
The Lotus Files: The Emergence of Technology Entrepreneurship in China and India

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This paper provides an interim report for The Lotus Files Project, a longitudinal research project on Technology Entrepreneurship in China and India.¹ Begun in November 2001, The Lotus Files Project examines the motivations of technology entrepreneurs in the post-Internet boom environment in two of the world's largest countries. Although Americans and Europeans do not consider China and India as immediate challengers to the West's technological leadership, our research indicates that this challenge is well underway and is accelerating rapidly.

In China and India the technology industry is just emerging, but within five to ten years (or even sooner), both nations will emerge as global leaders in technology in domestic and foreign markets. It is critical that Western countries understand how the technology industry is evolving in these two nations so that they can participate. Believing that China and India are "far-away" and "hard-to-understand" emerging markets will only serve to perpetuate and deepen existing stereotypes and misconceptions. Indeed, judging India's information technology (IT) sector to be merely a collection of low-cost outsourcing companies, and China's as a complex, self-centered domestic IT market and OEM (original equipment manufacturer) center, will only conceal their advancing global status and influence.

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Both Chinese and Indian entrepreneurs have participated in, and led, the rapid development of the Internet and information technology in the United States' Silicon Valley during the 1990s.² The application of the capital and experience they generated through their participation in the IT revolution in the

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United States has served as the core catalyst for the development of local entrepreneurship in China and India. Not only are ethnic Chinese returning to China from the U.S. in large numbers, but they are also bringing their capital, their families, and, most importantly, their ideas for new companies.³ Similarly, Indians are financing technology startups in their homeland in growing numbers. However, Indians are less likely to return to India to operate these

companies, preferring to delegate this to trusted family members or colleagues.⁴

A review of Chinese and Indian historical contexts as they influence technology entrepreneurship elucidates the broad motivation of Chinese and Indian entrepreneurs. An essential element of these contexts is a review of the current state of technology development in both countries as it relates to fostering technology entrepreneurship. Preliminary survey and interview results from The Lotus Files Project suggest that technology entrepreneurs in China and India are currently adopting very different strategies, but will inevitably collide with each other and compete for technology leadership. Finally, we conclude that the near total lack of mutual understanding between Chinese and Indian technology entrepreneurs is a significant opportunity for entrepreneurs in both countries.⁵

WHY CHINA AND INDIA?

Both size and history matter. China and India combined account for over 40 percent of the world's population. This fact alone is enough to ensure that both countries will play significant production and consumer roles in the global technology marketplace sooner rather than later. Population size also helps define the different characteristics of these two markets. China's GDP is more than one trillion dollars, while India's is at \$500 billion. India's share of world trade is less than one percent, while China has grown to 3.4 percent. China's international communications bandwidth is seven times that of India's. Software exports from India to the world are five times higher than from China.⁶

Charismatic leaders led both countries, Mao ZeDong in China and Mahatma Gandhi in India. Years of colonial rule and the depressing effects of a wartime economy devastated both nations. In China's case, the Japanese occupation

left the country nearly in ruins physically as well as emotionally. As peace settled in post-war China, the new government issued a patriotic call to all Chinese living abroad to return and help rebuild the nation. Tens of thousands ethnic Chinese, many of them academics, doctors, and other professionals, returned with their families and brought home overseas experiences. This was the first wave of successful Chinese to return. Unfortunately, many were to suffer humiliation, beatings, and, in some cases, death, as Mao and the Chinese Communist Party unleashed multiple ill-conceived campaigns from the late 1950s (The Great Leap Forward) through the early 1970s (The Cultural Revolution) to rid the country of "evil" and unwanted capitalist influences.⁷

Meanwhile, India turned its energies toward building a new democratic government modeled after British institutions. During the Cold War period, the Soviet influence grew in India, resulting in a country consisting of one part emerging democracy and one part command economy. The Indian government focused on building up its heavy industry and upgrading the nation's physical and public utility infrastructure, but lacked the necessary means and consistent institutional support to follow through. Unfortunately, the nation has yet to achieve the level of stability and economic growth required for large-scale integration of India's intensely diverse population, language, and culture. The significant discrepancies between the Indian state governments' ability to develop their economies and fight poverty continue to dampen India's growth prospects.⁸ Unlike China, India's best and brightest have left to study abroad with little intention of returning to India. This has developed into a fundamental difference between the Chinese and Indian diasporas: the Chinese seek to return to China and the Indians seek to remain outside of India.

CHINA

During the Cold War, China remained alternatively aligned with the Soviet Union, isolated from the world, and, in the early 1990s, loosely aligned with the U.S. The result was that the nation's economy, including development of technology for the civil economy (military R&D continued, including a nuclear weapons program), stood still. As the West was moving headlong into the closing years of the industrial revolution and laying the foundations for the information revolution, China remained stubbornly isolationist.

India, on the other hand, had a more open democratic society, but the country's alignment with the Soviet Union and America's unwillingness to establish firm political and economic ties prevented the economy from progressing significantly (again, the military investment continued unabated). Successive Indian governments have struggled with moving beyond the British legacy to create a political system and an economic formula that works in the Indian context.

Much has changed for both China and India as they entered the last decade of the twentieth century. Both nations had annual GDP growth rates above five percent (China was much higher at times). Relations with Russia were no longer pivotal to their geopolitical view. Both have been open to Western economic, political, and cultural influences and imported technology.

How does this brief history lesson relate to technology entrepreneurship in China and India in 2002? Entrepreneurs in China and India approach their profession with different historical mindsets. For the Chinese, the prevailing view is a rising tide that lifts the majority of the boats higher. Although the gap between rich and poor is increasing, most Chinese citizens have witnessed a significant improvement in standard of living over the past 50 years (and it is continuing to improve!). China is no longer focused on agrarian revolution, but on Deng Xiaoping's mandate that "it is glorious to become rich." Deng Xiaoping funda-

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mentally changed Chinese society's expectation that socialism was synonymous with poverty. In the 1980s, he unleashed an economic boom that has resulted in a more open economy and higher standards of living across the country. Early reports on growth rate in China's economy during 2001 indicate that GDP grew at a torrid pace of 7.3 percent.⁹ In late 2001, the Chinese Communist Party changed its rules to allow more than four million entrepreneurs (read: capitalists) join the party. While

less than 10 percent have accepted this offer, the symbolism of welcoming small capitalists into the Party demonstrates the development of the private sector and the political nervousness of the establishment in China.¹⁰ Allowing capitalists into the Communist Party is viewed by many in the Chinese establishment as not only contradictory, but as a symbolic wedge of change.

From numerous interviews with government officials, Chinese entrepreneurs, and students over the past 20 years, it is evident that the feeling in Chinese society is fundamentally positive. Discounting the Western press focus on human rights for a moment, one cannot deny that the last 50 years of Chinese history have created a platform for successive generations to improve their economic position in society.¹¹ This is enthusiastically evident when speaking with young entrepreneurs who become nearly speechless when they try to articulate the opportunity that lies before them.

The technology sector has begun to emerge as a critical growth element now that Chinese industry has made the first tentative steps toward modernization. Today's needs call for software solutions for the manufacturing sector, logistics,

order management software control systems, and all forms of technology focused on improving communication within the consumer and business sectors. These elements offer opportunities for technology entrepreneurs to create, invent, and grow new businesses. These new technology entrepreneurs will provide the solutions that will make Chinese industry work, and the Chinese government is encouraging this with a hands-off policy. The second wave of returning overseas Chinese (mostly from the U.S.) is powering a surge in new venture startups in China's technology centers of Beijing, Shanghai, and Shenzhen.¹²

The bursting of the Internet bubble in the United States and the increased competitive environment for technology startup capital has forced many Chinese residents in the U.S. to evaluate the pros and cons of remaining in the country. Starting a new business in a large, competitive market is difficult. Returning to China and launching essentially the same business in a less competitive, potentially equally large marketplace now appears to many entrepreneurs as a better investment. In addition, returning Chinese entrepreneurs will benefit from significant economic incentives in starting their new ventures in China's special economic zones.

INDIA

The Indian condition remains problematic. The large gap between rich and poor continues to plague India's fragmented society. The economy remains mired in the middle ground between a command and a free market economy. The government's most recent privatization initiatives are belated and may not be as effective as promised. In addition, the most recent 2002 budget submission by the government advocates increased taxes to pay for national security and no significant reforms focused on small and medium-sized businesses.¹³

Despite successful programs to significantly increase technical education, there are not enough schools and institutes to satisfy the rising demand for advanced education. As a result, many students must travel overseas to attain higher education. This exit of India's educated elite has, in past years, provided the U.S. and Europe with greatly needed technical talent. More worrisome, these engineers have not returned to India to start new companies. Many prefer to remain in the West where they have successfully risen to higher management positions in U.S. corporations. Unlike Chinese engineers, Indians are significantly more likely to rise to executive positions in U.S.-based technology corporations.¹⁴ And unlike the ethnic Chinese abroad, Indians living in the U.S. do not see benefits in terms of supportive business infrastructure and rising demand in returning to India.

Nevertheless, there is great potential for an entrepreneur-led technology sector in India. The country's network of technology and management institutes continues to serve as the nation's training ground for future engineers and entrepreneurs. These institutions have trained the majority of India's business elite over

the past 20 years. This concerted effort to raise the level of technical training has served India extremely well—as evidenced by India’s current world leadership as a center for software development—and should be emulated.

Non-Resident Indians (NRIs) continue to be an enigma in the development of technology entrepreneurship in India. On the one hand, they are the source of tremendous experience and seed capital, but on the other hand, they are more focused on building businesses outside of India. The TiE-IndUS association has succeeded in organizing U.S.-based entrepreneurs to provide mentoring and networking for fundraising.¹⁵ Unlike the Chinese situation, the majority of NRIs are not focused on returning to India to start new businesses.

TECHNOLOGY CLUSTERS AND ENTREPRENEURS

Technology innovation clusters are formed around universities, government agencies, pleasant weather, benevolent government policies, available capital, and a large educated workforce. The prototypical technology cluster is Silicon Valley, California. While many nations have attempted to duplicate this phenomenon through government policy, the most successful clusters continue to be developed by market forces. In China, technology entrepreneurs have flourished since the mid-1980s in the southern Special Economic Zones (SEZs), particularly Shenzhen (bordering Hong Kong). With the shift in central government focus to the north—away from Shenzhen—Shanghai and Beijing are leading the way with more than 30 percent annual growth in the formation of new companies. The government’s newest initiative is embodied in the “Go West” campaign. Special incentives are being offered to both domestic and overseas Chinese entrepreneurs to establish new companies in China’s western cities.

India has a well-established technology cluster in Bangalore. The combination of the India Institute of Technology, Indian military research offices, pleasant weather, and a plethora of talented engineers have created the world’s leading outsourced software development location. In addition to Bangalore, cities such as Hyderabad, Chennai (Madras), and Pune are home to exciting new companies. Unlike China, where the special economic zones have begun to merge into the general economy, India’s technology clusters remain islands within the Indian economy. The fact that their communications systems are based on satellites installed on the rooftops of office park buildings to avoid the inevitable poor service provided by domestic ISPs is a clear example of their isolation.

THE LOTUS FILES RESEARCH PROJECT

Begun in November 2001, The Lotus Files Project is a longitudinal study dedicated to exploring the motivation of post-Internet technology entrepreneurs

in China and India. The on-line survey, located at www.thelotusfiles.com, is designed to reach a broad set of technology entrepreneurs in Greater China and India. In addition, a series of 25 in-person interviews have been conducted in China and India to obtain a more in-depth understanding.

The preliminary results from the first year of The Lotus Files project indicate that technology entrepreneurs in China and India are similar to their cousins in the U.S. More than 90 percent are men. More than 68 percent have graduate degrees, with more than 64 percent of the degrees in engineering subject areas. The vast majority of respondents first considered becoming an entrepreneur while working for a large company. Most are first-time entrepreneurs with only 48 percent indicating that family members were also entrepreneurs and 70 percent indicating that there was no previous technology experience within their immediate family. As is typical with most entrepreneurs, two-thirds of the respondents indicated that they had "failed" at least once in starting a business and expected to start more than one business in their lifetime.

Both Chinese and Indian entrepreneurs are having difficulty raising capital in 2002, although they also indicated that more than 40 percent of them started with as little as one million and 60 percent with less than five million. This indicates that while capital may be tight in the current environment, it does not take a great deal of financing to start up a business in these markets. In addition to raising capital, respondents indicated their biggest challenges as retaining employees, creating a viable sales and marketing organization, and achieving break-even profitability. When they started their businesses, the most significant barriers to getting started included high tax rates, establishing subsidiaries and branch offices, and ensuring legal recourse for their company. Of the companies surveyed, 30 percent were revenue generating, 15 percent had reached break even, and the remainder were pre-revenue early stage firms. The majority of firms identified themselves as operating within the software, business, outsourcing, and consulting segments of the IT industry.

The majority of entrepreneurs surveyed believe that technology entrepreneurship is the driving force for economic change in their country. They supported this by indicating that they not only were building companies, but were also mentoring other entrepreneurs as they built their companies. This network of entrepreneurs has proven extremely important in developing a strong and innovative

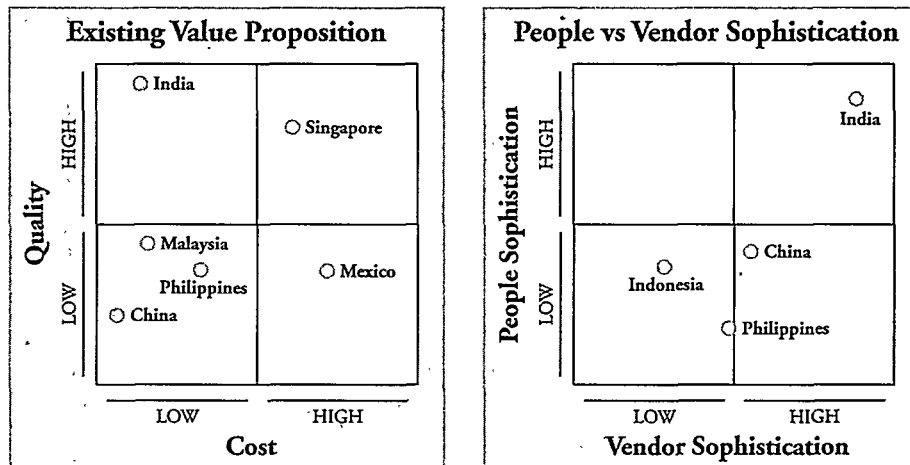
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business culture. Despite this optimism, respondents do not believe that either China or India will become a world technology leader for another five to ten years.

On the question of competition in the technology sector between China and India, respondents were clear: Indians view China as a major competitor (although they differ on when China will be a strong competitor), whereas the Chinese do not view India as competitive at all. Even more startling is that neither the Chinese nor the Indian entrepreneurs who were interviewed revealed much knowledge about the other country. With regard to geography, culture, and language, the knowledge gap between Chinese and Indians is significant.

The Indian NASSCOM (National Association of Software and Services Companies) conference held in Mumbai in February 2002 focused on the question of the Chinese threat to the Indian software and services outsourcing industry. Despite this fear of a new competitor arriving on the scene, very few entrepreneurs knew anything about China's technology policies. The chart below summarizes India's view of the competitive environment for software development and business process outsourcing.¹⁶

China's relatively low ranking is based on perceived limitations such as lim-



Source: Nasscom-McKinsey Report

ited knowledge of English, a communist political system, and a lack of track record for exporting software and services. The problem with this analysis is that it does not hold up to history: 10 years ago nobody would have predicted that India would develop into the world's leading software development locations. Just as the Western world had underestimated Indian technology entrepreneurs, so today Indians seem to be underestimating Chinese technology entrepreneurs.

An additional factor which influences technology entrepreneurs is the substantial difference in the size of the domestic IT and communications market in China and India. There are 33.7 million Internet users and more than 150 million

mobile phone users in China.¹⁷ More than five million new mobile phone users are added each month in China. This type of growth in China, combined with the overall economic growth in GDP of more than six percent, provides the Chinese technology entrepreneur a wide-open landscape to develop new businesses and meet urgent technology needs, especially for software. The result is that the Chinese technology entrepreneur is focused on the domestic market, not the export market.

The Indian domestic IT market is nascent at best. India has less than four million Internet users and only six million mobile subscribers.¹⁸ While Indian entrepreneurs have created the world's leading software export engine, they have ignored and shunned the domestic marketplace. This makes the Indian IT and software industry vulnerable to the economic swings of the

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U.S. and European Union, with no domestic market on which to fall back. A few Indian technology entrepreneurs are looking toward China for growth opportunities, both in terms of lower production costs (China is 15 percent cheaper than India in 2002)¹⁹ and increased market opportunity.²⁰ While Chinese engineers are paid less than their Indian counterparts, they have not yet obtained the required level of technical and business management necessary to compete on the world technology stage. Indian entrepreneurs have built up this expertise over more than 10 years and have the opportunity to leverage the cheaper Chinese engineering talent with their world-class development process quality.²¹

THE CHINESE ENTREPRENEURSHIP CONTEXT

The Chinese government and business community reveres technology. Despite the general impression that Chinese society is primarily agricultural and has a low technology adoption level, the reality is that technology is viewed extremely positively. Interviewees in The Lotus Files Project consistently describe the positive role that technology plays in China's emerging agricultural, industrial, and manufacturing sectors.

The most substantial opportunity exists in the software sector. China's new industrial and manufacturing sectors have an insatiable need for improved software to control and manage their businesses, plants, and factories. While the need is great, the requirement that software be developed specifically for Chinese business practices is essential. Beyond the obvious needs of providing Chinese language software, the manner in which these software packages are designed is unique to China.

In the United States, Europe, and Japan, software architecture is based on the assumption that the user is well educated in business in general and in how to use software in particular. This allows the software to be developed with a high level of user capability in mind. In the less developed business user communities in China, this assumption is not valid. Software designers must assume a much lower user knowledge and experience level when they are creating a software architecture. For example, a U.S. designer might assume that users are capable of “naturally” navigating through an application. This may not be the case in China. The Chinese designer will have to account for this lack of user experience when structuring the navigation principles for the Chinese software. To take a page from Deng Xiaoping, this is software design with “Chinese characteristics.”

The software opportunity in China is substantial. It is domestically focused to meet the acute demand for “software with Chinese characteristics.” Several entrepreneurs have estimated that it will take three to five years for Chinese software companies to meet the demands of China’s expanding economy before turning to the development of a software export industry. When China turns to exports, it will have a strong domestic economy fueling the software industry. This will put Chinese entrepreneurs in direct competition with their Indian counterparts.

The majority of China’s 450,000 engineers are university or institute graduates residing in the major cities of Beijing, Greater Shanghai, and the Pearl River Basin.²² They appear to have excellent programming skills, and most participate in

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U.S. software certification programs sponsored by Microsoft, Intel, Sun Microsystems, and others.²³ Significantly lacking in the Chinese environment is management experience in building and delivering large-scale software applications. Returning overseas Chinese from the United States are, however, filling this experience gap. These U.S.-trained and educated entrepreneurs and managers are bringing their Silicon Valley experiences to China to exploit the available pool of talented Chinese programmers. The Chinese government is encouraging this

trend by offering personal and corporate incentives. This phenomenon is the most important element of China’s growing technology sector, as well as a primary reason why China and India will become competitors for software outsourcing business.

This generation of returning engineers who left China in the 1980s suffered personally after the 1989 Tiananmen tragedy, but has now become convinced that there is significant opportunity in China. They are mostly from Silicon Valley and have solid experience in U.S. management techniques. This

will bring significant value to the Chinese technology situation. Over 50 years after Mao's return call to the Chinese Diaspora, it is economic opportunity rather than patriotism that is bringing Chinese back. In short, there is more opportunity in China now than there is overseas.

Chinese premier Zhu Rongji completed a groundbreaking visit to India in January 2002, stopping at the country's technology center, Bangalore. The visit has already produced a wave of hyperactivity between Indian and Chinese software companies including the establishment of representative offices in Shanghai by Infosys and Satyam Computer Services. With Shanghai's annual software exports in the \$100 million range per year and the arrival of two of India's top five companies, each with software export revenues well above \$200 million, it is abundantly clear that Indian companies are now focused on exploiting China's domestic market. China's ability to compete in the software export business remains immature.

In sum, the Chinese business environment is positive and attractive to technology entrepreneurs interested in starting new businesses.

Capital continues to be easily available in China. Because the funding requirements to start a software or technology company in China are low, entrepreneurs continue to be able to find willing investors. Venture capital in China takes many shapes, but is primarily available through small firms who invest locally or regionally. In addition, quasi-government organizations such as the Chinese Academy of Sciences are active seed investors. In 2001, 313 venture capital firms were registered with the Asian Venture Capital Association.²⁴ These firms employed 987 investment professionals. They raised \$29 billion and deployed this capital to 3,284 companies during 2001. While this level is low compared to the United States, it is growing rapidly despite the recent investing downturn. In order to maintain maximum flexibility, the majority of these companies remain registered in Delaware, USA.

The Chinese education system has rebounded nearly completely from the ravages of the Cultural Revolution. Students enter universities and institutes by examination. Many private secondary schools and special training programs have emerged in the past 10 years in response to the continued competitive admissions situation in China's institutes of higher learning. Despite an increased number of available spaces in Chinese schools, many students still go overseas for college and graduate school education. The political controls governing overseas education have essentially been eliminated as long as the student has some sort of financial sponsorship. The probability that these students will return to China has also changed. Gone are the PRC's political concerns that these students will stay

abroad. The economic opportunities in China's domestic market are motivating these students to come back and participate in the growth economy. This trend cannot be over-emphasized as an important fuel for China's economic engine.

A detailed review of the complex web of Chinese business regulations is beyond the scope of this article, however, it is clear that private industry in China operates relatively unencumbered by political regulations. Several entrepreneurs have described to the author new regulations and procedures which allow for the legal export of capital and profits from China. This has been the major stumbling block surrounding foreign investment in China and should be increasingly liberalized as the WTO regulations are phased into the Chinese economy. None of The Lotus Files respondents identified government regulations as a major barrier to starting their businesses.

In sum, the Chinese business environment is positive and attractive to technology entrepreneurs interested in starting new businesses. Capital is widely available, government regulations are supportive, experienced entrepreneurs are returning from overseas, the education and training system is improving, and, most importantly, the expanding Chinese economy is creating substantial domestic opportunity.

THE INDIAN ENTREPRENEURSHIP CONTEXT

Experts state that the Indian technology sector has developed as rapidly and broadly as it has because the Indian government did not have a minister in charge of this sector. In many ways this view of why India has been so successful as an emerging technology and software center is not far from the truth. In a country where government policies are tangled together with ethnic and political debates, the emergence of technology centers, such as Bangalore, for the world's software industry, is counter-intuitive at the very least.

Despite the lack of proactive assistance from the government, India has successfully developed in Bangalore the closest replication of Silicon Valley outside of the United States. Bangalore is home to both an India Institute of Technology and Management, as well as Indian military research centers, abundant talented engineers, and of course, excellent weather. In addition, the Bangalore municipal authorities have done a good job of developing the city's physical and communications infrastructure (except for power) and promoting the city across the world as the center of outsourced software development and CRM services.

Bangalore is not the only innovation cluster that has been successful. The cities of Hyderabad, Pune, and Chennai (all in southern India) have also begun to draw a significant number of technology entrepreneurs. Given that most office parks in India have their own private satellite high-speed access to the Internet, where an entrepreneur locates is becoming more a function of their personal preference than the need to be near one particular technology center.

Unlike China, an active professional association named NASSCOM²⁵ supports the Indian software and customer services industry. This organization has been responsible for promoting the Indian technology sector around the world. They have commissioned McKenzie & Company to do an exhaustive annual survey of the outsourcing business in general and India's role in particular. This survey and the resulting exposure have catalyzed Indian technology entrepreneurs into action. Trends have been identified and opportunities suggested. This serves as free market research for budding entrepreneurs and reinforces the strategies of the larger enterprises that are already entrenched.

Indian success is measured in many ways. One clear measure is the number of Indian companies from the software services sector that have listed on the U.S. technology stock exchange. Infosys, Sathyam, and Wipro are all examples of businesses that were started by entrepreneurs and became world-leading public companies. This legitimacy has helped the smaller enterprises across India's technology sector advance their commercial activity. It has given great encouragement to younger entrepreneurs who now can see a path to success and wealth.

It is difficult to find an answer to the question of why Indians are so talented at software development and engineering. Perhaps it is the combination of subject-specific educational opportunity and hard work that have enabled so many Indians to be successful at mathematics and software development. Not only does India have some of the

best engineering talent in the world, but they have also developed into world-class managers, capable of developing and scaling up companies.²⁶ It is this management experience that will continue to set India apart from the emerging low cost outsourcing countries. The final advantage is, certainly, native knowledge of the English language. Without this element, the Indian software industry may still have developed to high levels, but not as rapidly.

Venture capital is still a young industry in India. The Reserve Bank of India's foreign currency regulations, as well as foreign enterprise rules, have prevented a significant amount of foreign venture capital from entering the country. This has begun to change, but in 2001 there were only 81 firms with 278 investment professionals registered with the Asian Venture Capital Association making investments in India. Just under three billion dollars of capital was

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raised in 2001. From this capital base, 830 investments were made in Indian technology startup companies.²⁷ This level of investment lags the Chinese condition not only in terms of the amount of capital, but the number of experienced investment professionals actually reviewing business plans from entrepreneurs. It will take three to five years for the Indian venture capital community to mature to a level where investments are made at multiple stages (seed, early, growth, exit) and in multiple industries.

India is handicapped by not having a city (state) similar to Hong Kong. Regardless of one's feelings about the post-1997 regime in Hong Kong, there is little doubt that for more than 30 years Hong Kong has played a critical role in financing commercial activity inside the PRC. In particular, Hong Kong has been a source of capital for new ventures. India has not had such an engine of growth on its doorstep. In fact, India is extremely isolated on the subcontinent from any neighbors who might provide such a push. The lack of a nearby economic engine could limit India's access to capital in the future.

There is great opportunity for technology entrepreneurs in China to adopt the strengths of the Indian experience and expand their companies both domestically and internationally.

India has an excellent education system—for those that can actually attend institutions of higher learning. Passing examinations does not always result in obtaining a slot at one of India's prestigious universities or IITs.²⁸ Many of India's brightest students are forced to leave India to attend school in the United States or the United Kingdom. This brain drain has benefited the U.S. and UK over the past 15 years, but continues to weaken the business

environment at home in India. Enrolling in a university abroad provides a convenient escape from India's grinding poverty, high illiteracy rates (more than 40 percent), and an inefficient and corrupt bureaucracy. Returning to India after completing education is not a frequent or easy decision for a young entrepreneur. There is significantly more opportunity for these individuals if they remain in the U.S., pursue their interests, and, as many have done, begin companies in the U.S. that have an "Indian backend." These Indians become NRIs or Non-Resident Indians and form part of the Indian Diaspora.

As with China, a detailed review of the Indian regulatory environment is beyond the scope of this paper. The Lotus Files Project respondents were nearly unanimous in their agreement that starting a new business in India is not a simple matter. The preferred path is to set up a U.S. Delaware Corporation through a friend with a U.S. address and then create a tax-advantageous off-shore company, usually in Mauritius, which then in turn holds the local Indian company. All the

capital is maintained offshore. Only that capital necessary for local operations within India is transferred into the country. Of course, a local entrepreneur without an overseas connection is not required to take this path, but his/her ability to exit their investment with international investors is severely limited. The result is that starting a business is complex but not difficult.

In sum, the Indian environment is positive but contradictory. The venture capital industry is growing, government regulations are complex but not restrictive, experienced entrepreneurs are interested in the Indian technology sector, the education and training system is superior, but the lack of a domestic market for IT and software products is a limiting factor for India's continued growth and ability to compete with China.

THE TECHNOLOGY DIASPORA

More than any other people, the Chinese and Indian overseas communities are integral factors in creating and driving the technology sectors in their home countries. These individuals left their homes to pursue educational and commercial opportunities abroad and became successful. While many members of both communities put down roots in foreign countries, The Lotus Files project indicates that many technology entrepreneurs are taking distinctively different paths. The Chinese path is returning to China, bringing their experiences, their capital, and their families back to start new businesses. Indians, on the other hand, are not returning to India with their experiences, capital, or families, but prefer to remain "off-shore." It is too early to know what the long-term effect of this trend might be, but in the near term China is accelerating its growth rates as a result.

CONCLUSION

China and India should not be viewed as technology backwaters because they have fewer computers, fewer Internet hosts, more poverty, and different cultures. To subscribe to this view would spell certain commercial death for any entrepreneur or Western company. Through its leadership in software development, India has proven itself to be a world leader in technology. Through its rapid development of a domestic IT and telecommunications marketplace, China has demonstrated the same. The conclusion is that China and India cannot be ignored or placed in a second tier.

With this conclusion in mind, technology entrepreneurs in China and India remain myopically focused on what is most comfortable for them culturally and economically, while Western nations remain puzzled. There is great opportunity for technology entrepreneurs in China to adopt the strengths of the Indian experience and expand their companies both domestically and internationally. Indian

technology entrepreneurs also have a unique opportunity to penetrate the Chinese domestic market in the next one to two years. These windows of opportunity will not remain open long and, if ignored, will likely result in significantly more competition between these two emerging technology giants. China and India must engage each other. The United States and the European Union also must engage with China and India in order to understand from where tomorrow's technology will come. These engagements must be between equals, not between first and third world countries. China and India are proving their technical competence and ability to perform on the global technology stage. We must acknowledge and learn from these countries. ■

NOTES

- 1 See <<http://www.thelotusfiles.com>> for The Lotus Files project description and sample online survey.
- 2 Annalee Saxenian, *Regional Development: Culture and Competition in Silicon Valley and Route* (Cambridge: Harvard University Press, 1994), 128.
- 3 The Lotus Files interviews suggest that the number of returned Chinese from the U.S. with technology education and experience is in the hundreds per year and growing.
- 4 The Lotus Files interviews indicate that Non-Resident Indians (NRIs) who maintain their tax status overseas are much less likely to return to India than Chinese are likely to return to China.
- 5 A significant debate is currently underway (2002) in India and the NRI community regarding whether or not China is an immediate threat to the Indian IT software and services sector. NASSCOM has taken the position that the threat is more than three to five years away, others view it as more immediate.
- 6 DataQuest India, <www.dqindia.com/content/top_stories/102031101.asp> (accessed March 16, 2002).
- 7 There are numerous published personal accounts of these dark years in China.
- 8 Edward Luce, "Investment in India 'Riddled with Obstacles,'" *Financial Times*, March 19, 2002.
- 9 Owen Brown and Leslie Chang, "China Says Growth Slowed to 7.3 Percent in 2001," *Wall Street Journal*, March 1, 2002.
- 10 "No Thanks, Comrade," *The Far Eastern Economic Review*, January 31, 2002.
- 11 This is a highly controversial topic that is beyond the scope of this research.
- 12 Rafiq Dossani, "Chinese and Indian Engineers and Their Networks in Silicon Valley," *Asia/Pacific Research Center Working Paper*, Stanford University, <http://aparc.stanford.edu/docs/Dossani_survey.pdf> (accessed March 1, 2002).
- 13 Edward Luce, "India Budget Includes New Tax Surcharges," *Financial Times*, March 1, 2002.
- 14 Rafiq Dossani, 13, Table 8.
- 15 See <<http://www.tie.org>> for association information.
- 16 "Outsourcing: The Great IT Rush," Dataquest India, February 22, 2001. "Global outsourcing costs are pegged to scale \$177 billion by 2004, with India grabbing a big slice of that market pie."
- 17 *South China Morning Post*, February 26, 2002.
- 18 "Beware the Dragon," Dataquest India, <http://www.dqindia.com/content/top_stories/102031101.asp> (accessed March 16, 2002)
- 19 Dataquest India, <<http://www.dqindia.com>> (accessed March 16, 2002).
- 20 Contests-To-Win is an Indian company that entered the Chinese media market in early 2001. For company information, see <<http://www.contests2win.com>>.
- 21 India accounts for 15 of the 23 SEI CMM (measure of software quality) certified companies; China has zero.
- 22 Guangzhou, Hong Kong, and Shenzhen, all located in southern China.
- 23 See <www.universiti.com> for China's major online technical certification program.
- 24 Includes the People's Republic of China and Hong Kong.
- 25 National Association of Software and Services Companies, <<http://www.nasscom.org>>.
- 26 Annalee Saxenian, 128.
- 27 Asian Venture Capital Association publication on 2001 venture capital firms in Asia.
- 28 India Institute of Technology.