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A Tale of Two Regions in China

Rapid Economic Development and Slow Industrial Upgrading in the Pearl River and the Yangtze River Deltas

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Abstract
The study of regions has been undergoing an intellectual 'renaissance', resulting in a growing literature on the renewed importance and dynamics of varied forms of regions and regionalism (see Amin, 1999; Lovering, 1999; MacLeod, 2001). However, insufficient research has been devoted to the 'crucial middle' role of regions in bridging and integrating global, national, and local economies. This role also turns regions into highly contested terrains for the diverse tensions and outcomes of economic integration, or lack of it, to play out. These include simultaneous tendencies in competitive and cooperative policies and practices of subnational and local governments versus those of global and local firms, as well as shifting opportunities and constraints on economic development and industrial upgrading. In this article, I advance a thesis that new regional dynamics are capable of mediating or restructuring global-local economic relations in varied ways to either facilitate or hinder the course of local economic growth and industrial upgrading. This thesis is elaborated and validated through a comparative analysis of the Pearl River Delta (PRD) and the Yangtze River Delta (YRD) in China – two of the most dynamic manufacturing regions in the world. This analysis focuses on how the organizational and spatial formations of regionalized global-local production networks, the regional urban hierarchy, fierce inter-local competition, and decentralized governance have led to rapid economic development in two historically and geographically well-endowed regions but may impede industrial upgrading that is crucial to sustaining their economic development. The article concludes by offering improved regional governance approaches as collective solutions to what appears to be a spatially fragmented microeconomic challenge of upgrading to sustainable economic development.

Key words: China • global-local economic nexus • industrial upgrading • Pearl River Delta • regionalization • Yangtze River Delta

1. INTRODUCTION

The study of regions has been undergoing an intellectual 'renaissance' and become increasingly important to a more comprehensive understanding of

the multifaceted relationship between globalization, the nation-state, and local economic development. The renewed interest in regions reflects recent scholarly efforts to wrest fresh insights from scrutinizing new regional realities. This article intends to achieve this goal by demonstrating the importance of understanding the crucial role of regions in linking global and local economies through a comparative analysis of two dynamic regions in China.

The contemporary era of globalization has elevated the significance of regional studies, prompting Scott (1995: 59) to pronounce that '[R]egions are once again emerging as important foci of production and as repositories of specialized know-how of technological capability, even as the globalization of economic relationships proceeds apace.' The resurgent interest in regions has focused on the relative momentum of two seemingly competing tendencies: a trend toward a regionalization and localization of economic activity and production due to simultaneous vertical disintegration and political/administrative decentralization versus a tendency toward global economic integration and the resulting erosion of independent regional economies (see Amin, 1993). Corroborating evidence on the former tendency includes successful industrial districts of closely networked and functionally specialized small- and medium-sized firms in a tightly knit space like the Italian knitwear industry in Modena (Lazerson, 1993). The latter trend, on the other hand, was reflected in the steady decline of older regional economies due to the long-term 'lock-in' development and attempted recovery through continued specialization and internal coherence, as exemplified by the coal-and-steel-dominated Ruhr area of Germany (Grabher, 1993). The rise of global city-regions, mostly in industrialized countries in recent years represents a new spatio-economic form of local-regional responses to global opportunities and constraints (Scott et al., 2001), as exemplified by the Southeast region of England anchored to both London as a global financial center and involving a number of much smaller cities as booming high-tech and info-tech nodes (Hall, 2001).

Introducing the renewed interest in regional studies begs a pair of crucial questions: 1) to what extent are regions autonomous, specialized, and open in the era of globalization: and 2) what does regional autonomy, specialization, and openness mean to local economic development. While the first question calls for understanding a given region's relationship to the national government, its industrial history and structure, and its own institutional and cultural characteristics, the second question points the analytical attention to how the varied ways in which a given region is related to both the global and local economy will either facilitate or impede local economic development. In the next section, I develop the argument that regional dynamics have become crucial in reorganizing global-local economic ties under complex conditions, which in turn stimulate development and challenge industrial upgrading simultaneously.

2. REGIONALIZATION OF THE GLOBAL-LOCAL ECONOMIC NEXUS

The rising importance of regions lies primarily in their stronger role in mediating between globalization and localization as the nation-state has become weaker through decentralized and decentered governance (Chen, 2005), although I would not go nearly as far as Kenichi Ohmae (1995) in claiming that the rise of regional economies has occurred at the total expense of the nation-state. Regions also have become more important than in the past in restructuring global-local economic ties as the latter have become spatially and organizationally more differentiated in either agglomerated or dispersed forms. While regions may take on a more enabling role, they are by no means unified rational actors. Alternatively, regional change and development should be seen as a cumulative spatial outcome of aggregate decisions of various disaggregated actors such as business firms, local governments, and professional associations (Markusen, 2004). And decisions by powerful actors such as multinational corporations often carry strategic reference for and bearing on multiple locations in a regional context (Ho, 2000). These actors' behavior and decisions can add up to a collective force that serves as a 'mediating middle' between the global economy and local economies.

While economic globalization may exert an integrating and homogenizing impact on national and local economies, the global-local economic nexus is more balanced and nuanced. Rosenau (1997) argues that the integrating force of globalization and fragmenting impact of localization blend into *fragmegrative* (his original usage) processes that produce either complementary or contradictory outcomes. Amin and Thrift (1994) countered the thesis that globalization homogenizes by emphasizing persistent local diversity, which includes inter-institutional interaction and synergy, collective representation by many bodies, a common industrial purpose, and shared cultural norms and values. This explanation attaches primary importance to the particular combination of institutional factors across localities that differentiate their development. In a regional context, however, localities are nested in multi-layered spatial and functional hierarchies. To understand a regional hierarchical composition of local economies, it is important to differentiate between how *place* is viewed in relation to *network* and how value *chains* and industry *clusters* fit in.

Place has taken on added importance in the study of globalization, global cities, and regional development (see Orum and Chen, 2003). The greater salience of place is reflected in a new geography of power produced by economic globalization, exemplified by the emergence of global cities like New York, London, and Tokyo as the command and control centers in the global economy (Sassen, 2001). The role of cities or places in a globalized region is more complex as they get tangled up with networks of value chains and industrial clusters. A networked production system in a given region involves input-output links among embedded places. And these links shape the process of industrial upgrading as one occurring through a 'shift from bilateral, asymmetrical, inter-regional trade

flows to a more fully developed intra-regional division of labor incorporating all phases of the commodity chain from raw material supply, through production, distribution, and consumption'(Gereffi, 1999: 52). The relative benefits for the actors involved in a regional division of labor accrue from their positions in different value chains and their power or lack of it in the chains' governance (Gereffi et al., 2005).

Any globally integrated regional production networks contain value chains that vary in where and how they enter, extend through, and exit regions. In one region, the chains may encompass more cities and their hinterlands than in another region. Cities in one region may spread more evenly along different segments of a global value chain, whereas localities in another region may cluster around one distinctive segment of the chain (e.g. manufacturing). The uneven involvement and functions of cities as local nodes in global value chains depend on the size and concentration of industry clusters specific to a region. Given the rich components of a cluster in a region, it may either occupy a single segment (e.g. manufacturing of parts and components in a particular industry) or cover multiple segments (R&D, completion of a high-value-added product, marketing) of a value chain anchored to a locality. In other words, a value chain could thread through multiple clusters in different localities of a regional economy. The spatial configuration of chains and clusters in a given region matter a great deal to its development and integration by enhancing and sustaining the economic competitiveness of the places or localities that host these clusters as constituent parts of that region (Porter, 2000). This logic has made clusters or cluster-based initiatives a highly desirable policy tool for many cities and regions in their efforts to increase growth, productivity, and employment (Cumbers and MacKinnon, 2004), although it was criticized as based on a problematic concept and cautioned as a policy tool (Martin and Sunley, 2003).

Incorporating value chains and industry clusters into analysis of the relative importance of places and networks leads to a more integrated understanding of regional economic development at different spatial scales (Dicken et al., 2001). This synthetic approach is crucial for studying regions hosting complete or partial global production networks, that is, economically globalized or globalizing regions, that drive regional development through value creation and other enhancements (Coe et al., 2004; Yeung, 2005). While global production networks can exert a powerful external influence, its real local impact generally works its way through layers of embedded organizational and spatial relations to either facilitate or inhibit local development and industrial upgrading. Having proposed a more distinctive regional role in mediating global and local economies through clarifying how place, network, chain, and cluster are related, the stage is set for the comparative analysis to explain the coupled and puzzling regional phenomenon of rapid economic development and slow industrial upgrading in the Pearl River Delta and the Yangtze River Delta of China.

3. CHINA'S REGIONAL 'TIGER AND DRAGON'

Imagine that if the GDPs and exports for all major regions of the world are mapped out and up in colored bars, two regions on China's coast would easily stand taller than others. The two regions are widely known and labeled as the Pearl River Delta (PRD) region bordering Hong Kong and the Yangtze River Delta (YRD) region anchored to Shanghai, respectively. While the PRD fueled southern China's emergence and growth as a major region for massive foreign (mostly overseas Chinese) investment and manufactured exports during the 1980s and into the 1990s, the YRD rose as the second regional driver of huge foreign investment into and export out of central coastal China during the 1990s and into the 21st century. Given its earlier exports-induced economic boom, the PRD was seen and touted as a fifth (regional) 'little tiger' following the footsteps of the four tigers of East Asia (South Korea, Taiwan, Singapore, Hong Kong). The YRD, on the other hand, has risen as a regional 'dragon' led by Shanghai as China's 'dragon head.' Despite being often mentioned in tandem and glowing terms, the PRD and YRD have rarely been subjected to a coupled and critical comparison, almost certainly not via an integrated regional analytical lens as discussed in the preceding section. I begin this comparative analysis of the two dynamic regions by providing a brief statistical account of their dominant shares in China's inward foreign investments and exports as powerful engines behind their rapid economic growth (see Table 1).

As Table 1 indicates, the PRD and the YRD together have accounted for the lion's share of China's total inward foreign investment and exports, absorbing as much as 87.2 percent of China's foreign investment and sending as much as 74.6 percent of its exports in 2003. The two regions have moved differently in recent

Table 1 Foreign investment into and exports from the Pearl River Delta (PRD) and the Yangtze River Delta (YRD), China, 2000–05

	Pearl River Delta (PRD)[a] 42,000 sq. km; population 40.77 million; GDP=US$100 billion (2005)		**Yangtze River Delta (YRD)[b]** 101,000 sq. km; population 82.28 million; GDP=US$208 billion (2005)	
Year	Foreign investment	Exports	Foreign investment	Exports
2000	36.1	43.0	27.5	28.7
2001	33.8	41.5	28.6	30.2
2002	28.8	42.2	33.3	31.2
2003	36.6	40.4	50.6	34.2
2005 (1st Half)	19.0	28.0	51.0	37.0

Note: The figures in the four columns are percentages of China's totals.

[a] The PRD is defined as Guangdong and Fujian provinces for data through 2003, and the data for the first half of 2005 refer to Guangzhou and eight other central cities in Guangdong province.

[b] The YRD includes Shanghai, Jiangsu province, and Zhejiang province for data through 2003, while the data for the first half of 2005 pertain to Shanghai, eight cities in Jiangsu province, and seven cities in Zhejiang province.

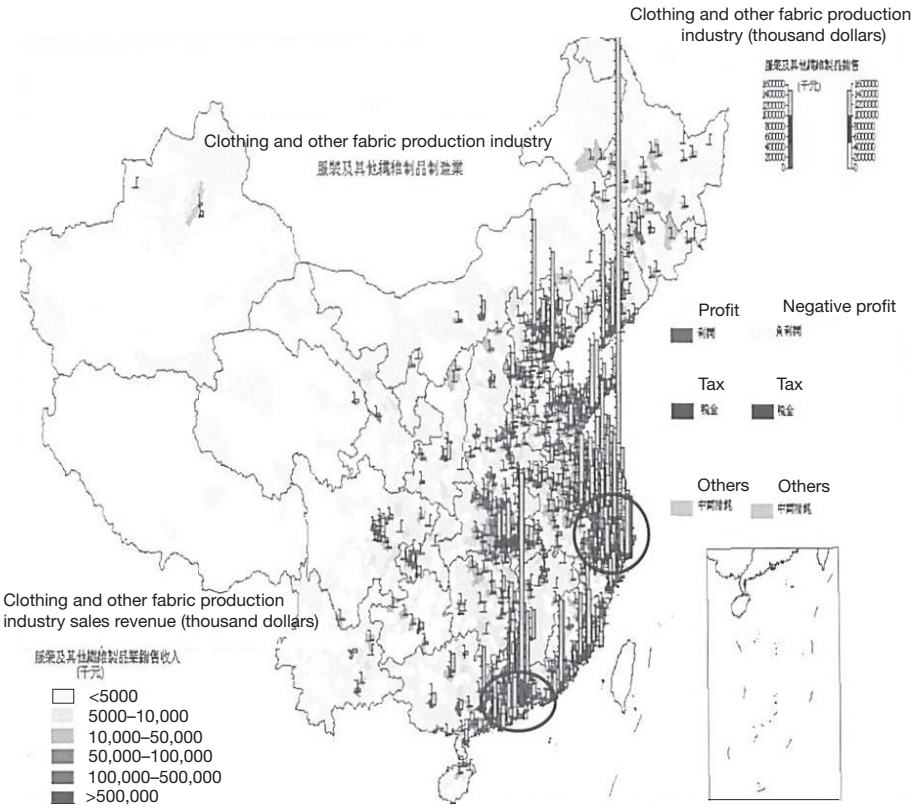
Source: 'Regional Rivalry: Delta Face-off', *South China Morning Post*, 23 September 2005, available online at: [www.scmp.com], accessed 24 September 2005.

years, however. First of all, while the PRD's share of foreign investment in China's total has stagnated and begun to drop, that of the YRD rose sharply after 2001. The two regions' shares of exports have exhibited a similar trend. Second, the PRD is more export-oriented than the YRD, and has had a consistently higher export-to-foreign-investment ratio, which reached 1.47 (28% divided by 19%) in the first half of 2005. The YRD, on the other hand, maintained a rough balance between foreign investment and exports until 2005 when its foreign investment inflow exceeded exports by a factor of 1.38 (51% divided by 37%), suggesting that foreign investment in the YRD became less export-oriented. (The use of different boundaries of both regions between 2003 and 2005 in Table 1 does not distort the parallel trends over time.) In general, the YRD gained momentum over the PRD in attracting foreign investment and promoting exports in the national context.

The influx of foreign investment into and abundant exports from both regions have kept the economic growth of the PRD's cities at an average of almost 15 percent annually since the 1980s and that of the YRD's cities at the same rate since the 1990s. In fact, even with slowed GDP growth of the YRD in the first half of 2005 due macroeconomic adjustment, half of the cities in the region maintained more than 15 percent GDP growth. Among them, the cities of Nantong and Wuxi led others by growing at 15.5 percent, closely followed by Suzhou, Zhoushan, Changzhou, Nanjing, Yangzhou and Zhenjiang, with growth standing at 15–15.4 percent.[1] While the total GDP of the YRD doubled that of the PRD, GDP per capita of the PRD remains higher than that of the YRD due to their population differentials (Table 1). Nevertheless, the GDP per capita gap narrowed over the last decade from 55 percent higher in 1995 of favor of the PRD to about 35 percent in 2004. Folding the GDP of Hong Kong into what may be called the Greater PRD would tilt the total GDP in favor of the PRD and further widen the GDP per capita gap between the two (Fang, 2005). The subsequent comparison of some important aspects of the two regions such as intra-regional core-periphery economic and spatial relations calls for including Hong Kong into the PRD.

The PRD and the YRD are remarkably similar in having had their sustained rapid economic growth driven by foreign investment and exports, which are tied to some shared features of the two regions' industrial composition. Figure 1 displays the striking spatial concentration of and huge outputs from the clothing and related industries in the PRD and the YRD, especially the latter. By these indicators, both the PRC and the YRD are what Florida (2005) calls economic 'hills' – cities or places that manufacture high quantities of the world's established goods. The dominance of labor-intensive and export-oriented industries like garments in both two regions may set them clearly apart from the so-called economic 'peaks' – the few cities that generate the world's innovations or many economic 'valleys', which have little connection to the world economy

Figure 1 The concentration of clothing and other fabric industries in the Pearl River Delta (PRD) and Yangtze River Delta (YRD), China



(Florida, 2005). However, the broad cross-regional similarity in certain spatially agglomerated industries between the PRD and the YRD masks important cross-regional differences across a range of spatially organized industries and intra-regional variations in the spatially networked production of both regions. These more complex and nuanced differences and similarities are probed from both the production network and urban hierarchy perspectives in the following subsections.

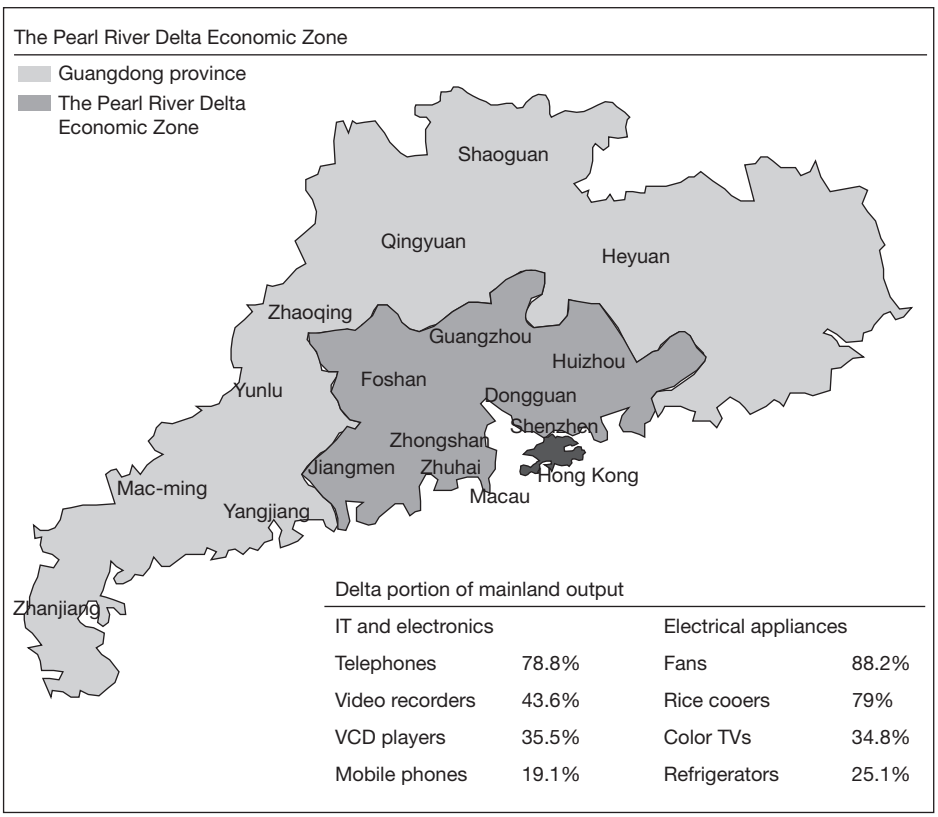
3.1. Characteristics and Relative Strengths of Two Regionalizing Production Networks

Understanding the real development dynamics and challenges of the PRD and the YRD requires a deeper scrutiny beneath the general glowing picture of their rapid growth and booming exports. The first step is to examine the structural and spatial organization of the production networks of the key industries that dominate and drive the two regional economies through absorbing foreign

capital and generating exports. The critical question here is the extent to which these networks are regionalized or regionalizing, that is, whether they exhibit a visible region-wide division of labor across localities of varied sizes, hierarchical positions, and functional influences. The question can be answered by mapping out the array of global-local economic links that tie the cities of either region together as local nodes of any regionalized or regionalizing production chains.

The PRD's stronger export orientation is based on a region-wide industrial system consisting of numerous factories of varied sizes in a cluster of cities that make labor-intensive products for exports. This massive export-driven growth machine has turned the PRD (with Hong Kong and Macao) into the world's 16th largest economy and 10th leading exporter, if it were a country. Approximately 40,000 Hong Kong-owned companies and factories in the PRD employ 10 million workers, more than Hong Kong's total population (Enright and Scott, 2005). These factories, coupled with over 10,000 Taiwan-owned factories, churn

Figure 2 The Pearl River Delta (PRD) region and beyond: a manufacturing and export powerhouse



Source: Guangdong Statistical Yearbook (2001).

Figure 3 Regionalized global-local production links embedded in cross-border production chains in and out of the Pearl River Delta (PRD)

- **A multinational company** owns brand names, sets product specifications, subcontracts, and controls wholesale channels and retail markets.
- **Taiwan** contributes capital, manufacturing technology, equipment, management expertise, raw materials, and intermediate inputs.
- **Hong Kong** contributes manufacturing management, product design, accounting and legal services, customs clearance, forwarding, logistics and other producer services.
- **Pearl River Delta (PRD) cities** contribute land, labor, and some raw and semi-processed materials.

Source: Modified from Chen (2005: 70).

out disproportionally large shares of China's consumer electronic products for the world markets (Figure 2).

Export-oriented manufacturing in the PRD is embedded in its regionalized global-local production links through global commodity chains that span Taiwan, Hong Kong, and the PRD cities in Guangdong province. Commodity chains consist of flows between the nodes, the relations of production, the dominant organization of production, the geographic loci of production, and other backward and forward linkages (Gereffi, 1994). Figure 3 displays the complementary inputs from and the functional links between the four geographic nodes of exemplary

commodity chains that link the PRD to the global economy through Hong Kong and Taiwan.

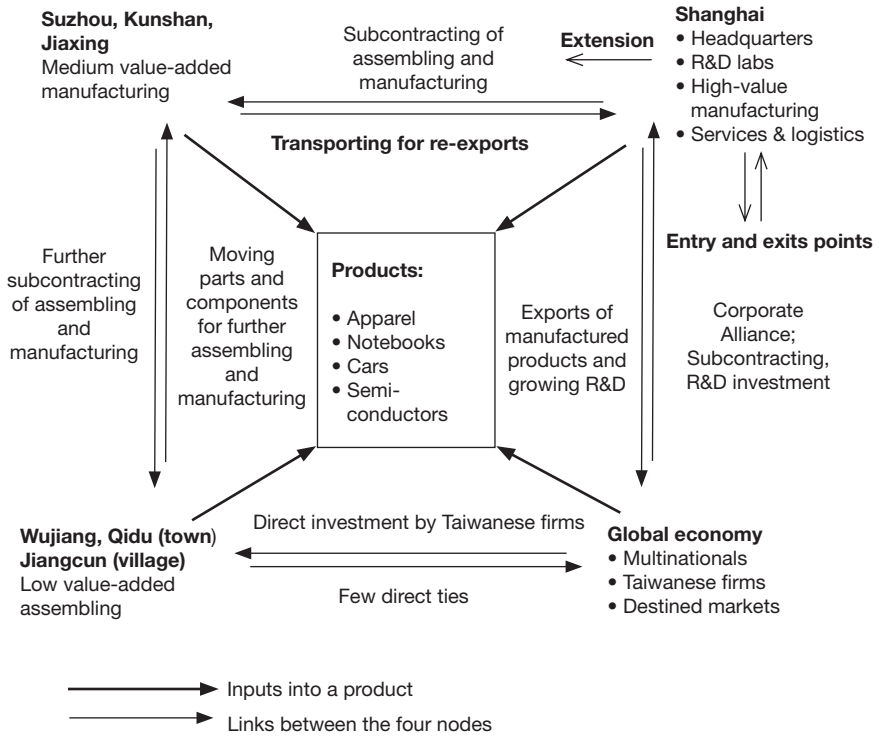
With regard to a typical chain of athletic shoes, multinationals like Nike and Reebok used to order the bulk of shoes from their subsidiaries or subcontractors in Taiwan, which began to move their factories into the PRD cities in the 1980s. Most of the raw materials were shipped from Taiwan through Hong Kong to the mainland sites, at least initially before they could be increasingly sourced locally. Each of the shoe factories would use a few Taiwanese resident managers who have been in the shoe business for years and might also speak the local dialect. Hong Kong-based staff of companies like Nike have continued to handle accounting and designs, make sure the sample and raw materials reach the factories on time, and transport the finished Nike shoes out of China through Hong Kong toward their destined markets. The chain of toys is similarly structured: toys are designed in Hong Kong, assembled in the PRD, often with a Taiwan-made chip for talking dolls, and finally packaged in and shipped from Hong Kong to world markets (see Chen, 1994, 2001).[2]

The revealed commodity chain structure of labor-intensive industries in the PRD has revealed both the cooperative and competitive aspects of industry-level inter-firm ties among the PRD, Hong Kong, and Taiwan. The broad distribution of benefits for the different nodes of a given chain varies according to their relative position on and contribution to its overall value. Generally speaking, multinational companies are most profitable by controlling marketing and retails. Hong Kong and Taiwanese firms control the less profitable segments of order receiving and manufacturing services, while PRD-based factories profit the least by occupying the middle segment of manufacturing (Chen, 1994, 1998, 2001).

Somewhat different from the dominance of labor-intensive industrial products in and from the PRD, the YRD features a more diverse set of industries of varied global connectivity and capital and technological intensity, ranging from garments to cars and to semiconductors (see Figure 4). The automotive industry in the YRD involves heavy capitalization and advanced manufacturing technology. Shanghai Volkswagen or SVW (a joint venture between Shanghai Automobile Industrial Corporation [SAIC] and VW) has already built an integrated 'motor city' (and a Formula 1 track) in the town of Anting on the outskirts of Shanghai, representing a spatial extension of manufacturing from Shanghai into the larger region. Shanghai GM or SGM (a JV between SAIC and General Motors) has begun to source simple, specialized components from small suppliers located in towns at the far edges of the YRD. Hankook, a large Korean tire-maker based in the city of Jiaxing in Zhejiang province, about one hour away from Shanghai, is a major supplier of tires to VW from the 50 percent of its domestic sales through its marking functions in Shanghai.[3]

The electronics/PC/IT industries involving primarily Taiwanese capital have become agglomerated in and around Shanghai and are more technology-intensive and advanced than their counterparts in the PRD. More interestingly,

Figure 4 Regionalizing global-local production and value chains into, through, and out of the Yangtze River Delta (YRD)



- **A multinational company** owns brand names, sets product specifications, subcontracts manufacturing, and controls wholesale channels and retail markets.
- **Shanghai** (central node of the YRD) contributes land, some capital, skilled labor, some production equipment, and management expertise; provides some producer services such as accounting, insurance, and legal services, custom clearance, shipping logistics, and increasingly R&D talent and outputs.
- **Suzhou, Kunshan,** and **Jiaxing** (secondary cities in the YRD) contribute medium-cost land and labor, intermediate inputs, manufacturing expertise, and also finished products to be moved (back) to Shanghai for exports.
- **Wujiang, Qidu** and **Jiangcun** (third-tier cities, fourth-tier towns, fifth-tier villages in the YRD) contribute lowest-cost land and labor, some raw processed materials, and ships parts and components to secondary cities for further assembling or manufacturing.

Source: Modified from Figure 3 above.

these industries also have developed a spatial specialization and redistribution among the key YRD cities in recent years as reflected in electronic notebooks in Shanghai and Suzhou versus semi-conductor chips in Shanghai. These industries vary in the spatial division of labor and inter-firm links between the global economy and the YRD and within the latter. In notebook manufacturing, the Taiwanese company of Quanta, the world's number one notebook maker that accounted for a quarter of the roughly 49 million notebooks shipped in 2004,

employs 20,000 workers at its US$48 million factory complex in Shanghai where more than 90 percent of its output is generated and for Dell and HP orders back in the US. While manufacturing, packaging, and shipping is done in and from Shanghai, the most valuable components of the notebooks are designed and sourced overseas, with memory chips from the US, Korea, and Taiwan, graphic processors designed in the US and Canada but made in Taiwan, and liquid-crystal-display screens from Korea, Taiwan, and Japan. However, more and more of the notebook component production has moved to near Shanghai (Dean and Tam, 2005). The smaller Taiwanese rival of Quanta (Compal Electronics), which also makes laptops for customers such as Dell, employs 13,000 workers at a notebook factory in Kunshan. The Taiwanese company of Asustek – the world's top producer of PC motherboards and is developing its own brand of notebooks – has a work force of 45,000 in Suzhou. Beyond notebooks, Asustek makes iPods for Apple in Suzhou, while the Taiwanese firm of Hon Hai – the world's second largest electronics contract manufacturer – employs up to 100,000 workers in both Kunshan near Shanghai and the PRD to make the PlayStation 2 for Sony among other products (Einhorn, 2005).

The garment industry provides a still different example of how highly labor-intensive, low-tech, and export-oriented goods are made by a regional division of labor embedded in inter-local flows of raw materials, intermediate inputs, and transport logistics. Despite the internal attrition of textile mills in and outward relocation of clothing factories from Shanghai to smaller YRD cities due to highly inefficient state control and ownership in these industries, Shanghai and the surrounding region has remained a dominant center of clothing manufacturing (see Figure 1). Hundreds of surviving state-owned garment factories now compete fiercely to meet the high standards of quality, delivery, service, and price of the international markets. For example, approximately 60 apparel manufacturers funnel knitted apparel to Shanghai Knitwear, which is the largest exporter of knit clothing in China and shipped 2.5 million t-shirts to the US in 2000 alone (Rivoli, 2005). Large US and European clothing retailers continue to flock to Shanghai and other cities in the YRD for more sourcing (Fong, 2005). In particular, the apparel industry in some smaller YRD cities has done well in using close physical and industry connections to Shanghai as China's fashion center.

3.2. From Nodes in Different Chains to Positions in a Regional Hierarchy

From a regional production chains angle, the PRD and the YRD appear to share more similarities than differences with regard to the distinctive presence and relational structure of largely labor-intensive and export-oriented industries. To search for more striking and subtle cross-regional differences, I shift the analytical focus on core, secondary, and peripheral cities as various nodes in the production chains to them serving different (and perhaps complementary) roles

in the respective regional hierarchies. This is essentially a shift from a horizontal to a vertical analysis of how cities of different sizes and complexities function both independently and in interdependence with one another. I begin with the two core cities or regional centers of the PRD and the YRD – Hong Kong and Shanghai. While some may view Guangzhou and/or Shenzhen as core cities of the PRD, Hong Kong has dominated the region from its much more powerful position and strategic location as the major source of investment capital, management experience, and export outlet. This renders Hong Kong squarely and fairly the regional core in a similar fashion as Shanghai for the YRD.

3.2.1. Different but Dominant Regional Cores: Hong Kong versus Shanghai

Since the purpose of this article and lack of space do not allow a full-fledged comparison of Hong Kong and Shanghai, I first present a set of most important economic indicators on the two cities to highlight their different structures and functions (see Table 2). Then I proceed with a restricted two-pronged examination of their recent development and key regional roles (in light of the statistics in Table 2 and Figure 4), followed by a brief look at the perceptions of their development and roles based on survey and interview evidence. As Table 2 shows, while Hong Kong still led Shanghai in total and per capita GDP, it had trailed Shanghai in GDP and investment growth. The striking difference between Hong Kong and Shanghai's economic composition reflects their very different functions. Hong Kong is almost exclusively a service center, whereas Shanghai is more balanced between manufacturing and services. This difference is partly reflected in Hong Kong's much stronger role as a trading and transit trade hub.

Hong Kong's development and role has been shaped by its evolved economic relations with the PRD. Tuan and Ng (2002) identified three stages in the transition of Hong Kong's economy as it became more integrated with the PRD. And they were referred as: 1) cross-border operations (1980–7) during which Hong Kong shifted partial manufacturing operations and original equipment manufacturing (OEM[4]) to the PRD; 2) direct outward investment (1988–92) during which Hong Kong shifted mid-stream manufacturing production to the PRD to achieve maximum re-exports; and 3) Hong Kong relocating whole plants with more service-oriented operations to the PRD since 1992 and becoming almost exclusively focused on manufacturing management (Tuan and Ng, 2002). What is most revealing about this shift in Hong Kong's ties with the PRD is not the continued decline of Hong Kong's manufacturing sector from 46 percent of total employment in 1980 to five percent in 2002 (Chen, 2005). It has something to do with the overwhelming spatial concentration (almost 70%) of Hong Kong-owned factories in the PRD. And it has a lot more to do with how Hong Kong's role in servicing the PRD has shifted.

Table 2 Economic indicators on Hong Kong and Shanghai, 2003

Economic indicators	Hong Kong	Shanghai
Population	6.8 million	17 million
Working population	3.2 million	8.1 million
Area (sq. km)	1098	6341
Agriculture's share of GDP	0%	1.5%
Industry's share of GDP	5%	50.1%
Service's share of GDP	95%	48.4%
GDP (2003 price)	US$152 billion	US$76 billion
GDP per capita (2003 price)	US$22,417	US$5644
GDP (based on purchase power parity, PPP)	US$22,991	US$8941
GDP 10-year growth rate (2000 market price)	0.4%	15.4%
GDP per capita growth rate (2000 market price)	0.1%	14.8%
Fixed assets investment growth	-3.5%	12.0%
Imports	$226 billion	$64 billion
Exports	$218 billion	$48 billion
Re-exports	$203 billion	--
Service's ratio to GDP	44.9%	21.3%
Trade's ratio to GDP	290.4%	18.0%

Sources: Adapted from Tuan and Ng (2006: 9); Lui and Chiu (2007: figure 6.2); and Shanghai Statistical Bureau (2004: 12).

The shift has occurred along two dimensions. First, Hong Kong companies have relocated some operations of service nature such as R&D, design, prototype manufacturing, and logistics to the PRD. However, they have kept high-level services like advanced R&D, manufacturing management, and offshore trade in their Hong Kong headquarters (Tuan and Ng, 2006). Second, Hong Kong has reasserted its broader service role not only by growing its traditionally strong banking and finance sectors, but also other services such as professional services, trading, and re-exports. As another example, the number of Chinese state-owned companies listed on Hong Kong's stock market increased from six in 1993 to 72 in 2004. In addition, the number of multinational corporations' regional headquarters in Hong Kong rose from 602 in 1991 to 944 in 2001 and then 1167 in 2005, while the number of regional offices increased from 278 in 1991 to 2631 in 2005. And 1046 of the 1167 regional headquarters are responsible for business in China, and more of these regional headquarters engage in wholesale, retail, and trade-related services. Hong Kong's strategic role in bridging the global economy and China's economy and in servicing the latter has become stronger (Lui and Chiu, forthcoming) even as its dominant service function for the PRD gets consolidated.

Turning to Shanghai in the YRD, its rapid economic growth (see Table 2) also has been accompanied and borne out by its remarkable physical transformation, with nearly 4000 modern high-rises erected over the last decade. The Pudong New

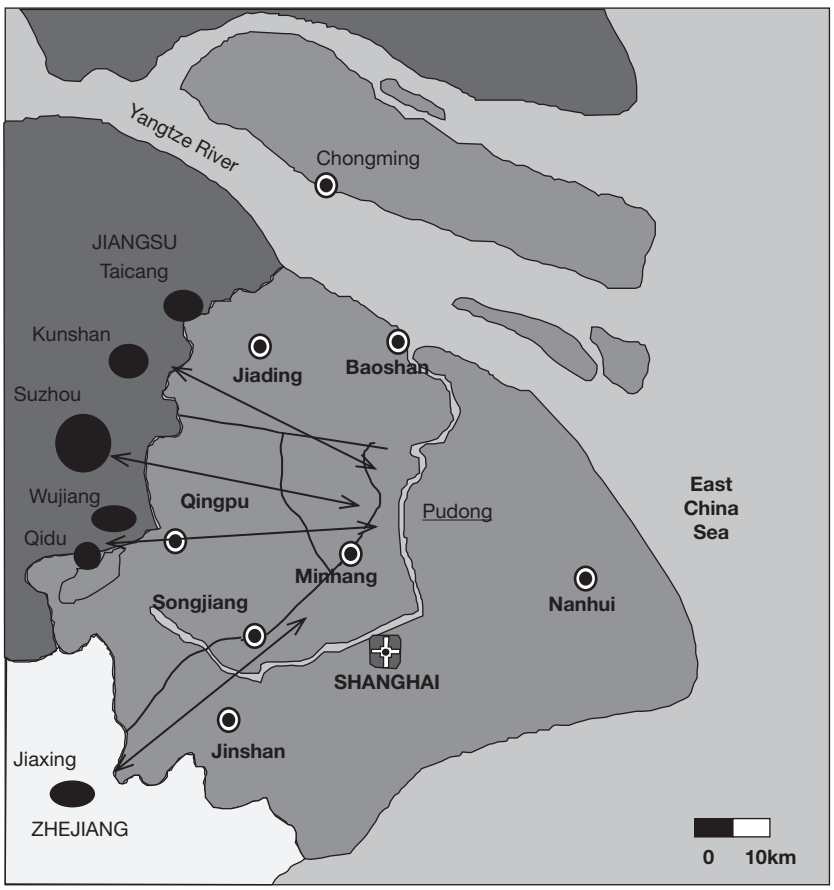
Area – Shanghai's previous backwater of rice paddies and farm houses – is now dotted with modern factories and commercial skyscrapers, including the world's tallest hotel, with Asia's second tallest building going up after delays caused by the Asian financial crisis in 1997–8. Receiving US$11billion in foreign investment in 2003, Shanghai ranked first among all Chinese and non-Chinese cities as a single-city destination of foreign investment in the world. Ranked outside the world's top 10 ports just five years earlier and 25th in 1994 (Lambert, 1996), Shanghai passed the Korean port of Pusan and the Taiwanese port of Kaohsiung in both volume and number of 20-foot equivalent units (TEU) containers and became the world's third-busiest port behind only Hong Kong and Singapore in 2003 (Dunn, 2005). And with opening of the new Yangshan deepwater port to the city's south in December 2005, Shanghai is poised to take over the title of the world's largest and busiest port by 2010.

While growing rapidly from inward foreign investment and booming exports, Shanghai has experienced a major restructuring of its economic system and thus faced a major dilemma regarding its role at varied scales. Behind the strong push of the Shanghai government to promote the service sector and downsize the declining state-owned manufacturing industries, the industries' share of the GDP dropped from 63.8 percent in 1990 to 57.3 percent in 1995 and then to 50.1 percent in 2003 (see Table 2). In terms of employment, the industries' share of the GDP declined from 54.6 percent in 1995 to 39 percent in 2003, while the services' share rose from 33.5 percent to 51.9 percent (Shanghai Statistical Bureau, 2004). Within the service sector, producer services such as finance, insurance, and real estate (FIRE), which are central to a global city (Sassen, 2001), grew most rapidly, as its combined employment in Shanghai's total service employment rose from two percent in 1997 to about 10 percent in 2003 (Shanghai Statistical Bureau, 2004). This economic restructuring has facilitated the emergence of Shanghai as an attractive new hub for multinationals' regional headquarters and R&D centers (see Figure 4). Fifty-five multinational companies set up regional headquarters in Shanghai after 2003, leading to increased memberships for the city's American Chamber of Commerce, while Amcham membership in Hong Kong shrunk (Overholt, 2004). There was an average annual addition of 30 multinationals' R&D centers in Shanghai from 2002 to 2005. The total number of R&D facilities of multinationals in Shanghai is expected to grow from around 150 in 2005 to around 200 by the end of 2008. The R&D centers that GE and Alcatel have set recently in Shanghai rank among their top three global R&D centers, respectively (Du, 2005).

Shanghai's shift from a dominant manufacturing to a more service-oriented center with increasing strength in business services and R&D moves it a little closer to the functional profile of a global city like Hong Kong. This generally favorable transition, however, has thrust Shanghai into an unfavorable scenario of balancing the continued growth of its advanced service sector, which is

expected of a global city, versus maintaining its dominance as a traditional regional manufacturing hub for the YRD. Regardless of whether Shanghai can be successful of readjusting and rebalancing its dual role as a globalizing city and a regional manufacturing hub, it is a crucial part of Shanghai's image and functionality that are perceived quite differently from those of Hong Kong. Having spent many years in Hong Kong, China watcher and analyst William Overholt (2004) saw its advantages in many business services such as accounting, law, and investment banking, and some of these have spilled over into the PRD over time and facilitated the latter's edge in logistics and supply-chain management, especially in rapidly changing product areas like toys, gifts, and fashion. Shanghai, according to Overholt, has advantages in engineering, R&D, and design due its concentrated human talent and top-notch universities, with another advantage in the economies of scale from the critical mass of heavy

Figure 5 The Yangtze River Delta (YRD) region around Shanghai: spillovers and back flows



industries like petrochemicals, steel, automobiles, machines tools, and information technology. Overholt's conclusion was that most Fortune 500 companies focused on China's domestic market belong in Shanghai, while most exporters and many sophisticated service industries belong in Hong Kong. Drawing on annual surveys of both multinational and local business executives in both Hong Kong and Shanghai from 2001 to 2004, Tuan and Ng (2006) found that while Hong Kong led Shanghai in economic development conditions, investment environment (by the largest margin), and international image, Shanghai closed the gaps with Hong Kong on all three dimensions.

Perceptions aside, the sustained economic boom of Shanghai has driven up land and labor costs in its densely populated central city where developable land has become scarce and thus more difficult and expensive for investors to lease. The average wages of both factory workers and technicians in Shanghai are now double those in interior cities, while the average pay for managers and senior managers in Shanghai is three times higher. In 2005, the annual pay of manual labor in Shanghai averaged US$2979 compared to US$1787 in Chongqing and US$1489 in Chengdu. Land cost in Shanghai has become 30–40 percent higher than secondary cities in the YRD (Roberts, 2006). As multinational have become less willing to build new manufacturing plants in Shanghai, development has begun to spill into the surrounding (YRD) region, especially to booming secondary cities such as Suzhou (see Figure 5).

3.2.2. Rising Secondary Cities from Nowhere: Dongguan versus Suzhou

To better understand the conditions and outcomes of a rising secondary city like Suzhou in the YRD context, it is helpful to bring in Dongguan as both a different and similar case of a booming secondary city in the PRD for comparative analysis. Bordering Shenzhen (and thus close to Hong Kong) and sitting right on the railroad between Guangzhou and Hong Kong, Dongguan is the most favorably located secondary city in the PRD. This location, coupled with its flexible policies and incentives, has turned Dongguan into one of the 'hottest' spots for Hong Kong and Taiwanese investments in over 15,000 enterprises. They account for 80 percent of Dongguan's gross industrial output, 62.5 percent of its economic growth, and 90 percent of its exports in 2002, pushing Dongguan up to China's third-ranked city in exports volume behind only Shanghai and its neighbor Shenzhen (Mao et al., 2004). A rural township surrounded by rice fields and known for growing litchis in the 1980s, Dongguan has risen to a booming manufacturing center that stretches 2520 sq. km and has over five million people. With large revenues from leasing increasingly valuable land for building factories, the local government is capable of funding the entire primary and secondary education at no cost to residents and of experimenting with completely free health insurance and old-age pensions. At the household level, the level of wealth in Dongguan is reflected in a 20 percent ownership of private

cars, the highest of all cities in Guangdong province and one of the highest in China (Chen, 2005).

Underlying this explosive growth is a difficult and complex process of Dongguan's evolving manufacturing sector, which is crucial to understanding the central theme of simultaneous rapid economic development and slow industrial upgrading. From the 1980s to the early 1990s, Dongguan was primarily involved in simple cross-border processing and assembly of labor-intensive food, clothing, and home electronics products for exports to and through Hong Kong. This was aptly characterized as 'Hong Kong as the shop window and Dongguan as the factory floor.' The limited IT activity in Dongguan was confined to assembling and finishing at the low value-added segment of the international production chain organized by and through Hong Kong companies based on cheap local land and labor. Since both raw materials, parts, and half-finished and finished components of IT products came from and went through Hong Kong (with the two high value-added ends being controlled from the outside), Dongguan was stuck in the low value-added middle with few inter-firm supplier-manufacturer links that benefit the local economy (Mao et al., 2004).

The mid-1990s ushered a new and more advanced stage for Dongguan's manufacturing sector, which began to take advantage of more Taiwanese IT companies moving more complete production networks to the PRD due to greater price pressure for OEM order from multinational corporations and growing competition from Southeast Asian IT firms. This process involved a core Taiwanese IT company with both or either OBM or ODM[5] relocating to Dongguan first and then bringing a group of its small and medium-sized suppliers of parts and components over to form a complete production and assembly network. A good example is the nearly half of the about 5000 Taiwanese-owned enterprises in Dongguan that supply global computer giants. As some Taiwanese firms have shifted more manufacturing of computer components (switch power supply units, motherboards) and peripherals (monitors, keyboards) to Dongguan, upstream suppliers of plastics, resistors, and printed circuit boards have followed them there, which was also facilitated by preexisting social networks in Taiwan that continued in Dongguan (Chen, 2001, 2005). This makes it possible for a PC to be assembled and shipped in only few days within an area of 50 sq. km in which specialized suppliers of such peripherals as monitors and keyboards cluster with motherboard manufacturers and final assemblers. The real local spillover benefit is that there are now approximately 1000 indigenous IT companies in Dongguan that can supply a whole range of parts and components like printed circuit boards and liquid crystal for Taiwanese-owned PC manufacturers (Mao et al., 2004). Today Dongguan is the world's largest supplier of computer peripherals. And it has prompted IBM and Compaq, which control the front-end of the PC production chain, to have set up purchasing centers there. Not surprisingly, the export of PC-related products reached US$6.7 billion and accounted for over

40 percent of Dongguan's total exports. To foster this competitive advantage further, the city of Dongguan has built several science and technology parks focusing on the computer-related industries (Chen, 2005). Dongguan illustrates the significant role of a rising secondary city with externally linked and specialized industry clusters in driving local economic development with some industrial upgrading.

In comparison to Dongguan, Suzhou has risen to a dynamic secondary city in the YRD from a very different background but reached a similar economic status as Dongguan along a distinctive development trajectory. Once a pleasant merchant town known for its fine silks, elegant gardens, and canal-lined streets, Suzhou is the oldest and one of the weathiest cities of Jiangsu province. It once thrived as a trading center along the Grand Canal built between Hangzhou to Beijing in the seventh century, and the silk trade and textiles remain important to its modern-day economy. Located only about 100 km west of Shanghai, Suzhou's fortune has long been tied with Shanghai through a reputation as the latter's 'backyard garden'. Despite and because of those fine qualities, Suzhou existed as an industrial backwater to Shanghai. With regard to the lack of industrial tradition, Suzhou was not dissimilar to Dongguan before their recent manufacturing boom.

Suzhou has pursued two different models of development as opposed to Dongguan's two sequential stages. From the early 1980s to the early 1990s, government-led development of Suzhou's economy focused on township and collective enterprises (TVEs) – the so-called 'Southern Jiangsu (Sunan) economic model', which was also followed by other nearby cities. While generally successful in stimulating pent-up economic growth and rural industrialization, the Sunan model ran into serious problems from its inherent constraints such as local government interference, lack of economies of scale, duplication of production and environmental pollution. In the next decade Suzhou switched gears, reducing the role of state-owned companies and concentrating on bringing in foreign capital. From 1997 to 2002, the share of industrial output for state and collective enterprises dropped from 58.9 to 9.8 percent, while that of foreign-invested entities shot from 33.2 to 55.8 percent.[6] What became known now as the Suzhou model (as opposed to the old Sunan model) relies heavily on careful planning and aggressive action by the municipal government to create an attractive investment environment, which differentiates Suzhou from other cities in the YRD. The most prominent and successful planned project is the Suzhou Industrial Park (SIP), which began as a 35–65 percent joint venture between the Chinese and Singapore governments in the early 1990s. The Singapore side effectively jumpstarted Suzhou's snowballing foreign investment with its technical know-how, and the large swath of land east of the old city morphed into a meticulously planned suburban community with efficient infrastructure and corporate campuses. A second large-scale planned project is the Suzhou

New District (SND), which the municipal government developed in the western part of the city as a sort of rival zone to the SIP.[7]

The SIP and the SND now host the operations of 107 Fortune 500 companies and most of the over 5500 foreign enterprises in Suzhou, with over 16,000 foreign expatriates working in the two parks. Electronics and telecommunications equipment make up the largest portion of the city's broad industrial base. High-tech firms like Panasonic, Philips, Nokia and Alcatel have large presences there. Suzhou exported 16 million laptop computers (taking only five days to assemble one) valued at US$10.9 billion in 2005, and makes more than a third of the world's mice as Logitech's largest production base (see later). Semiconductors have also become a major business, as chipmakers National Semiconductor, Solectron, Fairchild, and AMD have all moved into town. Besides being a manufacturing behemoth, Suzhou is also gaining a reputation as an R&D-friendly town. More than 30 top-500 companies in the city have set up R&D centers, and SIP plans to push for more growth in technological and R&D sites. Even as some firms move their assembly operations to cheaper, mid-sized cities in the larger region, they are staying in Suzhou for research.[8] This massive influx of foreign investment has fueled Suzhou's economy. In 2005, Suzhou's GDP ranked fifth in the country at US$50.8 billion, and its industrial output totaled US$150 billion, good enough for second place behind Shanghai after topping the list in 2004. Suzhou's manufacturing now accounts for over 60 percent of GDP compared to less than 50 percent for Shanghai. Suzhou also received US$6 billion in foreign investment in 2005, second only to Shanghai.[9]

Its prosperity aside, Suzhou's development strategy has become heavily dependent on foreign capital. Of the city's bounding growth figures in recent years, foreign investment accounts for over 70 percent. The massive foreign investment-driven exports not only cost huge amount of energy and resources to produce but also the local government hefty export tax rebates every year. For all the thriving foreign-invested enterprises in town, there are practically no significant homegrown businesses. The Suzhounese have become relatively poorer – while Suzhou's per capita GDP is higher than Shanghai's, its per capita income is about half that of Shanghai.[10] Local government officials see this heavy dependence on foreign investment as very imbalanced like walking on two very uneven legs, with the one based on foreign capital being long and strong and the one involving indigenous capital being short and weak. They also expressed a sense of potential crisis in which foreign companies will pick up and move to lower-cost cities in northern Jiangsu or the interior of China, leaving the local economy to weak indigenous companies.[11]

As an anticipative move, the Suzhou government has been luring Chinese companies in Shanghai to relocate to Suzhou using its comparative advantage in lower wages and cheaper land, which can be as low as only a fifth that of Shanghai depending on locations. Although continuing to lose white-collar professionals

to Shanghai due to the latter's higher salaries and standard of living, Suzhou has attracted some from interior cities like Xi'an, which has a concentration of well-educated people, and some employers are willing to offer senior managers salaries comparable to Shanghai so that they may come to and stay in Suzhou. Since 1999, Suzhou has attracted over 1000 industrial enterprises set up by Shanghai based companies with a total capitalization of over US$5billion. Shanghai has become the largest investor in Suzhou, accounting for over 35 percent of the total capital investment by 2004 (a sort of extension shown in Figure 4). More generally, the Suzhou government has officially adopted the policy or strategy of more actively linking with Shanghai through both competition and cooperation across different industries and services. This policy is characterized as simultaneously playing the 'best supporting role' for and occupying a complementary niche versus Shanghai.[12] While Suzhou's manufacturing boom has helped narrow its development gap with Shanghai in terms of very recent GDP, foreign investment, and exports, it still sees itself as a secondary city in the YRD relative to the dominant regional core of Shanghai.

3.2.3. The Vitality and Vulnerability of Bottom-tier Manufacturing Clusters and Places

Does the rise of secondary cities like Dongguan and Suzhou have a developmental influence on the smaller cities and towns below them in the urban administrative hierarchies? What are the opportunities and constraints for smaller and lower-ranked places to grow via their direct and indirect ties to the secondary cities and regional cores of Hong Kong and Shanghai? The networked production systems in both the PRD and the YRD (shown in Figures 3 and 4) suggest certain development advantages and disadvantages. Having the lowest land and labor costs, coupled with geographic proximity would seem to favor small towns as attractive and accessible sites for the most labor-intensive assembly and manufacturing operations, which may 'lock' them into the least profitable and dependent segments of the global-local production chains. Both realities are illustrated by the small places with distinctive manufacturing clusters in the PRD and the YRD.

In the PRD, the concentration of IT production in Dongguan has triggered spatially clustered specialization in the manufacturing of PC peripherals and other products in its towns. The town of Qingxi, with only 30,000 residents, hosts several large-scale manufacturing facilities of seven large Taiwanese PC companies traded on Taiwan's stock market. The town turns out two million monitors, 700,000 keyboards, and 13 million PC boxes (20% of the world's total) a year (Chen, 2005). While this was driven largely by production cost considerations and the spatial benefit from clustering, other factors make towns slightly beyond the main PRD cities attractive to overseas investors. A Hong Kong company chose to build a plant in the town of Xixiang just outside Shenzhen, because it had social connections with one local official there. In addition, Xixiang not only

is close to Hong Kong but also lies beyond Shenzhen's bureaucratic regulations, which tend to be heavier than its surrounding areas (Lee, 1998).

The growth of many towns in and around the PRD cities has led some making famous local brand products to register them as collective trademarks, including Houjie furniture, Nanhai Yanbu undergarments, Guzhen lightings and Xintang denims. The Dongguan town of Dalang, which is renowned for its woollen textiles, recently announced its plan for building Dalang into an International Brand Name and enhancing its international reputation. In early 2006, the Guangdong provincial government designated Dalang (China's celebrated town for woollen jumpers), Shantou's Chenghai (for toys) and Chaozhou's Fengxi (for ceramics) as pilot units for regional brand building. Dalang has asked the industry associations concerned to assist in the registration of 'Dalang' and 'Dalang Woollen Textiles' as trademarks. Efforts have been made to have the trademarks cover all relevant categories. The township government of Dalang will inject over one million US dollars as a start-up fund to cover expenses incurred in the hiring of experts, trademark design, and planning. There are estimated to be over 100 specialized industrial clusters in towns like Dalang in Guangdong province, mostly in the PRD. Most of these specialized towns started off as family workshops and many of them made their first large sales through carrying out OEM operations.[13] Despite using the branding strategy to elevate the position ad reputation of the PRD's towns in the global production networks, it is far from being sufficient to change their nature as specialized production sites for low-cost exports.

The development of manufacturing towns in the YRD is similarly dynamic and uncertain. The county city of Wujiang under Suzhou (see Figure 5) has several specialized manufacturing towns (see the lower-left corner of Figure 4). The town of Jinjiaba, with only about 50,000 residents, is crowded with several hundred small factories making and assembling steel frames used for constructing factory or office buildings, which makes the town the largest cluster with the largest output of this product in China. Everyday as many as 5000 salesmen for these factories roam the country to sell steel frames, which makes it quite a business story. In two towns specialized in making cotton and synthetic fabrics and extracting silk threads, there are over 100,000 water-powered looms humming in small and often makeshift factory buildings scattered in the villages around the town centers. Many peasant households also own a couple or handful of these looms and use them for subcontracted work at home during the slow farming season. These preliminarily processed fabrics are generally sold as inputs to clothing companies in the towns of neighboring Zhejiang province, which make garments for export. Given the constant pressure on the price of the fabrics, some small factories and individual families periodically have to shut down production to avoid selling their fabrics at a loss.[14]

The town of Qidu under Wujiang city (see Figure 4) illustrates how local manufacturing clusters are globally linked through a partially regionalized

production network. Qidu claims to have China's largest cluster of electrical and electronic cable-making factories that turn out the largest share of the country's cables for power generation plants and broadband connections. Related to this cable-making cluster is a large number of very small factories making electrical and electronic components that use thin copper wires. Increased copper price in 2006 has forced many cable and electrical components factories to suspend production because buying much more expensive copper to continue production would put them at a financial loss. To catch the windows of opportunity for drops in copper price, a peasant-turned-entrepreneur operating a tiny factory making car lights in Jiangcun village of Qidu town (see Figure 4) would get up and get online in the morning to watch copper price on the London Commodity Market and then track the price movement on the Shanghai Commodity Market in the afternoon (due to the time difference). This would help him decide whether to buy a roll of copper wire to fill an order of electrical switches for car lights from a Mercedes plant in Turkey through a middleman located in another city in Jiangsu province.[15] While this global-local economic connection does not run through the YRD's core of Shanghai or its key secondary city of Suzhou, it runs deeply into the very bottom of a local economy and far out to the geographic margin of the YRD.

A rare exception to the prevalence of small cable and electrical components factories in Qidu is a large Taiwanese-owned electronics company with approximately 1300 employees that is capable of making 600,000 key tops of computer keyboards, 480,000 sets of top/bottom cases of keyboards, and assembling over 120,000 complete keyboards a month. In fact, this company produces a large share of all the keyboards manufactured and exported by its Taiwan-based mother company, which accounts for 28 percent of the world's keyboards. The Qidu facility opened in 2001 to begin producing keyboards for the American company Logitech, which had just established a large factory in Suzhou one hour away (see earlier). The Taiwanese-owned factory also makes keyboards for Sony through a Japanese trading company based in Kunshan 80 minutes away (see Figure 5). Dell and HP also place orders for higher-end keyboards that are painted by hand after plastic injection. And all these keyboards are shipped out through the Shanghai port. Given its convenient location and in light of its multiple customers in the YRD, the Taiwanese manufacturer in Qidu tries to schedule the delivery date so that its trucks can carry the ordered keyboards to different customers located in the nearby larger YRD cities.[16]

The booming manufacturing towns in both the PRD and the YRD share three salient features in common. First, they are attractive local manufacturing sites, especially for Hong Kong and Taiwanese companies due to their lowest labor and land costs in the regions. Second, these towns' geographic proximity allows convenient and timely delivery of components and finished products to the secondary cities for further assembly or higher-value-added manufacturing

(see Figure 4). Third, regardless of their diverse industries, many of these towns have become directly or indirectly linked to or even embedded in increasingly regionalized economic network of global-local ties. Their positions and roles both stretch these ties spatially and solidify them in functional terms.

4. ACCOUNTING FOR CROSS-REGIONAL SIMILARITIES AND DIFFERENCES IN DEVELOPMENT SUCCESS AND CHALLENGES

Having compared the PRD and the YRD from chain (horizontal) and hierarchy (vertical) perspectives, it is time to highlight their most important similarities and differences in development success and challenges that need to be accounted for. First of all, despite the different timing of development, the rapid and sustained economic growth of both regions has been grounded in regionalized production networks of global-local and some local-local supplier-manufacturer links. Second, while the industries involved in the production networks or chains in the PRD and the YRD differ somewhat, they share the similar profile of being heavily foreign investment-driven, labor-intensive, and export-oriented. Third, as these general striking features are portrayed somewhat ideal-typically in Figures 3 and 4, there are variations in and deviations from the expected capital intensity of the industries involved, the length of the production chains and the number of their segments, and the spatial organization of production relations.

Viewed through a regional hierarchy lens, other related similarities and differences between the PRD and the YRD stand out. First, although the two regional cores – Hong Kong and Shanghai – are quite different in their own economic composition, geographic positions, and development histories, they play several similar roles as regional cores in generating and channeling investment, holding and strengthening highest value-added activities such as R&D and marketing, and providing trade and logistics management as dominant ports (the exit point shown in Figure 4). Second, despite their different pasts, Dongguan and Suzhou have risen as remarkably similar key secondary manufacturing centers with symbiotic economic ties to Hong Kong (and Taiwan) and Shanghai (as Figures 3 and 4 suggest), growing concentration of more sophisticated IT manufacturing facilities, and more intra-local and intra-regional supplier-manufacturer relations. Third, while some manufacturing towns in and around the major PRD and YRD cities have become dynamic and competitive clusters of specialized products for both global and regional markets, they have become vulnerable to and dependent on the fluctuating prices of imported raw materials and almost cut-throat inter-local competition based on prices, while struggling to upgrade through making higher value-added and more famous brand products.

4.1. Locating Explanatory Factors Within and Beyond Chains and Places

What may help explain these important similarities and differences above are factors located within and beyond the production chains and places (cities and

towns). The regionalized production chains have stimulated and sustained the rapid economic growth of the two regions thus far because they contain the 'big middle' segment of agglomerated factories and supportive facilities owned by foreign companies in many major and minor PRD and YRD cities, while the two ends – design and R&D at the front and marketing and after-sales services at the back – are largely outside the regions. The cheap and abundant land and labor allow these factories to churn out huge volumes of price-competitive exports, boosting GDP and trade statistics. The 'big middle', however, has stretched within itself and extended in both directions over time. Its internal stretching involves the development of more inter-firm ties of supply and subcontracting in certain industries, especially the IT industry. Extension to the front end of the production chain involves drawing R&D activities from the regional cores and beyond to key manufacturing nodes such as Suzhou. In extending backward, some foreign-owned factories have pulled a growing number of local domestic suppliers into their production orbit as exemplified by the IT manufacturing clusters in Dongguan.

There are however built-in constraints on the typical production chain in both regions that tend to fragment or truncate them, thus preventing their local development benefits from reaching more deeply and widely. Some chains are governed by a network or relational mechanism, which creates and sustains complex interactions between buyers and sellers based on mutual interdependence and high levels of asset specificity through reputation, or family or ethnic ties in either spatial proximity or not (Gereffi et al., 2005). In the two regions, foreign companies, especially those from Korea and Taiwan that drive and control the production chains rely primarily on their transplanted supplier networks to minimize the use of local suppliers who are often perceived as cheaper but less qualified.[17] In cases where multinationals source from Taiwanese-owned factories or where the latter use local Chinese suppliers, the buyer keeps a strong price squeeze on suppliers, creating extremely fierce competition among them. This tends to 'lock' small suppliers in the PRD and the YRD into a transactionally dependent relationship with large, powerful customers.

In a place-based explanation that complements that from within production chains, we see the strong and competing role of the local governments in both regions. Decentralized power to local governments has turned them into developmentally oriented entrepreneurial actors. Their control over and right to approve land use allows them to lease land as a both a valuable asset and financial incentive to foreign investors to build factories. Revenues from land lease are used to finance large-scale infrastructure provision, which in turn improves the transportation and logistics of manufactured goods (Chen, 2005). While the autonomous and flexible policies and incentives of local governments have brought in huge and spatially uneven numbers of growth-generating foreign

companies, they have led to almost unbridled competition for foreign investment that involves discounting land values and compromising on environmental protection. This has eventually put cities like Suzhou in a dilemma of foreign capital becoming 'too much of a good thing' where they feel the pressure to seek a more balanced development involving more local companies and investment from Shanghai (see earlier).

Looking beyond the explanatory factors within the chains and places to account for the cross-regional similarities and differences in development success and challenges, several larger and regional-level factors appear in sight. Both the PRD and the YRD are endowed with favorable geographic and natural conditions, and a long history of development. They are among the most populous and productive farming regions in ancient China. While the PRD has long been China's southern gateway for foreign trade and sea transportation, the YRD has always been China's central transport hub for the interior cities along the Yangtze River to link with the outside world. Situated at the southern end of the Chinese mainland, the PRD is far away from the political center of Beijing. This remote location, coupled with being separated from the vast national territory by the Nanling Mountains has fostered an outward, business-oriented, and flexible attitude among the people. In comparison, the YRD has long been one of China's central economic regions, and Shanghai has been one of the central government municipalities since 1949. Hence, the YRD has always been more constrained by the central government. While these geographic, cultural, and historical conditions do not guarantee rapid and sustainable development, they are generally conducive to it.

More direct and powerful external factors pertain to the initial trigger and subsequent timing for the takeoff and development of the two regions over the past two and half decades. The PRD was the first collective beneficiary of central government policies that triggered the region (following the Special Economic Zone model of Shenzhen) to pursue open and autonomous development in the early 1980s. This allowed the PRD to take full advantage of being close to Hong Kong and Taiwan to capture the massive cross-border relocation of their export-oriented factories. The shallow and less diverse industrial foundation in the region dominated by light consumer goods industries, which was an intended historical legacy of centrally planned economy favoring heavy industries in northern cities, turned out to be unintended advantage for the PRD to develop spatially concentrated competitive toys, garments, and consumer electronics, and some IT clusters. When the favorable development policies were shifted to Shanghai and the YRD in the early 1990s, they immediately set the region off on a fast growth track. In addition, the YRD has benefited tremendously from its historical advantage in having developed a more balanced and complete mix of industries under central planning, which allowed the region to draw foreign investment into more capital- and technology-intensive industries than the PRD.

4.2. Barriers to Industrial Upgrading

The above set of micro- and macro-conditions, on balance, has a favorable influence on the PRD and the YRD. However, some of the factors as discussed earlier, in conjunction with some recent trends stand as barriers to industrial upgrading and thus threaten the sustainable economic development of both regions. The PRD has relied heavily on labor-intensive and low-tech assembly and manufacturing that not only rely on suppressed low wages and razor-thin profit margins but also lack local integration and innovation. This model of industrialization, successful as it might have been in its earlier phase, has kept some local industries and firms in a dependent and even disconnected mode in relation to the global economy. Most PRD-based firms and factories may be trapped in the assembling and manufacturing segment of the production chain and earning merely labor-processing fees rather than engaged in acquiring technology, developing their own brand-name products, and creating international markets directly. The PRD also lacks indigenous companies that are sufficiently large and truly international beyond names like Huawei, TCL, Galanz, and Kanka (Enright and Scott, 2005).

In the PRD, the seemingly lasting comparative advantage of low-cost labor has lost some edge since 2004, mainly due to energy and labor shortages. According to Enright and Scott (2005), current demand for electricity in the PRD exceeds generation capacity by nearly 15 percent. There were two million more jobs than employees to fill them in 2004, and the figure rose to 2.5 million in 2005 (Roberts, 2006). A company in Dongguan making lamps and furniture for Wal-Mart, Home Depot, and Target had to raise salaries 40 percent in 2005, to an average of US$160 a month compared to about US$100 a month through the 1990s. The company also upgraded the dormitories and improved the food in the cafeteria. Despite these efforts, which led to its profit margins shrinking to five percent – half what it made when it opened about 15 years ago, the company's five factories remain about 10 percent shy of the 6000 employees needed (Roberts, 2006). Some of this labor shortage in the PRD may be attributed to the increasing attractions of accelerated growth, strong labor demand, higher wages, lower crimes, and better schools and job training in the YRD.[18] Businesses in response to a survey have preferred better geographic location, more cooperative local governments, and a richer supply of manpower of the YRD to the PRD.[19] In sum, the PRD is in danger of being 'locked-in' a 'low-road' (labor-intensive and wage-squeezing) to economic development (see Grabher, 1993; Schmitz, 1999).

The YRD also has begun to face the same labor shortage problem haunting the PRD, leading to high turnovers, rising salaries, and shrinking margins. Besides high-cost Shanghai, in second-tier cities like Suzhou, wages at an American maker of wireless networking gear have been rising by 10 percent annually in recent years. Turnover for some jobs an another American-owned company hit

20 percent forcing management to implement such additional incentives and benefits as flexible work hours for workers with children, holding quarterly parties for the entire staff, and organizing free trips to resort areas (Roberts, 2006). Selfish corporate development and sourcing strategies also block the path to industrial upgrading through more extended manufacturer-supplier networks. Dominant local companies like Shanghai Automotive Industrial Corporation (SAIC) pursued inefficient and wasteful import-substitution strategies for their component supplies (Huang, 2003), impeding horizontal or trans-local supplier and service links that are regionally based and thus more efficient. Although the YRD has already shown more progress in moving forward in the value chain toward R&D than the PRD, that progress has been slow and limited. Other than Shanghai, which has moved up in multinationals' global R&D hierarchy, the R&D facilities that have been set up in Suzhou recently are more geared toward serving local manufacturing of mature products rather than creating new and more innovative products.

The YRD may handle the challenges to local and regional industrial upgrading in a more favorable environment and at better timing than the PRD. As mentioned earlier, the more diverse industrial base and more educated and skilled work force in and around Shanghai have lured more multinationals to subcontract higher-value manufacturing to local companies, to source more parts and components locally, and to set up more producer services and R&D functions in the YRD. In other words, more multinationals have become willing to lengthen global value chains within and through the YRD, particularly by moving the more advanced segments of value chains to Shanghai to creating more backward links to sourcing and manufacturing and forward links to distribution and marketing in a newer and larger regional market. These opportunities have created both incentives and pressures for local or indigenous firms and factories in the YRD to connect to or 'hook into' certain niches or segments of global value chains as suppliers or assemblers. While this 'bootstrap' strategy may work to bring about some industrial upgrading of certain products, processes, and/or functions (Giuliani and Pietrobelli, 2005; Schmitz and Nadvi, 1999), it could raise the specter of 'immiserizing' industrial growth (paying the lowest possible wage) due to hyper competition (Kaplinsky, 1998, cited in Schmitz, 1999: 1647). Even if this tendency may be temporarily thwarted by labor shortage and rising wages, the 'high road' (industrial upgrading) to development is still long and twisted.

5. CONCLUSION AND PROSPECT: UPGRADING TO SUSTAINABLE ECONOMIC DEVELOPMENT

As the multi-scaled comparative analysis in this article has shown, most cities and towns in the PRD and YRD, which specialize in making low-end and medium-level standard products, qualify for what Florida (2005) called 'hills.' The hills may rise and fall, but the 'peaks' – the world's top advanced services

and innovation centers – can remain vital and dynamic. And Shanghai may rise further from a large hill to becoming a peak like Hong Kong some day, but the rapid development of the rest of the PRD and the YRD is difficult to sustain without industrial upgrading, although the YRD's prospect looks brighter down the road. This is as much a general conclusion as a conjecture about the future of China's two most dynamic manufacturing regions. What is more certain is that the recent past of the PRD and the YRD has pointed to the more enabling and extensive role of regions in mediating and restructuring global-local economic relations. This role has a potential double-edge. It could foster local industrial upgrading through more effective and cooperative mechanisms for regional integration as one possibility. Alternatively, this regional role could delay or even derail local industrial upgrading when inter-local or intra-regional competition breeds fragmentation or even disintegration.

To help overcome this biggest regional constraint on industrial upgrading in the PRD and the YRD, the need to develop new and more effective governance strategies for improving the 'collective efficiency' of local governments and firms is a high priority. This however, is not easy as regions like the PRD and YRD are sandwiched between the top-down (global) and bottom-up (local) governance pressures. Certain forms of global governance such as the rule-setting regime of the World Trade Organization (WTO) have introduced and reinforced global technical, social, and ecological standards, which exert considerable demands and pressures on national, regional, and local actors (Messner, 2002). From the bottom, local governments in the PRD and the YRD have become more autonomous and powerful vis-à-vis the central and provincial governments due to political and fiscal decentralization, as well as larger local coffers from rapid growth and land-lease revenues.

In the YRD, for example, local autonomy has not freed municipal governments from being fixated to territorially bounded and functionally independent entities. This has, under the legacy of the entrenched planning system, sustained regional and local economic fragmentation. Local governments have become more assertive and interventionist in economic development by using their monopoly of resources and policies over their jurisdictions. Although some of this extreme inter-city competition has been ameliorated by the administrative annexation by higher-order cities of adjacent lower-ranked, county-level units as new city districts in the YRD, it has not eliminated all the hierarchical and horizontal inter-city conflicts (Zhang and Wu, 2006).

Besides the powerful and competitive local governments in the PRD and YRD, non-government organizations (NGOs) and business associations have become more active and involved in local development policy-making and thus could contribute to broader and more effective policy networks for facilitating industrial upgrading and regional integration. Environmental NGOs could work with local governments to deter approval of some labor-intensive manufacturing

projects that may have pollution problems down the road. Business associations could cooperate with local governments to provide better and more targeted training programs to upgrade the skills of workers. By offering both financial (dis)incentives and market information to certain manufacturers, local governments in the regional network could redirect them to new or alternative market segments in order to reduce the current 'horde mentality' of too many local Chinese companies competing to produce the same profitable products by squeezing one another's already razor-thin margins. Although cross-boundary policy networks are slow to emerge due to the traditional administrative barriers that tend to keep Shanghai and the surrounding cities somewhat isolated in a vertical administrative system with relatively few horizontal ties, they appear to be an inevitable response to the complex challenges facing the YRD. While the PRD does not have to contend with the barrier effect of provincial boundaries, it faces a tough challenge of regulating a complex and differentiated movement of people across the Guangdong-Hong Kong border (see Lin and Tse, 2005). The PRD also faces a steeper climb than the YRD in upgrading from a more massive industrial system characterized by labor intensity, low wages and technology, and lack of local innovation.

In both similar and different ways, the PRD and the YRD have provided extensive and layered evidence that helps regional analysts recover region as a 'crucial middle' that is capable of mediating between the global economy and local economies with strong implications for sustainable economic development via industrial upgrading. These two cases' value for comparative regional research will only grow as they continue to figure prominently as dynamic growth areas in the global economy.

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NOTES

1 'Growth Cools in Yangtze River Region', *Asia Times* online, reprinted and accessed on Asian Development Bank Institute (ADBI)'s website at: [http://www.adbi.org/e-newsline/index.html], 3 June 2005.
2 In the early 1980s, when some children's dolls were made in Hong Kong, they would be designed in Hong Kong, and their molds were produced in Hong Kong where sophisticated machinery was available. Then the molds were shipped to China, where workers would shoot the plastic, assemble the dolls, paint the figures, and make the dolls' clothing. Then the dolls were brought back to Hong Kong for final testing, inspection, packaging, which could not be done up to quality in China, and finally were distributed from Hong Kong (interview with Victor Fung in Magretta, 1998). Nowadays, though the dolls may still be contracted to and designed by a Hong Kong firm, the manufacturing process through packaging is normally completed in China, which shifts 'Made by Hong Kong' to 'Made by China.' Hong Kong, however, still controls the front (design) and back (distribution) ends of the process. In this sense, 'Made by Hong Kong' has shifted to 'Made in Hong Kong but Made by China' (see Berger and Lester, 1997).
3 Hankook chose Jiaxing because its founding CEO knew Kim Gu (who, like Sun Yat-sen, was like the founding father of Korea, and his exile government in China during Japanese occupation ended up in Jiaxing where there is a Kim Gu museum) and had some sentimental attachment to Jiaxing. Hankook started making tires in 1996 with US$30 million investment and raised its capitalization to US$300 million by 2006. It now employs about 1000 people and also has brought its key suppliers from Korea to be with it in Jiaxing (author's interview in Jiaxing, 29 May 2006).
4 OEM refers to suppliers making certain products according to the designs and specifications and with equipment from generally multinational corporations as buyers. It makes companies engaged in OEM largely dependent on multinational corporations that contract the OEM production to them.
5 ODB (original design manufacturing) refers to companies engaged in OEM also providing designs, whereas OBM (original brand manufacturing) refers to companies owning their own brands and using them to deal with buyers of their branded products. ODM is an important upgrade over OEM, and OBM is another major advancement beyond ODM.
6 'Silks to Silicon', *China Economic Review* online, March 2006 [http://chinaeconomicreview.com/cer/], accessed 4 April 2006.
7 Due to this perceived or real competition between the SIP and the SND for foreign investment projects, the JV partners in the SIP had a falling out in the late 1990s, which led the Chinese side buying out 30 percent of Singapore's stake in the venture.
8 'Silks to Silicon', *China Economic Review* online, March 2006 [http://chinaeconomicreview.com/cer/], accessed 4 April 2006.
9 'Silks to Silicon', *China Economic Review* online, March 2006 [http://chinaeconomicreview.com/cer/], accessed 4 April 2006.
10 'Silks to Silicon', *China Economic Review* online, March 2006 [http://chinaeconomicreview.com/cer/], accessed 4 April 2006.
11 Author's interview in Suzhou, June 2006.
12 These accounts and information were based on my interviews in Suzhou in July 2004 and June 2006.

13 'Dongguan Protects Collective Brands with Trademarks', Hong Kong Trade Development Council online, reprinted and accessed on Asian Development Bank Institute (ADBI)'s website at: [http://www.adbi.org/e-newsline/index.html], 12 July 2006.
14 Author's interview in Wujiang, Suzhou, 9 June 2006.
15 Author's interview in Jiangcun, a village in Qidu town, Wujiang, Suzhou, 11 June 2006.
16 Author's interview in Qidu town, Wujiang, Suzhou, 10 June 2006.
17 Author's interviews with several business executives in the Yangtze River Delta, June 2006.
18 Reported by *South China Morning Post* online at: [www.scmp.com], accessed 24 September 2005.
19 'China: Tale of Two Deltas', *Asia Times* online, 6 September 2003, accessed 7 September 2003.

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