Regional Studies

ISSN: 0034-3404 (Print) 1360-0591 (Online) Journal homepage: http://www.tandfonline.com/loi/cres20

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To cite this article: Chun Yang (2009) Strategic Coupling of Regional Development in Global Production Networks: Redistribution of Taiwanese Personal Computer Investment from the Pearl River Delta to the Yangtze River Delta, China, Regional Studies, 43:3, 385-407, DOI: 10.1080/00343400802508836

To link to this article: https://doi.org/10.1080/00343400802508836

Regional Studies, Vol. 43.3, pp. 385–407, April 2009

Routledge
Taylor & Francis Group

Strategic Coupling of Regional Development in Global Production Networks: Redistribution of Taiwanese Personal Computer Investment from the Pearl River Delta to the Yangtze River Delta, China

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(Received August 2007: in revised form May 2008)

YANG C. Strategic coupling of regional development in global production networks: redistribution of Taiwanese personal computer investment from the Pearl River Delta to the Yangtze River Delta, China, *Regional Studies*. From the perspective of strategic coupling of regional development in global production networks (GPN), this paper attempts to explore the dynamics and patterns of the redistribution of Taiwanese personal computer (PC) investment from the Pearl River Delta (PRD) to the Yangtze River Delta (YRD) in China since the early 2000s. Through firm-level interviews and case studies, it argues that the redistribution is resulted from divergent strategic coupling between respective Taiwanese firms in the Pearl River Delta and Yangtze River Delta and their lead firm counterparts fostered by different local institutional initiatives. The study further elucidates that regional development in the global economy has turned increasingly to trans-local dynamics.

Strategic coupling Regional development Globalization production networks Redistribution of foreign direct investment (FDI) Pearl River Delta Yangtze River Delta

YANG C. 全球生产网络中区域发展的战略性耦合：台湾个人电脑投资从珠三角向长三角转移的再分配，中国，区域研究。基于在全球生产网络(GPN)层面考虑区域发展的战略性耦合这一视角，本文尝试探讨自本世纪初以来，台湾人在个人电脑（领域）的投资从珠三角向长三角地区转移的（资金空间）再分配的活力与模式。通过公司层级的访谈与个案研究，文章指出，这种资金在空间上的再分配是珠三角地区著名的台湾公司与长三角地区著名的台湾公司之间，以及与不同地方制度培育下的对应公司之间进行战略性耦合的结果。研究进一步阐明，全球经济背景下的区域发展已经逐渐转向了超越地方的活力。

战略耦合 区域发展 全球生产网络 国外投资再分配 珠三角 长三角

YANG C. L'association stratégique de l'aménagement du territoire dans les réseaux de production mondialisés: la redistribution de l'investissement taiwanais en ordinateurs personnels du delta de la Pearl au delta de la Yangtze, en Chine, *Regional Studies*. Du point de vue de l'association stratégique de l'aménagement du territoire dans les réseaux de production mondialisés, cet article cherche à examiner pendant les dix dernières années la dynamique et la répartition de la redistribution de l'investissement taiwanais en ordinateurs personnels du delta de la Pearl (PRD) au delta de la Yangtze (YRD) en Chine. A partir des interviews auprès des entreprises et des études de cas, on soutient que la redistribution résulte de l'association stratégique divergente entre les entreprises taiwanaises situées dans la PRD et la YRD et leurs homologues leaders qui se sont développés suite à diverses initiatives institutionnelles locales. En outre, l'étude montre que, dans le contexte de l'économie mondiale, l'aménagement du territoire porte de plus en plus sur la dynamique trans-locale.

Association stratégique Aménagement du territoire Réseaux de production mondialisés Redistribution de l'IDE Delta de la Pearl Delta de la Yangtze

YANG C. Die strategische Kopplung von Regionalentwicklung in globalen Produktionsnetzen: Umverteilung taiwanesischer PC-Investitionen vom Pearl River Delta zum Yangtze River Delta in China, *Regional Studies*. In diesem Beitrag wird versucht, die Dynamik und die Abläufe bei der Umverteilung taiwanesischer PC-Investitionen vom Pearl River Delta (PRD) zum Yangtze River Delta (YRD) in China während der letzten 10 Jahre aus der Perspektive der strategischen Kopplung der regionalen Entwicklung in globalen Produktionsnetzen zu analysieren. Anhand von Interviews und Fallstudien auf Firmenebene wird

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DOI: 10.1080/00343400802508836

argumentiert, dass die Umverteilung durch eine divergente strategische Kopplung zwischen taiwanesischen Firmen im PRD und YRD und ihren entsprechenden leitenden Firmen verursacht und durch verschiedene lokale institutionelle Initiativen gefördert wird. Wie aus der Studie weiter hervorgeht, hat die regionale Entwicklung in der globalen Wirtschaft die zunehmend translokale Dynamik verändert.

Strategische Kopplung Regionalentwicklung Globalisierte Produktionsnetze Umverteilung von ausländischen Direktinvestitionen Pearl River Delta Yangtze River Delta

YANG C. Conexión estratégica del desarrollo regional en las redes de producción global: redistribución de la inversión en PC en Taiwán desde el delta del río Pearl hasta el delta del río Yangtzé en China, *Regional Studies*. Desde la perspectiva de la conexión estratégica del desarrollo regional en las redes de producción global, en este artículo intento analizar las dinámicas y los modelos de redistribución de la inversión en PC en Taiwán desde el delta del río Pearl hasta el delta del río Yangtzé en China en los últimos diez años. Mediante entrevistas a nivel empresarial y estudios prácticos, sostengo que la redistribución es el resultado de una conexión estratégica divergente entre las empresas de Taiwán en el delta del río Pearl y el delta del río Yangtzé y sus socios líderes fomentados por diferentes iniciativas institucionales en un ámbito local. En este estudio también explico que el desarrollo regional en la economía global ha transformado las dinámicas cada vez más translocales.

Conexión estratégica Desarrollo regional Redes de producción global Redistribución de la IDE Delta del río Pearl Delta del río Yangtzé

JEL classifications: L22, R5, R12

INTRODUCTION

Since the 2000s, a debate has emerged in both academic and policy circles about the nature and dynamics of regional development. While the new regionalism literature has put a great deal of emphasis on localized agglomerations and institutional structures as both necessary and sufficient conditions to account for regional development, regional studies has turned from the earlier focus on analysing endogenous regional assets to the complex relationship between economic globalization and regional change (HENDERSON *et al.*, 2002; COE *et al.*, 2004; HESS and YEUNG, 2006; YEUNG, 2006). Regional economic performance is increasingly bound up with and embedded in a wider set of geographical relations beyond the local and national scales. Understanding 'regions' as fixed and demarcated units in the context of globalization has been questioned (PIKE, 2007). Recent thinking about regions as constituted by spatialized social relations stretched over space and manifest in material, discursive and symbolic, is based upon a relational approach (HUDSON, 2007; MACLEOD and JONES, 2007; LAGENDIJK, 2007; WOLFE and GERTLER, 2004). In consequence, regional development should be viewed as a trans-local dynamic process of growth and change, where multiple actors operate at a variety of geographical scales (COE *et al.*, 2004). Drawing upon the East Asian experience, YEUNG (2006, 2007) has urged a study of the complex strategic coupling of the economic actors, particularly large business firms operating in specific regions in East Asia with their lead firm counterparts orchestrating production networks on a global basis. It is argued that the developmental state is necessary, but not sufficient conditions for regional development (ASHIEM *et al.*, 2006; BRENNER, 2004; GIULIANI *et al.*, 2005; SCHMITZ, 2004; SCOTT and STORPER, 2003). Strategic coupling between regional and extra-regional actors in the perspective of global production networks (GPNs) tends to be an important framework to understand regional development in the global economy.

With the above conceptual and empirical backdrops, this paper attempts to advance the literature through the cases of regional development in the Pearl River Delta (PRD)[1] and the Yangtze River Delta (YRD)[2] in China, particularly the inter-regional competition for the in-flows of Taiwanese investment over the past decade. Both the PRD and the YRD have become 'globalizing' regional powerhouses in China since the country's Opening and Reform initiated in the late 1970s (CARTIER, 2001; ENRIGHT, 2003; CHEN, 2007). While the existing literature on the PRD and the YRD regional development tends to focus on the roles of state and local institutions in attracting foreign direct investment (FDI) inflows and articulating regional development in the global economy (LIN, 1997; SIT and YANG, 1997; WEI *et al.*, 2006, 2007; CHIEN, 2007), the present paper argues that the national state and local initiatives are necessary but insufficient to explain regional development and competition in the era of globalization. Similar to the East Asian perspective, regional development in the PRD and the YRD over the past three decades cannot be understood independently of the changing dynamics of GPNs. More specifically, regional development and increasing inter-regional competition in China could be better understood by analysing the strategic coupling of various actors, especially Taiwanese firms in host regions and their global counterparts in the GPNs as well as the roles of local initiatives played in the process.

Empirical analysis on the development and transformation of Taiwanese investment in China has recently tended to examine the embeddedness and disembeddedness in the PRD and the YRD (HSU, 2005; WANG and TONG, 2005). HSU (2006) postulates that Taiwanese information and technology (IT) firms took advantage of *guanxi* as relational assets in the beginning of cross-border investment at the international level and buffered themselves from disorders in state regulations in the PRD, while they moved to comply with the formal regulations and made use of the YRD regional domestic level as China's domestic market emerged (HSU, 2006, pp. 247–248). Recent studies on Taiwanese investment in the PRD have demonstrated that the *guanxi*-based salient investment form of 'processing and assembly' (*Sanlai Yibu*) established between Taiwanese investors and local governments in the PRD (especially Dongguan) has tended to be an institutional bottleneck, which has to some extent 'pushed' Taiwanese investment to the PRD (WANG and TONG, 2005; YANG and HSIA, 2005; YANG, 2006a, 2007). Others regard the locational shift of Taiwanese information technology (IT) investment as the result of the declining importance of proximity to Hong Kong and the 'pulling' effects of the local governments in the YRD with aggressive promotion of the IT sector (CHASE *et al.*, 2004; HONG KONG TRADE DEVELOPMENT COUNCIL (HKTDC), 2004; SAXENIAN, 2006; NG and TUAN, 2003; WANG and LEE, 2007; YANG and HSIA, 2007). While existing analysis has focused primarily on the specific aspects of endogenous regional assets, the present paper argues that the redistribution of Taiwanese IT investment in China has been driven by trans-local dynamics involving global, national, regional, local, and firm levels. The complex strategic coupling of Taiwanese personal computers (PC) firms in host regions such as the PRD and the YRD, and corresponding parent firms in the source region (Taiwan), as well as their lead firm counterparts in the respective GPNs, has contributed significantly to regional development in the PRD and the YRD as well as to inter-regional competition for the inflows of Taiwanese IT investment. Meanwhile, state and local initiatives have played significant roles to foster the process of strategic coupling in the GPNs.

Different from previous regional studies in China generally based on official statistical analysis, the present study adopts a firm-specific regional analysis, that is by 'studying regions by studying firms' (MARKUSEN, 1994). Through on-site firm interviews with Taiwanese IT firms involved in the redistribution from the PRD to the YRD, this study attempts to highlight the role of firms as 'important and active strategic players' in shaping regional transformation (YEUNG, 2006, p. 3). The present study is not a conventional analysis of the location determinants of FDI in host countries. Rather, it investigates the redistribution of Taiwanese PC investment in China from the perspective of strategic coupling of regional development in the context of GPNs. The remainder of the paper is organized as follows. It first addresses the theoretical perspectives of regional development from the perspective of strategic coupling in GPNs so as to develop an analytical framework for the empirical analysis. After introducing the data and methodology, the redistribution of Taiwanese cross-border PC production from the PRD to the YRD is investigated in terms of different practices of strategic coupling in GPNs. The divergent mechanisms to fostering strategic coupling of regional development in the GPNs is then explored by taking Dongguan and Suzhou as cases. The paper concludes with the theoretical and policy implications of FDI-driven regional development and inter-regional competitions in the global economy.

TRANS-LOCAL DYNAMICS OF REGIONAL DEVELOPMENT IN THE GLOBAL ECONOMY: STRATEGIC COUPLING IN THE GLOBAL PRODUCTION NETWORKS

Since the 1990s, regional analysis has moved on from the earlier focus on endogenous regional assets to the complex relationship between globalization and regional change (HESS and YEUNG, 2006; YEUNG, 2006). In the globalizing economy:

> [r]egional development is conceptualized as a dynamics outcomes of the complex interaction between territorialized relational networks and GPNs within the context of changing regional governance structure.
>
> (COE *et al.*, 2004, p. 469; HENDERSON *et al.*, 2002)

In the context of the global economy, regional development should be seen as a form of trans-local dynamic (YEUNG, 2006, p. 7). Any singular geographical scale is an inadequate means for analysing the global economy because what one has in reality is a complex intermingling of *different geographical scales* (global, regional, national, and local) in the formation of networks and network processes (DICKEN *et al.*, 2001, p. 95). The GPN approach with explicit attention to multi-scalar processes of regional development goes beyond the 'new regionalism' literature in which intra-regional processes are championed as the universal panacea for regional development, through a consideration of economic–geographical processes occurring at multiple scales – from local and regional to national and global (YEUNG, 2006; HUDSON, 2005).

Amidst the recent resurgence of interest in the region and regional studies, understanding 'regions' as fixed and demarcated units in the context of globalization has been questioned. Contemporary debates in thinking about space, place, and scale have questioned the traditional and long-established notion of the 'region' as a 'closed', 'bounded', and territorial entity (HUDSON, 2007; MACLEOD and JONES, 2007; LAGENDIJK, 2007). This recent rethinking of regions is based upon

a relational approach that sees geographical entities as constituted by spatialized social relations stretched over space and manifested in material, discursive, and symbolic forms (LAGENDIJK, 2007). In the more interconnected and interdependent context, 'regions' are defined by their linkages and relations within and without any predefined territorial boundary (PIKE, 2007). In this sense, regions are seen as open, porous, and 'unbounded'. More specifically, LAGENDIJK (2007) proposed to develop a strategic relational approach. The recent shift of analytical attention to the complex interrelationships between local/regional actors and global processes is recognized as a 'relational turn' (BATHELT, 2006; YEUNG, 2005). Focus is put on a relational undertaking of the evolution of local and regional firms and their dynamic articulation in the GPNs (COE *et al.*, 2004; YEUNG, 2006).

With the paradigm shift of external linkages of regional development in the global economy, the notion of 'strategic coupling' has been put forth to conceptualize the trans-scalar interactions between regions and globalization in the context of globalization production networks (COE *et al.*, 2004; YEUNG, 2006). Strategic coupling is defined as:

> a time–space contingent convergence of interests and cooperation between two or more groups of actors who might not act in tandem for a common strategic objective in regional development.
>
> (YEUNG, 2006, p. 14)

It is 'strategic' because the process does not happen without active intervention and intentional action on the part of the participants. It is time–space contingent as the coupling process is not permanent and is subject to change. Furthermore, Yeung put forward three mechanism processes that facilitate the strategic coupling of regional firms with lead firms in GPNs, namely the emergence of transnational communities, changes in industrial organization, and initiatives by states and institutions, from the East Asian perspective (YEUNG, 2006, p. 14). In the approach of GPN to regional development, both regions and GPNs are relational constructions that are constituted through ongoing actor-specific practices and processes. According to HENDERSON *et al.* (2002), the concept of GPNs involves both business firms and national economies in organizationally complex and geographically extensive ways. From this point of view, the GPN perspective has important relevance for theorizing the intensification of inter-regional competition, as different regions are articulated into the global economy through diverse networks of local firms and their global lead firm partners. From the East Asian perspective, YEUNG (2006) urged a study of the complex strategic coupling those economic actors, particularly large business firms, operating in specific regions in Asia with their lead firm counterparts orchestrating production networks on a global basis. More empirical analysis is needed to engage in recent theoretical debate on the paradigm shift of regional analysis with extensive empirical experiences in other regions.

The complexities of firm–region relationships, therefore, have to be unravelled in a more theoretically sophisticated and empirically rigorous manner. Rapid globalization and technological changes have endowed firms with increased geographical mobility and greater power in their dealing with other actors in the interactions between firms and regions (TAYLOR and ASHIEM, 2001). The dialect relationships between firms and places have been described as 'places produce firms' versus 'firms produce places' (DICKEN, 2000), 'firms in the region' (MACLEOD, 2001; MALMBERG and MASKELL, 2002; MARIN and SUNLEY, 2003) and 'the regions in the firm' (SCHOENBERGER, 2000) or a 'firm–territory nexus' (DICKEN and MALMBERG, 2001). As suggested by YEUNG (2006), the coupling process between firms in specific regions and their global counterparts may bring about greater intra- and inter-GPN competition that may manifest in the form of alleged inter-regional competition. At the intra-GPN level, different original designed manufacturers (ODM) providers are competing against each other for the same lead firm. At the inter-GPN level, lead firms and strategic partners belonging to different GPNs are competing for market share. During the course of inter-regional competition in the context of globalization, time and power are vital components to understanding how local economies change and power relations shift. It is essential to understand how power operates within 'time–space' to produce distinctive patterns of economic growth and decline that go beyond the 'one-size-fits-all' views of the clustering and embedded enterprise perspectives (BATHELT and TAYLOR, 2002). For states and localities, their objectives are to attract and retain as much productive investment as possible within their boundaries. However, the flexible 'territories' of multi-locational/transnational firms overlap and interpenetrate the relatively fixed territories of national and local states (PHELP and FULLER, 2000; TEWDWR-JONES and PHELPS, 2000). This tends to create an asymmetry of bargaining power between firms and local states. The tensions between firms and local states have increased as processes of firm-organizational restructuring have intensified and become geographically more extensive. The bargaining power of subnational governance units may be highly dependent upon the locational uniqueness of their bounded assets. Multi-locational firms have the potential to manipulate geographical space and to use territory as an intrinsic part of their competitive strategies. The ability to 'control' space and use the resources of specific territories are diagnostic characteristics of multi-locational firms, especially multinational enterprises (DICKEN and MALMBERG, 2001). As THOMAS (2000) described:

> competition for investment is not just any kind of competition. Unlike competition in good markets, there

> can be no presumption that competition for investment is efficiency enhancing . . . and it clearly has the potential to result in 'race to the bottom' in terms of wages, social protections, environmental standards, and tax base degradation. . . . Conscious intervention in markets is necessary to prevent negative outcomes.
>
> (p. 271)

Different combinations of increasing territorial and corporate competitions may generate different scenarios, which have been categorized as 'strong globalization', 'regulated globalization', 'strong localization', and 'fragmented globalization' (Fig. 1). In particular, competition becomes strong between territories and within corporations and results in fractured power relations in the scenario of fragmented globalization (RAINES, 2000; PHELPS and RAINES, 2003). In the context of GPNs, different patterns of strategic coupling initiated by different state and local institutional mechanisms may bring about different scenarios of globalization at national and regional levels, which will be demonstrated by this empirical study in the following sections.

In the era of globalization, regional development and inter-regional competition have become increasingly complex and difficult to be analysed satisfactorily. One helpful analytical approach is to situate regional development trajectories within the competitive dynamics of GPNs using a strategic relational approach (YEUNG, 2006; LAGENDIJK, 2007). The present paper attempts to advance recent debate on the concept of regions and regional studies in the global economy and extends empirical literature from regions in East Asia to China through comprehensive investigation and comparison of the strategic coupling of key actors in host regions (PRD and YRD in China) – Taiwanese firms – and their parent firms in the home region (Taiwan) and lead firm counterparts in the respective GPNs. Furthermore, it aims to explore and compare the extent and mechanisms of local initiatives in fostering the process of strategic coupling and corresponding outcomes on regional development, particularly inter-regional competition between the PRD and the YRD. Moving away from the new regionalism approach in which analytical privileges are placed on networks and institutions endogenous to specific regions, the empirical analysis in this paper will examine the critical link between regions and the global economy through foreign-invested firms and their trans-local production networks. Different from the previous FDI-induced regional development which was characterized by the external dependency of regions and the passive response to external control (SIT and YANG, 1997; ENG, 1997; SHEN, 2002; WEI and LEUNG, 2005), recent development driven by Taiwanese IT investment have incorporated the PRD and the YRD into respective GPNs. At the above theoretical and empirical backdrops, an analytical framework is developed to explore the trans-local dynamics of regional development and inter-regional competition between the PRD and the YRD in the context of GPNs (Fig. 2). It argues that the redistribution of Taiwanese investment from the PRD to the YRD has been driven by trans-local dynamics involving global, national, regional, local, and firm levels. More specifically, the transformation and distribution of Taiwanese investment in different regions in China is driven by the divergent strategic coupling of Taiwanese desktop and laptop mini-GPNs in the PRD and the YRD, respectively, with their parent firms in Taiwan as a source region and global flagship counterparts, through different mechanisms of local institutional initiatives. On the basis of the analytical framework, this study attempts to explore the following questions. Why did the PRD (especially Dongguan) fail to attract Taiwanese notebook investment, despite its first-mover advantage in the 1980s and 1990s? What are the mechanisms that make the YRD (especially Suzhou) successful in attracting the second round of Taiwanese IT investment since the 2000s? To what extent and what types of Taiwanese PC firms in Dongguan have redistributed to Suzhou? What is the outcome on regional development trajectories and competitions between the PRD and the YRD? And so on. Taiwanese investment-driven regional

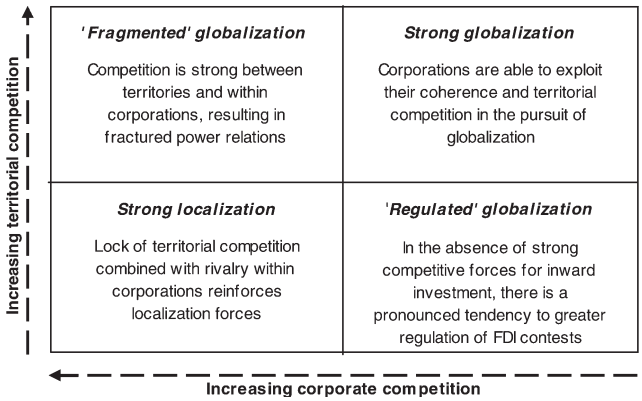

Fig. 1. *Scenarios of competition for inward foreign direct investment (FDI)*
Source: Adapted from PHELPS and RAINES (2003), p. 219

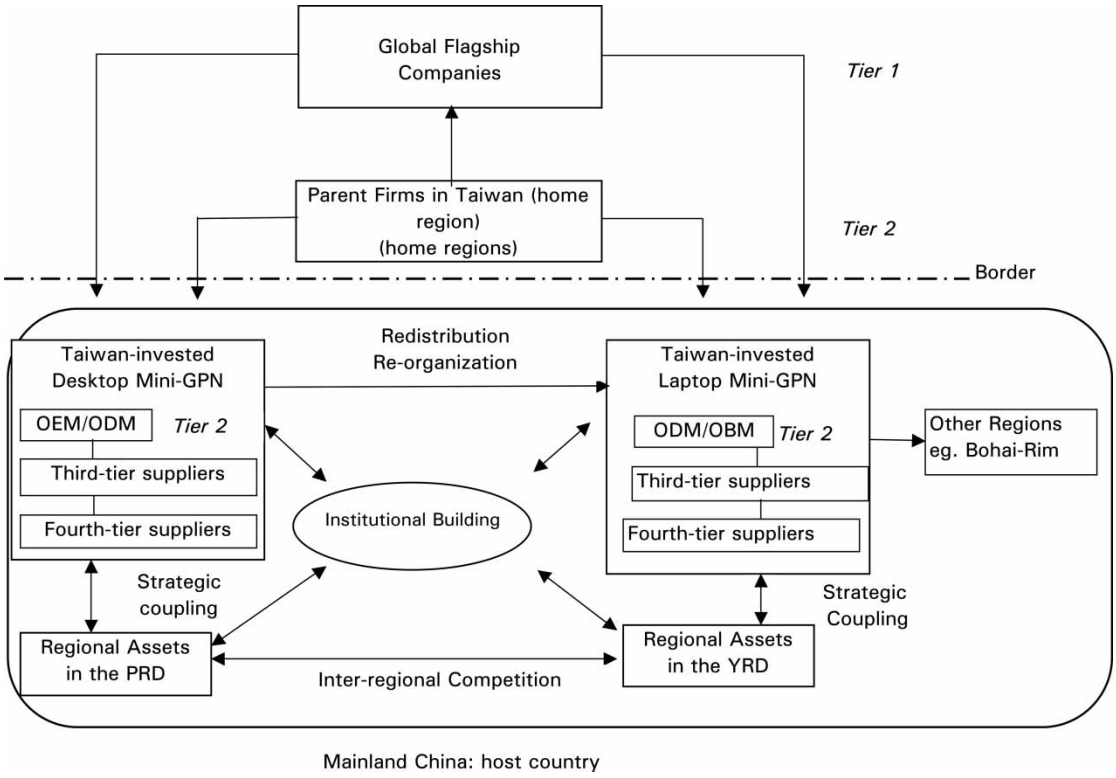

Fig. 2. *Inter-regional competition for Taiwan investment in the Pearl River Delta (PRD) and the Yangtze River Delta (YRD) in the global production networks: a trans-local analytical framework*

development in the PRD and the YRD as well as the redistribution of Taiwanese PC investment from the PRD to the YRD have thus been analysed and understood by the analytical framework of trans-local dynamics and local initiatives in the context of GPNs. The divergent strategic coupling between Taiwanese PC firms in host regions and their lead global counterparts in the PRD and the YRD will be analysed in the next section. Following it, the distinctive mechanism of local initiatives to foster the coupling processes in Dongguan and Suzhou will be explored comparatively.

STUDY AREAS AND RESEARCH DESIGN

Thanks to the 'one step ahead' in China's opening and reform, the Pearl River Delta (PRD) has become region of first choice for foreign investment inflows, especially the cross-border transplantation of export-oriented manufacturing activities from Hong Kong and Taiwan (Lin, 1997; Hsing, 1998; Yeung, 2001; Yang, 2006a, 2007). It has, however, been overtaken by the central government-initiated resurgence of the Yangtze River Delta (YRD) as the dragonhead of China's economy since the 1990s. Taiwanese investors have responded proactively to this changing bias of regional development with the redistribution of manufacturing activities, especially the information technology (IT) industry from the PRD to the YRD (Hsu, 2006; Walcott, 2003; Zhang, 2006). From 2003, actualized foreign investment in Jiangsu province in the YRD has surpassed Guangdong province in the PRD. The shares of the PRD in the total amount of Taiwanese investment on the mainland dropped from 43.5% during 1987–1990 to 18.5% in 2006, while that of the YRD soared from only 5.3% to 66.8% during the same period (Fig. 3). In 2006, Jiangsu Province alone accounted for nearly 55% of total Taiwanese investment on the mainland. Although Taiwanese investment ranked fifth and sixth among all sources of actualized foreign investment inflows to Guangdong and Jiangsu (Table 1), it has actually become the second largest source, just following Hong Kong, owing to the incomplete statistics under present cross-straits political–economic tensions (Smart and Hsu, 2005; Yang, 2006a, 2007). As a matter of fact, inter-regional competition for Taiwanese investment between the two Deltas has taken place at municipal levels. Instead of the primary cities, for example, Guangzhou in the PRD and Shanghai in the YRD, the intermediary cities in the PRD and the YRD, that is, Dongguan and Suzhou, have become keen competitors in attracting Taiwanese IT investment since the 2000s. Under the sway of inflows of Taiwanese IT investment, Dongguan has become the world factory for desktop PC production, while Suzhou has become the largest notebook (laptop) computer production centre in the world (Enright *et al.*, 2005; Li & Fung Research Centre, 2006a, 2006b). In 2005, Suzhou produced over 15 million sets of notebook computers,

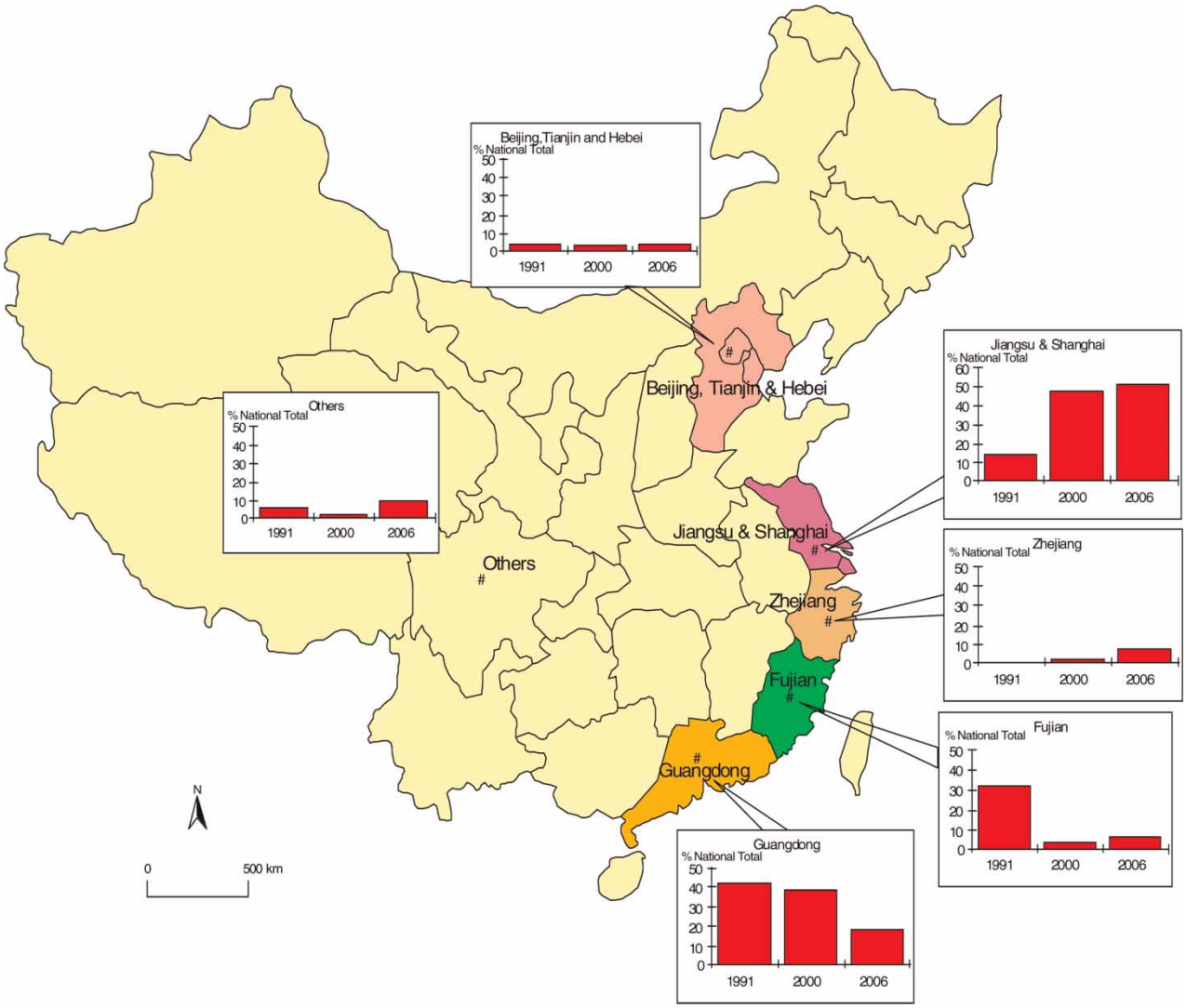

Fig. 3. *Evolving spatial distribution of Taiwanese investment in the mainland China, 1991–2006*
Source: Compiled from Statistics by Ministry of Economic Affairs, Taiwan, various issues

accounting for nearly 40% of the global total (Editorial Board of China Industrial Maps, 2007), whereas Dongguan, as a hub for producing desktop computers and peripherals, produced 30% of drivers, 20% of scanners, and 16% of keyboards of the world total (Foster *et al.*, 2006; Taiwan Ministry of Economic Affairs, 2006; Wang and Tong, 2005; Yang, 2006a). As a result, the shares of mainland China as an overseas production base of Taiwanese IT hardware increased dramatically from 14% in 1995 to 80% in 2005 of the total output value, while those of Taiwan decreased from 72% to less than 7% during the same period (Table 2).

A large body of literature has indicated the urban and regional development in the PRD during the 1980s and 1990 as an 'external-driven' or 'exo-urbanization' pattern, in which FDI, especially labour-intensive, small-scale manufacturing investment from Hong Kong and Taiwan, served as major driving forces (Eng, 1997; Sit and Yang, 1997; Shen, 2002). Lagging behind the PRD in China's opening and reform initiatives in the late 1970s, the development of the YRD during the 1980s and early 1990s was mainly driven by state-owned enterprises in Shanghai while township and village-ship firms in southern Jiangsu and private firms in Zhejiang (Marton, 2000; Wei, 2002). Since the opening of Pudong in Shanghai in the early 1990s the YRD has experienced dramatic transformations under the impacts of globalization (Chen, 2007; Wei, 2002; Wei and Leung, 2005; Wei *et al.*, 2006; Wu, 2000). In response to these changes, Taiwanese IT investment has targeted the YRD as the destination of the second-round investment inflows to China since the 2000s. The redistribution tendency has engrossed both academic and policy practitioners, especially Dongguan and Shenzhen in the PRD, who are facing keen competition from Suzhou and Kunshan in the YRD. The redistribution of Taiwanese PC investment interpreted by Guangdong provincial and Dongguan municipal governments is a

Table 1. *Contributions of Taiwanese investment in total actualized foreign investment in China, Guangdong and Jiangsu, 1990–2005 (US$ millions)*

	Total actualized foreign direct investment (FDI)			Among which, from Taiwan			Shares of Taiwanese investment in the respective total (%)			Ranks of Taiwanese investment in all sources of foreign investment		
Year	China	Guangdong	Jiangsu	China	Guangdong	Jiangsu	China	Guangdong	Jiangsu	China	Guangdong	Jiangsu
1990	3487	1460	141	222	70	n.a.	6.4	4.8	n.a.	4	4	n.a.
1995	37 540	10 180	4781	3162	360	n.a.	8.4	3.5	n.a.	2	3	n.a.
2000	40 715	12 237	6424	2297	497	581	5.6	4.1	9.0	5	4	4
2001	46 878	12 972	7122	2980	490	744	6.4	3.8	10.4	5	5	2
2002	52 743	13 111	10 366	3971	636	1126	7.5	4.9	10.9	5	4	2
2003	53 505	15 578	15 802	3377	677	1828	6.3	4.3	11.6	6	4	2
2004	60 630	10 012	12 138	3117	349	1022	5.1	3.5	8.4	6	4	3
2005	60 325	12 364	13 183	2152	334	608	3.6	2.7	4.6	7	5	6

Note: n.a., Not available.

Sources: China Statistical Bureau (1991, 1997–2007); Guangdong Provincial Statistical Bureau (1992, 1997–2007); and Jiangsu Provincial Statistical Bureau (1992, 1997–2007).

Table 2. Distribution of Taiwanese information technology (IT) hardware production, 1995–2005

Year	Total output (US$100 millions)	Production in Taiwan (%)	Overseas production (%)	Among which: in mainland China (%)
1995	195	72.0	28.0	14.0
1998	399	52.7	47.3	33.2
2000	470	49.1	50.9	36.9
2001	427	47.1	52.9	36.9
2002	484	35.7	64.3	47.5
2003	572	18.8	81.2	65.0
2004	696	15.6	84.4	70.1
2005	800	6.8	93.2	79.5

Source: GAO and CHAI (2006).

Table 3. Production locations of the top-ten Taiwan notebook vendors in China and their worldwide partners, 2005

Vendor	Production location in China	Share of China in total production (%)	Major worldwide OEM/ODM partners
Quanta	Shanghai	95	Gateway, Dell, IBM, HP, Apple, Sharp, Sony, Fujitsu, Siemens
Compal	Kunshan, Suzhou	90	Dell, HP, F/S, Toshiba, Acer
Wistron	Kunshan, Suzhou	60	IBM, Hitachi, Acer, Dell, F/S
Inventa	Shanghai	95	HP, Toshiba, BenQ
Arima	Suzhou	90	NEC, Hitachi, Gateway
FIC	Suzhou	100	NEC, P/B, Legend
ASUS	Shanghai	60	Epson, Canon, Trigem, Sony, Apple
Mitac	Kunshan, Suzhou	90	Sharp, F/S, NEC, ASUS, JVC
Uniwil	Suzhou	100	Clone, F/S, Actebis, Samsung
ECS	Shenzhen	90	Apple

Note: ODM, original design manufacturing; OEM, original equipment manufacturing.
Sources: Compiled from China information technology (IT) map, 2006–2007; and Ministry of Economic Affairs of Taiwan data.

pattern of 'northern expansion' (*beikuo*) rather than 'northern migration' (*beiyi*) (interviews with government officials in Guangdong and Dongguan, February 2005). The former means while Taiwanese firms expand to the YRD, they keep their plants in the PRD. The latter refers to those firms that close their plants in the PRD while they migrate completely to the YRD. Particularly, the relocation of Taiwanese investment has been accompanied by the sectoral upgrading of Taiwanese investment. While the PRD, particularly Dongguan, has turned into a cluster of Taiwanese desktop production, the YRD, especially Suzhou, has become a cluster of notebook (laptop) production. Except for ECS in Shenzhen, nine of the top-ten Taiwanese notebook vendors have transplanted over 90% of their production lines to Suzhou and other cities in the YRD (Table 3).

Dongguan in the PRD and Suzhou in the YRD have been chosen as cases in this study because the two cities contain the largest geographical concentration of Taiwanese PC investments in the PRD and the YRD, respectively, and in mainland China as a whole. In 2005, Dongguan accounted for 7.8% and 26.5% of Taiwanese investment in Guangdong and the national total, respectively (YANG, 2006a). In particular, 1541 IT firms accounted for 28% of the total of Taiwanese firms in Dongguan. Moreover, the IT sector, which has become the predominant industrial sectors in Dongguan with over 50% of total industrial output in 2005, has been primarily foreign investment driven, especially those from Taiwan and Hong Kong. Among the total number of foreign-invested electronics firms, Taiwanese firms accounted for the largest share (42.8%), followed by Hong Kong firms (42.6%). In 2005, Taiwan surpassed Hong Kong as the largest source of electronics investment, with 45% and 37% of the total amount, respectively (YANG, 2007). The output value of IT industry in Suzhou amounted to RMB370 billion in 2005, which accounted for 50% of Jiangsu province, or one-quarter of the YRD and one-tenth of the national total. Over 3300 Taiwanese firms with the investment amount of US$26 billion accounted for both one-third of the respective totals in Suzhou. By the end of 2005, production lines of notebook computers in Taiwan have completed transplantation to Suzhou, which has meant Suzhou has replaced Taiwan as the world largest processing base of laptop computers (SUZHOU YEARBOOK, 2006; MILLER, 2006). Therefore, case studies of Dongguan and Suzhou could to a large extent represent Taiwanese PC firms in the PRD and the YRD, respectively, as well as in China as a whole.

The PC industry is a perfect example to explore the redistribution of Taiwanese IT investment from the PRD to the YRD from the perspective of GPNs. The worldwide computer industry is configured as a pyramid. Microsoft and Intel sit at the top, rich in intellectual capital and flush with profits. Below them are the global PC flagship brands[3] – Dell, HP, and Acer – which turn a profit through ruthlessly efficient product sourcing and massive investment in marketing. They are supplied with near-finished goods by Taiwanese original designed manufacturers (ODM)/original equipment manufacturers (OEMs) with factories on the mainland that receive in turn from thousands of parts and component supply manufacturers, many of them also Taiwanese-owned. What almost all mainland China brings to the industry is cheap land and even cheaper labour. Taking into consideration the multi-tier structure of the PC industry, it is essential to differentiate locational characteristics of various tiers of firms. Except a few cases of global flagship

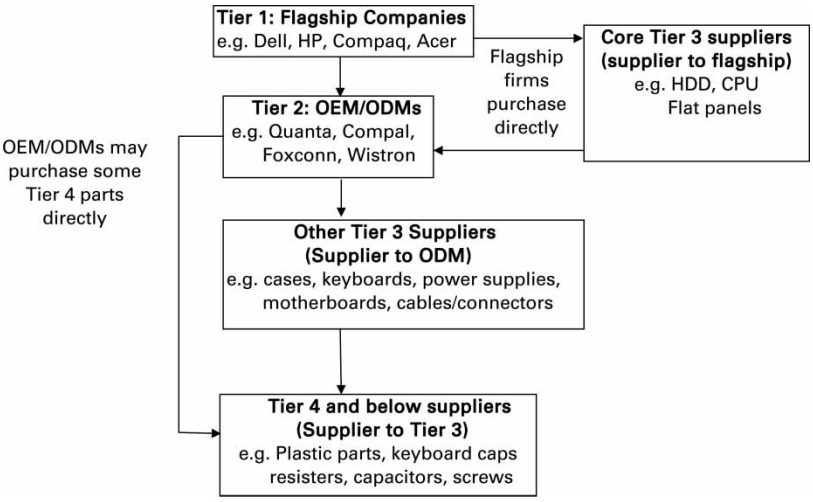

Fig. 4. *Structure of the interviewed firms in multi-tiered personal computer industry*
Source: Adapted from KRAEMER and DEDRICK (2006)

companies, the other three tiers of firms in the PC production networks have been selected for firm interviews (Fig. 4). They include the following:

- ODM firms (for example, Foxconn, Mictac, Quanta, and Compal).
- The third-tier suppliers to ODM with two categories, including core suppliers (for example, hard disk drive (HDD), flat panels, central processing unit (CPU), usually specified by flagship companies) and other suppliers (for example, cases, power supply, battery, keyboards, motherboards, and cables/connectors) (specified by the ODM).
- The fourth-tier suppliers to the third-tier suppliers (e.g. plastic parts, keyboard caps, screws, resisters, capacities), that have established plants in both the PRD and the YRD.

In attempting to conduct a study on the relocation of Taiwanese IT investment in China, data collection is a considerable problem. It is difficult to obtain the overall profile of firms involving the redistribution process from the PRD to the YRD, because it is sensitive for both Taiwanese investors who intend to keep their plants in both the PRD and the YRD, and local governments in the PRD, for which the attraction of foreign investment has been set as one of the most important criteria when evaluating their performance. The author was fortunate to obtain the data sets of Taiwanese firms in both Dongguan and Suzhou that provide basic information, including each firm's dates of establishment, sources of investment, entry modes, amount of investment, major products, and location. The two data sets were provided as internal documents that cannot be reproduced in their original formats. To exploit these valuable data as much as possible, the author was at the very beginning ambitious to conduct firm-level mailed surveys among the 1500 Taiwanese electronics firms in Dongguan and a similar number of Taiwanese firms in Suzhou, a popular method of international business research (YEUNG, 1998). However, pilot interviews with local officials and selective Taiwanese entrepreneurs discouraged the authors from doing so. In addition to the sensitive nature of the research questions, it is commonly cited that Taiwanese IT firms have been interrupted tremendously by numerous surveys conducted by various organizations and individuals in recent years.

In consequence, the study was mainly conducted on the basis of firm-level interviews with over 45 firms including strategic contractors for global flagships, third- and fourth-tier parts and component suppliers in Dongguan (23 firms) and Suzhou (22 firms) by the author in person between April 2005 and January 2007 (Table 4). The author was introduced to some of these firms by local officials through personal contacts in both Dongguan and Suzhou, and to others by previous interviewees (for example, the firms in Dongguan introduced the author to their branch firms in Suzhou, and vice versa). The representative level of the samples is a practical problem. An internal document regarding the redistribution of Taiwanese IT firms to Suzhou conducted by the Office of Taiwan Affairs of Dongguan municipal government in 2002 provided valuable information and helped in the selection of the representative interviewed firms. In comparison with the two data sets of Taiwanese IT firms in Dongguan and Suzhou, 23 pairs of the sampled third- and fourth-tier suppliers in the GPN were selected for interviews (Table 5). They were finally confirmed for interviews through personal connections with local officials, by introduction by previous interviewees, and the author's direct contacts as well. In all the open-ended and semi-structured firm interviews, Chief Executive Officer (CEO)/Chief

Table 4. Profile of interviewed firms in the Pearl River Delta (PRD) (Dongguan) and the Yangtze River Delta (YRD) (Suzhou)

Groups of firms	Location of fieldwork	Status of firms in GPN (number of firms interviewed)
I. Plants that only have establishments in the PRD without branch plants in the YRD	Dongguan	Small-scale fourth-tier suppliers and other firms (five)
II. Keeping plants in Dongguan while establishing new plants in Suzhou (or other places in the YRD) – 'north expansion'	Dongguan Suzhou	OEM/ODM for notebook flagship firms, third- and fourth-tier suppliers (23 pairs in Dongguan and Suzhou)
III. Closing plants in Dongguan while moving to Suzhou (or other places in the YRD) – 'northern migration'	Suzhou (Dongguan in case of coming back)	Very seldom third- and fourth-tier suppliers (two)
IV. Plants that only have establishments in the YRD (especially Suzhou) without branch plants in the PRD	Suzhou, Shanghai	Mainly second-tier ODMs and IC firms (15)

Note: GPN, global production networks; IC, integrated circuit; ODM, original design manufacturing; OEM, original equipment manufacturing.

Table 5. Sample interviewed firms from the top-100 information technology Taiwanese firms in Dongguan (in terms of investment amount) and their corresponding plants in the Yangtze River Delta

Number	Firms in Dongguan	Location in the Yangtze River Delta
1	Walson	Suzhou
2	GBM	Kunshan
3	Kinpo	Shanghai, Suzhou
4	Winteck	Suzhou
5	Ya Hsin	Suzhou
6	Suyin	Shanghai, Suzhou
7	Delta	Suzhou (Wujiang)
8	Foxlink	Shanghai, Kunshan
9	Surface Mount	Suzhou
10	Largen	Suzhou
11	HsiangKuo	Suzhou
12	Yageo	Suzhou
13	Gigabyte	Suzhou?
14	Lite On	Suzhou?
15	Hua Jung	Shanghai, Kunshan
16	Luxon	Shanghai, Suzhou
17	Chicony	Suzhou (Wujiang)
18	Wonderful	Shanghai
19	BestTech	Shanghai, Suzhou
20	Phihong	Shanghai, Suzhou
21	Kuan Kun	Shanghai
22	UNECC Chenming	Ningbo
23	Apollo	Suzhou (Kunshan)

Source: Compiled from the lists of Taiwanese information technology firms situated in Dongguan and Suzhou, 2006.

Managers who were familiar with the management and strategies of the respective firms in Dongguan, Suzhou, and their parent firms in Taiwan were the major targets for interviews. The interviews covered various aspects of the organization of cross-border production, namely:

- Firm profile, such as the date of establishment, venue of source registration, and major products.
- The driving forces of initial investment, locations of expansion, redistribution locations, and strategies and future plans.
- Transition of market orientation strategies and investment forms.
- Existing suppliers and future plans.
- Major customers or buyers and links with global markets.
- The evaluation of various levels of governments and the policies involved, etc.

The interviews were usually conducted in the respective plants of the interviewed firms and took about one hour. In addition, the author interviewed more than 20 government officials in charge of Taiwanese firms and relevant activities, such as the Office of Taiwan Affairs, the Bureau of Foreign Trade and Economic Operation, the Promotion Centre for Foreign Investment and Trade, the Bureau of Science and Technology, the Bureau of Urban Planning, etc., in both Dongguan and Suzhou. Communication and dialogues with over 15 university scholars and policy researchers who had relevant research experience in Taiwanese investment in Beijing, Guangzhou, Shenzhem, Shanghai, Nanjing, Hangzhou, Suzhou, and Taipei, etc., provided insights for conducting the study. All the interviews were taped and transcripted, with double-checks in the following visits and field investigations.

DIFFERENT PRACTICES OF STRATEGIC COUPLING IN GLOBAL PRODUCTION NETWORKS: REDISTRIBUTION OF TAIWANESE PERSONAL COMPUTER INVESTMENT FROM THE PEARL RIVER DELTA TO THE YANGTZE RIVER DELTA

The fieldwork and firm-level interviews in the PRD and the YRD have demonstrated that the redistribution of Taiwanese investment since the 2000s has mainly occurred in the PC industry, with very few exceptions in labour-intensive sectors, such as textiles, footwear, and toys which are the first wave of Taiwanese investment to the mainland. Different from the relocation of the PC industry in the form of networks, the redistribution of labour-intensive firms, such as furniture

and footwear manufacturing, has primarily been undertaken in an individual way (interview in Dongguan, August 2006) and it has not exerted significant impacts on both the PRD and the YRD if compared with the redistribution of Taiwanese PC investment.

Based on firm interviews and field investigations, four groups of Taiwanese PC firms regarding redistribution have been identified (Table 4). The first group refers to the firms that have only established plants in Dongguan. Most firms in this group are small-scale fourth-tier suppliers. As a CEO of a computer resister manufacturing firm for the third-tier suppliers in Dongguan declared, 'my firm is too small in scale and not welcome by the local governments in Suzhou, who have interests in large-scale and technology-intensive firms' (interview in Dongguan, August 2005). The second group refers to the firms that have expanded to Suzhou while keeping their plants in Dongguan. For the group of expanded firms, both branch plants in Dongguan and Suzhou were interviewed to explore their relations and compare respective relations with parent firms in Taiwanese as well as the respective OEM/ODMs. Almost all the top-100 firms (in terms of investment amount) in the electronics sector in Dongguan have branch plants in Suzhou (interviews in Dongguan, April 2005). Most of these firms are third- and fourth tier suppliers, their locations of which are primarily decided by their clients, that is, OEM/ODMs (Table 5). Two commonly cited motivations for the northern expansion to the YRD include: (1) tapping into the domestic market; and (2) the requirements of the clients, that is, global flagships and Taiwanese ODMs. The third group of firms are identified as those which have migrated to Suzhou while closing their plants in Dongguan, the so-called 'northern migration'. Consistently with the observation of the Dongguan municipal government and Guangdong provincial government (interviews with officials in Dongguan, April 2005), it was found that very seldomly were there cases in the third group, that is, northern migration. Only two firms were encountered that have completely migrated to Suzhou and closed their plants in Dongguan. The reasons for their migration to Suzhou are beyond business considerations. One of the cases explained that the reasons are:

> the environment of Dongguan has tended to be very worse. We felt very unsafe there, e.g. deteriorating drinking water of Dongjiang River, unsafe civil society owing to a large number of immigrants, etc.

The fourth group refers to the firms that have only established plants in Suzhou. Firms in this group are mainly the contractor ODMs for flagship firms, and IC firms, such as such as TSMC in Shanghai.

As the earlier analytical framework indicated, the redistribution of Taiwanese PC investment resulted from the strategic coupling between Taiwanese firms in host regions with their parent firms in home region and their global lead counterpart in respective GPNs. It is worthwhile to note that redistribution is driven by global flagship firms and their strategic contractors, that is, Taiwanese ODMs. For the first-tier firms, that is, the flagship PC-makers, their competitiveness greatly depends on technological innovation and it is usually located in the areas with innovative milieu (Castells, 1996) and the institutional thickness (Amin and Thrift, 1994) for facilitating knowledge creation. In recent years flagship PC-makers have shifted toward more complex direct sales and a build-to-order production strategy. Time-to-market and cost-drivers including production costs and logistics have become more essential as global competition intensifies and product life cycles become shorter. Except for IBM/Lenovo in Shenzhen and Dell in Xiamen, almost all the subsidiaries of the flagship companies have concentrated mainly in the large cities in the YRD, such as Shanghai and Hangzhou (Table 6).

In the context of GPNs, global lead firms have played important roles in the location decisions of their strategic partners and crucial component suppliers through market and product definition and control. The competitive strength of the key contractual suppliers is not based on innovation, but instead on speed, scale, and low cost. It is therefore reasonable for them on the one hand to locate their headquarters or offshore offices adjacent to the flagships to maintain close contact with them and access the latest information, while on the other hand establishing their manufacturing facilities and building their mini-GPNs in the area where the requirements of speed and scale can be met (Wang and Lee, 2007). New clustering of Taiwanese PC production in the YRD has been driven by the major Taiwanese ODMs, for example, Quanta, Compal, Wistron, BenQ, etc. The majority of them chose to establish new plants in the YRD when they decided to invest in the mainland in early 2000. Some of these ODMs have already established plants for desktop production in the PRD in the 1990s, for example, Wistron in Zhuhai and Foxconn in Shenzhen. For either the newly established ODMs in the YRD or those expanded from the PRD, the requirement of their clients, that is, flagship companies, are regarded as the most important reasons to invest in the YRD (interviews in Suzhou, July 2005 and June 2006). For the third, fourth and lower tiers of suppliers, their locations are primarily decided by the ODMs. The firm-level survey in both the PRD and the YRD demonstrate that there is an emerging pattern of simultaneous establishments of branch plants in both the PRD and the YRD (the so-called 'north expansion') for most of the component suppliers. Among the top-100 electronics firms in Dongguan in terms of investment amounts, over 90 have established branch plants in the YRD since the early 2000s (Table 5). While the majority of firms established their branch plants in Dongguan in the 1990s and then expanded to Suzhou in the 2000s, very few have

Table 6. Locations of flagship computer-makers and Taiwan original design manufacturing (ODM) suppliers

Flagship companies	Subsidiaries in China	Estimated per cent outsourcing (January 2005)	Percentage of Taiwan shipments (April 2005)	Taiwan original design manufacturing (ODM) suppliers
Apple		100	5.1	Quanta, Asus, Elite
Dell	Xiamen, Fujian	92–93	21.6	Quanta, Compal, Wistron
HP	Shanghai	100	19.1	Quanta, Compal, Wistron, Inventec, Arima
IBM	Shenzhen, Guangdong	40	4.2	Wistron, Quanta
Acer	Zhognshan, Guangdong	100	100	Quanta, Compal, Wistron
NEC	Shanghai	100	5.3	Arima, FIC, Wistron, Mitac
Sharp		n.a.	n.a.	Quanta, Mitac, Twinhead
Sony	Wuxi, Jiangsu	60	4.0	Quanta, Asus, Foxconn
Toshiba	Hangzhou, Zhejiang	> 70	9.6	Quanta, Compal, Invetnec
Fujutsu-Siemens		50	4.0	Wistron, Mitac, Uniwill, Quanta, Compal

Note: n.a., Not available.
Source: Adapted from FOSTER *et al.* (2006), p. 13.

experienced branch plants in Suzhou and then Dongguan (for example, Walsin Technology in Suzhou in 2000 and in Dongguan in 2002).

Notably, most of the Taiwanese investors have been expanding northward to the YRD without giving up their processing base in the PRD. The pattern is described as 'keeping the PRD and the YRD as two lovers' (*beikuo Changsanjiao, nannian Zhusanjiao*) (see http://news.xinhuanet.com/newscenter/2002-10/16/content_598874.htm). Take firm D, the world's largest provider of switching power supplies, as an example. Firm D established its branch plant in the Shijie town area of Dongguan in 1993. When it initiated building the fifth plants in Dongguan in 2002, the new plant in Wujiang, Suzhou, was built at the same time. The co-existence of branch plants in the PRD and the YRD has become one of the business strategies of the orporation's market expansion. For example, products by Dongguan plants are primarily for export while those in Wujiang plants are mainly for the target domestic market, for example, for Lenovo (interviews in Dongguan, April 2006, and in Wujiang, June 2006). In consequence, a new triangular organization pattern of Taiwanese PC cross-border production has been emerging in the home region, Taiwan, and the two host regions of the PRD and the YRD under the impacts of global lead firms. As stated by a CEO of a fourth-tier supplier company that produces inductors for both desktop and laptop PCs in Dongguan and Suzhou:

> we are now operating in a new pattern of organization, e.g. making orders in Suzhou/Taipei, manufacturing in Dongguan, and deliver in Suzhou/Dongguan.
>
> (interview in Dongguan, June 2006, and in Suzhou, July 2006).

The above analysis has demonstrated that inter-regional competition for Taiwanese PC investment between the PRD and the YRD has mainly targeted Taiwanese ODM/OEMs, the locations of which are decided primarily by the global flagship companies in the GPNs. It seems that Dongguan has successfully retained the third- and fourth-tier suppliers at this stage, as the redistribution of these firms is identified as 'northern expansion' rather than 'northern migration' declared by Guangdong provincial government. However, Dongguan and the PRD as a whole have failed to respond strategically to the needs of the GPNs, especially global flagship firms. This study argues that different coupling with the respective GPNs have resulted in the failure of the PRD and the success of the YRD as the destination of Taiwanese cross-border notebook investment since the early 2000s.

DIVERGENT MECHANISMS OF STRATEGIC COUPLING IN THE GLOBAL ECONOMY: A COMPARATIVE STUDY OF TAIWANESE PERSONAL COMPUTER CLUSTERS IN DONGGUAN AND SUZHOU

Taking Dongguan in the PRD and Suzhou in the YRD as two cases (Table 7), comparative analysis of the roles of local initiatives in fostering strategic coupling in the GPNs will be conducted in two aspects. One is their different response to the transformation of GPNs, especially the PC industry since the 1990s. The other is the differences of local institutional initiatives to meet the needs of Taiwanese notebook ODMs and third- and lower tiers of suppliers as well as their global counterparts in the PC value chain.

Desktop cluster in Dongguan: implicit initiatives to coupling in the GPNs

Dongguan, located between Guangzhou and Shenzhen on the eastern bank of the PRD, has been transformed

Table 7. Major indicators of Dongguan and Suzhou, 2005

Major indicators	Dongguan			Suzhou[a]		
	Dongguan	As a percentage of Guangdong	As a percentage of China	Suzhou	As a percentage of Jiangsu	As a percentage of China
Total population (10 000)	165.6	2.10	0.13	598.9	8.06	0.46
Area (km^2)	2465	1.38	0.03	8488.42	8.27	0.09
Gross domestic product (GDP) (millions yuan)	2181.62	1.26	1.20	3450	22.00	2.15
Export (US$10 000)	4 092 900	17.20	5.37	5 077 384	58.00	8.56
Utilized foreign investment (US$10 000)	375 100	30.34	5.88	503 314	41.47	7.86

Note: [a]Figures for 2004.
Sources: Dongguan Statistical Bureau (2007); and Suzhou Statistical Bureau (2007).

from a traditional agricultural county to a modern manufacturing metropolis over the past two decades. Rapid industrialization of Dongguan has been significantly driven by the massive inflows of Hong Kong and Taiwan since the 1980s. From the 1980s to the early 1990s, Dongguan was primarily involved in labour-intensive and export-oriented processing and assembly activities. The mid-1990s ushered in a new stage for Dongguan's manufacturing sector, which began to take advantage of more Taiwanese IT companies moving to the PRD due to greater price pressure for OEM orders from global flagships and growing competition from South East Asian IT firms. The so-called 'Dongguan model', characterized by rapid economic growth driven by export-oriented and labour-intensive Hong Kong and Taiwanese investment (Yeung, 2001), has been modified with the influx of computer component and peripheral investment from Taiwan (Yang, 2006a, 2007). In contrast to the government-initiated cluster promotion in Suzhou and Kunshan which will be discussed below, local clustering of Taiwanese desktop computer production in Dongguan is spontaneously led by the third-tier suppliers firms, such as power switch suppliers, keyboards and motherboards, followed by the fourth-tier suppliers, such as resisters, instructors, other peripherals, etc. Once the core manufacturers (that is, parent firms in Taiwan, tier 2 in the analytical framework) have made the move, downstream firms and related services providers tend to follow suit voluntarily or involuntarily, or risk seeing their costs rising (interviews in Dongguan, April 2005 and July 2006). Notably, the clustering pattern is transplanted based on the previous interpersonal social relations, that is, *guanxi* established in Taiwan, rather than intensive supply-chain relationships. Following with their well-established interactions in Taiwan, the third-tier suppliers are content to use face-to-face meetings, telephone calls, and faxes to supply forecasts and orders to their fourth-tier supplies (interviews in Dongguan, April 2005). For instance, Shijie town in Dongguan is labelled 'Delta town', which means Delta (the third-tier supplier firm in the framework), the largest producer of power supply for PCs and over 150 firms as suppliers have accounted for a lion's share of the total electronic firms in the town. Dongguan is the world's largest supplier of computer peripherals. It has prompted IBM and Compaq, which control the front-end of the PC production chain, to set up their purchasing centres in Dongguan.

In the third- and fourth-tier suppliers-dominated clustering pattern, very few system companies or OEM/ODM supplier companies have established plants in Dongguan or even the PRD region as a whole, except Wistron in Zhuhai, Mitac in Shunde, Foxconn in Shenzhen, GVC in Qingxi town, GBM in Huangjiang town of Dongguan, etc. Moreover, although identified as an industrial cluster, Taiwanese desktop production in Dongguan is characterized by a scattered pattern at town and village level, without any deliberate industrial planning, and described as 'numerous stars without a shining moon' (*mantian xingxing queshao yilun mingyue*; Lin, 2006; Yang, 2006a). Seven out of the 32 towns in Dongguan have recorded a location quotient (LQ) over 1.0 (Fig. 5), which indicates a simple concentration of firms with less competitiveness, if compared with the systematic planning of industrial production in Suzhou and Kunshan. It was until the early 2000s that the Dongguan municipal government realized the importance of industrial policies in attracting FDI, especially global flagships and electronic manufacturing services (EMS)/ODM firms from the Asian newly industrialized economies (NIEs), including Taiwan. After visiting and learning from the experience of Suzhou and Kunshan, the Songshan Lake Industrial and Technology Park was initiated in July 2001 to attract large-scale, technologically intensive and higher value-added multinational enterprises. However, due to the strict requirement of the investment scale and environment protection criteria, there were no Taiwanese firms among the 21 registered foreign-invested enterprises in the Park by the end of 2005 (interview in Dongguan, May 2006). Despite its original goals of promoting inter-firm linkages and developing indigenous innovation activities, the Park has failed owing to the idea of a simple concentration of firms but without a consideration of

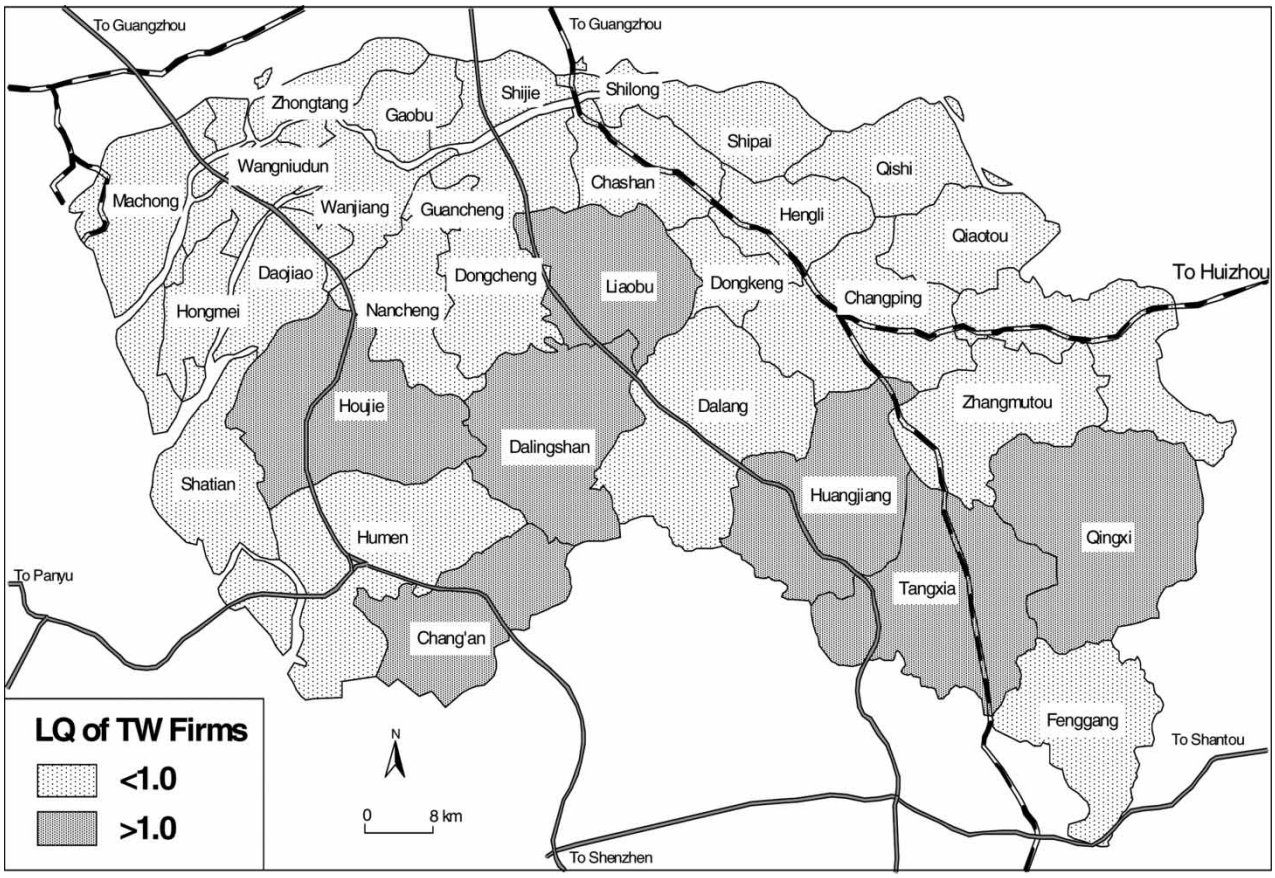

Fig. 5. *Location quotients of town-level Taiwanese information technology investment in Dongguan, 2006*
Source: Adapted from YANG (2007)

inter- and intra-linkages of firms in the PC supply-chain. Despite these policy initiatives, a lack of explicit industrial policy, especially intentional clustering policy, and insufficient industrial linkages between lead firms and ODM firms with the third- and fourth-tier suppliers have resulted in Dongguan's failure to attract Taiwanese notebook ODMs, that is, the second-tier firms in response to the request of their global counterpart firms in GPN, when they intended to target mainland China in the 2000s. Moreover, a deterioration of the investment environment in Dongguan has been recognized as the other major reasons of the relocation of Taiwanese investment from the PRD to the YRD. The PRD, especially Dongguan, has received relatively low scores in the Taiwanese Electronics and Electricity Management Association (TEEMA) surveys since 2001, in large part as a result of numerous investment and trade disputes involving Taiwanese businessmen coming from the so-called *Sanlai Yibu* activities. Since 2001, Dongguan has been listed as 'temporarily not recommended' to Taiwanese high-technology companies considering investment in the mainland (Table 8). The Dongguan model was characterized by a special entry mode of foreign investment, especially from Hong Kong and Taiwan, the so-called outward processing and assembly (OPA) with imported materials and compensation trade (or '*Sanlai Yibu*' in Chinese). Given the *Sanlai Yibu*'s requirement for 100% exportation of products, an increasing number of Taiwanese companies have attempted to change into wholly foreign-owned enterprises (WFOE), keeping pace with the opening of China's domestic market after its World Trade Organization (WTO) accession in 2001. The established *guanxi* between Taiwan entrepreneurs and local government in the 1980s (HSING, 1998) has turned from advantageous to disadvantageous factors in this transformation (YANG, 2006a). After more than a decade of such personal relationship-based (*renzhi*) interaction, Taiwanese investors have tended to tire of maintaining *guanxi* with local officials. During the course of redistribution of Taiwanese investment from the PRD to the YRD since the 2000s, *guanxi* has become less important to Taiwanese investors if compared with their entrance to the PRD in the 1980s. Instead, the upstream/downstream linkages have turned to one of the most important factors in a decision about location for Taiwanese IT firms in the YRD. It is cited as one of the reasons pushing Taiwanese investment to the YRD, where the transparency and efficiency of local governments, especially customs and tax departments in Suzhou, are greatly appreciated (interviews in Suzhou and Kunshan, June 2006 and January 2007). In addition, threats to personal safety, widespread official corruption, rampant counterfeiting, an unresponsive

Table 8. Least recommended cities for Taiwanese investors, 2002–2006

Ranking	2002	2003	2004	2005	2006
1	Nanning	Foshan	Huizhou	Huizhou	Shenzhen
2	Baoding	Quanzhou	City district, Dongguan	Longgang, Shenzhen	Shijie town, Dongguan
3	Quanzhou	Shijie town, Dongguan	Humen, Dongguan	Bao'an, Shenzhen	Nantong
4	Dongguan	Wenzhou	Zhangmutou, Dongguan	Humen town, Dongguan	Huizhou
5	Nanchang	City district, Dongguan	Quanzhou	City district, Dongguan	City district, Dongguan
6	Putian	Chang'an town, Dongguan	Baoding	Other areas, Dongguan	Chang'an town, Dongguan
7		Other areas, Dongguan	Taizhou	Zhangmutpu, Dongguan	Houjie town, Dongguan
8		Taizhou		Beihai	Qingxi town, Dongguan
9					Other areas, Dongguan
10					Zhangmutou town, Dongguan

Source: Compiled according to Taiwanese Association of Electrical and Electronic Engineering Industries (2006), p. 87.

legal system, and capricious local officials were also widely cited as serious problems degrading the attractiveness of the PRD (Taiwan Electrical and Electronic Manufacturers' Association (TEEMA), 2001, 2002). Dongguan has been regarded as the city with the most investment risks among all the surveyed cities in mainland China in TEEMA's survey in 2005 (TEEMA, 2006). More seriously, as described by a Taiwanese entrepreneur in the firm interview, there are six shortages, that is, insufficient supplies of production materials in Dongguan, including water, electricity power, oil, labour, capital, and raw materials.

Notebook cluster in Suzhou: explicit initiatives to coupling in the GPNs

Lagging behind Dongguan and the PRD, it is only after the 2000s that foreign investment has become the major driving force of economic development in the YRD (Wei and Leung, 2005). Suzhou has risen to a dynamic secondary city in the YRD from a very different background, but it has reached a similar economic status as Dongguan along a distinctive development trajectory (Chen, 2007). Over the past two decades, Suzhou has pursued two different models of development. From the early 1980s to the early 1990s, government-led development of Suzhou's economy has focused on township and village-ship enterprises – the so-called 'Southern Jiangsu (*Sunan*) economic model' (Wei, 2002). While generally successful in stimulating economic growth and rural industrialization, the Sunan Model ran into serious problems from its inherent constraints such as local government interference, a lack of economies of scale, and environmental pollution. Since the second half of the 1990s, Suzhou turned to reduce the role of state-owned companies and concentrating on bringing in foreign capital (Chen, 2007). Different from the PRD and Dongguan in which Hong Kong investment has initiated inflows of foreign investment inflows, Taiwanese investment has accounted for a lion's shares in most cities in the YRD (Wang and Lee, 2007; Zhang, 2006).

In comparison with the spontaneous clustering of desktop production led by Taiwanese lower-tier suppliers in the desktop computer supply-chain, the *Suzhou* model (as also opposed to the old *Sunan* model) relies heavily on careful planning and aggressive action by the municipal government. The primary differences between the practices of Suzhou and Dongguan in institutional modes of IT cluster promotion are the establishment and development of various industrial parks in Suzhou and Kunshan. These industrial parks have helped to promote the tight clustering of Taiwanese laptop ODMs and their suppliers in order to meet the requirement of network-based Taiwanese cross-border investment and production of the PC industry. The strategic coupling between the cost-down requirements of global flagship PC-makers and Taiwanese notebook ODM/OEMs, and the needs for inward FDI in the local economy of the Suzhou has been promoted by the explicit initiatives of the local governments. In consequence, there emerges a mini-GPN of notebook production networks led by Taiwanese ODMs in Suzhou and Kunshan. By 2005, the YRD has become a cluster of notebook computer manufacturing with the co-location of the twelve Taiwanese notebook companies and five notebook companies from other countries (Fig. 6). In order to promote the formation of a notebook cluster explicitly, the local governments of Suzhou have established various industrial parks and export-processing zones in order to imitate the situation in Taiwan. This could be well illustrated by the case of Kunshan. Kunshan is a county-level city under the jurisdiction of Suzhou. Kunshan is the first to change development directions from the previous Sunan model, which is predominated by township and village-ship enterprises. It first established the Kunshan Economic and Technological Development Zone (KETDZ) in 1989, which was the first industrial park initiated by the local government and authorized by the State Council in 1995. With other entrepreneurial efforts of local governments, such as the establishment of land-granting systems, Kunshan has experienced rapid growth since the 1990s. The KETDZ was ranked as the third largest development zone in terms

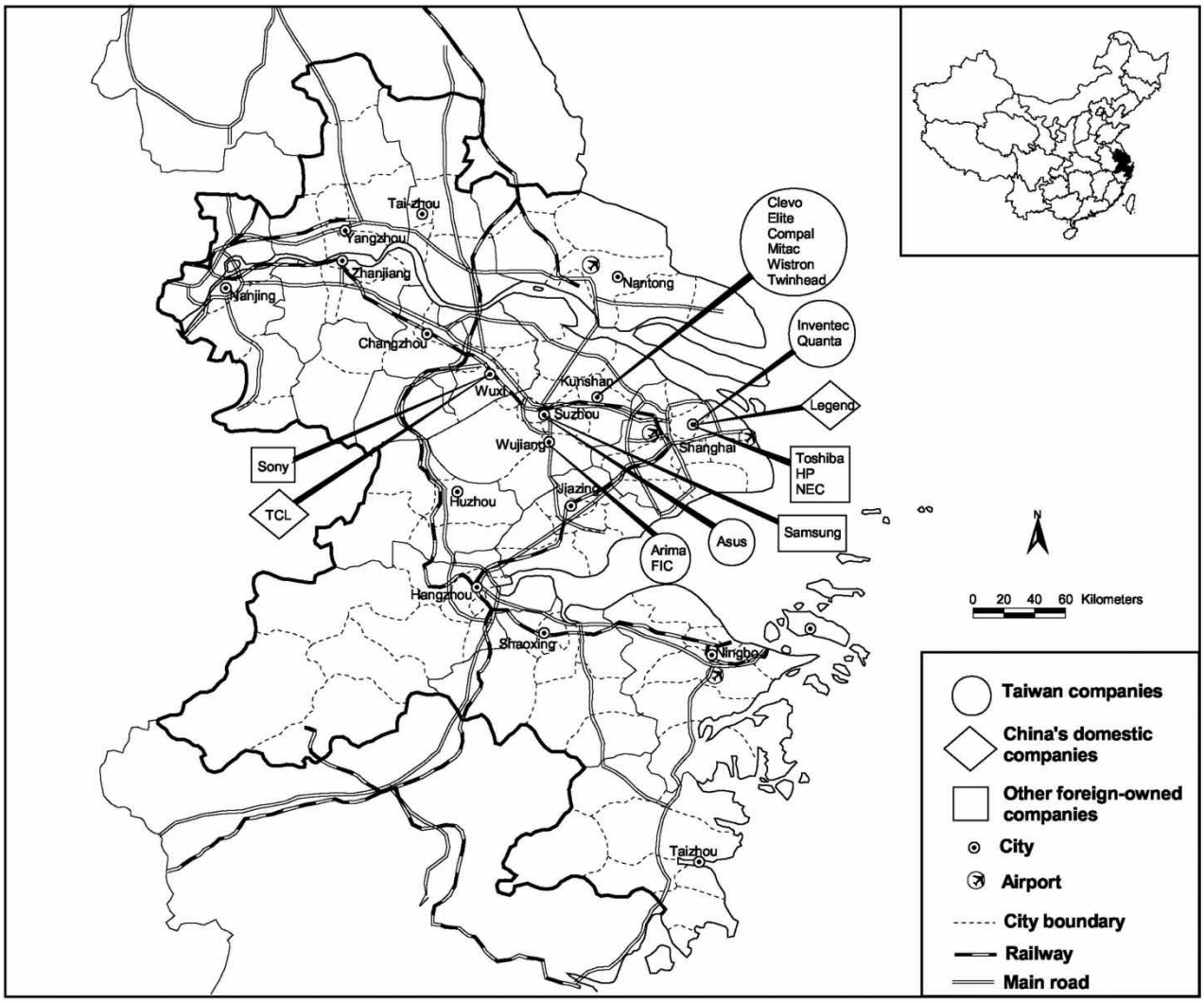

Fig. 6. *Distribution of Taiwan notebook original design manufacturers (ODMs) in the cities of the Yangtze River Delta (YRD)*
Source: Compiled from EDITORIAL BOARD OF CHINA INDUSTRIAL MAPS (2007); and YANG (2006b)

of production value in China. The total amount of Taiwanese investment in Kunshan accounted for more than one-half that of Suzhou city, one-quarter that of Jiangsu Province, and one-tenth of the national total. There are more than 50 000 Taiwanese businessmen, employees, and their families in Kunshan, which is called a 'small Taipei'. Over a decade Kunshan has changed from an agricultural county to one of the most prosperous counties of the nation. Kunshan has turned from a small county with 40 000 persons and government revenue of RMB5.7 million, to the most advanced county in China. In 2006, the total volume of export and imports of Kunshan Export Processing reached US$2.5 million, accounting for nearly 30% of the total of all export-processing zones of China. It is now the world's largest manufacturing base of laptop computers: every one out of three is made in this small county. The development zone-led cluster initiatives in Kunshan has been followed by the establishment of Suzhou–Singapore Industrial Park (SIP) in 1994, the Suzhou municipal government-sponsored Suzhou New District (SND) in 1990, and Wujiang Economic and Technology Developing Zone in 1993.

Different from the implicit cluster initiatives in Dongguan, local governments in Suzhou and Kunshan have adopted explicit initiatives in the formation of a cluster of notebook production networks. In order to enhance the development of an IT cluster in Kunshan, the ex-Vice-Mayor Zhu Fengquan attempted to decompose mechanically a notebook computer in order to understand the organization of the IT production chain, and found out which firms among around the 800 part and component producers had not invested in Kunshan. Kunshan's strategy is to attract explicitly the leading firms, usually Taiwanese ODMs, which could bring about all of their suppliers (around 200 for each ODM; interview in Kunshan, June 2006). Because of the Taiwanese government's restrictions on notebook production in Taiwan until 2001, it was often the third- and fourth-tier suppliers who first went to China to take advantage of low labour costs. Those associated with desktop PC production ended up around the PRD, especially

Dongguan. In a different way, those associated with notebook production chose to locate around the YRD. Following the OEM/ODMs of notebook production, the third- and fourth-tier suppliers have relocated/established new operations in the YRD. Therefore, the formation and dynamic of the PC clusters in the PRD and the YRD are quite different. As for the desktop cluster in Dongguan, the third- and fourth-tier suppliers moved first, following the limited number of OEM/ODMs, which could be identified as the so-called 'lower-tier-driven cluster'. With regard to the notebook cluster in Suzhou, it was the OEM/ODMs that led the cluster formation, followed with the relocation/establishment of operations by the third- and fourth-tier suppliers, the so-called 'OEM/ODMs-driven cluster'. More specifically, while person-to-person communications prevail between ODMs and the third-tier suppliers and the follower suppliers, formal bidding and contracts are the basis of doing business between global flagships and Taiwanese ODMs. Notebook companies prefer to work together with existing suppliers to improve cost and quality. Collaborative design very often takes place between notebook computer companies and component suppliers. A manager of a Taiwan-based notebook company said:

> We have some long-term collaboration with component suppliers because components are usually customized. We have to start from the beginning if we change a new supplier. We prefer establishing a long-term collaboration with our suppliers to ensure quality required by our customers. So it is not good to change suppliers too often.

The establishment of industrial and technology parks in the YRD and the strategic coupling of local development have enhanced the relocation of the whole production network of notebook computers from Taiwan.

When interpreting the so-called 'the Kunshan model' (YANG, 1995), the efforts of local government have been widely acknowledged as the key institutional breakthrough (KENG and CHEN, 2005). Almost all of the interviewed firms agree that if the government had not assumed the role of a 'business-friendly style' (*Qinshang, Anshang, Fushang*), Kunshan could not attract so much Taiwanese investment. The most appreciated measures praised by Taiwanese investors is that they can communicate with the Mayor and Party Secretary at any time because their home telephone numbers are printed on their name cards. (This is not usual in China in governmental officials' circles.) This could be reflected by the prevailed entry modes of Taiwanese investment in Suzhou and Kunshan. In contrast to the predominant firms taking the salient entry mode of '*Sanlai Yibu*' in Dongguan, the majority of Taiwanese enterprises have adopted the form of wholly foreign-owned enterprises when they enter into the YRD in order to target the Chinese domestic market (interviews in Suzhou, July 2005 and June 2006). This finding is consistent with other studies (GAO and CHAI, 2006). In the form of WFOE, Taiwanese investors have attempted to prevent disputes and the interference of local governments in the management and operation of their firms, such as they encountered in the PRD, especially Dongguan. In practical terms, Taiwanese firms have encountered difficulties in selling their products in China. The complexity of the distribution systems and inadequate protection of intellectual property and trademarks have been mentioned as some of the major roadblocks. As a result, most Taiwanese firms in Suzhou have their products mainly for export at this stage, despite their original expectation of targeting the domestic market (interviews in Suzhou, June 2006 and January 2007).

Comparisons of development trajectories driven by Taiwanese information technology investment in Suzhou and Dongguan

Over the past decade, the PRD and the YRD in general, Dongguan and Suzhou in particular, have tended to convergence on the development patterns driven by inflows of FDI, especially Taiwanese investment. However, the Dongguan model and Suzhou model are found to be differentiated in their different practices of responding to GPNs. As YEUNG (2006, p. 14) puts it, 'it is strategic because the process does not happen without active interventions and intentional action on the part of the participants'. Moreover, FROMHOLD-EISEBITH and EISEBETH (2005, p. 1252) postulated that institutional forms of cluster promotion have juxtaposed two modes, that is, explicit cluster policies and implicit policies. Adopting the notions from FROMHOLD-EISEBITH and EISEBETH (2005) in relation to the above discussions, the Taiwanese desktop cluster in Dongguan is characterized by 'implicit coupling' initiated from the bottom up by the groups of third- and fourth-tier Taiwanese firms without active participation of the local institutional initiatives. Whereas the notebook cluster in Suzhou could be summarized as 'explicit coupling' implemented top-down by regional and local authorities.

Although Suzhou has been more strategically coupling with the GPNs, the development trajectories may not be dissimilar to Dongguan. This paper argues that the redistribution of Taiwanese investment has not changed the asymmetric power relations between Taiwanese investors and host regions in the mainland. Similar to Dongguan's experience, Taiwanese PC investment-driven coupling in the GPNs has taken place in the absence of local firms in Suzhou, which has led to the territorial disembeddedness of Taiwanese investment. In fact, Suzhou has faced similar challenges to those in Dongguan five years ago when the redistribution happened. In the past few years the YRD has encountered such problems as labour and electricity power shortages which have haunted the PRD. In consequence, there has emerged in recent years the movement of Taiwanese investment from the YRD to northern Jiangsu and Bohai-Rim, etc. The keen competition between the

PRD and the YRD has occurred in similar products in similar sectors, which has led to a decrease in profits. Therefore, increasingly more Taiwanese firms that do not have intensive upstream and downstream linkages in the PC supply-chain have proposed a plan of 'northern migration' from the PRD and the YRD. TEEMA (2006) states that the investment environment in the PRD is deteriorating, that that in the YRD is becoming saturated, while that in the Bohai-Rim is becoming more attractive. Since 2003, around 20 Taiwanese firms have moved out of Suzhou and Kunshan (interview in Suzhou, January 2007). For instance, Quanta, the world number-one notebook ODM, has already established a branch plant in Changshu of Jiangsu province as the production base of its US$100 per notebook computer. Foxconn has developed a new branch plant in Langfang, Hebei province.

It is criticized that Suzhou will follow the development trajectories of Dongguan after the preference policies such as land and tax incentives have finished and the similar problems emerge in terms of a rising cost of labour, a shortage of labour and land, the deterioration of environment, etc. These findings could support the argument by PERKMANN (2006) that branch plants will always be territorially 'disembedded' to some degree depending on the sectoral, technological, and commercial features of their activities. Based on the above analysis, Taiwanese PC production in the YRD is characterized by 'network embeddedness' while a lack of 'territorial embeddedness' as described by HENDERSON *et al.* (2002). This case study substantiates the argument put forth by HENDERSON *et al.* (2002) that the positive effects of embeddedness in a particular place cannot be taken for granted over time. 'Once a lead firm cuts its ties within a region (for instance, by plant closure), a process of disembedding takes place' (p. 453). Similar to Dongguan, through Taiwanese investment Suzhou could be linked with the global economy in a fragmented way lacking of development initiatives of local firms, that is, the so-called 'fragmented globalization'.

It is worth noting that through redistribution in terms of either northern expansion or northern migration, Taiwanese investment has not only participated in the inter-regional competition between PRD and YRD, but also heightened competition in China as a whole. On the one hand, Taiwanese investors could lever the comparative advantages through the strategy of co-location in the PRD and the YRD discussed above. As mentioned by a Taiwanese entrepreneur in Suzhou:

> although Suzhou has good reputations of well regulated and transparent government, Dongguan is more flexible with 'human touch' (*renqing wei'er*) especially in some special occasions (e.g. it is easier to negotiate with local officials when the imported materials are found inconsistent with the previous contracts).
>
> (Interview in Suzhou, June 2006)

On the other hand, Taiwanese investors have strengthened their bargaining power with respective local governments to fulfil the target of cost-down always required by global PC flagships. Taking Firm D, the world's largest producer/supplier of power switches as an example, it first invested in Shijie town in Dongguan in 1992. When the town government realized its northern expansion plan to Wujiang, it provided similar or more attractive conditions for the company. As a result, while Firm D established a new plant in Wujiang in 2002, it built up new branch plants in Dongguan at the same time. From this point of view, Taiwanese investment has heightened inter-regional competition and resulted in fragmented globalization in the mainland.

CONCLUSIONS

Through empirical analysis of regional development in China, this paper attempts to advance recent theoretical debate on the concept of 'regions' and regional studies in the context of globalization. It further extends the empirical literature from the regions in East Asia to the Pearl River Delta (PRD) and the Yangtze River Delta (YRD) in China. The PRD and YRD experiences elucidate that the fortunes of regions are shaped not only by what is going on within them, but also through wider sets of relations of control and dependency, of competition and markets. It echoes the argument that traditional notions of regions as a closed, bounded territorial entity have been questioned and should be changed to open, porous and unbounded entity in the context of globalization (PIKE, 2007). The differences between the strategic coupling of regional development in China and East Asian lie mainly in that the former lacks large local business firms while actively operating in the latter with their lead firm counterparts orchestrating production networks on a global basis. Instead, the strategic coupling of regional development in China with the global production networks (GPNs) tends to be driven by various tiers of Taiwanese personal computer firms in the respective GPNs in the PRD and the YRD as host regions, interacted with their parent firms in home region, and global counterparts orchestrating production networks on a global basis. Moreover, state and local initiatives in China have played as significant mechanisms during the strategic coupling of regional development in the GPNs. From this point of view, whether and to what extent that the PRD and the YRD will follow the development of the East Asia is another valuable issue for further investigation and comparative studies.

The desktop cluster in Dongguan has been driven by bottom-up dynamics of Taiwanese third-tier firms without active local initiatives, the so-called 'implicit' local initiatives to fostering coupling in the GPN. Whereas the notebook personal computer cluster in

Suzhou has been initiated top-down by local governments and fostered 'explicitly' coupling between Taiwanese original equipment manufacturers (OEMs)/original design manufacturers (ODMs) and global lead firms. The redistribution of Taiwanese personal computer investment from the PRD to the YRD, particularly from Dongguan to Suzhou, has demonstrated a trans-local dynamic process, involving global, national, regional, and local levels. In the application of the GPN approach with explicit attention to multi-scalar processes of regional development, this paper has provided a vivid case of regional development that has been strategically coupled with the respective GPNs.

Through the process of relocation of cross-border production, Taiwanese investors could leverage comparative advantages of various host regions and strengthen their bargaining power with local governments in host regions. Through either northern expansion or northern migration, Taiwanese investment has heightened inter-regional competition and resulted in fragmented globalization in the host regions. It is worth noting that the asymmetric power relations between Taiwanese investors and host regions may keep inducing territorial disembeddedness in the process of relocation of foreign direct investment (FDI) inflows and cross-border production. Therefore, well-regulated local institutional initiatives and strategic coupling with the GPNs have become important for the relevant regions that are facing intensifying competitions driven by trans-local dynamics in the era of globalization. Although the PRD and the YRD tend to converge on the FDI-driven regional development patterns over the past two decades, both of them, especially Dongguan and Suzhou, have responded distinctively to changes in the GPNs, especially the strategic needs of the global flagships and Taiwanese OEM/ODMs as well. One of the lessons for Dongguan to learn from the redistribution of Taiwanese personal computer investment from the PRD to the YRD is as described by YEUNG (2006, p. 32) that 'they are unlikely to be effective and sustainable without a full appreciation of the trans-local dynamics in which the region is located'. The case of Suzhou indicates that strategic coupling with the respective GPNs through explicit local initiatives might help local regions to win the inter-regional competition at the early stage. The implicit coupling of the Taiwanese desktop cluster in Dongguan and explicit coupling of the Taiwanese notebook cluster in Suzhou with their respective GPNs and the subsequent transformation of development trajectories have indicated that regions in developing countries, which are facing intensifying competition in the global economy, should take more proactive actions to couple strategically and intentionally with the changes of global economy, rather than respond passively to external control in the era of globalization.

Acknowledgements – Earlier versions of the paper were presented at the AAG Annual Meeting in San Francisco, CA, USA, 17–21 April 2007, and at the 2nd Global Conference on Economic Geography in Beijing, China, 25–28 June 2007. The author is grateful for the constructive comments and suggestions of the anonymous reviewers, Henry Yeung and Dennis Wei. The author's thanks are extended to the Ford Foundation (Grant No. 1085-1022) for supporting the author's visit in the Department of Geography, the University of Utah, and the Fairbank Centre for Chinese Studies, Harvard University, where the paper was improved. Felix Liao and Kevin Leung provided helpful research assistance. Financial support by the Competitive Earmarked Research Grant from the Research Grant Council of Hong Kong Special Administrative Region government (Grant No. HKU7238/04H) is acknowledged. The author is indebted to a number of organizations, firms, and individuals for their kind helps in the field investigations and data collection. All the errors are the author's own responsibility.

NOTES

1. The administrative sphere of the PRD includes nine municipalities under the jurisdiction of Guangdong province, namely Guangzhou, Shenzhen, Zhuhai, Dongguan, Foshan, Huizhou, Jiangmen, Zhongshan, and Zhaoqing.
2. The administrative sphere of the YRD includes 16 cities and consists of Suzhou, Wuxi, Nantong, Changzhou, Zhenjiang, Yangzhou, and Tàizhou under the jurisdiction of Jiangsu province; Hangzhou, Ningbo, Shaoxing, Jiaxing, Huzhou, Zhoushan, Tāizhou, and Jinhua under the jurisdiction of Zhejiang province; and Shanghai as a centrally governed municipality.
3. The author would like to thank the reviewers for clarifying firms at different tiers in the GPN.

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