

14 The Migration of Chinese Professionals and the Development of the Chinese ICT Industry

YU ZHOU

Robin Li (Li Hongyan) graduated from Beijing's Peking University, the "Harvard" of China, in 1991.¹ Like many of the graduates from China's elite universities at the time, he headed to the United States for a graduate-level education in computer science. Before he finished his Ph.D. at the State University of New York at Buffalo, he interned and worked for a number of Japanese and American corporations in the United States. During this time, Li made a breakthrough in Internet search-engine method and was recruited by Infoseek—once the leading Internet company—to be responsible for its search-engine development. In the white-hot Internet bubble of the late 1990s, Li decided to start his own company and was able to raise \$1.2 million in venture investments (Barboza 2006).

Li returned to Beijing in 1999 and rented a space in a hotel next to his alma mater, naming his company Baidu.com. (The name comes from a famous phrase in a classical Song dynasty poem, which describes the arduous search for beauty amid a crowd.) Initially, Baidu struggled for a few years because of China's immature Internet industry, but by 2003, it had become China's favorite search engine. In August 2005, it achieved international fame when it issued its initial public offering on NASDAQ. The share price of Baidu, known as the Chinese Google, more than quadrupled on

the first day, setting a record for the best first-day performance of all foreign firms ever listed on the U.S. stock market, as well as the best first-day performance among *all* firms in the previous five years.

While Baidu's turn of fortune might have been exceptional, Li's life trajectory is not. He is among the growing number of Chinese youth who, in the mid-1980s, began to go abroad to study or work, and eventually found that returning home could be an attractive option. In other words, Li represents the Chinese digital diaspora that is making a profound mark on the transformation of China's society and economy, by bringing together the countries on their residential itinerary. Their experiences and inspirations demonstrate the tremendous impact of information and communication technology (ICT) on the diaspora population. Yet they have also in turn played an instrumental role in constructing global linkages. This chapter will outline the main patterns of the Chinese diaspora in the United States. I will focus on the stream of Chinese youth who went abroad to study and work, only to return to their homeland. I will also analyze the forces that drive the flows on both sides of the Pacific, and I will outline some of the opportunities and challenges that returnees face back in their homeland.

The information of this chapter has been collected through documentation research and interviews, conducted mostly in Beijing's Zhongguancun Science Park between June 2005 and June 2007. I have interviewed mostly returnee entrepreneurs who have started up their own companies in Beijing as well as local government officials who are in charge of returnee affairs. A few interviews with returnee professionals also took place in Shanghai or over the Internet.

THE CHINESE PROFESSIONAL DIASPORA IN THE UNITED STATES

Chinese migration to the United States has a long history. The significant Chinese migration first started arriving in the United States around the 1850s to work on the railroad and to make a fortune in the California Gold Rush. Composed mostly of manual male labor, the flow reached its peak around the 1870s, with 123,201 Chinese people migrating to the United States in the decade between 1870 and 1880 (U.S. Department of Justice 1991, 1996). However, immigration was sharply curtailed by the Chinese Exclusion Act passed by the U.S. Congress in 1882. The law was the first U.S. federal immigrant law excluding a population solely on the basis of race. However, the Chinese Exclusion Act did not limit the entry of Chinese students and

scholars, and they continued to trickle onto the shores of the United States over the next eighty years.

Some of these individuals upon returning to China became key reformers in the Chinese revolution in the late nineteenth century. For example, Charlie Soong returned in 1886 and became the key financial sponsor of Sun Yat-sen, the founder of the Republic of China. His daughters, the Soong sisters, were also educated in the United States; they were arguably the most famous and influential women in China during the twentieth century (Seagrave 1996).² By and large, however, the highly educated constituted such a tiny number in war-torn and impoverished China that they could safely be ignored in demographic terms.

The real turning point for Chinese immigration came in 1965, when the U.S. Congress abolished the national-origin immigration quota that had favored European countries. Since then, the number of immigrants from China has grown sharply. During the decade of the 1960s, 102,649 Chinese immigrants were admitted to the United States. This number increased to 261,151 in the 1970s and to 444,962 in the 1980s (U.S. Department of Justice 1991, 1996). Whereas male labor dominated the first wave of Chinese immigration into the United States, the post-1965 immigrants tended to be permanent residents who brought their families with them. Since 1970, the long-skewed sex ratio within Chinese communities of the United States has become almost balanced (Tsai 1986; M. Zhou 1992).

The immigration reform in 1965 also implemented the professional and family preference as two primary channels for immigration. With only a small established population in the United States, the Chinese relied heavily on professional preference for initial entry, and then used family preference to bring in their family members and relatives. Some Chinese also migrated illegally. The result has been a polarized population composed of both highly and poorly educated groups, which is typical of Asian immigration to the United States. In 2000, there were a total of 3.6 million Chinese people in the United States. About 18 percent of adults had less than a high school education, which was slightly higher than the national population (16 percent). However, 50.5 percent of the Chinese had a bachelor's degree or higher, considerably higher than the U.S. population at large (27 percent) (U.S. Census 2000). This shows that the Chinese population in the United States is heavily biased toward professionals, even though the poorly educated population also represents a significant share.

Between 1949 and the 1980s, because of the cold war and the international isolation of mainland China, most of the Chinese immigrants in the

United States actually came from Hong Kong and Taiwan, although many of them were born in mainland China. However, since the Chinese government adopted the Open Door Policy in 1980, a growing share of Chinese immigrants has come directly from mainland China. The next two sections will map out the changing flows of Chinese immigrants to the United States from Taiwan and mainland China.

THE FIRST PHASE: BRAIN DRAIN

Before 1980, Chinese immigration into the United States could be safely characterized as a one-way brain drain. These immigrants originated from Taiwan, Hong Kong, or Southeast Asia—places that had a heavy American dominance in the political, military, ideological, and educational systems (Ong, Bonacich, and Cheng 1994). For the Chinese professional population, the United States represented the ultimate inspiration and path for self-growth and development. For example, in Taiwan during the 1960s, going abroad to the United States was a rite of passage for the most elite students. According to a survey conducted during that time period, 21,248 students left Taiwan for advanced study between 1960 and 1970, but only 1,172 returned, resulting in a mere 5 percent retention rate (NYC 1987). Between 1970 and 1979, 33,165 students went abroad to study, and 5,028, or 15 percent, returned—a marked improvement over the figures from the 1960s, but still quite dismal.

Overall, nonreturnees in the two decades amounted to approximately 88 percent of the student migrants, with the overwhelming majority of the nonreturnees staying on in the United States. Another Taiwanese government manpower study shows that during 1976 and 1981, one out of every five college graduates in the fields of science and technology went abroad, and only 10 percent of those students returned (Liao and Tang 1984). In fact, more than 40 percent of the graduates of the departments of mechanical engineering, electrical engineering, civil engineering, physics, and chemistry from prestigious universities such as National Taiwan University, Tsinghua University, and Chiao Tung University went abroad. Almost 95 percent of them went to the United States. For Taiwan, losing so many of its brightest and most educated students to the United States during the postwar recovery period was not a pleasant experience.

For Chinese professionals, however, it was not until the 1980s that going abroad to the West was even considered an option, due to China's isolation. Yet once the gate opened after the mid-1980s, the brain drain took hold in an even more powerful way. When Deng Xiaoping came into power in 1978, he viewed studying in the West as a necessary step in China's modernization

drive. Thus, he began to encourage students to pursue advanced degrees abroad, initially through state sponsorship, and then by allowing self-sponsored students—students paid by foreign institutions—to leave. The hope was that these students would return to China after their educations abroad. The outflowing tide started to emerge during the mid-1980s, and it has gone unabated ever since.

The initial flows of mainland students tended to be a highly selected group from the most prestigious Chinese universities, since they had the best chance of being awarded scholarships by foreign universities or by the Chinese government. Until the mid-1990s, an overseas postgraduate education was practically impossible and unimaginable for most Chinese students without those sponsorships.³ Since then, as China's interactions with the world have expanded vastly, and the average household income has increased, going abroad has become an option for an increasing portion of the population. As a result, the category of mainland Chinese students abroad has become rather diverse.

According to the Chinese Ministry of Education (2005), a total of 815,000 Chinese went abroad between 1978 and 2004, but more than half of these—about 480,000—left after 2000, signaling the growing intensity and diversity of the outgoing flow. Most of these students went to the United States and Europe, with science, engineering, and business management as the main fields of study. A survey of college students in Beijing by *Chinese Youth Daily* in December 2007 found that an astonishing 80 percent of current college students were interested in studying abroad (Li, Qin, and Mei 2007). Forty-two percent thought that doing so would help their personal development, and 66 percent believed that those students who returned after studying abroad would have better employment opportunities in the next five years. The top choice, once again, was the United States, according to 42 percent of those surveyed. Barring unforeseen international circumstances, the outgoing flow of Chinese students is likely to continue well into the future.

As with the case of Taiwan, the first ten to fifteen years of outflow from China saw little counterflow. The high pay of jobs abroad and the low salaries and limited opportunities in China discouraged students from returning to their homeland. Given that the economy in mainland China was even less developed than in Taiwan in the 1980s and 1990s, and with an authoritarian and oppressive government, mainland Chinese students had little incentive to return. In fact, research in 1987 and in the 1990s found extremely low interest among Chinese students to return home (Hertling 1997; Zweig and Chen 1995). Hertling reported in 1997 that only 4,000 out of 130,000

self-sponsored students who had left China since 1978 decided to return to China, although returning rates were much higher among government-sponsored students or scholars. Zweig and Chen (1995) reported that in the early 1990s, the leading reasons for students not to return to the mainland were perceived political instability and restrictions on political freedom, lack of economic opportunities, and low standards of living in China.

Furthermore, in 1989, the Chinese government's violent crushing of peaceful student movements in Beijing shocked the world and brought tremendous anger and anguish to Chinese students abroad. For many, it only hardened their resolve not to return home. Subsequent to the crackdown, Chinese students in the United States lobbied intensively to remain in the United States indefinitely. Political sympathy from the U.S. government and the public allowed the rapid pass of the Chinese Student Protection Act in 1992, which gave all Chinese nationals—around 50,000 at the time—permanent residency in the United States. Thus, studying abroad in the 1980s and early 1990s for mainland Chinese was practically a one-way ticket to the West. Going home, in the meantime, was regarded as extraordinary, if not unfortunate.

SECOND PHASE: THE EMERGENCE OF THE RETURNING FLOW

In the case of Taiwan, the returning flow started to pick up speed in the late 1980s, as the development of Taiwan's manufacturing industry reached a stage where high-tech, high-value-added sectors came into focus. The Taiwanese government actively recruited talent from the United States. The development of the ICT industry and the strength of overseas talent—in addition to the personal networks among Taiwanese engineers—further augmented the returning flow until it became the norm in the late 1990s (Hsu 1997; Saxenian and Hsu 2001).

The Chinese government, in contrast, had a much harder time enticing overseas talent to return during the 1980s and 1990s. The fact that Chinese students had lobbied and taken advantage of U.S. government protection made it difficult for the Chinese government to assume their political loyalty. Indeed, Zweig and Chen (1995, 15) cite several surveys after 1989 that reported that an overwhelming majority of Chinese students in the United States professed very strong antigovernment political attitudes. It was not until the late 1990s that the Chinese government could begin systematically seeking out the assistance and advice of the overseas Chinese population. Until then, Chinese professionals abroad largely shied away from direct collaboration with the Chinese government, particularly in the aftermath of 1989, although they continued to maintain strong family and personal ties.

The situation began to change in the late 1990s during the heyday of the dot-com rush—and, at the beginning, with little governmental initiative. The Internet boom in the United States made China look like an untapped gold mine for prospective Internet entrepreneurs. With the memory of the 1989 event gradually fading, a few Chinese professionals returned to the mainland to test the business waters. Some returnee-founded enterprises, such as Sohu.com, AsiaInfo.com, and utstar.com, successfully drew foreign venture capital and achieved wealth and fame within a very short period (Sheff 2002). Their examples inspired a growing number of Chinese professionals to contemplate the possibility that China might, at long last, be ready for private ventures in knowledge-intensive industries.

The bursting of the Internet bubble on the NASDAQ in 2000 did nothing to moderate the flow of Chinese returnees; in fact, the flow has actually intensified. The most recent study (Jiang and Yang 2007) suggests that a total of 160,000 Chinese students returned from abroad between 1978 and 2003, yet 110,000 of these students returned between 2003 and 2006. In an Internet survey of Chinese students abroad conducted by the All-China Youth Federation, China's official association of young people, 87.7 percent expressed a willingness to return to China after studying or working abroad for a few years (*China Youth Daily* 2005). Since the survey was not by a random sample and covers only 3,097 people, the results have to be taken with a grain of salt. Still, the trend of accelerating returns is unmistakable. More than half of those surveyed agreed that returning has become a trend, and only 9.5 percent thought otherwise. The survey also reveals that many returnees (32.7 percent) have found work in foreign enterprises or organizations, and more than 20 percent have chosen to become entrepreneurs. In 2000, Beijing's Zhongguancun—China's largest science park—began to compile statistics on returnee-founded enterprises. These statistics show a steady increase of roughly five hundred firms every year (see figure 14.1).⁴ Half of the returnee enterprises were founded by people who had returned from North America, particularly from the United States (46 percent), reflecting that it has been the most favored place to study abroad in the past twenty years. Europe, Japan, and others divide the remaining half equally.

The flow of returnees has been sustained by several forces. First, the growth of China's economy has reached a point where an increasing array of high-tech job opportunities is available. For instance, before 2000, the only job options for a skilled integrated chips (IC) engineer would have been in government research institutes or universities. Since then, both multina-

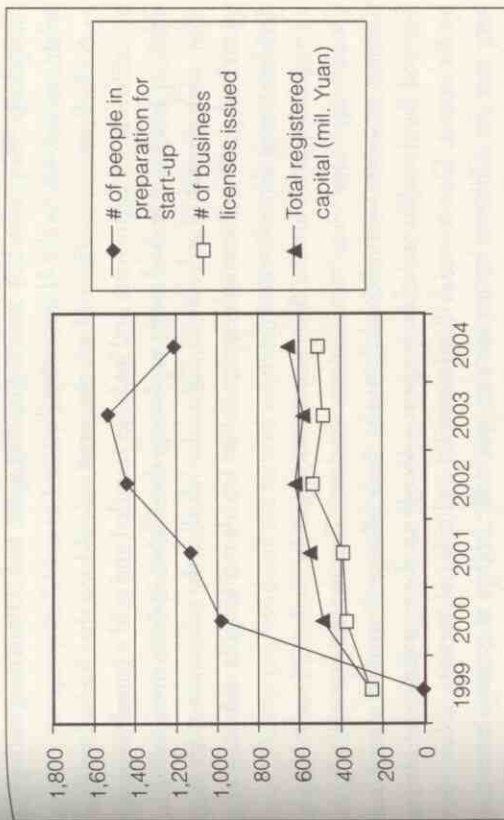


Figure 14.1 Growth of returnee-founded enterprises in Zhongguancun Science Park. Source: Zhongguancun Administrative Committee; statistics compiled by Headquarters of Returnee Enterprises Services, January 2005.

tional companies (MNCs) and Chinese companies have invested heavily in the semiconductor business, to the extent that China is expected to become one of the world's largest semiconductor manufacturing sites in the near future (Jelinek 2004). As a result, engineering skills in all stages of IC chip production have become highly coveted. Some companies, such as SMIC, are shopping all over the globe for talent. The growing chip-manufacturing industry creates further opportunities for software, IC design, and other specialized products and services. Yet while salaries for highly skilled professionals in China are still low in comparison to the United States, the much lower cost of living in China affords these professionals a comfortable and even luxurious lifestyle that they could not afford in developed countries.

The slow recovery of high-tech sectors in the United States and other advanced countries after the NASDAQ crash and the September 11, 2001, terrorist attacks have also contributed to the increased flow of returnees. Layoffs of personnel in Silicon Valley and elsewhere between 2000 and 2004 made returning more attractive. An entrepreneur explained his choice: "I came back [to Beijing] after 2001. After 9/11, my judgment was that U.S. business would be experiencing several years of lows. It may boom again four to five years later, like the country always does. I figured that I could use these four to five years to develop in China, where market opportunities were

expanding. When the U.S. side is growing again and I am strong enough, I might reach back to the U.S. market."

A chief executive officer of another start-up told me that he had worked in California for eight years and had also founded and sold a couple of small firms in Seattle. He had been exploring the China option since 1996. In 2001, after several trips home to China, he felt that the telecommunications sector had generated enough opportunities for his multimedia company and decided it was time to return.

Another reason for the flow home that began in the late 1990s is simply the coming of age of overseas Chinese students. Because the vast majority of Chinese students went abroad from the mid-1980s and onward, many had finished their studies and already spent a decade on their professional careers by the 2000s. Due to racial discrimination and cultural barriers, it has been very rare for Chinese immigrants to reach the higher corporate executive posts in the United States, and even rarer in Japan and Europe. In fact, large numbers of technical professionals face the glass ceiling quite early on, coming to the sad realization that they have reached the peaks of their careers in the West by their late thirties or early forties. Though many do settle on their current track, the more ambitious and restless among them inevitably look for new challenges and excitement. China, as their rapidly developing homeland, holds irresistible appeal. As some returnees started to settle well in China, they drew their friends back, increasing the flow significantly.

Mr. M was among the earliest Chinese students to go to the United States in 1982 with a master's degree in engineering. He earned a Ph.D. in the United States and started to work for IBM in 1987, specializing in semiconductor physics and engineering. After a solid career at IBM, he took an early retirement and returned to Shanghai to work for a major Chinese semiconductor company in Shanghai in 2007. He said that he was responding to the long-standing calls from his graduate school friends, many of whom had already returned to assume the leadership positions in this company. Mr. M was a very active and athletic person in his early fifties. It was clear that he has reached the top of his U.S. career.

Returning to Shanghai—a key hub in China's rapidly growing semiconductor industry—offered Mr. M an entirely new opportunity. Beyond career opportunities, many returnees I interviewed mentioned extended family, friends, cultural affinity, active social lives, and—always—Chinese food as attractions. All these things contrasted with the cultural alienation, isolation, and boredom that many suffered in foreign countries. The China bug hit even the most elite scientists in the United States. Steve Chen, con-

sidered one of the United States' most brilliant supercomputer designers, set up a company in China to build a supercomputer after he was unable to secure American venture capital for a similar venture in the United States (Markoff 2004).

To be sure, of all the students who went abroad, only a minority of the Chinese professional population has returned. In 2007, China's own estimate was that roughly more than 70 percent are still abroad (Jiang and Yang 2007). Many professionals are so well established in Western countries that it would be difficult, if not impossible, for them to move back. In particular, it is very difficult for American-educated children who lack fluency in Chinese to be reintegrated back into China. Even for professionals who have returned, it is common for them to leave their families behind in order to accommodate their children's educations or their spouses' careers while maintaining an exit option. This suggests that most returnees are not permanently committed to one side or the other. In many ways, their activities are consistent with those of generations of the Chinese diaspora, who have, over the centuries, woven business networks connecting China, Southeast Asia, North America, and other parts of the world (Ong and Nonini 1997; Weidenbaum and Hughes 1996; Y. Zhou and Tseng 2001).

LOCATIONS OF RETURNEES

Overseas returnees are highly sought after in many Chinese cities, because of their scarcity and because of their perceived technological and managerial superiority. But most returnees prefer large metropolitan centers such as Beijing and Shanghai, as they are rich in job opportunities and offer more comfortable lifestyles. For entrepreneurial returnees, China's national science parks are often the most attractive. Beijing's Zhongguancun Science Park offers RMB100,000 (US\$12,500) in grants for quality entrepreneurial projects, providing tax breaks as well as other benefits for start-ups. The local government reports that by 2004 it had issued RMB4.1 million in grants to 509 returnee enterprises (Zhongguancun Administrative Commission 2004). Other cities offer even greater cash incentives. Though the money may not be much in terms of U.S. dollars, it can help small firms significantly, given the low costs of business in China.

However, according to interviews with returnee entrepreneurs, such cash incentives are not the main reason returnees start companies in Beijing. Rather, the most important factors are personal attachments, social networks, and human resources (Y. Zhou 2008). The entrepreneurs tend, disproportionately, to be northerners and people who attended universities in Beijing;

a common sentiment is that "it is only natural to come here, since this is the place I know the best, including the universities and professors." A number of interviewees admitted to looking at other locations such as Shanghai or Shenzhen, which also offer highly developed economies and comfortable lifestyles. Yet they were deterred by the cultural differences between northern and southern China, as well as their lack of personal networks in these places. An Internet entrepreneur explained, "Start-ups need a lot of support and connections. Most of my friends are in Beijing, and they are crucial for me at this stage since many of them are my experimental clients."

It appears that Beijing's concentration of universities has multiple levels of significance for the entrepreneurial returnees. Not only do universities provide all levels of human resources—from faculty to undergraduate students—that firms can use, but, more important, alumni networks also help returnees renew social networks with former schoolmates and professors in Beijing. They thereby provide an entry into the local social network. Shanghai, in contrast, has also become a favored location for professional employment due to its cluster of large Western or Taiwanese transnational corporations in the finance and semiconductor industries. In fact, it has the highest concentration of Taiwanese businessmen in China.

Most start-ups are concentrated in business incubators in Beijing and Shanghai. These incubators are typically affiliated with universities or the local government bodies. They provide discounted office space for one to three years; afterward, the enterprises either move to other locations or stay put and pay the full rent. Zhongguancun (ZGC) International Incubator, for example, is located at the Shangdi Information Industry Base to the northwest of Beijing, which is a modern and well-maintained office building. One wall of its spacious lobby is covered with large displays about firms in the building. The incubator has been managed by a company that uses subsidized rent as venture investment for the firms. The manager of the ZGC International Incubator explained:

A start-up needs many things. We provide all the services from the initial stages, such as registration, applying for government grants, setting up office space, firm publications, exhibitions, and so on. We also offer consulting services such as marketing and VC [venture capital] training, project evaluation, financial consulting, and human resource recruitment. We are in the process of establishing a business service platform. Since many company founders have technical backgrounds and many were away from China for years, some of them may not

even realize that they need professional help, or they do not know how to approach it here. We can help them throughout the process.

In 2001, there was only one incubator in Zhongguancun Science Park that had the explicit mission of attracting returnee entrepreneurs. In 2005, there were thirteen. In fact, ZGC International Incubator's office building was fully occupied, and while a second building was under construction, its tenant list was already full (interview). Successful incubators like this one have been able to forge a collective identity and community for entrepreneurs. There are social gatherings, salons, lectures, exhibitions, and routine conversations among the tenants through which they share problems and solutions. One entrepreneur told me that his most critical business partners could all be found in the same incubator. The high-profile incubators such as Zhongguancun International Incubator also attract hundreds of visitors each year, ranging from the Chinese president to foreign dignitaries as well as visiting businesspeople and investors, giving the start-ups valuable external exposure.

At another popular incubator affiliated with Tsinghua University, the managers explained some of the unique resources that it had to offer, including a shared laboratory for biotech start-ups that cannot afford expensive equipment and access to the university's labs. The proximity to Tsinghua's campus has meant that faculty and students who work there part-time are only a short bike ride away. Tsinghua's extensive alumni network has been another invaluable resource. As one of China's most prestigious universities, Tsinghua is renowned for graduating not only engineers but also high government officials. For example, China's president since 2002, Hu Jintao, is a Tsinghua alumnus; so was the powerful former Prime Minister Zhu Rongji. Countless Tsinghua alumni now occupy key positions all over China. The director of this incubator told me how she helped arrange a meeting between a start-up entrepreneur at the incubator and a high official of the Bank of China, a Tsinghua alumnus, to discuss possible collaboration between the enterprise and the bank. She also helped connect the start-ups with major government organizations, such as the Beijing Organizing Committee for the 2008 Olympic Games. In a *guanxi* (connections-) driven society such as China, it is impossible to overstate the value of access to key officials, as they can grant small firms credibility, opportunities, and resources that would otherwise be hard to imagine.

THE BUSINESS STRATEGIES OF RETURNEE ENTERPRISES

Returnee-founded enterprises are hybrids between Chinese and Western businesses, as they are deeply engaged with both the global technology

centers and China's innovative resources. Many of the returnee enterprises are miniature transnational corporations, as they maintain foreign branches or headquarters. This is especially true for those founded by returnees from the United States, which are most likely to have their foreign branches in Silicon Valley. Even firms that do not have foreign affiliates usually have close business partners in Silicon Valley. "You have to have a presence in the United States to keep in touch with the most up-to-date trends in the market and technology," one interviewee explained. For business and family reasons, these returnees led an almost astronaut lifestyle, regularly shuttling back and forth between the two sides of the Pacific. The earliest group of returnee enterprises followed the dot-com rush, and mainly sought to replicate the successful U.S. dot-com models. They focused primarily on the Chinese market, using the United States as their capital, technology, and information source.

However, since 2002, returnee enterprises have become more diverse and more transnational in their integration with international technology markets. They now cover a wide range of business areas, but the majority of them in Beijing and Shanghai concentrate on the ICT or biotech sector. The heaviest concentrations are in the Internet, IC design, digital media, and software fields, again reflecting China's fastest-growing fields as well as the traditional human resource strengths of the region. Some returnee enterprises, such as Baidu.com, focus on the Chinese market with little desire to grow abroad. Others are geared more toward serving advanced markets, using China primarily as a research and development (R & D) site while keeping an eye on the potential of the Chinese market. There are no statistics on which types of firms predominate, although my interviews in several incubators suggest that those focused mainly on advanced markets are growing.

BUSINESS OPPORTUNITIES I: CONVERGING AREAS OF CHINA'S MARKET AND EXPORTS

One of the most concentrated fields for returnee enterprises is wireless technology. This is no surprise, as China is the world's largest mobile market. Mobile phones rely on complex technology involving many components, which some returnees have pinpointed as an area where the Chinese market has the potential to lead the world. Vimicro Corporation, established in 1999, is one of the most successful multimedia chip designers in Beijing. The company was publicly listed on NASDAQ in 2005. Its main product is the chip used in desktop computer cameras, for which it held 60 percent of the world market share in 2005. The company is also developing multimedia chips for next-generation mobile phones. Its chief financial officer, who pre-

viously worked for several large Western investment banks, explained why he believes that technology from his Chinese firm could have a competitive edge in the global market:

You need three conditions to compete in the international market:

1. Market demand: not only does China have the world's largest mobile-phone market, it is also among the most demanding in design-features for communication and entertainment functions.
2. Supporting features for communication and entertainment functions. All major world companies have come into China. All stages of IC production ranging from design, foundry, packaging, testing and others are present here. There is no problem to produce quality chips here.
- And 3. Human resources: we have U.S.-trained experienced entrepreneurs, professionals, and engineers, including senior engineers from Intel, HP, Lucent, and Kodak. In addition, we have many smart Chinese students from Tsinghua and elsewhere.

His comments underscore the power of synergy between China's domestic demand and export capacity (conditions 1 and 2). The reason a new company such as Vimicro can sharply increase its world market share, he explained, is because most of the world's mainstream PC accessory makers are already located in China. As long as Vimicro can convince manufacturers such as Samsung, HP, Lenovo, Logitech, and others to use its chips in their PC cameras, those chips can quickly become prevalent in the world market.

Yet Vimicro sees its biggest opportunity not in supplying for export but in creating multimedia chips for third-generation (3G) mobile phones in the domestic market. These chips integrate various audio and visual functions. After China started its 3G system in 2008, Vimicro hopes that it will be in a good position to benefit from the extensive growth of this market. Quite a few other entrepreneurs also hope to benefit, and consequently a critical mass of returnee firms collaborating on mobile phone-related technology has already formed, particularly in Beijing and Shenzhen. These firms tend to specialize in designing chips or devising software solutions. They rely on manufacturing facilities in the Yangtze River delta to make their technology into hardware. Most interviewees commented that the capacity for manufacturing IC chips or related devices on the coast has become quite mature: "They can do anything you ask them to do and do it well" was a common sentiment of these IC designers. The convergence of China's market growth with its export manufacturing strength in this area offers promising opportunities for local firms.

On the flip side of the coin, however, returnee firms have also discovered, sometimes rather painfully, that they can run into serious difficulties if they work in areas outside the synchronization zones of the Chinese market or its export specialization. For example, the Chinese market may not even be ready for their advanced products. Many returnee enterprises were originally lured by China's seemingly rapidly expanding information technology market, only to find out that it has not materialized for their products. Considerable adjustments are almost always necessary. And even then, they may not be able to find a market. One entrepreneur, who had returned from Japan, commented, "China has the largest number of home appliance consumers. It is also the world's largest manufacturing base. There should be no better place for firms like us [multimedia-device manufacturers]. But so far, our marketing in China has not been very successful. Most of our products still sell to Japan because the Japanese market is more technologically sophisticated. The Chinese market is more price sensitive, so you have to be cheap to sell in this market. We are working on it."

One returnee, Hu Hui, set up his company in Zhongguancun for \$150,000—too small an amount for a venture in Silicon Valley but a significant sum in China. Hu developed a software solution for remote medical diagnoses at Zhongguancun International Incubator, but he could find no buyers in China, nor could he convince Chinese VCs to invest in his firm. He tried to donate the manufactured device with his software to Chinese hospitals during the SARS outbreak in 2003, but the units were never used. Relief finally came from the United States, and an American firm bought his company for the princely sum of \$18 million in 2004.

In addition to the lack of a market for advanced products, many returnees have to come to terms with their weak marketing ability. Since these entrepreneurs were typically abroad for an extended period, starting at a young age, they have been unfamiliar with China's technology market and its business culture. Baidu, for example, struggled for some time to gain name recognition, even though it had received U.S. venture capital and Chinese governmental support. It was only after Li Hongyan hired energetic local marketing personnel that the company started to effectively push its brand name and create a profitable business model (interviews). The marriage between the returnees' overseas technology and capital and local marketing and cultural expertise is critical for the success of these firms. But, as with all marriages, fitting partners are hard to come by.

At other times, it has not been the market but the commodity chain that has caused the problem. Since returnees tend to specialize in rather narrow

niches, they depend on others to turn their specialization into a product. If China does not have mature and high-quality production partners for a specific product, these returnee enterprises end up running into trouble. One entrepreneur told me that he spent eight months rethinking his business strategies after returning to China: "The commodity chain in China is far from developed, as compared to in America. If you just specialize in your technological niche, it will be impossible to survive here. You have to extend your work up or down the chain. It might be enough for me to just do software in the U.S., but here I have to make it into a piece of hardware, so it is a so-called product. Otherwise, the clients do not recognize the value of your technology. To make these adjustments, I have to have considerably more capital and some business partners."

The experiences of returnee firms suggest that there were some serious constraints on the development of innovative technology in China in the early 2000s. In fact, the Chinese state has put more and more emphasis on autonomous technological innovation since 2003 in an attempt to reduce technological dependency; the encouragement of returnee enterprises is one example. But the state's strategy may not bear fruit if the Chinese market does not support innovative products. Generally speaking, the limited purchasing power of the majority of Chinese consumers means that the market still best supports the inexpensive adaptation of MNCs' mainstream products and has yet to develop stringent demands on quality and features, except in selected areas such as the Internet and mobile phones.

These market characteristics limit the ability of Chinese companies to profit from innovative products in broad areas, thus discouraging investment in them. In China, as elsewhere, the supply of advanced technology per se is not sufficient to create the market. Companies whose products and services are out of sync with China's market and export strengths, whether founded by returnees or not, are going to have a harder time. Thus, it is no wonder that returnee firms tend to thrive in selective areas such as mobile phones and the Internet—areas in which the Chinese market is rapidly growing and the commodity chain is the most well established. These are also the areas where new innovation is most likely to emerge from China.

BUSINESS STRATEGIES II: R&D FOR ADVANCED MARKETS AND WAIT AND SEE FOR THE CHINESE MARKET

An alternative to focusing on the Chinese market is to concentrate on advanced markets and to use China primarily as an R&D outsourcing base. This is a relatively simple operation on the Chinese end of returnee

enterprises. Returnees are very familiar with the technical and learning ability of Chinese engineers. Local engineers may lack experience, but they are fast learners and much more willing to put in long hours than their counterparts in America—and at one-tenth of the cost. For Chinese entrepreneurs who are involved in start-ups in advanced countries, it is logical to consider moving part of their R&D operations to China so that their capital can stretch further. Operating in China also gives them opportunities to observe and experiment with the Chinese market.

Here the spatial mobility and networks distinctive to returnee enterprises give them advantages over local firms. First, they are more flexible: they can work on technological accumulation and test their products through serving advanced markets while observing or making adjustments for later developments in the Chinese market. Local firms with advanced technology but no access to advanced markets, on the other hand, are often faced with life-and-death choices if the Chinese market cannot support them. Second, by operating in advanced markets and forming partnerships with large transnational corporations, returnee companies gain credibility that is not usually given to small firms in the Chinese market. "We may be small, but if Sony is using our product, why would you doubt my technology?" said one entrepreneur in the computer-security sector. Third, they have better access to capital and more funding options than local firms do. As mentioned earlier, overseas VC activity in Beijing has grown considerably in recent years, and VC firms find dealing with returnees much easier because they share a similar business language and culture. The *San Jose Mercury News* reported in February 2006 that venture capital from California has surged in China in recent years, and that 70 percent of Silicon Valley investment in China is in firms with executives from the Bay Area (Ha 2006). Many Chinese startups hire overseas returnees as managers to communicate better with VC firms.

In short, these returnee-founded firms adopt a strategy of *exporting* China's human resources, but their focus is on skilled labor for R&D, rather than on unskilled labor in China's coastal regions. Generally speaking, China is lagging behind India in exporting services and the software industry. But this does not signify that Chinese professionals lack technical skills. In fact, their much weaker proficiency in English is what makes them less competitive than their counterparts in India. This disadvantage cannot be overcome in a short period, and it is likely that China will never be as competitive as India in English-dominated software or service export markets. However, in technological areas where language communication may not be as crucial—and returnee firms are experts in identifying these areas—Chinese engineers

can still be used to serve the global market. Also, operating in China helps these returnee firms observe and adjust to the Chinese market, which is often their ultimate goal. Though most of these firms are currently out of sync with China's market, it won't be long before some of them determine how their core competencies intersect with Chinese consumer demands so that they can enjoy rapid growth.

THE SEARCH FOR CAPITAL

Besides marketing, another critical barrier that returnee companies face in mainland China is capital. Most returnees find that they can count on only limited access to domestic capital. But start-ups in innovative technologies require considerable capital backing, and China's state-dominated financial infrastructure has been inept at providing capital for these companies. While the Chinese government has helped fund a few VC agencies through government financial institutions, these agencies have either a small financial base or little experience in high-tech venture-capital operations. One returnee entrepreneur told me, "It is weird. Chinese VCs do not look at your growth primarily; they look at whether you can survive. If you can survive, they might give you money. American VCs look at the possibility for growth."

The behavior of Chinese VCs is not surprising, given the institutional culture that comes with being state-owned agents. They are very concerned with risk, but not so much with profitability. As long as the firms they are supporting are surviving, it looks good on paper, and good for their supervisors. Whether these firms can generate a high return for the investment is not their immediate concern. Local VCs are also not qualified to make judgments on the prospects of a particular piece of technology in the international market.

Overseas VCs, in contrast, function based on the promise of potential growth and significant share-value increases in the international stock market with initial public offerings. While their influence in China's high-tech parks is growing, it is difficult for them to serve the diverse needs of local firms as these overseas VCs lack local roots. In terms of capital sources, startups in China have had a very different experience from Hsinchu Science Park in Taiwan, where local capital was the primary driving force for new enterprises (Saxenian and Hsu 2001). The manager of the Zhongguancun International Incubator told me that international VC firms are very active there, even if they do not yet have a permanent presence: "They have contacted many firms in our park, as the returnees have open communication channels with the international VC community. The hometown VC firms,

on the other hand, are rather conservative. We have made a lot of recommendations to push our companies, but nothing much has come of them."

However, some returnee enterprises have received Chinese state capital. A few select ones are able to receive substantial investment if the founders can successfully develop relations with the government. Vimicro, for example, received RMB10 million from China's Ministry of Information Industry (Xia 2004, 53). In 2005, it also won a top national prize for progress in science and technology. It is often held as an example of the successful synergy between the Chinese government and returnee entrepreneurs. But, to date, it has been a rather unusual case, since government investment still tends to go to state-owned institutions rather than private enterprises founded by returnees. For the majority of returnee enterprises, support from the government is available but limited, mostly in the form of state-sponsored incubators, small start-up grants, bank guarantees for small loans, rent breaks, and other limited subsidies. These are helpful in the beginning stages of the start-ups but are of little use for sustaining further development.

Perhaps the best hope for local enterprises is the growing breed of new local vcs who were previously entrepreneurs or professionals in the ICT fields in China or elsewhere. Lenovo, for example, operates a successful vc subsidiary. Some entrepreneurs, such as Zhou Hongyi, the former Yahoo China executive and longtime ZGC resident, have also become involved in vc investments for local firms. Some of the most active vc investment firms in China were founded by returnees who had been entrepreneurs in Silicon Valley (Ha 2006). For example, Hong Chen, the chairman and CEO of the Hina Group, was the founder of two technology companies in California. The Hina Group now has offices in Beijing, Shanghai, and California and specializes in investments in ICT sectors in China (<http://www.hinagroup.com/aboutchina.htm>). One of the largest and most influential Chinese high-tech business associations, the Hua Yuan Science and Technology Association (HYSTA) in Silicon Valley has more than three thousand members, with chapters in Beijing and Shanghai. The three former chairs of the HYSTA were all entrepreneurs in the valley, and each is now involved in the venture capital business in China (Du 2007).

This new breed of vcs is more locally rooted than mainstream vcs or investment agencies from abroad. They are also far more professional and commercially aggressive than their predecessors in locally grown vc firms, which had often been moved from state banks to vcs on government assignments. Yet most of these new vcs still have very limited access to locally generated capital. The lagging development of China's capital market has

clearly imposed a major constraint on the availability of capital tools for the development of innovative enterprises.

Despite the current interests of global capital, the sustainable development of Chinese technological firms still depends on reforms in China's financial sector, especially in creating ways to encourage the investment of local capital in innovative industries. The situation, however, is changing quickly. China's stock exchange in Shanghai has experienced rapid growth since 2006, and was among the world's best-performing markets in 2007, signaling the potential of domestic capital. A smaller NASDAQ-style stock market was established in Shenzhen in 2009. Although one should not expect the overall situation of capital shortage for start-ups to change in the immediate future, one can safely expect that the capital provision will gradually improve over time.

CONCLUSION

While the Chinese immigration flow to the United States between the 1960s and 1980s was a clear case of brain drain, the returning flow has been established so that many Chinese immigrants return to their homeland after some time. Immigrants from Taiwan were the first to participate in what experts have coined *brain circulation* (Saxenian 2006), with immigrants from mainland China to follow. With their deep linkages with both the American and the Chinese technical worlds, the Chinese digital diaspora is making a monumental impact on Taiwan's and China's technological industries by creating synergetic fields of capital, technology, information, and marketing on both sides of the Pacific. The emergence of high-tech and innovative industry in Taiwan and China is in turn redrawing the map of global industry.

Compared to Taiwan, the out- and inflow of mainland Chinese professional migration occurred with a fifteen- to twenty-year lag, but with a larger population and more sustained timeline. While the returning flow to Taiwan has become well established, and their impact on the global industry clearly demonstrated, the returning flow to mainland China is only at the beginning stage. Although a critical mass of returnees in high-tech industry has been reached in Beijing and Shanghai, their success in creating and sustaining innovative industry in China is yet to be ensured.

Many obstacles continue to plague the returnee entrepreneurs, whether these obstacles are capital, market connections, or making necessary adjustments to the Chinese business culture. Many returnees have been taken aback, at least initially, by the extent of the cultural gulf they have encountered with homegrown entrepreneurs and managers. Some returnees, disappointed with

the low business rewards or unable to tolerate the cultural shock or prolonged family separation, have gone back to the United States. This phenomenon suggests that the returnee flow, although robust now, is vulnerable to the shifting political and economic situation in China and other parts of the world. Continued growth of the Chinese economy could encourage returns, but a deteriorating economic situation could inhibit or stop them at any time. In the end, the contribution of returnees to China's development will be determined by China's ability to encourage and sustain innovation and its ability to foster a tolerant but also rewarding political, social, and economic environment for the returnees.

NOTES

1. This article draws from the author's book, *Inside Stories of China's High-Tech Industry: Making Silicon Valley in Beijing* (Lanham, Md.: Rowman and Littlefield, 2008). I would like to thank the National Science Foundation, Chiang Ching-Kuo Foundation, and Vassar College for their financial support for the research.

2. The oldest of the Soong sisters, Soong Ai-Ling married H. H. Kung, who was once premier of the Republic of China. Soong Ching-Ling, the second daughter, was the wife of Sun Yat-sen, the founder of the Republic of China. Soong Meiling, the youngest Soong sister, was the wife of Chiang Kai-shek, the successor of Sun Yat-sen.

3. Even after twenty years of sustained income growth in China, in 2005 minimal living expenses for one year in the United States (\$12,000) equaled five years' total earnings for an average resident of Beijing. And those living expenses did not include tuition and other college costs. In 1995, the cost of an overseas education could very well have equaled the entire lifetime earnings of an ordinary urban Chinese citizen.

4. In 2004 there was a decline in the number of people said to be preparing to launch start-ups. It is possible that the recovery of the high-tech sector in the United States and elsewhere that started in 2004 might have prompted fewer people to return to China. But other indicators of new start-ups, such as the number of business licenses issued and the amount of registered capital assets of returnee-founded firms, were slightly higher in 2004 than in previous years.

REFERENCES

- Barboza, David. 2006. The rise of Baidu (that's Chinese for Google). *New York Times*, Business sec., September 17. Available at http://www.nytimes.com/2006/09/17/business/yourmoney/17baidu.html?pagewanted=t&_r=1.
- China Ministry of Education. 2001-2005. *Yearbook of Ministry of Education*. Available at <http://www.moe.edu.cn/>.

China Youth Daily. 2005. Haiwai Liuxue yu guiguoren yuan xianzhuang dadiaocha jieguo fabu. Press release of the Survey Report of Overseas Students and Returnees, no. 18 (December). Available at <http://www.cunews.edu.cn/html2006/jxw/083803809.htm>.

Du, Chen. 2007. Guigu guilai [Returning from the Silicon Valley]. Editorial. Vol. 223. Available at <http://www.ceocio.com.cn/store/detail/article.asp?articleid=13356&Columnid=3049&adId=10&view=>.

Ha, K. Oanh. 2006. Valley vc firms boost bets on China: Talent, money flow east to huge market. *San Jose Mercury News*, Local news, February 13. Available at <http://www.mercurynews.com/ml/mercurynews/news/local/13861269.htm>.

Hertling, James. 1997. More Chinese students abroad are deciding not to return home. *Chronicle of Higher Education* 43 (March 28).

Hsu, Jinn-Yuh. 1997. The historical study of Taiwan's integrated circuit industry—high technology, state intervention, and returnee entrepreneurship. *Journal of Geographical Science*, no. 23: 33-48.

Jelinek, Len. 2004. China is catching up to leading-edge technology. *Solid State Technology* 47, no. 2: 520-522.

Jiang, Dan, and Xiaojing Yang. 2007. Zhongguo Liuxue rencai anquan de xianzhuang yu zhengce fenxi [Security implications of China's overseas talents and policy analysis]. In *Zhongguo Rencai Fazhan Baogao* [The report on the development of Chinese talents], ed. Chenguang Pan. No. 4. Beijing: Social Science Press.

Li, Tao, Zhou Qin, and Han Mei. 2007. Liuxue, Neng wei ziji yingde weilai mai? [Can study abroad win the future for you?] *China Youth Daily*, December 7. Available at http://campus.cyol.com/content/2007-2/07/content_1986475.htm.

Liao, C., and M. Tang. 1984. *Research and analysis on the employment of the returned scholars and students*. Taipei: National Youth Commission.

Markoff, John. 2004. Have supercomputer, will travel. *New York Times*, November 1, C1-C4.

NYC. 1987. *A helping hand to overseas scholars for their service at home*. Taipei: National Youth Commission.

Ong, Aihwa, and Donald Nonini. 1997. *Ungrounded empires: The cultural politics of modern Chinese transnationalism*. New York: Routledge.

Ong, P., E. Bonacich, and L. Cheng. 1994. *The new Asian immigration in Los Angeles and global restructuring*. Philadelphia: Temple University Press.

Saxenian, Anna Lee. 2006. *The new argonauts: Regional advantage in a global economy*. Cambridge: Harvard University Press.

Saxenian, Anna Lee, and Jinn-Yuh Hsu. 2001. The Silicon Valley-Hsinchu connection: Technical communities and industrial upgrading. *Industrial and Corporate Changes* 10, no. 4: 893-920.

Seagrave, Sterling. 1996. *The Soong dynasty*. London: Corgi Books.

Sheff, David. 2002. *China dawn: The story of a technology and business revolution*. Vol. 1. New York: Harper Business.

- Tsai, S. H. 1986. *The Chinese experience in America*. Bloomington: Indiana University Press.
- U.S. Census Bureau. 2002. *2000 Census of Population*. Washington, D.C.: U.S. Bureau of Census.
- U.S. Department of Justice. 1991–1996. *Statistical yearbook of the immigration and naturalization service*. Washington, D.C.: U.S. Government Printing Office.
- Weidenbaum, Murray, and Samuel Hughes. 1996. *The bamboo network: How expatriate Chinese entrepreneurs are creating a new economic superpower in Asia*. New York: Martin Kessler Books.
- Xia, Y., ed. 2004. *Huigui qiangian Zhongguancun* [Overseas returnees' innovation in Zhongguancun]. Beijing: China Development Press.
- Zhongguancun Administrative Commission. 2004. Annual report of Zhongguancun Science Park. *Touzi Zhongguancun—'Hu Hui xianxiang' yantaobui shilu* [Investment in Zhongguancun—Huhui phenomenon. Discussion panel transcript]. Available at <http://gov.finance.sina.com.cn/zsy7/2004-07-20/16782.html>.
- Zhou, M. 1992. *Chinatown: The socioeconomic potential of an urban enclave*. Philadelphia: Temple University Press.
- Zhou, Y. 2008. *Inside story of China's high-tech industry: Making Silicon Valley in Beijing*. Lanham, Md.: Rowman and Littlefield.
- Zhou, Y., and Y. Tseng. 2001. Regrounding the "ungrounded empires": Localization as the geographical catalyst for transnationalism. *Global Network* 1, no. 2: 131–54.
- Zweig, D., and C. Chen. 1995. China's brain drain to the United States: View of overseas Chinese students and scholars in the 1990s. Berkeley: Institute of East Asia Studies.

15 “Cyberonaut” Diaspora Arab Diaspora in Germany

KHALIL RINNAWI

The proliferation of satellite broadcasting and new transnational media technologies has become accessible to the Arab diaspora, allowing diasporans to reintegrate into their homeland's life and society.¹ This situation raises the important questions of how these new media work and what their implications are for the relationship between the homeland and the diaspora (Morley and Robins 1995). Visits to refugee (*Azulheim*) buildings in Berlin during the early 1990s revealed that one of the most important and essential pieces of electronic equipment owned by refugees was a decoder connected to a satellite dish outside the window of their respective rooms. The refugees told me about this equipment, and how television connected them to their homelands. Despite the low socioeconomic status of most of the refugees, a significant percentage of them owned this electronic equipment. As the refugees moved from the *Azulheim*, they took this equipment with them as a continuous link to their original homelands.

Similar to voluntary migrants, refugee populations (e.g., asylum seekers) desire to maintain links with their countries of origin. Transnational networks play an essential role for both groups of migrants. Nevertheless, this information and its implications are largely ignored by the academic literature (Breidenbach 2001). Since the mid-1980s, transnational Arab media