

# Divergent engagements: roles and strategies of Taiwanese and mainland Chinese returnee entrepreneurs in the IT industry

YU ZHOU\* AND JINN-YUH HSU†

\**Institute of China Innovation (ICI), East China Normal University,  
Shanghai 200062, China & Department of Earth Science and Geography,  
Vassar College, Poughkeepsie, NY 12603, USA*  
*yuzhou@vassar.edu*

†Corresponding author:  
*Department of Geography, National Taiwan University, Taiwan*  
*jinnyuh@ntu.edu.tw*

**Abstract** Professionals and entrepreneurs returning to developing countries from developed countries play key roles in the technological ‘catch-up’ of their home countries, but they are rarely well-conceptualized by the theories of globalization. This is especially the case in Asia. The American-trained Chinese engineers who returned to Taiwan were instrumental in creating Taiwan’s excellent semiconductor industry during the 1980s and 1990s. In a similar vein, since the late 1990s, Chinese professionals returning to the mainland have also emerged as the most innovative industrial and capital agents in the technological industry. In this article we compare the roles and business strategies of transnational entrepreneurs on the two sides of Taiwan Strait in the information communication industry (ICT). While these Chinese returnees share striking similarities in their educational and personal trajectories, we identify major structural differences underlying their particular resources and commercial strategies. These empirical findings move beyond the assumptions of common behaviour by overseas Chinese, for they highlight the different political economic dynamics between mainland China, Taiwan and the United States in shaping the divergent engagements of these entrepreneurs in the emerging global technology industry.

**Keywords** CHINA, TAIWAN, TRANSNATIONAL ENTREPRENEURS, TECHNOLOGY INDUSTRY, OVERSEAS CHINESE

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It has become widely acknowledged in Asia that scientists and engineers returning from overseas play an instrumental role in the development of technology in the region. As skilled professionals return with expertise, experiences and connections

after their education and extensive practices abroad, they create a new synergetic field upon which different regional economies and technology flows intersect. The transnational practices of returnees have produced major shifts in the patterns of transnational business, and have had significant impacts for technological changes in their homelands.

Despite a well-established recognition of the roles of overseas returnees and widespread policy mechanisms to attract them within developing countries, English-language literature has just begun to formulate a theoretical understanding of the forces underlying the transnational practices of these returnees. The globalization literature tends to regard large Western corporations and national and international regulatory bodies as the primary agents of globalization; the role of returnees is often included only as a footnote, if not ignored altogether (Saxenian 2007). Policy makers in developing countries, by contrast, are eager to capitalize on the return flow as strategic assets of the home countries. Yet, their policies rarely go beyond providing financial incentives to returnees, and frequently avoid addressing deeper structural problems for those who have returned (Cao 2008). Though we appreciate the power of cultural affinity and social networking as major forces drawing overseas returnees back to their home countries, the highly varied patterns of returnees' practices over time and space indicate that a cultural explanation is insufficient. In this article we compare the business strategies of two significant streams of Chinese high-tech returnee entrepreneurs and professionals who spent time in the United States before returning to Taiwan and mainland China, starting in the 1980s. We show the prominent role of overseas returnees in creating the global articulation of the commodity chain within the information and communications technology (ICT) industries in both locations. More importantly, we argue that the patterns of returnees' activities and their success or failure are context specific, namely they depend on the convergence of global forces and the local formation of an institutional environment for returnee ventures. The findings suggest that, contrary to Kotkin's (1993) view, overseas Chinese are not an essentialized population with a predefined 'tribal-like' orientation to the homelands. Instead, we argue that uneven globalization processes and local geographical variations are critical variables in producing the returnees' divergent practices. Such differences are evident even among people from a similar cultural background within the ICT industry.

### **Transmigrants and the geography of flexible production and territorial grounding**

The current literature on globalization has generally privileged the role of multinational corporations (MNCs), international organizations, treaties and national governments in structuring global commercial transactions and interactions. Sklair (2001: 5) argues that 'a transnational capitalist class based on the transnational corporations is emerging that is more or less in control of the process of globalization.' However, there is increasing recognition that transmigrants, namely those who develop and maintain multiple relations that span international borders – be they familial, economic, social, organizational, religious or political – are also agents

of globalization. It is certainly possible to link transmigrants with transnational corporations, as the expatriate executive class exemplifies. The majority of transmigrants, however, do not necessarily enjoy privileged access to mainstream capital in the West. The host countries' dominant economic structure excludes or marginalizes many because of their immigrant or minority status. Instead, they may act as entrepreneurs, traders or professionals on their own initiatives. Drawing on and reworking the pre-existing notion of diaspora, scholars define transnationalism as a process in which migrants or diasporic populations build a social field that links their countries of origin to their countries of settlement (Pries 2001; Vertovec 2009). One can understand this decentralized transnationalism as an alternative form of globalization from below (Smith and Guarnizo 1998).

Transmigrants are in a better position and more highly motivated than MNCs to exploit the economic potential of countries located at different junctions in the global production chain. MNCs are keen to take advantage of world resources to advance their global interests, but the resources they use tend to be widely acknowledged, relatively mature, or 'visible' through the Western business media. The access that transmigrants have to social networks in several countries, by contrast, allows them to discover, mobilize and cultivate resources in their nascent stage. In this sense, it is precisely because transmigrants are often located on the margin or outside the mainstream in developed countries that they are more open to exploring or initiating changes in the global production system. It is often after their painstaking efforts to cultivate a resource enough for it to become 'workable' in the global division of labour that large MNCs start to take advantage of the resource. For instance, while China is widely acknowledged today as the 'factory of the world', its entry into the global division of labour was initiated by overseas Chinese entrepreneurs in Taiwan and Hong Kong during the 1980s – *before* MNCs viewed China as a viable option in the 1990s. Indian engineers working for large corporations in the United States also initiated India's software industry (Saxenian 2007: 275) *before* India turned into a software-exporting powerhouse. In the end, the different globalizations that come from above or below are not contradictory. Rather, they *complement* each other, since transmigrants acting as entrepreneurs are constantly in search of ways to bring global capital to the countries on their residential itineraries.

Zhou and Tseng (2001) argue that patterns of transmigrant practices are grounded in territorial, political and economic complexes that are only effective if they create a powerful synergy between local and international spaces. Different locations are bound to give rise to distinct opportunities and constraints, and thus set off divergent strategies and patterns of growth.

The overseas Chinese are noted among transmigrant groups for their deep history and extensive geographical coverage in global production and trading networks, which have persisted for centuries (Marks 2007). They are recognized as central players in the flexible production networks around the Pacific Basin (Choudhary 2001; Huchet 1997; Ong and Nonini 1997; Redding 1990; Yeung 2000; Zhou and Tseng 2001). Lever-Tracy and Ip (1996) argue that the synergy between the specific skill sets of Chinese investors in labour intensive export and labour management, and

China's developmental local states were catalysts for China's rapid industrialization in the 1980s and 1990s. The cultural knowledge of overseas Chinese was also an indispensable factor because they were well versed in using propensities and social relations to get things done in a highly unregulated environment. As China's political and economic environment has become more established, some note that the importance of this particular form of synergy has declined (Smart and Hsu 2004). We argue that as Taiwan and mainland China have respectively entered an era of engagement with global technological development since the 1990s, new fields of synergy have emerged between the returning high-tech professionals in both places. In the following section we compare the trajectories of the Taiwanese and mainland Chinese professional populations returning from overseas to their origins, and how they have influenced the ICT industry on both sides of the Taiwan Strait.

### **From 'brain drain' to 'brain circulation'**

Post-Second World War Chinese migration to the United States started in 1965 following changes in US immigration law. From this point to the 1980s, scholars would study the movement of Chinese professionals to the United States within the framework of the 'brain drain', for the net flow of expertise was heavily unidirectional (Salt and Stein 1997). After completing their studies, most students who had arrived as graduates to pursue postgraduate degrees remained in the USA as academics, government scientists, industrial engineers or researchers. Once committed to an American career, few returned home.

Since the 1980s, highly skilled engineers and professionals from Taiwan and mainland China have been returning in growing numbers. Saxenian (2007) has noted the active engagement of Chinese and Indian engineers in technological startups in Silicon Valley, California, calling them 'the new Argonauts' when describing their roles of connecting technological spheres around the globe. Saxenian and others (Saxenian and Hsu 2001; Wong 2006; Zhou and Tseng 2001) have also shown that local ethnic associations in California that promote entrepreneurial endeavours in both host and home countries have institutionalized the international circulation of technical expertise. Their findings have led to the coinage of the term 'brain circulation' (Saxenian 2007; Saxenian and Sabel 2008), which describes the phenomenon of skilled immigrants becoming increasingly beneficial to both home and host countries.

The changing pattern of migration and circulation suggests that, beyond cultural affinities, which one can regard as more or less constant for the foreign-born generation of immigrants, political and economic forces bring about the major changes in the flows. In particular, while studies have shown that the circulation of professionals and institutionalized links can give rise to new models of the global division of labour, few studies have looked into the process of local institutional formation that supports transmigrant activities. We argue that the return flow can only be substantiated and sustained if transmigrant activities are firmly grounded in both countries' respective regional economies and supported by their local institutions.

To date, with the exception of Saxenian's work, most studies on transmigrants

have been country or region specific. In our attempt to elucidate what structural forces shape the returnees' practices, we focus on two groups of Chinese professionals in the ICT industry – those from Taiwan and those from mainland China. The two Chinese groups are a good pair for comparison because they share similar cultural, linguistic and social backgrounds. Beyond sharing certain staple Chinese cultural traditions prior to their migration, both groups were composed of highly educated and selected people with a strong predisposition to careers in science and technology. The bulk of the returnees left their homeland at the time of authoritarian governments and returned to a more open, though not necessarily democratic, society, especially in the case of mainland China. In the United States, they generally received postgraduate educations and launched their careers in American high technology companies; some started their own companies in the United States. Governments on both sides of the Taiwan Strait also actively courted them. For both groups, the return flows occurred during the economic boom in East Asia, but differed in important respects. For example, the two groups grew up in different societies – Taiwan was more Western oriented and capitalist, whereas mainland China was isolated and communist during the 1960s and 1970s. Furthermore, they both returned to different political and economic contexts at different stages of globalization. The high-technology industry in mainland China, though connected with Taiwan, is lower on the technology hierarchy, but with one of the world's largest growing markets. As a result, the returnees face very different sets of opportunities, resources and constraints, both globally and locally. In the following sections, we look at the life trajectories of Taiwanese and mainland Chinese professionals in the United States and the factors informing their decisions to return to their homelands. We shall then examine their contrasting business strategies.

### **Outgoing flow of Chinese students**

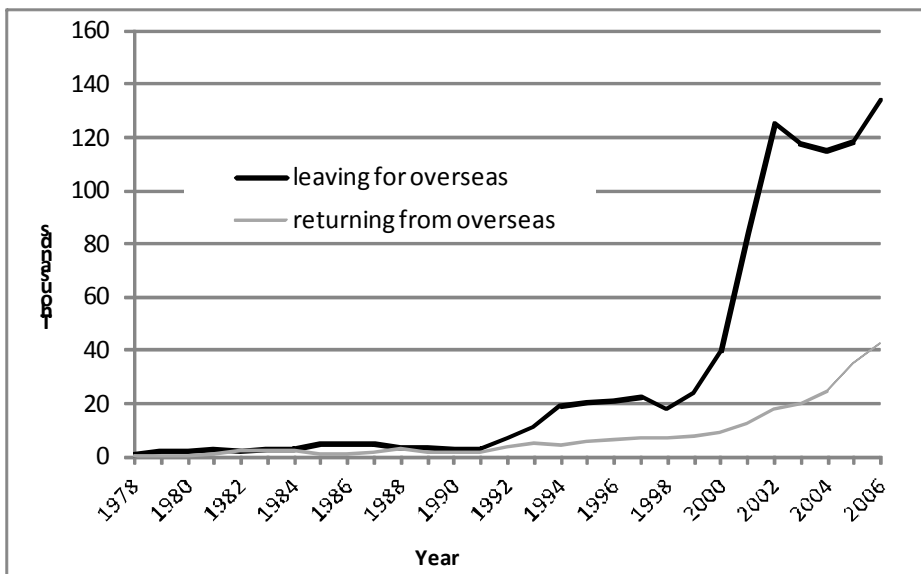
'Brain circulation' started earlier in Taiwan than on the mainland. The island, which has been a staunch US ally since the Second World War, has close ties with American political and economic establishments (Liu and Cheng 1994). Since the 1960s, going to the United States has become a rite of passage for Taiwan's most elite students. According to one survey (NYC 1987), 21,248 students left Taiwan in the 1960s to advance their studies abroad, but only 1172 (5 per cent) returned. Between 1970 and 1979, 33,165 students studied abroad and 5028 or 15 per cent returned – a marked improvement, but still a low rate. The overwhelming majority of these students went to the United States. Overall, the non-returnees in the two decades amounted to approximately 88 per cent of the student migrants. Science and engineering dominated the fields of study. In fact, more than 40 per cent of the graduates from the departments of mechanical engineering, electrical engineering, civil engineering, physics and chemistry at prestigious universities such as National Taiwan University (NTU), Tsinghua University and Chiao Tung University went abroad.

As can be expected, better research facilities, promising career prospects, better professional opportunities, higher salaries and stronger job satisfaction were reasons

that supported the student migrants' decision to stay in the USA (NYC 1987). These conditions remained unchanged until the mid-1980s, when Taiwan's economy took off and the Taiwanese government started to recruit overseas talent for high-technological development (Chang 1992).

The flow of mainland Chinese students to America lagged behind Taiwan by about 20 years, but when it came it came as a torrent. China's international isolation under Mao's regime meant that virtually no mainland students went to the West between 1950 and 1980. Those who went to the Soviet Union in the 1950s returned in the 1960s. The 1980s saw about 34,000 mainland students go abroad, primarily to Western countries (Figure 1). Given the strict passport and visa controls, a significant portion of them applied for short-term government-sponsored study programmes. However, foreign universities were also paying for growing numbers of self-sponsored students on an extremely selective basis. With higher incomes in China in the 1990s and more relaxed passport regulations, the number of students travelling abroad soared to almost 150,000, and then leapt to three-quarters of a million between 2000 and 2006. Since the 1990s, the student body has become increasingly mixed with more and more private households able to afford foreign education. Government sponsorship has accordingly diminished. In the 2000s, self-sponsored students grew to constitute over 90 per cent of the total outgoing flow.

**Figure 1: Mainland Chinese students going to and returning from abroad**



Source: Cao (2008).

The United States has always been the most favoured destination for mainland Chinese students. The US Institute of International Education (IIE 2008) reported that mainland China was the leading sender of foreign students to America throughout much of the 1990s – only in 2001 did India begin to exceed China; however, the latter

has remained in second place, growing at a rate of more than 10 per cent every year. In 2008, there were 81,127 Chinese students in institutions of higher education in the USA and 65.4 per cent of these were in graduate programmes.

For our focus on returnees, we concentrate on people who went abroad in the 1980s and 1990s. This is because those who left in the 2000s either are still abroad or, if not, were likely to be in entry-level positions at the time of the research. Their huge numbers indicate, however, that once they return to China in significant numbers – which is almost inevitable given their visa status – they will have a major and lasting demographic/social/economic impact on China's professional population. It is thus necessary to conceptualize China's return flow at the beginning stage.

### **Calls from home: the draw of high-tech industry**

#### *Taiwan*

The significant return flow of professionals and entrepreneurs to Taiwan began in the 1980s, corresponding with the economic boom and political opening up. More precisely, the combination of a booming high-tech industry, the soaring stock market, and a ready supply of skilled engineers created a suitable entrepreneurial environment that enticed overseas talent to return in growing numbers.

In the late 1980s, Taiwan's PC industry got into its stride and entered a phase of rapid growth (Hwang 1995; III 1991). The sales revenues of local PC manufacturers reached US\$ 1 billion in 1985, 1.6 per cent of Taiwan's total GDP of US\$ 62 billion. At the same time, the skyrocketing stock market – fuelled in part by the real-estate boom after the mid-1980s – provided local financial options for higher-end technology ventures. The transaction value of the stock market then reached US\$ 650 million. Several small semiconductor companies founded by Taiwanese-Americans moved their bases to Taiwan to tap into the huge reservoir of capital on the island, and a number of major technological ventures went public on the stock market. The steady supply of skilled and less expensive labour was another attracting factor. In the late 1980s, American and Taiwanese universities flooded the island with graduates in computer and related fields, giving Taiwan a substantial pool of engineering talent (Liu 1993). These financial and manpower incentives, in addition to government subsidies in the PC and semiconductor industry, and a booming PC business, created a highly favourable climate to attract and support a large number of overseas talents. As president of ITRI (Industrial Technology Research Institute), a public and private research institute, Mr Chin-Tay Shih, observed, 'When the current of overseas technology and talent met the current of local capital and Taiwan's industrial base, it created multiplier effects. The two forces were complementary, and reinforced each other' (Chang et al. 1994).

The development of the semiconductor industry in particular shows the role of the Taiwan state in cultivating and encouraging return flows. Taiwan, a relative newcomer to the industry, decided to borrow technologies from foreign countries, especially the United States. Many overseas Chinese worked in large semiconductor companies in the USA, and Taiwan needed their expertise. Under the leadership of

the Minister of Economic Affairs, a group of senior overseas Taiwanese electronics engineers provided advice and guidance to help nurture high-technology industries in Taiwan. The group later formed an informal Technical Advisory Committee (TAC),<sup>1</sup> which regularly met to discuss the progress of Taiwan's semiconductor industry. The following quote from Dr Wen-yuan Pan, head of TAC, summarizes Taiwan's strategy: 'to expedite the growth of Taiwan's electronics industries, the semiconductor industry should be targeted. The best way to develop it was to transfer technology from foreign companies, particularly the American companies, to save valuable time' (ERSO 1994: 5). Heeding this advice, the Taiwanese government targeted recruitment from US industries in particular. The strong political alliance between the USA and Taiwan during and after the Cold War made the arrangement politically tenable. Taiwan dedicated more than US\$ 10 million to the development of the semiconductor industry through a series of projects that successfully caused local semiconductor firms to take root, as discussed later.

After the initial stage of long-distance consultation from overseas, the state heightened investment in the industrial infrastructure, including public projects, in the hope of luring back overseas talent. For the semiconductor industry, the establishment of state labs, such as the ERSO (Electronics Research Service Organization) and the HSIP (Hsinchu Science-based Industrial Park), were significant developments. The inflow into HSIP – the government established research park – shows the growth of returnees. In the early 1980s, HSIP attracted only a handful of returnees each year, cumulatively 422 by 1990. By 1997, however, the cumulative total had increased fivefold to more than 2850 – with an average of 350 returning each year. US-educated engineers started almost half the 97 companies in the HSIP in 1997. The significance of these returnees went far beyond their number, as many of them had returned to Taiwan in mid-career after having accumulated considerable managerial or entrepreneurial experience in Silicon Valley (HSIP 1998).

### *Mainland China*

As in Taiwan, the significant upswing in the return flow of mainlanders came 20 years after the outgoing flow. As Figure 1 shows, the return flow increased much more slowly than the outgoing flow and a noticeable upward swing came after 2000. Given that the economy in mainland China was less developed than in Taiwan during the 1980s and 1990s, and with an authoritarian and oppressive government, mainland Chinese had little incentive to return after receiving their education in America. Research in the 1980s and 1990s found extremely low interest among Chinese self-sponsored students to return home, though returning rates were much higher among government-sponsored students or scholars (Hertling 1997; Zweig and Chen 1995). Zweig and Chen reported that the leading reasons for students not returning to mainland China in the early 1990s were political instability, restrictions on political freedom, lack of economic opportunities and low standards of living. In 1989, the Chinese government's violent crushing of peaceful student movements in Beijing shocked the world and hardened the students' resolve not to return home. Subsequent



to the crackdown, political sympathy from the US government and the public allowed the rapid passing of the Chinese Student Protection Act in 1992, which gave all Chinese nationals – around 50,000 at the time – permanent residence in the United States. Studying abroad in the 1980s and early 1990s for mainland students meant, practically, that they had a one-way ticket to stay in the United States; meanwhile, going home was considered extraordinary, if not unfortunate. The cultural ties lay dormant.

Compared with the Taiwanese government, the Chinese government also had much more trouble enticing the return of overseas talent during the 1980 and 1990s. Given that Chinese students had lobbied and taken advantage of US governmental protection made it difficult for the Chinese government to command their political loyalty. In contrast with Taiwan, it was not until the late 1990s that the Chinese government could begin systematically to seek out the assistance and advice of the overseas Chinese population.

The situation began to change in the late 1990s during the heyday of the dot-com rush – and with little governmental initiative at the beginning. The internet boom in the USA 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 (搜狐), AsiaInfo.com (亚信), and UTstarcom (UT斯达康), successfully drew foreign venture capital and achieved wealth and fame within a short period (Sheff 2002; Zhou 2008a). Their examples inspired a growing number of Chinese professionals to contemplate the possibility that China might at last be ready for private ventures in knowledge-intensive industries (Sheff 2002).

The internet bubble burst in the spring of 2000 as NASDAQ crashed. Yet the disappointment did nothing to moderate the return flow, which has actually intensified since 2000 (Figure 1). China's sustained economic growth since the 1980s proved crucial in attracting returnees. The rapid rise of income also significantly reduced the gap in standards of living between China and advanced countries. Sensing the growth of its return flow, China started to implement numerous governmental programmes to provide financial incentives for returnee entrepreneurs or professionals. In addition, local governments provided grants and preferential policies for high-tech start-ups by returnees in their science parks. Industrial aid has not, however, been systematic and policy changes aimed at easing travel restrictions, such as the multi-year visa for returnees, are unavailable. It is unclear how effective the state incentives have been in fostering the flow (Xiang and Shen 2009).

As in Taiwan, major science parks in large Chinese metropolitan areas like Beijing, Shanghai and Shenzhen worked hard to attract returnees, and they now host the lion's share of returnee entrepreneurs in the high-tech sectors. In 2000, Beijing's Zhongguancun Science Park, the earliest and largest high-tech zone in China, began keeping records on returnee-founded enterprises. These show a steady increase of roughly 500 firms every year (Zhou 2008a: 126–7). People returning from North America, who make up 46 per cent of the total, founded half the returnee enterprises. Returnees from Europe, Japan and other countries make up the remaining half. The

vast majority of these enterprises in a range of technological areas are very small and undercapitalized (Saxenian 2007), yet their growth has helped the ZGC industrial ecosystem become more internationalized.

Besides the pull factors of the homelands, it is also important to acknowledge the push factors in the United States for mid-career Chinese professionals. Hitting glass ceilings in American corporations was a common experience among Chinese from both the mainland and Taiwan (Zhou and Tseng 2001). After 15 to 20 years in the United States, many of these professionals had finished studying and had already spent a decade in their careers. While there are a few high-profile Chinese executives in some leading high-tech companies, racial discrimination and cultural barriers have kept the vast majority out of the key corporate decision-making posts. A large number of technical professionals faced this 'glass ceiling' in corporations quite early on, coming to the sad realization that they had reached the peak of their career in their late thirties or early forties, with nowhere else to go in the American corporate world (Wong 2006). Many chose to settle in their current tracks, but the more ambitious and restless of them inevitably looked for new challenges and excitement. For them, Taiwan and mainland China – their rapidly developing homelands – held irresistible appeal. Edward Tian, the founder of AsiaInfo, famously announced that his career choice had been between counting little white rats in the biology lab for the rest of his life or creating the internet in China (Sheff 2002).

In sum, despite the different political economies in Taiwan and mainland China, there are striking parallels between the return flows. Both regions experienced about 15 to 20 years of brain drain, and both are seeing an accelerating rate of return after the significant local development of high-tech industry. While the Taiwan return flow has matured, it has only begun for the mainland. The much larger outgoing pools in the latter suggest that a broad scale and far more lasting circulation will be likely.

The role of the state has been much more coordinated and focused in Taiwan than on the mainland, even though the state in China is more centralized. The state played an instrumental role in the early stage of returnee recruitment and technological upgrade in Taiwan. The Chinese state began active recruitment after the initial return flow, but its efforts lacked focus and their effects are unclear.

### **Business strategies in Taiwan: domestic capital and global market**

Regardless of government efforts, the success and sustainability of professional returnees really depend on the convergence of global and local interests, particularly the configuration and maturation of the local industrial environment. This consists of the market, the industrial structure and capital provision. We make the following comparisons between Taiwan and the mainland.

Taiwan has an export-oriented economy. The returnees come from the high-tech sectors in the USA, so have the precise combination of technical expertise and connections with the exporting market. Building on the success of electronic exports, the returnees made their most visible contribution to the semiconductor and venture capital industries. Compared with South Korea and Japan, Taiwan's high-tech

industry has a unique business structure where smaller or medium sized enterprises (SMEs) play a strong role, in addition to large enterprises in most exporting industries. Such systems of highly specialized production through a subcontracting network was present in labour intensive export industries, and was replicated in the later PC sectors as well as in the technology-intensive sectors such as Integrated Circuits (IC) sectors (Saxenian 2007; Shieh 1992). SMEs constituted diverse entry points to join the game, especially for those returnees who possessed new product technologies for startups, but did not have the large capital for major ventures.

In the process of new firm formation, the role of the government, along with the operation and movement of the production networks were critical for the returnee to start up their businesses. Take IC design as an example. Despite a swarm of returnees setting up design houses, the real thrust for the IC boom came from a fabrication plant with state-of-the-art technology. The Taiwanese government initiated TSMC (Taiwan Semiconductor Manufacturing Corporation) to concentrate on manufacturing chips for other companies, while not competing with them in the sale of the chips.<sup>2</sup> Today domestic foundries do more than 98 per cent of the fabrication work the independent design houses generate. In fact, design companies have emerged in abundance since the establishment of TSMC. There were fewer than five design houses in the HSIP in 1987; afterwards there were more than 20, with 200 more founded in the 1990s. The establishment of made-to-order fabrication factories, pioneered by Mr Zhang in Taiwan, is an exemplary case of how the knowledge, expertise and social connections of transmigrants can reshape the global IC commodity chain and attract more returnee enterprises.

The returnees also maintain ongoing collaborations and partnerships between specialist producers at different stages of the global supply chain, connecting Silicon Valley with production in mainland China. While Silicon Valley and Hsinchu are at different levels of development and have different specialisms, the interactions between the two regions are increasingly complementary and mutually beneficial. As long as the USA remains the largest and most sophisticated market for technology products, which seems likely for the foreseeable future, new product definition and leading-edge innovation will remain in Silicon Valley. Taiwanese semiconductor SMEs, however, continue to enhance their ability to design, modify, adapt and rapidly commercialize technologies developed elsewhere. As local design and product development capabilities improve, Taiwanese companies are increasingly well-positioned to take new product ideas and technologies from Silicon Valley, to integrate them quickly and to produce them in volume at relatively low cost.

One of the key driving forces behind the burgeoning IC design houses has been the role of small venture capitalists. Since the early 1980s, the Taiwanese government has tried to promote the venture capital industry to imitate the Silicon Valley model. As mentioned earlier, the boom of Taiwan's stock market in the 1980s provided initial capital channels for firms in PC industries and then for the higher-end semiconductors industry. Later, returnees became a central player to bridge the domestic capital with technological expertise and establish connections with the global market. Taiwan's venture capital companies rose from 1 in 1984 to 27 in 1994. Some 97 per

cent of their investments are concentrated in the ICT industries. The total amount of total venture capital investment reached US\$ 5 billion in 2004. Some venture capitalists, like Champion Investment, and some securities companies, like Chien-Hong Securities, are becoming very important investors in high technology sectors. Saxenian (2007: 151) argues that Taiwan's venture capital industry reached the point of self-sustaining growth in the 1990s, which significantly improved entrepreneurial opportunities for returnees.

In sum, building on their success in labour-intensive exports, the Taiwan returnees help transformed the global chain of semiconductor production to make Taiwan an indispensable part. Returnees thrived on their transnational networks and experience with leading semiconductor firms in Silicon Valley. They also took advantage of Taiwan's indigenous capital market and highly skilled population. The state provided the initial crucial steps and helped to found the large capital-intensive ventures that anchored the growth of SMEs. Maturation of the industrial environment attracted even more returnees with experience and this further strengthened brain circulation.

One needs to note that this did not happen overnight. Collaboration among returnees, the state, local capital and multinational companies has been going on since the 1970s. A solid political alliance between the USA and Taiwan, and decades of a thriving export-oriented SME-centred economy, also contributed towards the success. At this point, the return flow has become self-sustaining with broad international reach alongside close and ongoing links with the United States and mainland China.

### **Mainland returnees: global capital and domestic market**

In sharp contrast to Taiwanese returnees, neither the opportunity to become involved in the global division of labour nor the availability of local capital initiated the recent return of Chinese entrepreneurs; it was the prospect of China becoming an immense market for high technology goods and services.

#### *Market and industrial structure*

When China became the 'factory of the world' in the 1990s, it started to develop a buoyant export industry, which the overseas Chinese (and technically the returnees) initiated. Chinese professionals in the USA generally have little experience of labour-intensive manufacturing or of the export economy; China's domestic market potential attracted their attention.

In the late 1990s China entered the global scene as one of the largest and most rapidly growing high-tech markets in the world (OECD 2006). The internet, in particular, shows the promise of the world's largest population. By the mid to late 1990s, China had a nascent domestic ICT industry, but the state-owned enterprises dominated the key telecommunication sectors, and foreign companies dominated the PC and other key high-tech equipment markets. The non-state technological firms such as Lenovo and Huawei were just emerging between the two giants. They specialized in manufacturing, but were too weak financially and too inexperienced in R&D to engage in risky higher-end ventures in the 1990s (Zhou 2008a). The feverish

pace of internet development in the USA, by contrast, suggested the transformative potential of the internet for China. The first-generation mainland returnee entrepreneurs were younger and less experienced than their Taiwanese counterparts were. Edward Tian, the co-founder of AsiaInfo mentioned earlier, trained as a biologist. Charles Zhang, the founder of China's top internet portal, sohu.com, had a Ph.D. in physics; his only prior high-tech experience was in a dotcom company that his Harvard friend had founded. One of the most experienced of the returnees, the founder of Baidu.com, Li Hongyan, had worked in a number of high-tech firms but had not reached the middle management level before deciding to return to Beijing to work on his startup. These entrepreneurs were interested in transplanting the startup models from Silicon Valley to China and not in reconfiguring the global commodity chain.

There are reasons for their choices. Compared with other high-tech industries that require the formation of a complex industrial supply chain, the internet is a service industry directly interfacing with the end users. The returnees thought they could bypass China's relatively lagging commercial infrastructure, or at least avoid dealing with traditional sectors where they had few connections, but it did not take them long to realize how wrong they were. China's commercial soil is quite different from that of Silicon Valley. Regulation by state bureaucracies and the monopolies of the state-owned telecommunication giants turned internet development into an obstacle course (Zhang 2006). Under-developed finance and logistic infrastructure slowed down the emergence of many necessary supporting services. Yet, these internet companies persisted with adaptations and innovations to meet the demand of a surging Chinese on-line population. By the mid-2000s, China had largely fulfilled its internet promise. Many startups, founded by returnees or locals, have emerged in almost all areas of the internet industry. The lack of a pre-existing monopoly and low technological barriers helped make the on-line industry the most hospitable space for small high-tech startups. Today China has the world's largest and fastest growing internet population and one of the largest internet markets. The pioneering work of returnees in probing and pushing for reforms in China's finance, logistics and other service sectors deserves considerable credit. China's on-line industries remain a key area attracting venture capital investments from overseas as the so-called TMT (telecom, media and technology) sectors (Li 2006).

More high-tech fields have opened up well into the 2000s and we started to see return flows of more experienced professionals. Some joined large MNCs or state-owned companies; others started their own businesses. Mr M was among the earliest Chinese students to go to the United States. He left in 1982 with a Masters degree in engineering. He got 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 early retirement and returned to Shanghai to work for a major China-Japan semiconductor joint venture in 2007. Regular calls from his graduate colleagues, many of whom had already gone home to assume leadership positions in the company, prompted his decision to return. Mr M was an athletic man in his early fifties<sup>3</sup> and he moved to Shanghai to start a new career, not to enjoy retirement. Similarly, Mr H, in his early forties, had also had a long career in major IT companies such as

Philips and IBM; he voluntarily relocated to work in the IBM Beijing R&D centre while leaving his family in the USA. Most of the key engineers in major MNC R&D centres in China were returnees. They do not have much routine contact with local enterprises, but they often become role models by indicating that returning is a viable option for career development.

Those who came back to found their own companies, by contrast, have had a bumpier ride. The promise of China's mass market initially lured most of them, but many discovered that the Chinese market was not yet ready for the advanced technology to which they were accustomed in the United States.

One returnee, Hu Hui (胡晖), set up his company in Zhongguancun Science Park for US\$ 150,000, which is too little for a venture in Silicon Valley but significant in China. Hu developed a software solution for remote medical diagnoses at Beijing's Zhongguancun, but he could neither find any buyers in China nor persuade Chinese VCs to invest in his firm. He donated the manufactured device with his software to Chinese hospitals during the SARS outbreak in 2003, but they never used the units. Relief finally came from the United States: an American firm bought his company for the princely sum of US\$ 18 million in 2004 (ZGC Administrative Commission 2004).

The returnee entrepreneurs commonly complained about the lack of a market and this reflects a key structural problem. Taiwan's export market suited returnees, but China's domestic market is entirely new. The overall low purchasing power and lack of experience with high-tech goods in the mainland suggest that China's mass market, namely one in which demands are increasing in both quantity and sophistication, has materialized in only a few areas. In other areas, returnee entrepreneurs will have a hard time. In addition, since most returnee companies are small and highly specialized, they need the maturation of the entire commodity chain to become a viable business. One entrepreneur interviewed in 2005 said that he spent eight months rethinking his business strategies after returning to China:

The commodity chain in China is far from developed compared with 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 just to do software in the US, 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.

We followed up with him again in 2008, and it was only then that he was finally able to locate a niche incorporating his chips with surveillance cameras makers.

Concentrations of returnee firms have begun to emerge in areas with reasonable commodity chains. Mobile phone and IC design are the clearest examples. These sectors relate to both the development of China's manufacturing capacity for the world market and its unique consumer demands (Zhou 2008a and 2008b). As in Taiwan, China's IC designers tie up with the PC and mobile phone industry. Vimicro, a company a Chinese returnee from California founded in 1998, has been one of the

most successful fabless<sup>4</sup> IC design houses in China, specializing in PC and wireless phone cameras. Most of Vimicro's engineers are mid-career returnees from Intel, Lucent Kodak and elsewhere. The company became established by supplying PC camera chips to PC manufacturers, and it claims it had 60 per cent of the world market share in 2006 (company website). The path of Vimicro is thus similar to many Taiwan IC design houses in its strategy of tapping into the global manufacturing chain. The company's ambition, however, is to serve China's domestic market for third-generation wireless phones rather than to supply to global production (Zhou 2008a: 133).

China's largest IC designers are concentrated in Shanghai, though Beijing and Shenzhen also have sizable clusters. Returnees who had worked with the major chip manufacturers founded many of the chip design houses and software companies. As in Taiwan, the establishment of the large foundry manufacturer, Semiconductor Manufacturing International Corporation (SMIC中芯国际), which is a student of and rival to TSMC, facilitated the rise of mainland Chinese design houses. A China–Japan joint venture – Huahong–NEC – also located in Shanghai and had been in the business for decades.

A 2008 study by Obukhova (2008) at MIT on the IC design industry in Shanghai suggests that these design houses did not grow explosively between 2004 and 2008 as such businesses did in Taiwan in the 1990s. Many firms are yet to become profitable, but the returnee-founded companies have a better chance of survival. This suggests that although IC design is an area with a strong returnee presence, it might be misleading to expect the mainland to replicate the success of Taiwan in exactly the same sector. The Taiwan semiconductor industry had a substantial lead and it continues to progress. In addition, much of its designing capacity has moved to the mainland, so there is little cost advantage for the mainlanders. In addition, there has been a reduced rise in the demand for IC chips in the West since the 2000s, which has slowed the industry down, especially since the start of the recession in 2008. The best strategy for mainland returnees' firms might lie in collaboration rather than competition with Taiwanese firms. In fact, such collaborative patterns have already emerged among Taiwan firms relocated in China. The case of *Shanzhai* cellphone (山寨手机) is particularly illustrative. *Shanzhai* is a new Chinese term describing knockoff phones. Such phones mostly follow the prototypes of the branded products, such as Nokia or the iPhone, but with additions or modified functions in order to meet local demands. It is estimated that more than 150 million *Shanzhai* mobile phones (*Shanzhaiji*) were sold in 2008 in China and even exported (Barboza 2009; Lin 2008). *Shanzhai* phones are one-third of the branded price and their core component is the GSM chip, which is the product of MediaTek (MTK), a Taiwanese IC design house. MTK, which collaborates with mainland mobile phone makers and dealers, has successfully created new low-priced mass markets with many segments.

If the Chinese market fails to materialize for high-tech products, the returnees have another business strategy: this is to focus on advanced markets, using China primarily as an R&D site, while keeping an eye on the Chinese market potential for their products. This is often an involuntary choice. After failing to locate a local

market in a short time, many returnees have realized that their best hope might still be abroad. Focusing on the advanced market is a relatively simpler operation on the China end of returnee enterprises. Local engineers may lack experience, but they are fast learners and are more willing than their American counterparts are to put in long hours and at one-tenth of the cost. Chinese entrepreneurs involved in startups in the USA or Japan should consider moving part of their R&D operations to China so that their capital can stretch further. For those companies, the main office is typically still in Silicon Valley and the Chinese operation consists of back-office R&D. Operating in China also gives entrepreneurs the opportunity to observe and experiment with the Chinese market. Software export is an example in this area. Returnee enterprises have a natural advantage – they speak English well, they have overseas social contacts and they have been the main founders of such enterprises, often through collaborating with companies abroad. For example, Mr Z returned to China from Texas in 2003. He originally hoped to provide his software to China's logistics industry, but later switched to software export with partners in California. The California companies receive orders and he provides software support with his employees in Beijing. Even though China is far behind India in this sector, the software outsourcing industry is growing quickly, over 50 per cent a year since 2000 (Software Association Annual report, multiple years). Compared with India though, China started decades late and lacks large, well-recognized firms. To overcome their size limitations, small firms have engaged in establishing alliances with each other to share work. Overall, given the much weaker English-language facilities in China, it is unlikely that China will be as competitive as India in software outsourcing for English-speaking countries, even if this sector continues to grow.

In short, mainland returnees have made significant inroads in sectors targeting the Chinese market and are increasingly moving into the international markets. Nevertheless, returnee enterprises are still in the initial stages, with sizeable returnee firms only beginning to emerge in 2002. Thus far, the online industry remains the most successful area for returnees, though, like very successful non-returnee companies such as Alibaba, it has become highly localized. Smaller clusters of IC design and software export have also emerged, but without the transformative impact of Taiwan or India on the global division of labour.

Given the early stage of return flow, we cannot be certain that the lack of rapidly growing clusters of returnee enterprises, besides the internet, is a permanent phenomenon; we also cannot determine whether the lack of clusters is necessarily a bad thing. China's policy is to increase the overall technology level of many sectors by incorporating returnees rather than creating returnee enclaves. We make two observations. First, the patterns and dynamics of returnees in the ICT industry in the mainland have failed to replicate the export-oriented development in Taiwan, with China's domestic market the primary attraction. ICT might possibly even be the wrong area in which to look for additional returnee breakthroughs. For example, returnee companies have become global leaders in the alternative energy industry. For instance, Suntech, which returnees founded, has become the largest maker of solar products in the world.



Second, in comparison with Taiwan, returnee ventures on the mainland need to make many more adjustments to fit in with China's market and economic system. This is hardly surprising given China's general weakness in supporting SME entrepreneurship, which is a sharp contrast to Taiwan's long history of SME-dominated growth. Below, we examine in more detail the problem of capital provision on the mainland.

*Mainland returnees: capital*

China has a centralized financial system with mostly state-owned banks. As is well known, this system discriminates against non-state enterprises and SMEs, to which returnee companies largely belong. High-tech startups may have valuable intellectual property, but they are often low in the kinds of assets that might serve as collateral for bank loans. A few selected returnee firms were able to raise substantial investment from Chinese banks, but that is more the exception than the rule. For the vast majority of returnee enterprises, support from the government is available but limited; it comes mostly in the form of state-sponsored business incubators, small startup grants, bank guarantees for small loans, rent breaks and other limited subsidies. These are helpful at the beginning stages of the startups but are of little use for sustaining further development. In Beijing's Zhongguancun Science Park, the administrators have done local experiments to help firms with a good credit history. Overall, however, the situation has not changed fundamentally (Zhou 2008a). China's stock market has one of the largest market values in the world, but it has been unfriendly to small innovative companies. In 2009, China started to establish a NASDAQ style stock market to encourage innovation and this has generated a considerable amount of excitement.

Given the obstacles of China's financial system, it is not surprising that overseas venture capital from the United States, Hong Kong and Japan supported the first waves of returnee enterprises. China's population and its sustained economic growth provided global capital with ample room for imagination. Global capital, with its deep pockets, has been willing to fund – at first rather tentatively but later on more lavishly – potential Chinese entrepreneurs hoping to gain inroads into this vast potential market. This was different from Taiwan where local capital was the main source of funding for high-tech firms.

Since the mid-2000s, the venture capital industry, which foreign capital interests in China's online ventures mainly fuels, has grown rapidly in China. By 2001, China and Hong Kong together accounted for 30 per cent of Asia's private equity investment, overtaking Japan for the first time. By 2002, the total venture capital pool in mainland China reached US\$ 7.15 billion (Batjargal and Liu 2004). There was a brief dip between 2001 and 2003 due to the after effects of the NASDAQ crash, but growth has accelerated since 2003 as a series of Chinese companies, including the telecom provider China Netcom (网通), the online gaming company Shenda (盛大), the semiconductor company SMIC (中芯国际) and others have gone public in the USA or Hong Kong. The rush of venture capital reached a feverish pace around Baidu's

IPO at NASDAQ in 2005. On its first listed day Baidu's share price more than quadrupled, which set a first-day record for any foreign firm ever listed on the US stock market and any firm in the previous five years (Barboza 2005). Since 2004, large amounts of mainstream US venture capital have entered China, with new capital injection reaching over US\$ 4 billion in 2005, far exceeding the total of the previous three years. According to a report by British USB Wealth management, issued in August 2007, China has overtaken Britain, as the second largest destination of venture capital in the world (Arnold 2007). With the robust growth of China's economy in the global recession, it is certain that more venture capital will target China as a fertile field for innovative ventures.

Returnees have been key agents in the venture capital industry. For example, Hong Chen, the chair and CEO of a major Chinese venture capital company, Hina Group, was the founder of two technology companies in California. One of the largest and most influential of the 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).

It is important to note that China *does* have an indigenous venture capital industry, with government-sponsored VCs established since the late 1990s. These organizations are, however, mostly affiliated with state-owned financial institutions, which have little experience and expertise in the venture capital industry. In addition, since China's own stock market could not work as an exit for venture capital funds, foreign VCs financed the lion's share of projects, for they are the experts in bringing innovative companies to foreign stock markets. This, however, will change with China's own 'NASDAQ' taking shape in October 2009. Already, in the second quarter of 2009, domestic VCs grew by more than 70 per cent and for the first time invested in more cases than foreign VCs, mostly in anticipation of this new public option (Ye 2009). It is clear that the weakness of China's financial provision has been the crucial inhibiting factor for the growth of returnee firms, a weakness that foreign VCs can only partially compensate. To make the venture capital industry sustainable, China has to connect its huge accumulation of capital to the professional investment and industrial expertise in the high-tech sectors, as done successfully in Taiwan. The new NASDAQ style market can potentially be a game changer on that.

In sum, the success of returnees in Taiwan's semiconductor and China's internet industries suggests that these are two clusters in which the synergy of capital and markets through global and local sources has emerged, but with different combinations. The global market and local capital ensured the success of Taiwan's semiconductor industry, whereas the domestic market and international capital formed China's internet industry. The slow development in other returnee clusters in the mainland points to an immaturity of the local industrial structure, a stagnant global market, or both. The experiences of mainland and Taiwan returnee firms suggest that the development of returnee businesses is not that different from the development of SMEs in general. They both require a local supporting structure of fair financial

systems, less monopoly, and better information channels and services. Taiwan returnees benefited from a friendlier environment for SMEs, while mainland returnees had to battle against a more hostile one. Returnees coming from well-established business environments may be more demanding or more vulnerable if such local ecosystems are not in place.

## **Conclusion**

In this article, we have demonstrated that returnee professionals and entrepreneurs are critical agents reshaping the map of high-tech global production and service in the Pacific basin. Even though mainland and Taiwan returnees from the United States share similar personal attributes and life trajectories, their commercial strategies reflect the different intersections and synergy of global forces and local conditions. The concentration of Taiwan returnees in semiconductors – a Taiwanese specialism in the global market – contrasts with the concentration of mainland returnees in the internet and telecommunication sectors, which focus on the domestic market. Both have utilized their technological experiences and personal connections in America. Taiwanese returnees, however, have deeper technological accumulation, better-focused technological fields and more success in establishing a self-sustaining entrepreneurial environment. Mainland returnees are only emerging, and they attract more attention from global capital and are involved in broader fields of technology. They also face considerably more difficulty in adjusting to a developing domestic market, which involves overcoming weakness in finance and commodity chains, and working with an uncertain regulatory framework. Despite these problems, the mainland returnees have shown perseverance and business shrewdness in creating an on-line industry. Given that the flow of returnees only really gathered momentum in 2002, more profound changes may occur in the future. Given the much larger and more diverse economy of the mainland, it is entirely plausible that the returnee ventures may be less concentrated than the more specialized Taiwanese equivalents.

The experiences of returnees on both sides of the Taiwan Strait show that technology expertise and personal trajectories are only the beginning of building a sustainable return flow. The mainland China state has been actively constructing financial incentives to attract returnees. Its most important task is to address the totality of the local environment with a view to lowering barriers to non-state firms and SMEs in general, especially with respect to capital, the market, business services and information channels. If China can create a more hospitable environment for non-state SMEs, there is little doubt that the returnee enterprises will thrive.

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## Notes

1. TAC has three groups within it: a Bell Labs group, an IBM group and a university group. They meet four times a year with ITRI and ERSO personnel in Taiwan (Meaney 1991).
2. As Mr James Dykes, the first president of TSMC, argued, 'the idea of a pure foundry is unique. Other semiconductor companies can utilize our resources without fear that we will take their technology and run to the market' (*Electronics*, 5 March 1987).
3. We use people's real names if the sources are published elsewhere. For interviews with middle level managers of larger firms or executives of small firms, we use only the initial of the last name to protect the interviewee's identity.
4. A fab is a facility that produces its own silicon wafers. A fabless facility is one that outsources the production of silicon wafers. Fabless companies focus on design and development.

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