.²⁹ The Indian diaspora is smaller, at 15–20 million, and more widely dispersed in far-flung regions, such as the Middle East, the U.K., and North America. More importantly, the Chinese diaspora is wealthier than the Indian diaspora, and accounted for up to 80 percent of China's FDI inflows in the 1980s.³⁰ Overseas Indians have not been as affluent: in places like the Middle East, they hold relatively low-skilled jobs and hence have modest incomes; and even though in North America they hold high-skilled and professional jobs, only a few have achieved high net-worth positions, and that only recently. In contrast, the Chinese diaspora is entrepreneurial and quite affluent everywhere. For these reasons, FDI into China by the affluent Chinese diaspora has been 20-fold that by overseas Indians into India. In contrast, remittances by the Indian diaspora have been seven times that of the Chinese diaspora (\$49.8 billion and \$7.6 billion, respectively, between 1991–1998). Furthermore, Indians in the U.S. are mostly professionals, while overseas Chinese are manufacturers, traders, and exporters. Therefore, overseas Chinese have helped China boost its exports of manufactured goods, especially labor-intensive products, while overseas Indians have helped India boost its exports of knowledge-based services. In both cases, though, overseas nationals have played key roles in information, reputation building, technology transfer, and capital supply.

Implications for Managers

India is undergoing a slow but steady revolution whose significance may not yet be readily apparent to foreign investors. Statistics on India's exports or inward FDI are still unimpressive compared to other large Asian countries like China. But significant changes are underway beneath the surface that have reduced political risk for investors, by strengthening democratic processes and institutions, and by creating a multiparty consensus on economic liberalization. They have resulted in greater decentralization to the states and fostered competition among them for private investment. And they have begun to lift the heavy hand of government in economic matters, boosting the growth rate to 6 to 7 percent annually, with 8 to 10 percent growth likely within a decade. Other promising trends include the growth of software exports through the 1990s at 50 percent or more annually and signs that this boom will not only continue in the 2000s but spread to other knowledge-based

industries. Aiding this transformation process at critical stages has been the overseas Indian community.

Recruit Indian talent

How should foreign firms and managers take advantage of these developments in India? In the short run, a few safe opportunities present themselves. For starters, foreign firms can tap into India's well-educated, inexpensive, English-speaking manpower, as consulting companies like BCG and McKinsey or financial services firms like Citigroup have done. In the past, Indian manpower went abroad searching for jobs or training; today foreign companies go to India to recruit talent, be it at the Indian Institutes of Management, the Indian Institutes of Technology, or from their Indian subsidiaries (e.g., Citibank, Proctor & Gamble, and Unilever).

Outsource back-office services

Another relatively low-risk option is to move less critical steps of the value chain to India, such as back-office services like accounting, payroll, or benefits administration. Potential cost savings are estimated at more than 50 percent of the cost of providing these same services in the U.S. Firms can set up their own operations in India, as GE Capital has done, or outsource the work to Indian companies. Similarly, customer interaction services, such as call-center operations, can and are being relocated to India.

Relocate high-skill services

Although moving higher value-added services to India, such as design and engineering services, education services, or R&D (as many well-known software companies have already done) may appear riskier, we believe that India has a comparative advantage in all such activities that make intensive use of human rather than physical capital. Similar opportunities wait to be exploited in biotechnology, financial services, media, and entertainment. The FDI associated with these ventures is low—which means the financial risks are low—but the potential payoff to the foreign investor are substantial, as are the gains to India by way of high-paying jobs and foreign exchange earnings. It is becoming easier by the day to create such operations in India, because of the incentives and help that state governments are extending to foreign investors. Overseas Indians, who now number nearly two million in the U.S. alone, can

help launch such operations or help locate reliable Indian suppliers.

Proceed cautiously with manufacturing

We have focused on opportunities to move service stages of the value chain to India because India is much less attractive as a location for manufacturing operations. That may change, once Special Economic Zones become functional or the bottlenecks in India's physical infrastructure are removed. Until then, manufacturing FDI should mostly be targeted at serving the Indian market. However, we think it ill-advised for firms to wait until India's economic growth rate rises high enough to catch the attention of the average manager. Because of the complexity of doing business in India, and the fierce nature of local competitors, there will be several bumps along the way for foreign investors.³¹ It is also important that foreign investors make those investments in the states that are most business-friendly, such as Andhra Pradesh, Gujarat, Karnataka, Maharashtra, or Tamil Nadu. Having thus established a toehold in India, larger manufacturing investments may merit consideration. In the short run, though, the most promising opportunities for foreign investors will lie in knowledge-based services.

Endnotes

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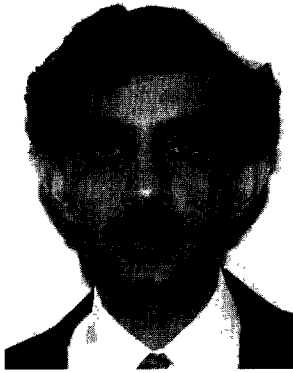
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Executive Commentary

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Lucent Technologies India

In the past decade, India's image has transformed from the land of snake charmers and witchcraftsmen to the land of opportunities and intellect. And in the last five years or so, there has been a remarkable change in the Indian economic landscape. The Indian economy has primarily been an agrarian economy, but a metamorphosis is taking place, and India is gaining prominence as a knowledge-driven economy. India has the world's second largest pool of English-speaking scientific and technical manpower and this provides it with a unique competitive advantage—especially when the raw material for the knowledge businesses is people.

I often find very conflicting views on India. Some consider India a developing nation with more than 40-percent illiteracy and a large population living below the poverty line, whereas others look upon India as a land of world-class technical resources and entrepreneurs, and a very hospitable nation. India is indeed a land of contrasts and inconsistencies, where the gaps are so wide that its image really depends on the perspective of the viewer.

Devesh Kapur and Ravi Ramamurti provide an in-depth analysis of the changing economic situation in India, and indicate to business people and policy makers how they can gain by investing in India. This is one of the more accurate and balanced analyses of the Indian economy I have seen in recent times. Like each major industrial nation, India has its own competitive advantage. First and foremost, India has a vast resource pool with no language barrier—ideal for knowledge-intensive industries. India also offers a very attractive cost structure, about one-

third that of the U.S. Added to these attractions are high-quality output and rapid delivery capability.

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India's talent and capability in the software sector have been well recognized around the globe. India today is known as a software nation, and with several other sectors like biotechnology and pharmaceuticals gaining momentum, India is poised to emerge as a high-tech nation by the end of this decade. Every major high-technology company in electronics, telecommunications, and software already has a significant presence there—both market as well as R&D. And investments in other sectors like power, biotechnology, and pharmaceuticals are gradually coming into the country, not to mention large sums of venture capital funds.

As Kapur and Ramamurti note, economic and political changes are underway in India. I believe that these changes are only for the good. Political stability has improved and the best thing that has happened is an apparent consensus among various political parties on the policies and thrust of economic reforms. This means that, in the event of any political instability, the process of economic reforms that has started would not be affected, and would thus ensure protection of investments. Moreover, in the last couple of years, India's relationship with major world powers has significantly improved, and India is now viewed very strategically by most developed nations as an integral partner for their economic growth.

The continued focus on infrastructure development and liberalization is gradually helping improve India's image as a nation that provides very attractive, perhaps unmatched, returns on investments. The rising internal competition among the states to be a key player in the growth of the Indian economy has enhanced accountability for performance among politicians and dramatically sharpened their focus for improvement.

I find the authors' comparison with China very interesting. My impression is that China is perhaps better suited to the manufacturing industry, whereas I consider India apt for cerebral activities—at least for the next five to eight years. Many growth-hungry Chinese companies are considering India as a strategic base. For example, Huawei Technologies, a Chinese telecommunications company, has established a significantly large R&D facility in India, is doing cutting-edge work, and sourcing a large portion of its software needs from India.

The software industry has now established that India can do well in knowledge-intensive businesses. The software industry has posted an impressive cumulative aggregate growth rate of more than 50 percent in the last five years, and with the backing of enabling government policies, I believe that India will soon achieve a similar reputation in other knowledge-intensive fields. An institutionalized, focused approach to increase the quality and quantity of manpower, combined with a recent strategic thrust on creation and protection of intellectual property, have given further impetus to the Indian economy. Many Indian companies have been listed on the U.S. Nasdaq Composite Index and the New York Stock Exchange. And in recognition of India's potential in the high-tech sector and its economic promise, this year Nasdaq established an office in Bangalore, the city known as India's Silicon Valley.

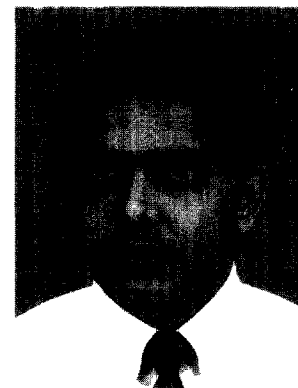
The talents of Indian professionals have been very well recognized by several countries as well as by organizations. In fact, I am now witnessing an intensification of global competition to grab the Indian talent pool. Besides the U.S., other countries such as the U.K., Germany, and Japan, have thoughtfully devised visa policies to attract Indian professionals. Within India, a war is going on among transnational companies to grab the mind share of the talent pool. Generally speaking, Indian professionals have a strong drive for excellence and are quite flexible. In my experience in working with global companies, I find that Indian professionals are also sensitive to other cultures as well as adaptive to different situations.

Though there are several areas that need to be addressed, the cost-quality proposition for doing business in India far outweighs the current deficiencies. With India beginning to emerge as a regional hub in the Asia-Pacific region, there are

also benefits to be realized in having regional customization centers, such as in telecommunication and software products. Of course, with increasing liberalization there are handsome opportunities in sectors like insurance, banking, e-commerce, packaged goods, and utilities, as well as in retailing.

Having said all this, I must also share my experiences and recommendations on how best to benefit from India-based business operations. First of all, I encourage people to think long-term when formulating their India business strategy. This helps in brand building as well as developing business-critical domain skills. I also would like to encourage people to learn from others' success stories and not be influenced by their own previous experiences, if any, for India has undergone a sea change in the last few years. In addition, I suggest that local managers be considered for India operations. I find that many Indian managers can align very well with the company's home location, are committed, results-oriented and innovative, have a strong business orientation, and on top of it all, understand the local culture, which is very critical for success. Furthermore, it is a good idea to explore if a company's plans can be aligned with India's needs. For example, a company might explore which technologies are more relevant for India.

Industry heavyweights like Jack Welch and Bill Gates have already endorsed the India value added by locating some of their strategic activities there. Many others are matching the decisions of Welch and Gates. Tremendous intellectual capacity exists in India, and the winners will be those who not only know how to tap into this intellectual reservoir, but also how to translate the intellectual capacity into intellectual capital. With pressure for business excellence mounting and globalization becoming pervasive, it has become a necessity to locate business operations outside home locations. While India has miles to go in terms of establishing a world-class infrastructure, I believe it provides an unmatched platform for business scalability as well as a very significant cost-value proposition. Kapur and Ramamurti make this point very well.



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