

# 行政院國家科學委員會專題研究計畫 成果報告

由下而上的全球生產網絡建構—以中國廣東省的日本中小  
企業與其中介機構為例  
研究成果報告(精簡版)

計畫類別：個別型  
計畫編號：NSC 99-2410-H-034-059-  
執行期間：99年08月01日至100年07月31日  
執行單位：中國文化大學中山與中國大陸研究所

計畫主持人：郭永興

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報告附件：國外研究心得報告  
赴大陸地區研究心得報告

處理方式：本計畫涉及專利或其他智慧財產權，1年後可公開查詢

中華民國 100 年 10 月 18 日

Small and medium enterprises as pioneers in the expansion of global production networks: a case study of the Japanese electronics industry in Guangdong, China

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Japan has been the largest source country of foreign direct investment (FDI) in China, excluding overseas Chinese territories and tax havens. However, Japan's large-scale but relatively closed, production networks have received little discussion in previous research. Two peaks in Japanese investment can be distinguished: the first led by the electronics industry in the mid-1990s, and the second by the automotive industry after 2003. Cross-border production network building in the electronics industry is quite different from the scenarios of conventional global production networks GPN theory, where leading firms dominate the building of global production networks. In this paper, I demonstrate that in the development of the electronics industry small and medium enterprises' institutional advantage of knowing how to operate production bases in Southern China has enabled them to guide leading firms in building cross-border production networks.

Keywords: China; Japan; small and medium enterprises; global commodity chains; global production networks; processing trade; foreign direct investment

## **1. Introduction**

In the last three decades, China has experienced rapid economic growth. Previous research has demonstrated that China's open door policy and successful integration into the global economy are critical factors contributing to its economic development (Wei 2000; Wei and Liu 2001; OCED 2002; Zweig 2002; Fu 2005; Xu and Lu 2009). Recently, researchers have focused on the institutional arrangements and spatial configurations that have enabled China, in a relatively short time, to integrate with the global economy and become a world factory. They have found China's integration into the East Asian production network to be a crucial factor in the country's outstanding export performance. (Lemoine and Ünal-Kesenci 2004; Gaulier, Lemoine and Ünal-Kesenci 2007).

This paper contributes to the literature by exploring how Japanese firms have built cross-border production networks in China. Despite the fruitful results, current

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studies largely overlook the role of East Asian countries other than Taiwan, Hong Kong and Singapore. Fan (2002) demonstrated that due to their institutional experience and knowledge of Chinese society, overseas Chinese territories could deal with non-transparent bureaucracy, distorted markets, and many other types of inefficiencies when investing in China. This advantage has made such territories the dominant suppliers of foreign direct investment (FDI) in China. However, apart from overseas Chinese territories and the tax haven, the Virgin Islands, Japan has been the largest source country of FDI in China. How did Japanese firms acquire the necessary institutional knowledge to extend their production networks in China<sup>1</sup>? This is a crucial issue when seeking to comprehend China's integration into global production networks led by Japanese firms, but has been little discussed in previous research.

This paper also aims to extend the theory of global production networks. Due to the influence of dependency theory (Gibbon 2001), global commodity chains (GCCs) and global production networks (GPNs) perspectives emphasise the asymmetrical power relations between leading firms from developed countries and their suppliers and subcontractors. They assume that because leading firms have the advantages of technology, capital, brand names and managerial skills amongst others, they dominate the global production network (Gereffi 1999; Gereffi and Bair 2001; Henderson et al. 2002; Ernst and Kim 2002; Ernst 2004). This perspective on governance patterns has also greatly influenced research concerning Chinese integration into production sharing with other East Asian countries. For example, Yang and Hsia (2007) show that the formation of IT clusters in the Greater Suzhou Area (GSA) is inseparable from the asymmetrical power relations embodied in GCCs. They found that foreign brand-name companies have not only driven the wave of investment in the GSA by Taiwanese IT companies, but have also influenced the mechanisms governing those companies' supply chains. Although Gereffi, Humphrey and Sturgeon (2005) built a theoretical framework of multiple governance patterns in global value chains, few empirical studies challenge the leading firms' dominant position.

In this paper, I take groups of Japanese suppliers to illustrate the case that small and medium enterprises (SMEs) could lead multinationals in the expansion of GPNs. I show that, unlike assumptions in the literature, Japanese investment in Guangdong from the late 1980s was actually led by SMEs located in Hong Kong. These SMEs' early ventures allowed them to establish semi-nonprofit institutes to share knowledge about investing in South China and to help other Japanese firms, including multinationals, to enter China. Unlike the expectations inherent in traditional GCC and GPN theories, leading firms followed these SMEs when building their initial production networks in South China. Those following the advice of the semi-nonprofit institutes have found this to be a successful business model in

Guangdong. The business model generated by the Japanese SME's has helped foreign firms to transform the external uncertainty of building production networks in developing countries, such as bribes for local bureaucrats, into countable production costs. The operation of these institutes and their imitators will be explained later, giving useful indicators for attracting foreign capital into less developed provinces in China and other developing countries.

This paper is based on two separate 2-3 week field trips that took place in Guangdong in August 2002 and March 2008. More than fifty interviews were held<sup>2</sup>; they were conducted in Japanese or Mandarin, depending on the interviewees' native language. Interviewees included Japanese bureaucrats in Guangdong, managers in SMEs and leading firms, the founders and managers of the semi-nonprofit institutes and their imitators. Leaders of local villages and managers of other foreign affiliates from Taiwan and Hong Kong were also visited. A variety of secondary data sources was also used including government reports, industrial and financial analyses, business and commercial books, journals and newspapers.

## **2. The fundamentals of SMEs' leading position: The institutional advantages of suppliers in developing countries**

Over recent decades, many studies have used either the GCC or the GPN perspective to explore the dramatic global increase in cross-border production. Although GPN theorists have often criticised the GCC perspective for neglecting horizontal integration and sub-national dimensions in networks, (Henderson et al., 2002; Coe et al. 2004), GPN and GCC perspectives are similar regarding the subject of governance patterns where leading firms dominate their suppliers or subcontractors.

Referring to GCCs, Gereffi (1999) argued that multinational capital has promoted globalisation by establishing two distinct types of international economic network: 'producer-driven' and 'buyer-driven' commodity chains. Because leading manufacturers possess technological and organisational advantages in producer-driven commodity chains, and leading retailers or branded marketers own relational, brand name or trade-policy advantages in buyer-driven commodity chains, Gereffi concluded that multinationals in advanced countries are the leaders in the GCC networks.

Within the framework of GPN the domination of network flagships (international corporations) over suppliers has been emphasised, as principal scholars in the field have stressed: "*GPN typically consist of various hierarchical layers that range from network flagships that dominate such networks, down to a variety of usually smaller, local specialized network suppliers*" (Ernst and Kim 2002, p.1420). The framework of GPN also admits that suppliers may be distinguished by their competitive advantages,

including technology. Ernst and Kim (2002) distinguished two types of local supplier: higher-tier (or lead) suppliers, and lower-tier suppliers. The higher-tier suppliers, such as Taiwan's original equipment manufacturers (OEMs) of laptops, play an intermediary role between global flagships and local suppliers.

Recently, researchers have tried to build new frameworks of GPN or GCC that go beyond the single-dimension hypothesis that leading firms dominate networks. Henderson et al. (2002) reject a conception of power in which leading firms have a monopoly on corporate power. Rather, they believe that usually power is asymmetrically distributed in production networks, and lesser firms sometimes have sufficient autonomy to develop and exercise their own strategies. Moreover, Gereffi, Humphrey and Sturgeon (2005) have built a theoretical framework of multiple governance patterns in global value chains. They identify three variables – the complexity of transactions, the ability to codify transactions and the capabilities in the supply-base – that play a large role in determining how global value chains are governed and change.

Although these studies of theory construction have indicated the possibility of going beyond the conventional governance pattern where leading firms are dominant, some effort will be needed if we are to improve our understanding of global production networks. First, theoretical work alone is not enough; we need more empirical evidence to confirm that multiple governance patterns do exist between multinationals and their suppliers. Second, previous studies have overlooked the difficulties when multinationals build affiliations in developing countries. Ström and Wahlqvist (2010) argue that GPN approach has made an important contribution towards spatial explanations of industrial production with a geographical lens, where different dimensions of value, power, and the embeddedness of individuals and collective actors being explored. However, *GPN does not explicitly deal with the questions of the internationalisation process and its strategy implications for firms* (Ström and Wahlqvist 2010, p.299). Consequently, previous literature concerning the GCC/GPN approaches has seldom discussed the process of and firms' strategies in building production bases in developing countries.

Most studies of the GCC approach focus on buyer-driven, not producer-driven commodity chains (Gereffi and Bair, 2001). Moreover, even those studies that do focus on producer-driven commodity chains deal with multinationals from one advanced country looking to build production networks in another advanced country, for example Japanese automotive manufacturers in the US (Gereffi, 1999). As a result, how multinationals overcome high levels of external uncertainty and build their production affiliates in developing countries has never been seriously discussed in the GCC framework. Meanwhile, the literature on the GPN framework seldom explores

the process of how network flagships build their own production affiliates in developing countries. In the discourse within the GPN framework, flagships insert their production networks into developing countries by subcontracting their production activities to higher-tier suppliers (Ernst, 2004). Since the GPN approach does not deal with the process of flagships directly setting up their own factories in developing countries, the difficulties of building production bases in developing countries have not been one of the approach's main concerns.

Differing from the GPN approach, scholars concerned with transnational business have mentioned the various problems or barriers multinationals have to face when they extend into another nation. Most past studies on the foreign market entry strategies of multinationals have adopted one of two theoretical approaches. One is the transaction cost approach, such as Anderson and Gatignon (1986), which prescribes cross-border activities according to the economic rationale that firms will minimise all costs associated with the entire value-added chain. The second approach was proposed by the eclectic (OLI) theory. It proposes that cross-border business activities are influenced by three types of factors: host country-specific factors, ownership-specific factors, and internalisation factors (Dunning 1988). The host country specific factors include country risks and location familiarity. The ownership-specific and internalisation factors focus on the industry-specific and firm-specific variables (Tse, Pan and Au 1997).

Although few studies related to transnational business focus on the entry into developing countries (Bhaumik and Gelb 2005), the two theoretical approaches cited here explicitly or implicitly mention the special business environment in the developing countries. Dunning and followers of the OLI theory have pointed out that "artificial barriers" and "cross-country ideological, language, cultural, business, political, etc. differences" could be "location-specific variables" which would have a great influence on multinationals' production activities. Some of these barriers are embedded into the context of developing countries<sup>3</sup>. (Dunning 1995, 2001; Brouthers, Broutherst and Werner 1996).

Referring to transaction cost analysis, Anderson and Gatignon (1986) stated that external uncertainty (the unpredictability of the entrant's external environment) is one of the decisive transaction costs influencing multinationals' entry mode. Bhaumik and Gelb (2005) follow the transaction cost approach and stress the significant external uncertainty in the developing countries. Fan (2002) took a similar approach and argued that significant transaction costs represent the most important reason for the lack of capital flow from rich to poor countries. Examples of transaction costs include the fact that when multinationals want to build an affiliate in a developing country, they may well have to interact with a local government which sees bribes as usual,

need to hire and manage workers with different cultures, races and languages. They must also obtain the necessary intermediate goods without access to their familiar network of suppliers and be supported by adequate public utilities amongst other issues. High transaction costs may impede multinationals' production activities, undermine their profitability or terminate their investment.

Proper social and economic institutions could reduce transaction costs (North, 1990). However, such proper institutions for decreasing transaction costs are generally inadequate or insufficiently developed in most developing countries (Kristiansen 2006). Developing countries that want to grow their economies by taking part in global production networks will have to build special institutes or institutions to improve the business environment. The Export Processing Zone (EPZ) is perhaps the most common form in which this strategy has been implemented. An EPZ can be defined as an industrial enclave that engages in export manufacturing with the assistance of foreign investment, and enjoys preferential treatment that is not generally available in the rest of the country (Amirahmadi and Wu 1995). There are some ways to decrease transaction costs for multinationals when they build affiliates in the developing countries, such as joint ventures with local firms, hiring local managers and so on (Zacharakis 1997). For example, Gatignon and Anderson (1988) argued that in highly risky countries, multinationals more likely to opt for a local partner by the way of a joint venture but as multinationals gain experience abroad they tend to opt for wholly owned subsidiaries.

This research intends to suggest another way that multinationals could reduce significant external uncertainty in developing countries. It argues that multinationals recruit suppliers who can provide them with intermediate goods for production, and offer institutional knowledge about running a business in that country as a solution to the difficulties of entering developing countries. This argument is consistent with research that found that overseas suppliers could help multinationals reduce the problems of internationalisation. For example, Andersen and Christensen (2005) demonstrated that overseas suppliers acting as connective nodes in global supply networks could "bridge multinationals over troubled water".

In the previous literature, such as Henderson et al. (2002), local suppliers' technological advantages, referring to their production capability in the networks (including R&D, production, marketing, and managerial skills), have been considered as the main factors influencing the governance patterns in GPN. In this paper I propose the local suppliers' institutional advantages, referring to their knowhow which could reduce external uncertainty when building and operating production bases in developing countries, as another dimension that influences the governance patterns in GPN. In other words the suppliers' institutional advantages enable them to

help multinationals build production networks in developing countries, and influence the formation of multinationals' production organisations in those areas. In the remaining sections of this paper I will use Japanese SMEs and their organisations in Guangdong as a case study to demonstrate how their institutional advantages have led Japanese multinationals to build production networks in Southern China.

### **3. Overview of Japanese production networks in China**

Japan has been the largest source country of FDI in China, apart from overseas Chinese territories and the tax haven, the Virgin Islands (Mainland Affairs Council, Taiwan 2009). This means that Japanese firms have built cross-border production networks in China on a significant scale when compared with countries that possess the advantages of Chinese culture and language. Moreover, due to Japan's advanced technology and its being the second largest economy in the world, Japanese firms can integrate production affiliates in China into their own GPNs without the need to cooperate with foreign firms. Most firms from overseas Chinese territories are obliged to cooperate with leading firms from more advanced countries, or to be their subcontractors, to access core technology and final consumers.

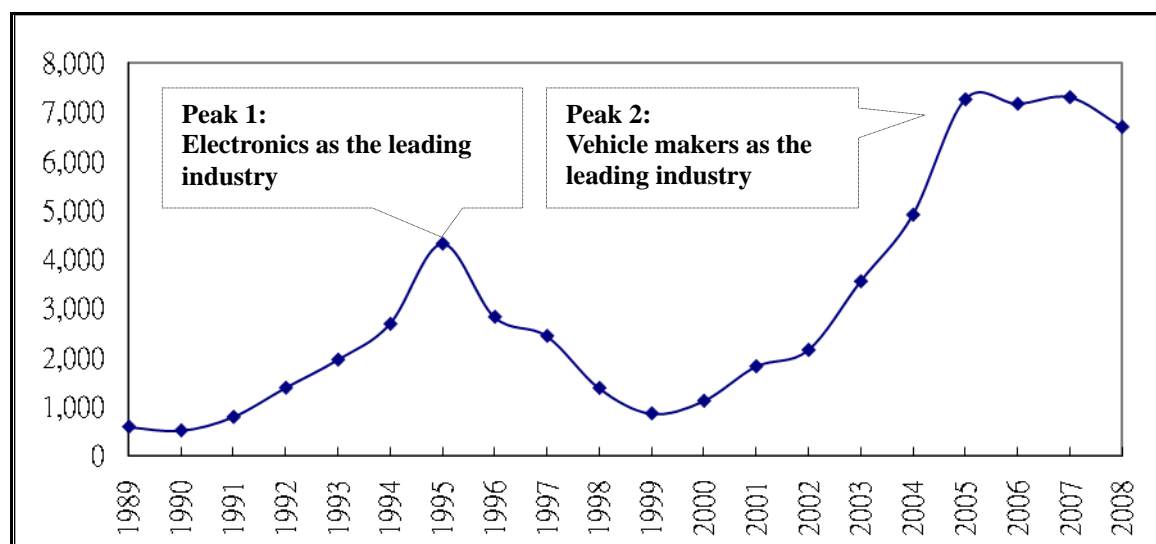
Japan's large-scale but relatively close production networks in China have not been discussed much in previous research. Statistical data, and some Japanese studies including fieldwork, provide useful knowledge of Japanese production networks in China. In the last 30 years, the most significant change in Japanese direct investment in China has been that manufacturing has become the majority rather than the minority activity. In the 1980s manufacturing only accounted for 15% of Japanese direct investment in China, but that figure rose to 70% in the 1990s (Minami and Makino, 2001). Up to the end of 2008 manufacturing made up 75.1% of the whole cumulative investment, with the electronics industry owning the largest share at 17.9%. Transport equipment (such as automobiles) was the second largest industry with a share of 16.7%<sup>4</sup>.

Figure 1 shows Japan's direct outward investment in China from 1989-2008. In Figure 1, two peaks in investment can be distinguished: the middle of the 1990s, and since 2003. The leading industry of each peak can be identified. In 1994, the Chinese government eased the most significant barrier which had made multinationals hesitant about setting up subsidiaries: the control of foreign currency. Before the liberation, except in certain special cases, multinationals' subsidiaries could not exchange their earnings in RMB for foreign currency. This freedom greatly encouraged Japanese electronics companies to set up factories in China. For example, until 1992 Matsushita only had one factory in China; encouraged by the liberation, Matsushita set up 37 new factories in China between 1993 and 1996 (Marukawa, 2007).



Figure 1. Japan's direct outward investment to China, 1989-2008 (JPY 100million)

[sources: 1989-2004: Ministry of Finance, Japan  
([www.mof.go.jp/english/e1c008.htm](http://www.mof.go.jp/english/e1c008.htm)); 2004-2008: Japan-China Investment  
Promotion Organization ([www.jcipo.org/toukei/2009/index.html](http://www.jcipo.org/toukei/2009/index.html))]

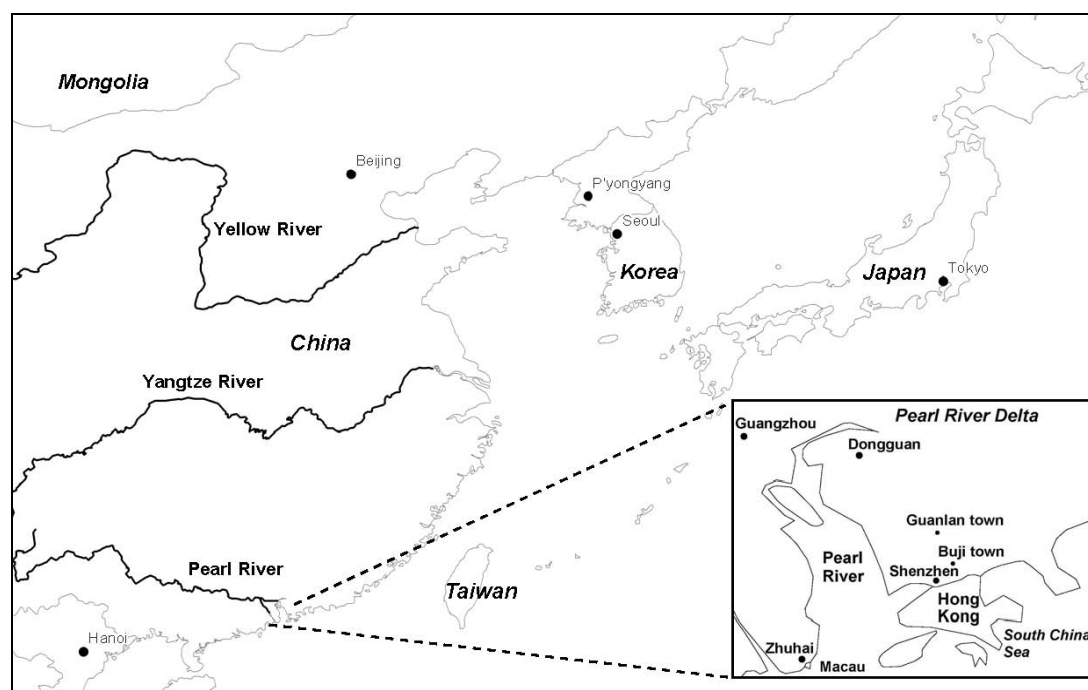


Japanese automotive manufacturers started large-scale investment in China toward the end of the 1990s. In 1998 Honda set up a joint venture with a local firm in Guangzhou, Guangdong province, followed by Toyota and Nissan who set up joint ventures in China in 2002 and 2003. Subsequently Mitsubishi and Mazda also extended their production bases into China. To maintain product quality Japanese vehicle manufacturers in China sought to purchase parts from original supply chains, thus permitting their suppliers in Japan to build production affiliates in China (Zhu, 2008). As a result, Japanese vehicle makers and their suppliers have created substantial levels of investment since 2003.

Although the investment by vehicle makers would be an interesting research topic, it is not the main issue for this paper. This is because the building of production networks by Japanese vehicle makers in China is dominated by leading firms, which are not the main concern of this work. Cheung (2008) shows that leading vehicle manufacturers have successfully reproduced their Japanese supply chains in China. Cheung (2008) also demonstrates that with Honda, Toyota and Nissan building large-scale factories in Guangzhou, Guangdong province has the largest cluster of Japanese car part factories in China.

#### **4. The geographic and industrial characteristics of Japanese electronics in Guangdong province**

Figure 2. The locations of Japan and the Pearl River Delta



As mentioned in the previous section, the electronics industry led the first peak of Japanese direct investment in China in the 1990s and still accounts for the largest share of Japanese manufacturing there. Geographically, the largest cluster of Japanese electronics companies is in the Pearl River Delta (Guangdong Province). According to calculations by the Mitsubishi Research Institute (2000), up until the end of the 1990s the largest cluster of Japanese electronics factories in China was located in Guangdong Province. Japanese electronics in Guangdong accounted for 25% of all Japanese electronics in China, the next largest, in the Shanghai municipality, cluster accounts for 21.4%. However, comparing the concentration of large-scale electronics companies, the cluster in Guangdong province significantly exceeds the cluster in Shanghai municipality. There were 13 firms in Guangdong listed in the top 200 largest foreign-capital firms in China in 1999, but only 8 in Shanghai. All the large-scale companies in Guangdong are electronics manufacturers, apart from Honda, while only about half large-scale companies in Shanghai are electronics producers (Mitsubishi Research Institute 2000).

The emergence of Japanese large-scale companies in Guangdong in the 1990s demonstrates some geographical and industrial characteristics. First, these firms are located in the major cities of the Pearl River Delta, near Hong Kong, such as Guangzhou, Shenzhen and Zhuhai. Hong Kong, as an international harbour and business centre, can provide the logistical and commercial functions that these export-oriented firms need. Second, these firms are electronics manufacturers which need a very large labour force to assemble the final products: for example, Matsushita

and Sanyo for home electronics; Canon and Olympus for digital cameras; Canon, Ricoh and Toshiba for office equipment such as printers and copy machines. All these products need human hands to assemble large numbers of parts into merchandise. This characteristic has driven such firms to extend their production into China, where there is a large labour force.

Third, these leading companies need the support of local supply chains established by Japanese firms. To assemble their final products, firms must ensure they have access to sufficient parts. According to Kuroda (2001) and Seki (2002), the labour cost in Japanese assembly firms such as Canon, Epson and Ricoh is between 5% and 10% of their total product cost, while the cost of obtaining components can be as high as 85%-90%. Accordingly, the key challenge for assembly firms is to cut their purchasing costs. Normally, the best way to do this would be to increase the share of components purchased from local suppliers rather than importing from abroad. However, many of the parts these firms require can only be provided by Japanese suppliers. Many of their products' components, such as those needed for copy machines and digital cameras, are precise and varied; clear communication between suppliers and assemblers is needed for smooth production. Moreover, many parts were not standardised or modular in the 1990s (nor are they, even today) and as a result these parts could only be provided by experienced Japanese suppliers.

Leading Japanese firms planning to invest in the Pearl River Delta had problems persuading their suppliers in Japan to follow them into China. Most of their suppliers are SMEs, unable to afford the risk of investing in unfamiliar countries. In August 2002, I saw that Canon in Zhuhai had not only provided an area in its factory where its supplier could produce components, but it also allowed the supplier to sell components to rival firms. What I saw in Canon may be confirmed by the research of Seki (2002) and Aoyama (2000). Seki (2002) shows how, given the dilemma where leading firms wanted their suppliers to be in China but could not guarantee sufficiently large orders, those firms would offer terms which would be unimaginable in Japan. Aoyama (2000) demonstrated that traditional networks of production, keiretsu-based organisations, have not played a major role in dictating the formation of industrial agglomerations for Japanese investment in the electronics industry in Asia.

In the 1990s, leading firms struggled to ensure that they had enough local supply chains composed of Japanese firms to support their production in China. In this situation, the emergence of agglomerations of Japanese SMEs was decisive for leading firms implementing plans to build production affiliates in China. In the 1990s a semi-nonprofit institute for Japanese SMEs, called Techno Centre, was crucial to building production networks for the Japanese electronics industry in Guangdong.

Techno Centre has provided geographical space for agglomerations of Japanese SMEs. In addition some leading firms, such as Fuji Xerox and Brother, chose to build their first production affiliates inside Techno Centre to learn how to operate in Guangdong province.

Moreover, as one of earliest Japanese firms to set up production bases in Guangdong and the only institute providing institutional knowledge, Techno Centre has been popular on observation tours for those investigating investment in the Pearl River Delta. Since the institute was set up, thousands of firms and businessmen from across Japan have visited Techno Centre each year, representing many leading firms and important organisations. For example, in 1992 alone there were over 200 visitors from the Ministry of Economy, Trade and Industry (METI). At that time, it was said in METI: “Without the experience of visiting Techno Centre (to see what is happening there), it is impossible to draft industrial policies” (Sato, 2003).

### **5. SMEs as pioneers in building cross-border production networks: the case of Techno Centre**

In 1979, in order to reduce labour costs Mita<sup>5</sup>, then a famous manufacturer of copy machines, built a production affiliate in Hong Kong. Initially, Mita’s factory in Hong Kong imported most of its parts from Japan; in the mid-1980s, due to the requirement for a certificate of origin, Mita was asking its suppliers in Japan to set up production affiliates in Hong Kong and in 1988 an unofficial association of Mita’s suppliers was set up there. They called this association Youkakai (“The eighth society”: the members meet on the eighth of every month). At the end of the 1980s, Ricoh planned to extend its production affiliates into China. Its subsidiary in Hong Kong was experiencing problems finding potential supplier chains for the new factories being planned; however, in 1989 the subsidiary discovered the existence of Youkakai, and was made welcome by its members. Since then, Youkakai has become famous among Japanese society in Hong Kong. Leading firms in the electronics industry such as Sony, Sharp, Toshiba, Minolta, Fuji Xerox and their suppliers have joined Youkakai. Although these leading firms became members of Youkakai, the main leaders of this unofficial association have continued to be businessmen from SMEs.

In the early 1990s, influenced by growing investment by Hong Kong firms the Youkakai members, nearly 50 firms, considered extending their production affiliates into China, but hesitated because of their limited knowledge about operating factories there. At that time, most Hong Kong affiliates in Guangdong operated their export-oriented production by following the processing trade system. Basically, the processing trade can be divided into two main subsystems: Jinliao jiagong (ordinary processing) and Lailiao jiagong (contractual processing). In ordinary processing, the

subsidiaries of foreign firms import duty-free components and raw materials for use in export manufacturing. In contractual processing, Chinese firms process components or raw materials supplied by foreign firms outside China and earn a processing fee for doing so (Sung, 2000).

Initially contractual processing in Guangdong was operated by Chinese firms, but since the 1980s this has been transformed into a special form of FDI. Seki (2002) demonstrated the real operation of contractual processing. Usually, a town or village will construct factories and rent them to foreign firms and nominally, those factories are owned by township and village enterprises (TVEs). In practice, the subsidiaries of foreign firms dominate the factories, with the village providing only a nominal degree of direction. To operate contractual processing, foreign firms are required to sign an official contract to maintain the pretence that they are ordering a TVE factory to process components or materials for them; in the provisions of this official contract, the TVE is the dominant operator of the factory. Meanwhile, the subsidiary of the foreign firm will often sign a secret contract with the TVE to ensure their right to manage the factory. For example, in the text of the official contract usually only the TVE will be able to dismiss employees, but in the provisions of the secret contract the subsidiary may do so (Sato 2003).

Until 1993, contractual processing accounted for the largest share of international trade in Guangdong<sup>6</sup> (Guo, 2008). This kind of investment was welcomed by SMEs. First, without the costs of land and construction, foreign firms could establish or abandon production affiliates at little cost. Second, such production affiliates could be set up in a short time without official registration. Third, since they were paying rent and other fees to towns or villages, subsidiaries could enjoy the protection of the local government umbrella.

In the early 1990s, only a few years after the Tiananmen Square protests of 1989, the political and business environments in China were unstable. Both SMEs and some leading firms chose contractual processing as the way to build their first production affiliate, the costs of entry and withdrawal being relatively low. However, operating contractual processing required institutional knowledge of the local cultural and business environment, in order to negotiate with village governments and finally to obtain a secret contract or other form of guarantee. At that time, most members of Youkakai lacked institutional knowledge of this kind and hesitated over their investment plans.

In 1991, one of the core members of Youkakai, named Ishii, proposed the idea of a Techno Centre to the group. Ishii worked as CEO for a subsidiary of a Japanese SME. He successfully extended the production networks of the subsidiary into Shenzhen in 1989 and assembled peripheral computer products, such as keyboards,

for NEC there. The success of that venture was largely due to Ishii's Hong Kong employees, who were familiar with the local culture and business environment thus enabling Ishii to sign a secret contract for contractual processing with the town government (Sato 2003).

His proposal for the Techno Centre was taken up, and the members of Youkakai raised 70 million yen to set up the firm. From the beginning, Ishii and his partners defined the Techno Centre as a semi-nonprofit institute, established to help Japanese SMEs build production affiliates in China. To achieve this goal they made Techno Centre an industrial park for Japanese SMEs. An SME could be given all the support they needed to operate in China, as firms without overseas experience could set up production lines in the park. Because Techno Centre was set up as an education institute and space in the park is limited, firms in the Centre were encouraged to move out when they had learned enough about operating factories in China. If they were leading firms, a deadline for graduating from the Centre would be set.

## **6. The organisational innovations of Techno Centre and its imitators**

In 1992, Techno Centre built its first production affiliate in Buji town, which is in Shenzhen city but outside the Special Economic Zone; the cost of land and labour being cheaper than inside the Zone. Techno Centre signed contracts for contractual processing with the town government, and rented a single factory that the town built. The factory was soon filled by five SMEs, and a waiting list put pressure on Techno Centre to extend its facilities. In 1997, after years of renting town-built factories as bases, Techno Centre started to build its own industrial park on about 6 hectares of land in Guanlan town, outside the Special Economic Zone but still in Shenzhen. The park was completed in 2005 with factories, places to eat, dormitories, sewage works and a power station. In the spring of 2008, when I revisited Techno Centre, there were about 4,500 workers and 50 SMEs in the park. These were mostly related to the electronics industry.

Techno Centre supports its tenants in three ways:

1. Physical space for manufacturing. Techno Centre provides not only space for workshops, but also utilities for manufacturing and general equipment. The rent is calculated from the square footage occupied by the tenant, and the fees for utilities are based on their actual cost. Although utility bills are a little higher than outside the park, the high quality of utilities provided by the Centre makes the tenants feel the extra is worth paying. For example, the power supply in Guangdong can be unstable, so the Centre has its own generators producing sufficient electricity.
2. The personnel service. What makes Techno Centre different from other industrial parks built by foreign capital is that the labourers working for the tenants are

recruited by the Centre. This service enables the tenants to save the cost of labour recruitment and management. Most workers in the electronics industry in Guangdong are temporary workers migrating from rural China. The Centre set up restaurants and dormitories for the workforce, inside or close to the park.

3. The trade affairs service. The customs procedures for the processing trade are highly complicated, and it is common for firms to break the rules. In severe cases, such offences may be considered as smuggling by the Customs authorities. Zhang (2003) describes how, because of the problems with customs procedures, hundreds of Taiwanese businessmen were arrested by the Customs in the years leading up to 2003. In the interviews in 2008, Ishii, the founder of the Centre, told me that Techno had refused several requests for bribes; but in the 1990s, the staff of Techno Centre found it necessary to use bribery to make customs procedures smoother (Sato 2003).

In the fieldwork in 2008, the manager of the Centre told me that about 40 firms had become independent of the Centre. Most of those firms maintain contact with the Centre: for example, the Centre brings tenants' factory directors together for a regular meeting every month, and about 10 of the graduate firms send directors to take part in that meeting.

Since 2000, several industrial parks similar to Techno Centre have been built in the Pearl River Delta. In the spring of 2008 I visited one of the parks, Min Li Licence Limited, in Dongguan city which is connected to Shenzhen. Yoshizawa, the director of Min Li, said that his park had been inspired by Techno Centre, and that the services that Min Li provides are the same as those at Techno Centre, with one difference: in Techno Centre several tenants have to share a building, but every tenant in Min Li has its own building in which to operate. Some Japanese SMEs have chosen Min Li because of the greater space available for each tenant. At the time of my visit, Min Li was tenanted by eight firms from the electronics industry with about 3000 Chinese workers.

The organisational innovations of Techno Centre and its imitators are crucial for building Japanese production networks in the Delta. They have educated SMEs and leading firms. These institutes enable SMEs to build production affiliates with low entrance cost in Guangdong; in extreme cases, SMEs have been able to establish a production base simply by installing some old machinery and sending a few Japanese engineers. Moreover, the tenants avoid the unpredictable risks of building and maintaining an affiliate in a developing country; including risks from interacting with local government, hiring and managing foreign workers and ensuring adequate public utilities. The tenants are able to predict all their costs using the clearly defined charges listed by the institutes. Having gathered enough institutional knowledge about operating a factory in Guangdong, they can move out and make space for newcomers.

These institutes have become crucial partners for leading Japanese firms seeking to build production networks in Guangdong. Techno Centre has formed a cluster of businesses working in the electronics industry, and provided leading firms with many parts and components that can only be supplied by Japanese SMEs. Moreover the Centre's important institutional knowledge has led some leading firms, such as Fuji Xerox and Brother, to choose to build their first production lines inside the Centre to garner knowhow about the processing trade.

## **7. Discussion and conclusion**

Japan has been the largest source country of FDI in China if we exclude overseas Chinese territories and the Virgin Islands. Japan's large scale but relatively closed production networks have not been much discussed in previous research. From statistical data and previous studies in Japanese, it is clear that two peaks of investment can be distinguished: led by the electronics industry in the mid-1990s, and by the automotive industry since 2003. Cross-border production network building in the electronics industry is quite different from the scenarios of conventional GPN theory, where leading firms dominate global production network building. In this paper, the institutional advantages of SMEs enable them to guide leading firms in building cross-border production networks.

However, to view SMEs as pioneers is not to make a case against conventional GPN theory, but rather an extension of it. It demonstrates that in some circumstances SMEs are crucial for leading firms seeking to build cross-border production networks. In this paper, I have used the Techno Centre as a case study to show how SMEs lead multinationals in building GPNs. However, Techno Centre could be also considered as a conventional case, where multinationals take the lead in building GPN. Techno Centre sprang from the Youkakai in Hong Kong, and the Youkakai was an unofficial association of Mita's suppliers. Without the leadership of Mita, its suppliers would not have extended their production networks into Hong Kong. In my fieldwork during August 2002, the director of Canon in Zhuhai said that Mita was like the ship MAYFLOWER for Japanese firms in Southern China. Although many founding members of the Mita group failed to survive, they broke the ground for the Japanese firms that came later.

Japanese cross-border production network in China is a crucial subject that needs more exploration. There is another important but less-often mentioned dimension to Techno Centre; it has been a pivotal institute activating social capital. As one of earliest Japanese organisations moving into Guangdong, and by providing space for businessmen to visit and come together, Techno Centre has been crucial in supporting and extending the networks of Japanese representatives and companies, thus



contributing to the dynamics of this regional cluster.

Lorenzen (2007) argued that if dominant (flagship) firms establish and co-ordinate supplier networks from the top-down, relations may be few and they will all be tightly coupled. In this kind of clustering creating social capital, the potential for interactive learning and experimentation across value chains is limited. On the other hand, if the formation of social capital is a bottom-up process of building social relations and institutional learning, the development of the cluster will be more dynamic and unconstrained. The cluster of social capital accumulated by Techno Centre, its tenants, graduates, imitators and their customers, including flagship companies, has been constructed from the bottom up. In other words, the network of Japanese electronics industry in Guangdong is not controlled nor dominated by one or even a few leading firms.

The openness of the network is advancing the dynamics of the regional cluster. As described earlier, the second peak of Japanese investment was led by the automotive industry; and Guangdong province has the largest cluster of the Japanese automotive industries in China. Cheung (2008) has shown how leading vehicle manufacturers successfully invited their first-tier suppliers to build production bases in China, whereas the first-tier suppliers have had trouble drawing second-tier suppliers into China. One of the solutions for these first-tier suppliers, eager for local suppliers, has been to ask for help from the suppliers of Japanese electronics components (Cheung 2008). During my visit in March 2008 I saw that some tenants in Techno Centre had begun to supply parts to the car industry. However, the supply chains of the electronics and automotive industries operate on different systems. For example, constrained by Customs requirements the parts produced by tenants in the Techno Centre have to be exported to Hong Kong, and then re-imported to Toyota's factory in Guangzhou. (This is called the "Hong Kong one day tour").

Has the bottom-up style of social capital accumulated by Japanese electronics companies contributed to the development of production networks in the Japanese car industry in Southern China? If it has, how did it operate? The relevance of social capital to the connections between Japanese electronics and the car industry is a very interesting topic, and one that deserves to be explored in future studies.

### **Acknowledgements**

The author is grateful to Hiromi Yamamoto, Mitsuo Inada, Li-Hsuan Cheng for their comments and suggestions on earlier drafts. He also thanks the National Science Council of Taiwan for financial support under Grant 99-2410-H-034-059-. Furthermore, the author is indebted to the business persons and local officials in Guangdong, China, who kindly responded to his surveys.

## Notes

1. Concerning Japanese FDI in East and Southeast Asia, the “flying geese” model has been the issue most often discussed (Bernard and Ravenhill 1995; Edgington and Hayter 2000; Hayter and Edgington 2004). However, the “flying geese” is not an explanatory metaphor for interpreting Japanese FDI in China. As the Ministry of Economy, Trade and Industry (2001) has argued, given China’s rapid expansion of production capacity from labour-intensive to technology-intensive industries, the conventional flying-geese metaphor can no longer be used to interpret the regional development of East Asia.
2. The interviews were conducted in a random manner. Our research group used both private networks and formal applications to contact firms or organisations related to the Japanese electronics industry or the processing trade; we only could interview organisations, which replied to our approach. Due to the sensitivity of our research, private contacts have been very important in our fieldwork. For example, it is not appropriate to ask an unknown manager if he or she ever bribes officials. We collected the information by in-depth interview. Compared to large-scale quantitative surveys, the representativeness of the data gathered from in-depth interviews is limited. However if interviewers are trusted by interviewees, such as in our case, then in-depth interviews may provide more insights than might be gathered through a quantitative survey.
3. OLI theory has made a vital contribution to the literature of transnational production activities. The framework of this theory, however, does not fit the main argument of this paper. Following OLI theory, the internalisation factors are concerned with the costs of choosing a hierarchical mode of operation over an external mode. The internalising of international operations comes at a cost and the costs must be compared with the costs of finding and maintaining an external relationship to perform the same functions in the international market (Brouthers, Broutherst and Werner 1996). However, a multinational’s choice between purchasing goods from the international market or setting up overseas factories is not the main issue in this paper. The main discussion of this paper is how a multinational faces the costs caused by external uncertainty in the developing countries after a firm decides to build factories there. Moreover, Tse, Pan and Au (1997) also pointed out the weakness of OLI theory, where ownership and internalisation factors share some similarities with the transaction cost perspective. As a result, this research does not use OLI theory as the main source of the theoretical construction.
4. For the market shares of other industries, refer to the database of the Japan-China Investment Promotion Organization ([www.jcipo.org](http://www.jcipo.org)).
5. The main advantage of Mita’s copy machines was their lower price. To maintain its advantage, Mita started to build global production networks at a relatively early stage compared to other Japanese makers. However, Mita did not catch up with the move to digitalisation and went bankrupt in 1998. In 2000 Mita merged with Kyocera, switching its name to Kyocera Mita.
6. On a national scale, the amount of exports and imports in ordinary processing exceeded the figure for contractual processing in 1989.

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出國時間: 2011/01/23-2011/01/30

出國地點:東京

出國內容:蒐集國科會計畫相關資料，並且訪問日本學者。

出國時間: 2011/06/10-2011/06/19

出國地點:中國

出國內容:訪問企業，進行田野調查，蒐集國科會計畫相關資料。



# 國科會補助計畫衍生研發成果推廣資料表

日期:2011/10/18

國科會補助計畫	計畫名稱：由下而上的全球生產網絡建構—以中國廣東省的日本中小企業與其中介機構為例
	計畫主持人：郭永興
	計畫編號：99-2410-H-034-059- 學門領域：其他
無研發成果推廣資料	

99 年度專題研究計畫研究成果彙整表

計畫主持人：郭永興		計畫編號：99-2410-H-034-059-				計畫名稱：由下而上的全球生產網絡建構—以中國廣東省的日本中小企業與其中介機構為例		
成果項目		量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）		
		實際已達成數（被接受或已發表）	預期總達成數（含實際已達成數）	本計畫實際貢獻百分比				
國內	論文著作	期刊論文	0	0	100%	篇		
		研究報告/技術報告	0	0	100%			
		研討會論文	0	0	100%			
		專書	0	0	100%			
	專利	申請中件數	0	0	100%	件		
		已獲得件數	0	0	100%			
	技術移轉	件數	0	0	100%	件		
		權利金	0	0	100%	千元		
	參與計畫人力（本國籍）	碩士生	0	0	100%	人次		
		博士生	0	0	100%			
		博士後研究員	0	0	100%			
		專任助理	0	0	100%			
國外	論文著作	期刊論文	1	1	100%	篇	單一作者 SSCI 期刊 (2010 Impact Factor: 1.353).	
		研究報告/技術報告	0	0	100%			
		研討會論文	0	0	100%			
		專書	0	0	100%			章/本
	專利	申請中件數	0	0	100%	件		
		已獲得件數	0	0	100%			
	技術移轉	件數	0	0	100%	件		
		權利金	0	0	100%	千元		
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次		
		博士生	0	0	100%			
		博士後研究員	0	0	100%			
		專任助理	0	0	100%			

<p>其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)</p>	<p>無</p>
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科 教 處 計 畫 加 填 項 目	成果項目	量化	名稱或內容性質簡述
	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與(閱聽)人數	0	

# 國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

達成目標

未達成目標（請說明，以 100 字為限）

實驗失敗

因故實驗中斷

其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文： 已發表  未發表之文稿  撰寫中  無

專利： 已獲得  申請中  無

技轉： 已技轉  洽談中  無

其他：（以 100 字為限）

Yung-Hsing Guo. (Forthcoming). ' Small and medium enterprises as pioneers in the expansion of global production networks: a case study of the Japanese electronics industry in Guangdong, China.' Entrepreneurship & Regional Development (SSCI, 2010 Impact Factor: 1.353).

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）（以 500 字為限）

Japan has been the largest source country of foreign direct investment (FDI) in China, excluding overseas Chinese territories and tax havens. However, Japan's large-scale but relatively closed, production networks have received little discussion in previous research. Two peaks in Japanese investment can be distinguished: the first led by the electronics industry in the mid-1990s, and the second by the automotive industry after 2003. Cross-border production network building in the electronics industry is quite different from the scenarios of conventional global production networks GPN theory, where leading firms dominate the building of global production networks. In this research, I demonstrate that in the development of the electronics industry small and medium enterprises' institutional advantage of knowing how to operate production bases in Southern China has enabled them to guide leading firms in building cross-border production networks.