

11. Pearl River Delta Supracity, People's Republic of China

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11.1 INTRODUCTION

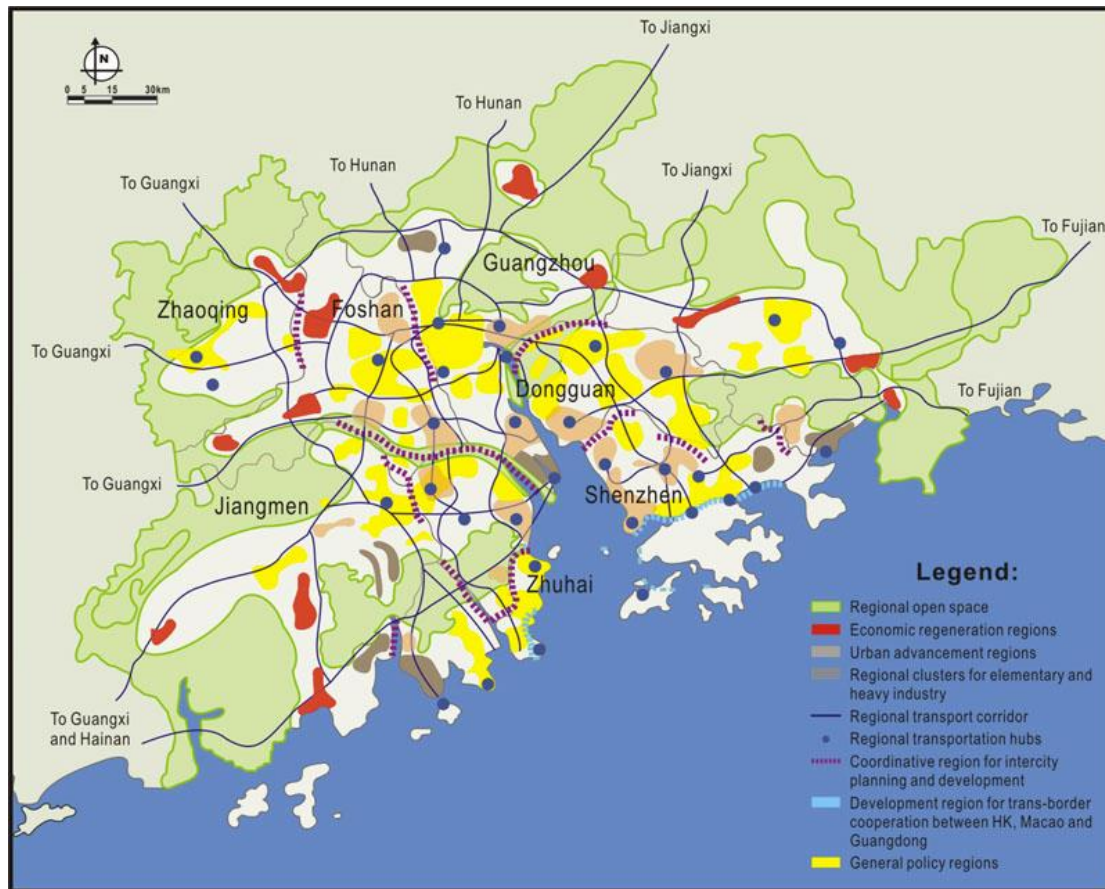
The Pearl River Delta area is now generally synonymous with the dense network of cities that covers nine prefectures of the province of Guangdong (Guangzhou, Shenzhen, Zhuhai, Dongguan, Zhongshan, Foshan, Huizhou, Jiangmen and Zhaoqing) and the Special Administrative Regions (SAR) of Hong Kong, China and Macau. It is part of an enormous configuration of interconnected cities which has become the world's first supracity. The 2010–2011 State of the World Cities Report published by the United Nations Human Settlements Programme estimates the population of the Pearl River Delta region at 120 million people; and it is urbanizing rapidly.⁵⁵⁴ The Pearl River Delta is one of the most economically dynamic regions of the People's Republic of China (PRC). Annual GDP growth for the region has consistently outpaced that of China as a whole over the three decades since 1978 – averaging 13.45 percent, or 3.5 percentage points higher than the average for China. The region has also attracted nearly a third of foreign investment into China.⁵⁵⁵ By 2007, its GDP had risen to USD 448 billion, which is almost 10 percent of China's GDP.⁵⁵⁶ Since 1979, when China's began its reform programme, the Pearl River Delta Economic Zone has been the fastest growing part of the fastest growing province in the fastest growing large economy in the world.

Photo 11.1 Macau Central District



Credit: John Courtney (2015).

Figure 11.1 Nine Policy Zones in the Pearl River Delta



Source: Department of Geography and Research Management 2009.

The economy of the Pearl River Delta is highly diversified. The largest cities are:

- **Hong Kong, China** (population 7.1 million). Focusing on high-end services and finance, Hong Kong, China is also one of the largest ports in the world.
- **Guangzhou** (population 12.7 million). Guangzhou is the provincial capital and regional hub for southern China. Industries located in the city include: machinery and equipment manufacturing, petrochemicals, information technology, pharmaceuticals, and building materials. It has also been attracting investments from high-tech industries (including the manufacture and assembly of electronics equipment) and heavy industries, including automobile companies such as Honda, Toyota and Nissan.
- **Shenzhen** (population 10.4 million). Shenzhen has a very strong industrial sector mainly due to its geographical advantage of being the only municipality bordering Hong Kong, China. It has a large manufacturing base of traditional industries built up through companies (from Hong Kong, China and other areas) relocating their manufacturing base to the lower-cost Special Economic Zones (SEZs) in China. From this base, Shenzhen has seen significant high-tech development in the electronics and petrochemicals sectors. To establish the city as a sourcing centre for multinational corporations, Shenzhen has also been upgrading its logistics

sector. It is also upgrading its logistics sector in order to establish itself as a sourcing centre for multinational enterprises.

- **Dongguan** (8.2 million). Dongguan is an important export base in China especially in electronics, information technology, toys, household electrical appliances and printing.
- **Foshan** (7.2 million). Foshan is the third-largest manufacturing base in the Pearl River Delta. Key industries include textiles and apparel, shoemaking, leather products, metal products, household electrical appliances, furniture, aluminium materials, and ceramics.
- **Jiangmen** (4.5 million). Jiangmen Port is the second largest river port in Guangdong province and was one of the original ‘treaty ports’ opened in 1902. The local government intends to develop a harbour industrial zone with heavy industries such as the petrochemical and machinery industries. Manufacturing predominates, with a particularly strong motorcycle industry.
- **Zhongshan–Zhuhai–Macau SAR** (5.2 million). Located on the western fringe of the Pearl River Delta, Zhongshan specializes in light manufacturing and agroprocessing; Zhuhai (with its SEZ) focuses on IT and electrical machinery manufacturing, but with growing biomedicine and medical equipment, software, petrochemicals, steel and shipmaking industries; Macau is a tourism focal point.
- **Huizhou** (4.6 million). Huizhou is a crucial manufacturing centre for electronics and IT products where its output being top of the world and among the biggest producers of computer circuit boards in Asia. Huizhou is an important manufacturing hub for electronics and IT products with its output being among the highest in the world. It is one of biggest producers of computer circuit boards in Asia. It also is strong in the petrochemicals sector.

11.2 ECONOMIC ENVIRONMENT

Table 11.1 sets out some key facts about the Pearl River Delta. Its economy, if it was standing alone as a nation, would be globally significant. It has an area 60 percent greater than Belgium with twice its economic product, and six times its population. The Pearl River Delta exports twice as much as Belgium.

Table 11.1 Key Economic Facts – Pearl River Delta, 2013

	Pearl Delta	River	Hong Kong, China	Macau
Land area (sq.km)	54,754		1,104	30
Population (000s)	57,152		7,188	592
Urban population (000s)	48025.5		as above	as above
Labour force (000s)	37,841		3,859	368
Unemployment rate	n.a.		3.4%	1.8%
GDP (million USD)	856,699		270,346	48,090
Primary industry (million USD)	17,132		135	0
Secondary industry (million USD)	388,319		18,056	1,717
Tertiary industry (million USD)	451,247		248,393	25,773
GDP per capita (USD)	15,034		37,611	81,233
Total exports (million USD)	607,093		458,724	1,139
Total imports (million USD)	440,338		523,286	10,138
Foreign direct investment (million USD)	23,062		76,633	2,33t1

Note: The Statistics Bureau of Guangdong province includes nine cities in the regional economic data for the Pearl River Delta: Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Dongguan, Zhongshan, Huizhou and Zhaoqing.

Source: Data based on Guangdong Province *Statistical Yearbook 2014*; United Nations Conference on Trade and Development (UNCTAD) *Inward FDI Performance 2014*.

The Pearl River Delta's labour market employs around 38 million people, about 5 percent of China's workforce. Of these, some 40 percent are employed by companies based in Hong Kong, China.⁵⁵⁷ The region also accommodates 52 million migrants, or some 21

percent of all migrants in China.⁵⁵⁸ Wages are significantly higher than averages for China as a whole.

11.2.1 City Economic Competitiveness

The Economist Intelligence Unit *Hot Spots 2025: Benchmarking the future of competitiveness of cities* published in 2013 ranked the three major component cities of the Pearl River Delta. The overall rankings were: Hong Kong, China 4th (69.3/100), Shenzhen 52nd (51.7/100) and Guangzhou 64th (47.4/100). While these scores do point out the significant differences in the level of development within the Pearl River Delta, the relatively lower scores for mainland cities need to be put in perspective. Shenzhen ranks only one place behind Rome, and above Budapest, Lisbon and Tel Aviv. Guangzhou ranks above Santiago and Johannesburg. Further detail on components of this index will be given in the relevant sections of the chapter.

11.2.2 Key Industry Growth Sectors

The Pearl River Delta's regional industrial output (excluding Hong Kong, China and Macau) at 2013 prices was CNY 9,069.15 billion (USD 1.46 billion), where light industry contributed 36 percent, and heavy industry 64 percent. The number of enterprises with an annual revenue of over CNY 20 million (USD 3.2 million), in 2014 and their gross industrial output are summarized in Table 11.2, categorized by industrial sectors.

Table 11.2 Key Industrial Sectors in the Pearl River Delta, 2014

Industrial sector	No. of enterprises	Gross industrial output (million USD)
Manufacture of communication equipment, computers and other electronic equipment	4,319	401,962
Manufacture of electrical machinery and equipment	3,750	165,012
Manufacture of automobiles	563	74,286
Manufacture of raw chemical materials and chemical products	1,677	74,099
Manufacture of textile garments, apparel and footwear	3,302	63,865
Metal products	2,638	61,995
Plastic products	2,655	53,478
Manufacture of cultural, educational and sports articles	1,080	47,785
Nonmetal mineral products	1,294	42,683
Petroleum refining, coking and nuclear fuel processing	54	35,101
Agriprocessing	405	25,386
Smelting and pressing of metals	905	64,751
Manufacture of machinery	2,473	75,657

Note: Data refer to enterprises with annual business revenue over CNY 20 million (USD 3.2 million).
 Source: Based on data from Guangdong Province *Statistical Yearbook 2014*.

It should be noted that the value of electronics is presently almost eight times that of automobile production and over five times that of petrochemicals; and that these two

sectors are seen as potential growth areas for the Pearl River Delta. While some labour-intensive industries, such as garments, now constitute a smaller proportion of total output, electronics assembly is highly labour-intensive and currently low value-added.

11.2.3 Trade

Annual exports from the Pearl River Delta totalled USD 608.17 billion in 2014, with annual imports totalling USD 411.54 billion.⁵⁵⁹ The foreign trade activity of the Pearl River Delta historically has been concentrated in the top-three export destination region/economies, which are Hong Kong, China; the United States; and the European Union.

In 2013, Hong Kong, China saw USD 523,286 million import of goods and USD 458,724 million export of goods. Mainland China was the biggest trade partner, representing around half of the imports and exports with Hong Kong, China. Other major trade origin or destination economies and regions account for roughly a quarter of the foreign trade, including the United States; Japan; Chinese Taipei; Singapore; Viet Nam; and India. Hong Kong, China re-exports most of its imports (Table 11.3).

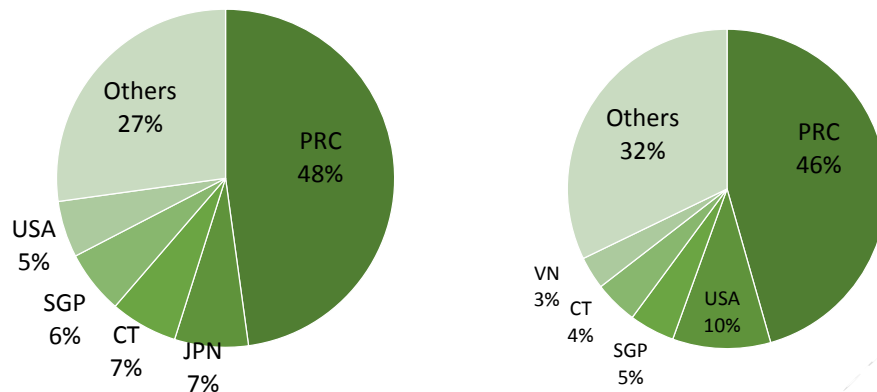
Table 11.3 Total Imports and Exports of Goods for Hong Kong, China, million USD, 2013

Imports	523,286
Domestic export	7,010
Re-export	451,714
Total exports	458,724
Total trade	982,010
Trade balance	64,562

Source: Based on data from *China Statistical Yearbook 2014*.

The bulk of its imports and exports are to the PRC (Figure 11.2), indicating that Hong Kong, China is a major node for PRC exports to the rest of the world and that many PRC imports are routed through Hong Kong, China, speaking to the quality of its logistics and value-added trade services.

Figure 11.2 Hong Kong, China's Imports by Origin (right) and Domestic Exports by Destination (left), 2013



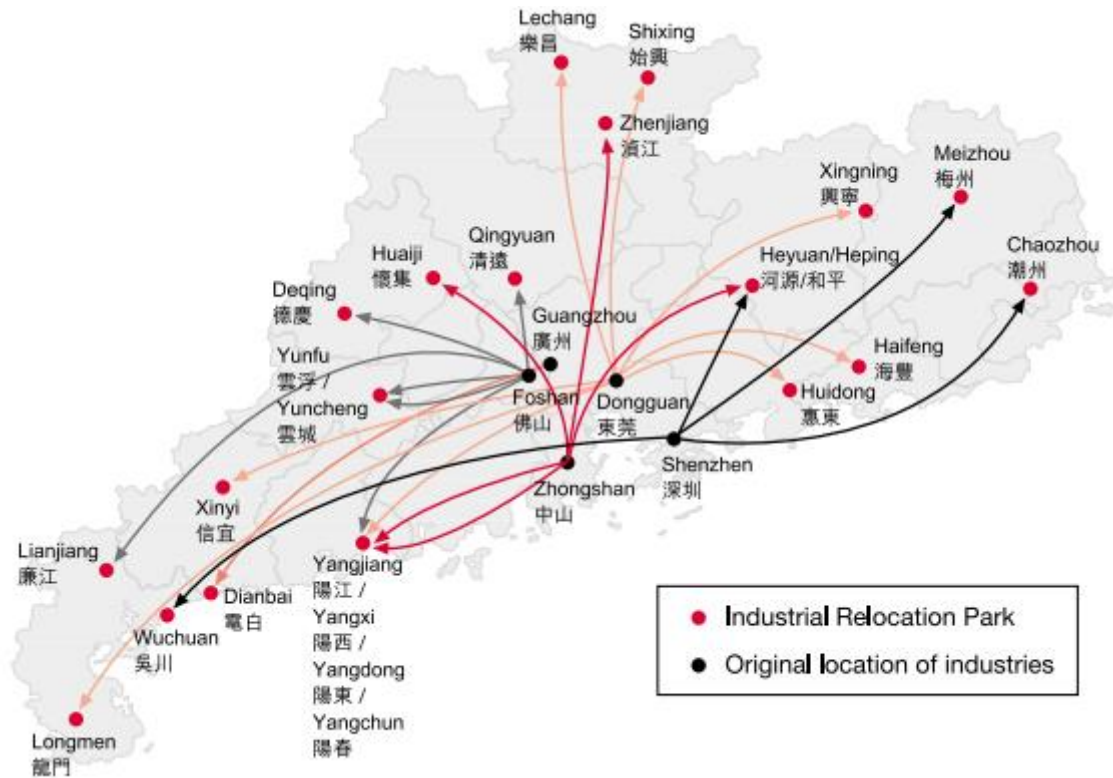
Note: PRC = China (mainland); JPN = Japan; SGP = Singapore; CT = Chinese Taipei; USA = United States of America; VN = Viet Nam.

Source: Based on data from *China Statistical Year Book 2014*.

The composition of trade of the Pearl River Delta and Hong Kong, China has changed significantly since the turn of the century, with the percentage of exports destined for Japan, the United States and Europe declining, and the percentages destined for ASEAN and 'other markets' (Latin America, Australasia and Africa) rising. Further, there has been a gradual shift from labour-intensive to capital-intensive industries, particularly electronics.⁵⁶⁰

Much of this shift has occurred because of the relocation of industry from Hong Kong, China to the Pearl River Delta – mainly into the surrounding provinces (Figure 11.3). This restructuring represents a push factor of higher wages in the coastal provinces and the pull factors of lower wages and labour availability on the one hand; and significant subsidies for relocation on the other hand.

Figure 11.3 Relocation of Industry from Hong Kong, China



Source: Fung Business Intelligence Centre, 'China's industry relocation and upgrading trends: Implications for sourcing business', *China Distribution and Trading* (56) (2008).

11.2.4 Investment Environment

The strengths of the Pearl River Delta region were grounded in the effective use of China's SEZ policy. This policy was a concrete manifestation of the government's wish to foster a supportive investment environment, which would take advantage of China's large pool of relatively well-educated, disciplined and lower cost labour. The influx of engineers and scientists from inland China and abroad has transformed Shenzhen, in particular, into a high-tech centre; and other areas in the Pearl River Delta have benefited from the spill-over effects. The integration of the Hong Kong, China and Macau SARs into the Chinese economy, substantially preserving their open investment climate, was further testament to the coherence of support to investment provided by the PRC government. As development has proceeded, the investment promotion activities have evolved, moving to foster higher value-added industries as manufacturing costs and sophistication increased.

Through market feedback and administrative response, the costs of doing business in the Pearl River Delta have always been reasonably well-calibrated to world markets. While substantial initial infrastructure spending was required, cost recovery for the services, through both user charges and other taxes, was sufficient to provide good and constantly improving infrastructure.

The urban areas of the Pearl River Delta have exhibited high levels of innovation in response to the huge pressures of growth. Guangzhou has arguably China's most effective busway, integrated with appropriate land-use planning to foster effective use of the infrastructure. Shenzhen has put in place effective infrastructure for its burgeoning industries, using innovative methods of mobilizing finance from developers. Hong Kong, China has long been a bastion of proactive and innovative land-use transport planning. However, these examples of innovation have not yet become ubiquitous, with systems of accumulating, disseminating and incentivizing the use of best practice largely lacking.

Actual factory and housing construction were left to the private sector (including state-owned enterprises) and corporatized 'industrial estate companies' in multi-tenant factory buildings and on large sites for heavy industry. This policy was designed to allow flexibility to cater for a range of industries – smaller scale industries relocating from Hong Kong, China; state-owned enterprises from China; and foreign direct investment (FDI).

Significant challenges remain in the area of human capital. The rising cost of labour is a concern. Also in question is the ability to continue attracting migrant labour in the face of increased job opportunities in the 'sending' provinces (due to the PRC's policy of developing the western regions of the economy).

The results of such policies in the current international context are shown in the ranking of component Pearl River Delta cities in the Economist Intelligence Unit's Hot Spots index of 120 major cities.⁵⁶¹ Hong Kong, China received the ranking of 18th and 1st in the 'economic strength' and 'human capital' categories, with Guangzhou scoring 4th and 70th, and Shenzhen scoring 2nd and 41st respectively. This shows a potentially highly synergistic pattern of existing development – but that human capital needs to be further developed. The realization of any these synergy synergies would will also depend on attracting the needed new investment for the required infrastructure and institutions.

Another area of strength for the Pearl River Delta is that the transaction costs for running a business were systematically addressed over time. They included streamlined administrative control; relative independence for local planning authorities; direct access to provincial and central level planning units; access to tax breaks; free or low duties on imported equipment and production materials; free or low-rent business accommodation;⁵⁶² flexibility in hiring and firing workers; depreciation allowances; negotiated limited access to the domestic Chinese market for goods produced within SEZs; and residence and work permits and income tax exemptions for foreigners working within the SEZs.⁵⁶³

While the region has been the focus of extensive, coordinated and effective policy reforms at various levels of government to promote urban efficiency and external trade, significant challenges remain in the context of encouraging more endogenous, service-focused growth. It is only recently that the issue of integration of the various economic initiatives existing in the region and the desire to coordinate and create synergies between them has emerged. Current practice has resulted in wasteful competition, with underutilized infrastructure being a burden on local authorities. While such destructive competition is recognized as a problem, the required analysis and institutions (see Section 11.4) to address it are not yet developed. In particular, the intra-Pearl River Delta flows of trade

and the spatial pattern of exports need to be better established, and the constraints to more effective utilization of investment need to be better understood.

11.2.5 Innovation and Business Support

In regard to its enterprises, the Pearl River Delta region has significant capacity to support the development of local clusters and their supply chains, including financial support. Key interventions (relating to Shenzhen) include:

- **Quality support services.** The Shenzhen Quality Assurance Centre was established in 1992, funded by the Shenzhen Technology Monitoring Bureau.
- **Productivity enhancement services.** The government funded the Shenzhen productivity promotion centre to maintain a wide range of productivity enhancement services, including laboratory facilities, specialized training courses and a variety of consultancies.⁵⁶⁴
- **Information services.** The Shenzhen Science and Technology Bureau established the Technology Market Centre in 1993. The purpose of the centre is to present industrial firms with information on new technology, and promote the diffusion of new technology. Other such support has since been created.
- **Protecting intellectual property.** In order to encourage the transfer of more technologies to Shenzhen SEZ via FDI, and to motivate technological innovation, the Shenzhen SEZ government has taken numerous steps to protect intellectual property, including enacting and enforcing new laws

While such measures support existing industries, and foster higher quality production by those industries, most of them do not, of themselves, foster innovation. Support for innovation is a challenge that requires a commitment to world-class R&D and product development. Hong Kong, China has had an Innovation and Technology Commission since 2000. Significant resources are available for the support of R&D. There has been a joint Guangdong and Hong Kong Technology Funding Scheme since 2004. But generating results in terms of creating high value-added jobs (to replace those moving to the western provinces) remains a challenge.

The results of existing policies are shown in the ranking of component Pearl River Delta cities in the ‘global appeal’ category of the Economist Intelligence Unit’s Hot Spots index. Hong Kong, China ranked 6th, Guangzhou 88th and Shenzhen 102nd. While Hong Kong, China fares well, the lack of support from the remainder of the Pearl River Delta is a challenge.

The financial sector is also a strength of the Pearl River Delta, and especially in Hong Kong, China. Chinese officials and business leaders continue to stress the importance of Hong Kong, China as the facilitator and intermediary for investment business between China and the rest of the world. But new financial districts are being built in Guangzhou and Shenzhen to service the Pearl River Delta region in China. The second wave of cooperation between Guangdong and Hong Kong, China will need to focus on developing an integrated regional services industry – particularly in financial services – and the traditional model will reverse. Hong Kong, China will become the ‘back-end factory’, using its global connections and technical expertise to help Guangdong build a financial services platform, funnelling the investment and services expertise needed for the next

phase of economic expansion into the mainland. Guangdong will play the role of the ‘front-end shop’ in financial services by exploiting and utilizing its enormous economic potential to develop into a high-consumption province supported by dynamic financial services.⁵⁶⁵

The results of existing policies are shown in the ranking of component Pearl River Delta cities in the ‘financial maturity’ category of the Economist Intelligence Unit’s Hot Spots index. Hong Kong, China received a ranking of first along with eight other world cities. Guangzhou ranked 92nd, and Shenzhen was 25th. Hong Kong fares exceptionally well, but the lack of financial services support to companies in the remainder of the Pearl River Delta is a cause for concern.

11.2.6 Industry Clusters

The Pearl River Delta has an extremely well-developed set of manufacturing clusters that are horizontally and vertically integrated, with effective supply chains, both within the Delta area and linking to broader global markets (Table 11.4). Interestingly, the two banks of the Delta are themselves specialized, with the east bank focusing on electronics and IT products, and the west bank on household appliances. Such physical focus shows the importance of competitive advantages, gained by concentrating geographically.

Table 11.4 Clusters in the Cities of the Pearl River Delta

City	Clusters
Guangzhou	Autos and parts, transport equipment, electrical products, electronics, chemicals, garments, textiles, business services, software, toys
Panyu*	Sports goods, textiles, garments, jewellery, toys, electric supply equipment, shipping containers
Shenzhen	Electronics, computer products, telecom products, integrated circuits (ICs), toys, plastics, watches, clocks, oil paintings, port services, logistics, finance, printing, artificial trees
Dongguan	Electronic computers, components, peripherals, garments, furniture, shoes, toys, watches, clocks, cutlery, kitchen tools, soldering machinery, angling equipment
Huizhou	Laser diodes, digital electronics, CO-ROMs, telephones, batteries, circuit boards, precision machinery, plastics, chemicals
Zhongshan	Lighting fixtures, lamps, metal products, motorcycles, casual wear, locks, audio equipment
Foshan	Industrial ceramics, ceramic artwork, needlework, textiles, children's garments
Chencun*	Flower farming, ornamental fish, turf farming
Nanhai*	Textiles, aluminium products, motorcycles, underwear
Shunde*	Electrical appliances, woodworking, shipping containers, furniture, machinery, bicycles
Jiangmen	Textiles, garments, paper, batteries

* Panyu is a district of Guangzhou; Chencun, Nanhai and Shunde are districts of Foshan.

Source: Data from M.J. Enright, E. Scott and K. Chang, *Regional Powerhouse: The Greater Pearl River Delta and the Rise of China*. (Singapore: John Wiley & Sons (Asia), 2005)

The Pearl River Delta region's success is in light manufacturing for the electronics industry; but heavy industry is growing relatively quickly. However, many firms are moving to less labour- and more capital-intensive enterprises, reflecting labour shortages

and a growing trend toward computer-aided manufacturing. The policy focus for future development will be the higher-value telecommunications, equipment manufacturing, auto and petrochemical industries. For example, Guangzhou is becoming one of the three auto manufacturing bases in China. The number of sedan cars produced in Guangdong reached 1.55 million in 2013, accounting for nearly 12.8 percent of the PRC total. Cities surrounding Guangzhou are strengthening the supply chain in this sector by establishing development zones catering to auto parts manufacturing, for example, in Foshan, Zhongshan, Shenzhen and Huizhou Daya Bay.⁵⁶⁶

Hong Kong contributes much of the marketing and financial services input to these supply chains, although Guangzhou and Shenzhen are rapidly developing such service inputs, particularly as they relate to sales within the domestic PRC market.⁵⁶⁷

11.2.7 Constraints to Economic Development

The National Development and Reform Commission succinctly summed up the challenges to the Pearl River Delta:

The overall industrial level is low, the value added to the products is not much, the trade structure is unreasonable, the innovative capability is insufficient, and the overall competitiveness is not strong; the land has been excessively developed, the ability to guarantee energy and resources supply is inadequate, the problem of environmental pollution becomes prominent, the constraints of resources and environment are outstanding, and the traditional pattern of development is unsustainable; the imbalance of development still exists between the urban and rural areas and among different regions, the distribution of production forces is not rational, and the use of space is not efficient; the social undertakings remain relatively backward, and the levels of human resources development, public services and the cultural soft strength need to be further improved; the reform of the government and social administration systems are still strenuous, and the pre-breakthrough reforms face ever more challenging difficulties.⁵⁶⁸

While many of these issues are being addressed, collectively they remain significant and inter-related. Development of the service industry, and indeed higher value-added manufacturing, is constrained by the problems of pollution which dissuade the highly skilled but globally mobile workers that are needed. The development of heavy industry is restricted by water and other resource constraints. It is important to stress that almost all of these constraints are urban management issues.

In recognizing this, China is very advanced. Economies burdened with policymakers steeped in conventional economic theory ignore the spatial aspects of the economy and the implications of the fact that most economic assets are physically located in cities. Chinese economic policy thinking specifically integrates implementation mechanisms grounded in city administrations and implemented through investment in urban areas.

Several challenges are particularly important for the Pearl River Delta. Many industrial clusters there have a large operational scale, but (as flagged by the National Development and Reform Commission) the profit margin of many established industries remains low. For example, while the sales price of some types of cloth is 50 times the manufacturing

cost, the producer in the Pearl River Delta has a 3 percent (or less) profit margin. Further, as industries mature with consequent decreasing margins, and cities and towns compete for manufacturers in the same established sectors and types of industries, the returns on infrastructure investment decrease. There are about 18 major textile and apparel clusters across the Pearl River Delta producing comparable cloth with a similar design. This often means cut-throat competition for FDI and export contracts.⁵⁶⁹

The low-end and labour-intensive manufacturing industries based in the region are traditionally in need of cheap labour and resources. However, labour cost is rising. The new labour law implemented in January 2008 reduced the employer's bargaining power and legalized mandatory social security and overtime payment for workers, increasing labour costs by up to 25 percent.

In addition, many companies, but particularly SMEs, have been confronted by other rising cost of inputs. The global financial crisis, and its consequences, pushed up borrowing rates (after an initial loosening) and inflation is rising in China. Prices of oil-related products and other main raw materials, such as coal, fibre, paper and important raw materials, had been rising rapidly, although the post-2013 economic slowdown has eased these pressures. Competition from cheaper areas of China, especially in the case of lower-end manufacturing, is also being felt; this is occurring with the support of the central government as set out in the discussion of industrial relocation in Section 11.2.3.⁵⁷⁰

11.3 STRATEGIC INFRASTRUCTURE

A core strength of the Pearl River Delta is its world-class logistics infrastructure. Urban and provincial governments in the area have focused on improving connectivity between and within cities with the goal of becoming a competitive mega-urban region. In addition to a network of expressways and metro systems, three of the twenty biggest ports in the world are located in the Pearl River Delta: Hong Kong, China; Shenzhen; and Guangzhou.⁵⁷¹

However, various concerns remain. Despite an extensive network of expressways, the rapid rise of automobile use is an outcome of income growth and has overwhelmed the transport system with consequent congestion. The focus of public transport investment has been on high visibility metros, but the integration of feeder services generally is poor, despite such excellent examples as the Guangzhou bus rapid transit system. Rail infrastructure expansion has been slow, but ambitious plans are underway to connect the region.

Urban infrastructure also remains a challenge. In particular, water, wastewater and solid waste services have lagged behind demand, except in Hong Kong, China. The results of existing policies are shown in the ranking of component Pearl River Delta cities in the 'physical capital' category of the Economist Intelligence Unit's Hot Spots index. Hong Kong, China received a ranking of first together with seven other cities. Guangzhou ranked 59th, and Shenzhen 102nd. While Hong Kong, China fares well, the weak performance of the remainder of the Pearl River Delta is a surprise and reflects the lower

levels of service provided by the components of infrastructure other than roads and freight.

Education and health services are also not keeping pace with the expectations of citizens. For the migrant population, services are even less accessible. Hong Kong, China boasts world-class education and health facilities. Even in Hong Kong, China, the cost of such services is a problem for many lower-income workers and their families. However, the situation in the remainder of the Pearl River Delta is even worse.

Financing the required range of strategic infrastructure is also a challenge for the region. Hong Kong, China's combination of effective property tax and use of land value capture has (among other factors) enabled it to build world-class infrastructure on a sound fiscal base. Other local governments in the Pearl River Delta are not so well established. While the use of land conversion to finance infrastructure has been very successful, the long-term viability of this strategy is very questionable, particularly in the context of the need to fund increasing levels of services for native-born and migrant populations.

The Chinese government has recently allowed some local governments to issue bonds and has started to promote PPPs as a funding modality for infrastructure. This is a welcome expansion of the options open to city and provincial governments, although many have been issuing debt and doing what might be called 'state-owned enterprise (SOE)–private partnerships' for years through investment companies funded by domestic banks and trusts. Such financing modalities must, however, be based on a sustainable revenue base, either from general taxation and/or user-pays charges. Neither is currently in place. The introduction of a broad-based property tax at a significant rate is urgent.

11.3.1 Assessment of Physical Infrastructure and Assets

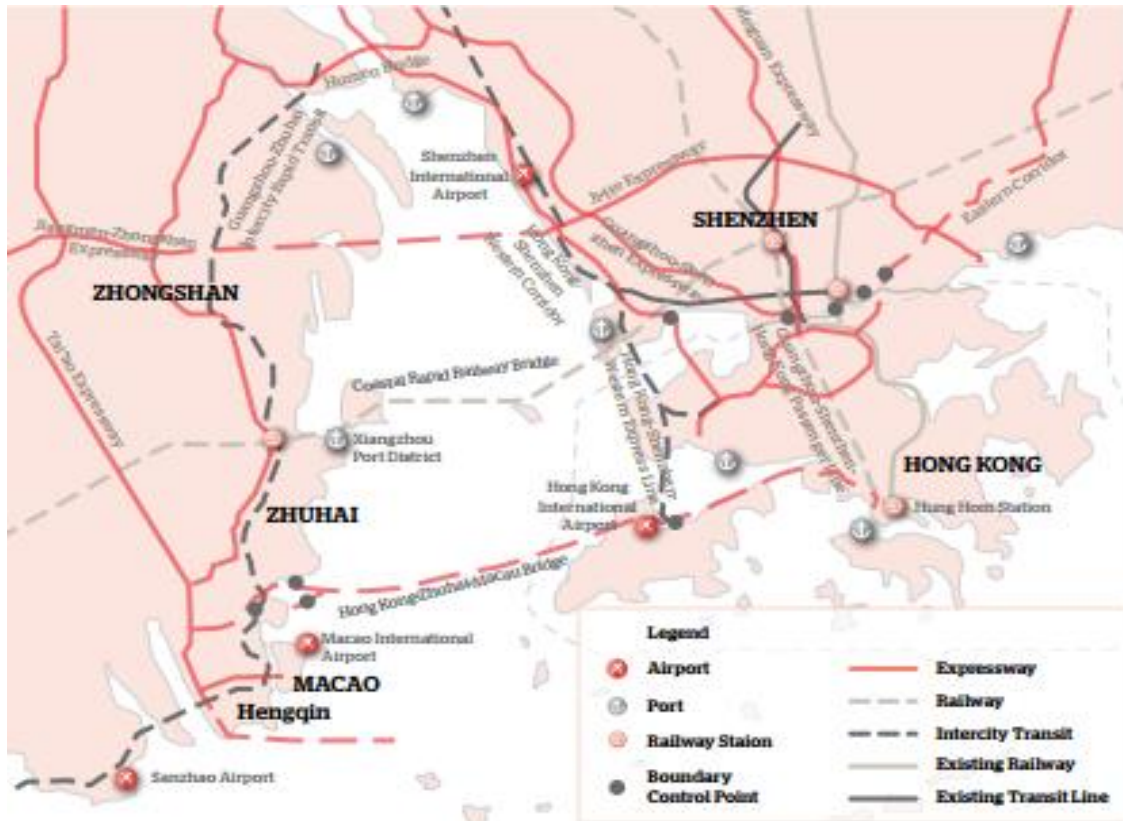
The existing and planned highway and rail network serves as the backbone of the Pearl River Delta as illustrated in Figure 11.4. This backbone will be reinforced by high-speed passenger and dedicated freight railways. The network links the core airports and ports of the region, integrating the economy of the Pearl River Delta, reducing costs for enterprises in access to common-user infrastructure facilities and through savings in the time taken to reach markets.

Figure 11.4 also shows the scale of regional infrastructure projects launched by the regional governments of Guangdong province and the Pearl River Delta to stitch the southern end of the area together, creating a closely integrated economic region. Such projects have focused on improving regional connectivity and access to export hubs. These investments will redefine the economic space and spatial relations among Pearl River Delta cities and further encourage the integration of the areas outside Pearl River the Delta region.

The infrastructure projects boost regional connectivity on three levels: (i) improve connectivity within the Pearl River Delta region and other parts of Guangdong province; (ii) streamline and enhance cross-boundary links in the Greater Pearl River Delta region, especially the links between the Pearl River Delta region and Hong Kong, China and Macau; and (iii) expand the connectivity of the Greater Pearl River Delta

region to international economies and other mainland China regions. Key investments are set out in the Table 11.5.

Figure 11.4 Cross-Boundary Transportation Facilities in the Greater Pearl River Delta City-Region



Source: T.M.H. Chan, J.H.W. Yung and M. Chung, *The Greater Pearl River Delta*, 7th edn. (Hong Kong: Invest Hong Kong, 2014).

Table 11.5 Key Transport Infrastructure Investments in the Pearl River Delta

Connectivity	Infrastructure	Selected Major Projects under Construction/Planning
Within the Pearl River Delta region and Guangdong province	Railways	<ul style="list-style-type: none"> High-speed railways to Nanning, Guiyang, Xiamen and Maoming
		<ul style="list-style-type: none"> Intercity railways linking cities and major towns in the Pearl River Delta region
		<ul style="list-style-type: none"> Metros or urban transits in Guangzhou, Shenzhen and Dongguan
	Expressways	<ul style="list-style-type: none"> 1,110km network in the PRC and 3,410km provincial network in the 12th Five-Year Plan period
Cross-boundary links in the Greater Pearl River Delta region	Railways	<ul style="list-style-type: none"> Guangzhou–Shenzhen–Hong Kong Express Rail Link
		<ul style="list-style-type: none"> Hong Kong–Shenzhen Western Express Line
	Expressways	<ul style="list-style-type: none"> Hong Kong–Zhuhai–Macao Bridge
		<ul style="list-style-type: none"> Liantang/Heung Yuen Wai Boundary Control Point
International and external connectivity	Airport Development	<ul style="list-style-type: none"> The third, fourth, and fifth runways of the Guangzhou Baiyun International Airport and its neighbouring economic zone
		<ul style="list-style-type: none"> The third runway of the Hong Kong International Airport
		<ul style="list-style-type: none"> The third runway of Shenzhen Bao’an International Airport
	Container Terminals	<ul style="list-style-type: none"> Phase three of Nansha Port in Guangzhou
		<ul style="list-style-type: none"> The container ferry in Yantian Port and phase two of Dachanwan Port in Shenzhen

Source: Based on information from T.M.H. Chan, J.H.W. Yung and M. Chung, *The Greater Pearl River Delta*, 7th edn. (Hong Kong, China: Invest Hong Kong, 2014); Hong Kong–Zhuhai–Macao Bridge Related Hong Kong Projects, ‘Project benefits: Transportation’, accessed 31 October 2016, http://www.hzmb.hk/eng/benefits_transportation.html

11.3.2 Logistics and Information Systems

Hong Kong, China is the site of the second-largest container seaport and the second-largest freight airport in the world. Two other important ports are located in neighbouring Shenzhen and Guangzhou, making the region around the Pearl River Delta China’s most important logistics hub. Logistics has been a core focus of the various levels of governments – often to the exclusion of other infrastructure needs. Logistics hubs – ports,

trucking hubs, and intermodal facilities – have been strongly supported by governments in the following ways:

- Assisting in project development: 85 percent of the logistics parks are initiated by local governments.
- Investing in infrastructure.
- Facilitating the provision of sufficient space for future development.
- Applying a special tax policy to logistics enterprises in logistics parks.
- Ensuring that cluster formation leads to high levels of synergy because the purchasers of logistics services are specialized and physically concentrated, e.g. Automobile Logistics Park, Food Logistics Park and Chemical Logistics Park .
- Promoting investment in logistics IT systems and platforms.

However, there are some problems in implementation, including:

- Sometimes land speculation is the driving factor in the establishment of such parks, and easy finance for purchasers has led to unsustainable land price increases in some cities and regions.
- Overcapacity and bottlenecks exist. In general, the parks have a 40 percent utilization rate; but popular ones have traffic, resources (e.g. water) and pricing problems.
- Corruption in the allocation of land exists.
- Sometimes form rushes ahead of function; and high-quality campuses and other buildings are built with little consideration given to the market requirements of the clusters served.
- Detailed planning restricts flexibility and the capacity to change as the needs of a cluster changes.
- Multimodal transport is not sufficiently encouraged. Some logistics parks have only a road connection.⁵⁷²

In order to increase the efficiency, effectiveness and sustainability of the Pearl River Delta industry, multimodal transport options is particularly important. It is essential for the achievement of efficiency and sustainability goals that goods are routed through the most efficient mode of transport and the ease (transaction costs) of interchange between modes will determine this.

11.3.3 Operation and Maintenance of Infrastructure

Except in Hong Kong, China, a lack of asset management systems and the ease of justifying and financing capital investments has militated against effective operation and maintenance (O&M). Old assets have been rebuilt. This is environmentally and financially inefficient. Better asset management and more rigorous project appraisal will help. Given the rebalancing of growth in China and a move away from an automatic recourse to new build, continuing growth in the Pearl River Delta will increase the stress on infrastructure. The region's cities also need to increase their resilience to events occurring both inside and outside of the region as a result of natural or technological hazards, human error or equipment failure.

The need for Pearl River Delta cities to future-proof against disruption to infrastructure supply and network systems, particularly in respect of the vulnerability of the region to typhoons, requires a series of actions to improve the operation, maintenance and replacement of urban utility services. Infrastructure failure can be significant and costly. As a risk management strategy, utility service agencies need to undertake comprehensive asset management planning to reduce the possibility of future failure and ensure that services are re-established as soon as possible if failure does occur.

11.3.4 Future Infrastructure Needs

Planned infrastructure projects feature a heavy continued emphasis on high profile transport infrastructure, specifically high-speed and freight railways (Figure 11.5). However, the need to further develop other aspects of strategic infrastructure, such as higher education, better health services, and a healthier environment, is not sufficiently emphasized. Reliance on Hong Kong, China alone for higher value-added internationally competitive services is unlikely to generate the incomes needed to further increase the GDP per capita and quality of life of the Pearl River Delta's citizens.

Much future investment in infrastructure is projected to include PPP elements. The main PPP modalities for key sectors are:

- **Railways.** Passenger rail is highly subsidized but effective in minimizing car traffic. Freight rail is very important to reducing truck traffic, but also highly subsidized. Opportunities are mainly through availability payment schemes.
- **Metro extensions.** Property based value capture on the Hong Kong, China model is both possible and intended.
- **Water supply.** This is dependent on cost recovery tariffs or availability payments from the local governments.
- **Health.** The provision of health services by PPPs through availability payments is both feasible and equitable. Full-cost recovery PPPs in the sector will only serve the higher income groups.
- **Education.** Availability payments for schools are now routine, but performance-based contracts for teaching may also be possible.

Figure 11.5 Development of the Regional Intercity Railway Network, Guangdong



Source: Based on the Plan on the Development of Integrated Transportation System of Guangdong Province in the 12th Five Year Plan Period; T.M.H. Chan, J.H.W. Yung and M. Chung, *The Greater Pearl River Delta*, 7th edn. (Hong Kong, China: Invest Hong Kong, 2014).

For many of these PPP modes, a sustainable revenue base is essential. As many infrastructure projects are not able to cover capital and O&M costs from user fees, a stable subsidy stream, or availability payment, will be necessary from local governments. The key to such revenue streams is land-based revenues – from property tax in the case of availability payments and from development/land taxes for public transport. Structuring such projects to ensure the community does not lose out is not trivial and is not well understood by Pearl River Delta governments. Further, the use of land sales as a major source of such revenue is not sustainable and should be avoided.

11.4 SOCIAL SUSTAINABILITY

Social challenges have grown as growth has accelerated. The rural migrants who provided the labour in the factories of the Pearl River Delta were largely shut out of the social services available to residents of the urban areas as they did not have the required residency permit. However, Guangdong has exhibited strong leadership in social policy, progressively extending to migrants the rights to such services.

Cities such as Foshan continue to prosper, powered mainly by migrant labour. Social stability hinges on providing services to attract and retain those workers. Half of Foshan's population and about two-thirds of its workforce are migrants. Despite lower average incomes and living standards than Foshan citizens, migrants are making significant improvements to their productivity and lifestyle by moving to Foshan and other growth poles. They are also increasingly able to access the same social services as locals due to reforms, especially in the areas of vocational training, healthcare, housing and social security.⁵⁷³ Other cities are starting to emulate such practices. Despite reforms, strikes fuelled by price rises in relation to incomes and/or companies not providing statutorily mandated benefits have broken out – sometimes on a massive scale.

In the Pearl River Delta, like in the rest of China, the housing market is a serious challenge and source of social exclusion, with the availability of affordable housing well below needs. This leads to crowding or use of dormitory accommodation, both of which do not promote social harmony. This is recognized by the central government, which has instituted a number of programmes to address the issue. However, the programmes are implemented mainly through local governments which have, in many cases, few incentives to pursue them; and progress has been slow. In 2014, the central government increased its support to the programme in an effort to speed up implementation.⁵⁷⁴

The results of existing policies are shown in the ranking of component Pearl River Delta cities in the 'social and cultural' category of the Economist Intelligence Unit's Hot Spots index. Hong Kong, China ranked 42nd, Guangzhou 94th and Shenzhen 96th. While Hong Kong, China's performance is best, it lies at the very low end of the developed cities with which it must compete. The performance of the other Pearl River Delta cities is poor.

11.5 ENVIRONMENTAL SUSTAINABILITY: POLICIES AND MEASURES

Environmental issues in the Pearl River Delta are a major challenge. The Delta is notoriously polluted.⁵⁷⁵ The capacity of sewage and industrial waste treatment facilities have lagged behind the growth in population and industry. Much of the area is frequently covered with a brown smog, which affects Hong Kong, China and consequently its attractiveness to the very high value-added companies and individuals it needs.

In 2007, the World Bank approved a USD 96 million loan to the PRC government to reduce water pollution in the Pearl River Delta.⁵⁷⁶ In December 2008, it was announced that CNY 48.6 billion (about USD 7.1 billion) would be spent by mid-2010 to clean up the river's sewage problems in the Guangzhou area. The city is building about 30 water treatment plants, which will treat 2.25 million tonnes of water per day. The environmental improvement programme is intended to reduce the amount of sewage in the region by 85 percent. But much of the pollution is related to industrial activity. The 2009 Greenpeace East Asia report, *Poisoning the Pearl River*, detailed the results of a study in which 25 samples were collected from five manufacturing facilities in the Greater Pearl River Delta.⁵⁷⁷ The study concluded that all the facilities sampled were discharging wastewater containing chemicals with proven or suspected hazardous properties, including heavy metals.

Action is being taken. In 2013, Guangdong announced a further CNY 117 billion (USD 18.9 billion) programme to cut water pollution. In 2014, the Guangdong government announced the implementation of its air pollution action plan, which requires PM 2.5 in populated regions and cities to be reduced by 15 percent by 2017. To achieve the goal, the action plan puts forward measures, including desulphurization and denigration, the removal of nitrogen compounds in industrial production, controlling ozone pollution and developing green transportation. Some 90,000 vehicles were phased out of use in 2013 because of heavy exhaust emissions.⁵⁷⁸

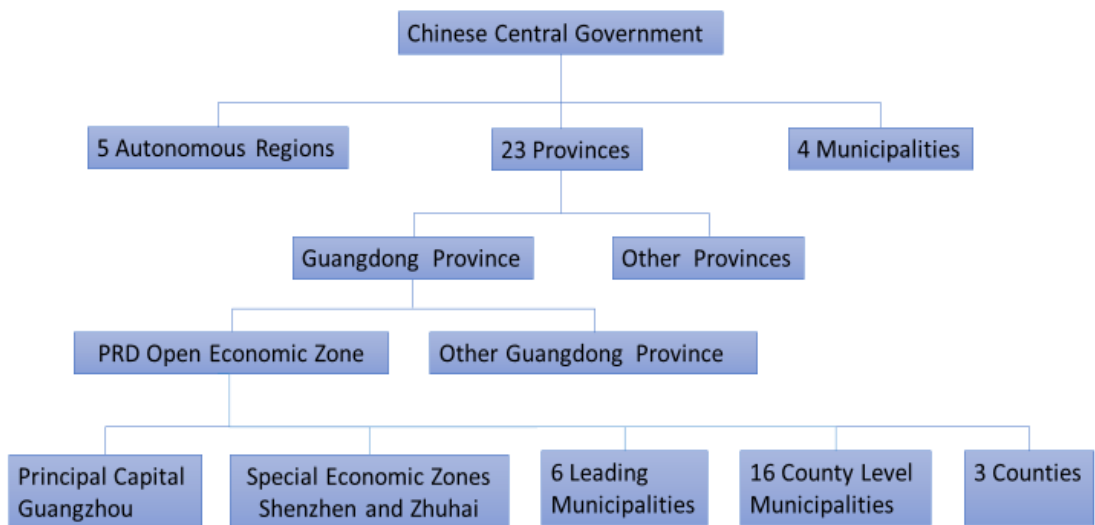
Cities in the Pearl River Delta are particularly susceptible to natural disasters and climate change. Given the concentration of infrastructure, non-agricultural activities and population in those cities, such disasters could severely impact economic activities and daily life. Rainstorms and typhoons frequently occur in the region and typically cause serious damage and huge economic losses. During the 2000–2007 period, for instance, rainstorms and typhoons in Shenzhen caused cumulative direct economic losses of CNY 525 million (USD 80 million) and 277 million (USD 41.5 million) respectively, accounting for approximately for 63 percent and 33 percent of total direct economic losses associated with all meteorological hazards in the city.⁵⁷⁹

The results of existing policies are shown in the ranking of component Pearl River Delta cities in the ‘environmental and natural hazards’ category of the Economist Intelligence Unit’s Hot Spots index. Hong Kong, China received a ranking of 72nd with Shenzhen and 12 other cities; with Guangzhou scoring 59th with 10 other cities. The overall result for the Pearl River Delta is poor.

11.6 EFFECTIVENESS OF URBAN GOVERNANCE

The governance structure of the Pearl River Delta is set out in Figure 11.6. It is clear from various studies and observations that, despite the clear directions provided by the State Council and the National Development and Reform Commission, coordinating such a structure is a challenge. In addition to the level of complexity, the operational divisions between sectoral agencies are particularly challenging in China.

Figure 11.6 Government Structure in the Pearl River Delta (PRD)



Source: C. Miu, *Pearl River Delta* (Sydney: Australia-China Chamber of Commerce & Industry, 2005).

In the face of pressure from growing competition from cities in the Yangtze River Delta region, the Guangdong provincial government and other Pearl River Delta cities recognized the urgency and necessity for the development of a ‘Greater Pearl River Delta’ as an integrated economic region. The Guangdong provincial government has initiated a ‘Pan-PRD’ concept, to ‘avoid duplicating construction, achieving better coordination among nine PRD [Pearl River Delta] cities with two Special Administration Regions (Hong Kong and Macau), and exploring new development opportunities within the delta region’.⁵⁸⁰ In 2004, a Pan-PRD Regional Cooperation and Development Agreement was signed. The major changes and characteristics of Pan-PRD spatial development were finalized by the Cross-boundary Liaison System in 2007 and featured the following:⁵⁸¹

- Improving cooperation with neighbouring provinces (Fujian, Jiangxi, Hunan, Guangxi, Hainan, Sichuan, Guizhou, Yunnan).
- Strengthening transport linkages between regions of the Pearl River Delta.
- Developing the western region of the Pearl River Delta.
- Better integration of Hong Kong, China and Macau into the Pearl River Delta.

While such a structure is very desirable, the challenge is to create a coordination mechanism, and to institutionalize that mechanism and provide it with sufficient resources to undertake the analytical and liaison work required. This is difficult, given the autonomy of provinces and local governments in China. The results of existing policies are shown in the ranking of component Pearl River Delta cities in the ‘institutional effectiveness’ category of the Economist Intelligence Unit’s Hot Spots index. Hong Kong, China received a ranking of 22nd with Shenzhen and 12 other cities; and Guangzhou was 59th with 10 other cities. The overall result for the Pearl River Delta is poor.

11.7 PARTNERSHIPS FOR SUSTAINABLE DEVELOPMENT

11.7.1 Development Partnerships

The component province, SARs and cities have different types and levels of partnerships that support the development and management of the region. Many of these involve the creation of formal structures, especially the public–private sector partnerships between government and business. Others are less formal and involve networks and associations of professional, community and cultural interest groups. The following describes the core partnership types.

- **Government-to-government partnerships**

The Closer Economic Partnership Arrangements (CEPAs) between the central government of the PRC and the two SARs – Macau and Hong Kong, China – focus on coordination of economic development activities.⁵⁸²

The Hong Kong, China CEPA, signed in 2003, represents a major move toward economic integration between the mainland and Hong Kong, China, by reducing or eliminating tariffs and non-tariff barriers on substantially all the trade in goods between the two. This has given Hong Kong, China goods and services much greater access to markets in the mainland. Annual supplements to the agreement set out areas for further cooperation.

The Macau CEPA, also signed in 2003, sets out the mechanisms for the liberalization of the goods and services trade and the conditions for improved economic relations, in particular in relation to investment.

Under these agreements, separate ‘twinning’ of agencies occurs, for example, between the environmental agencies of Hong Kong, China and Guangdong.

- **International city-to-city relationships**

These include sister city relationships and membership of specific interest groupings such as the C40 or Metropolis. These relations have been given a much higher profile with the establishment of the Guangzhou Institute for Urban Innovation which has instituted an international Award for Urban Innovation.

- **Partnerships involving institutions.**

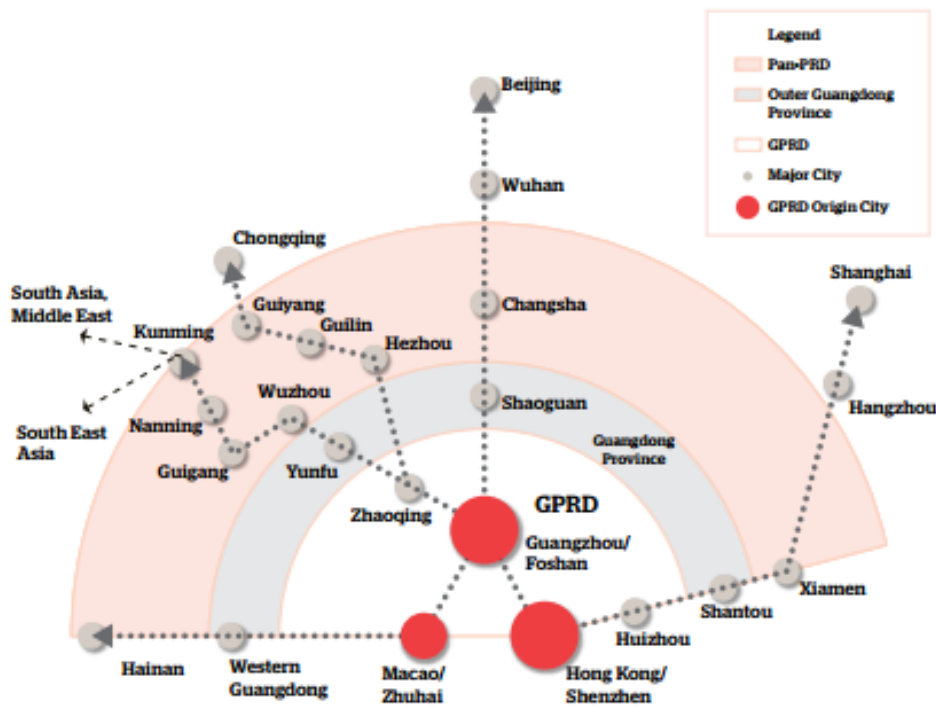
These are partnerships between institutions – such as educational institutions –resident in the cities of the region with other cities in the region or with international partners. For example, Sun Yat-Sen University, the top university in Guangdong province, has established the office of international cooperation and exchange for affairs related to Hong Kong, China; Macau; and Chinese Taipei. It now has two joint institutions: the Sino-French Institute of Nuclear Engineering and Technology and the Sun Yat-sen University–Carnegie Mellon University Joint Institute of Engineering. The office operates three international cooperative programmes offering Master’s degrees and PhDs in international business and business administration.

A good example of a regional partnership between an educational institution and the private sector is the School of Medicine and the Life Science Institute of the South China University of Technology. The school is run cooperatively by the university, Guangdong Provincial People’s Hospital and Shenzhen Baoneng Investment Group. The university also has a School of Continuing Education which organizes training courses for senior professional managers in regional enterprises and party members both within Guangdong province and other provinces in the Pan-PRD region such as Henan and Guizhou.

- **Partnerships involving the private sector**

The private sector may enter into partnerships with the government or between industry associations. In particular, PPPs have occurred in the infrastructure space, the water sector and for rail investments. However, these have not been transparent in their structures and are unlikely to be replicated. The PRC government recently introduced an improved framework for such activity.

Figure 11.7 Outbound High-Speed Railways of the Greater Pearl River Delta Region



GPRD=Greater Pearl River Delta; PRD=Pearl River Delta

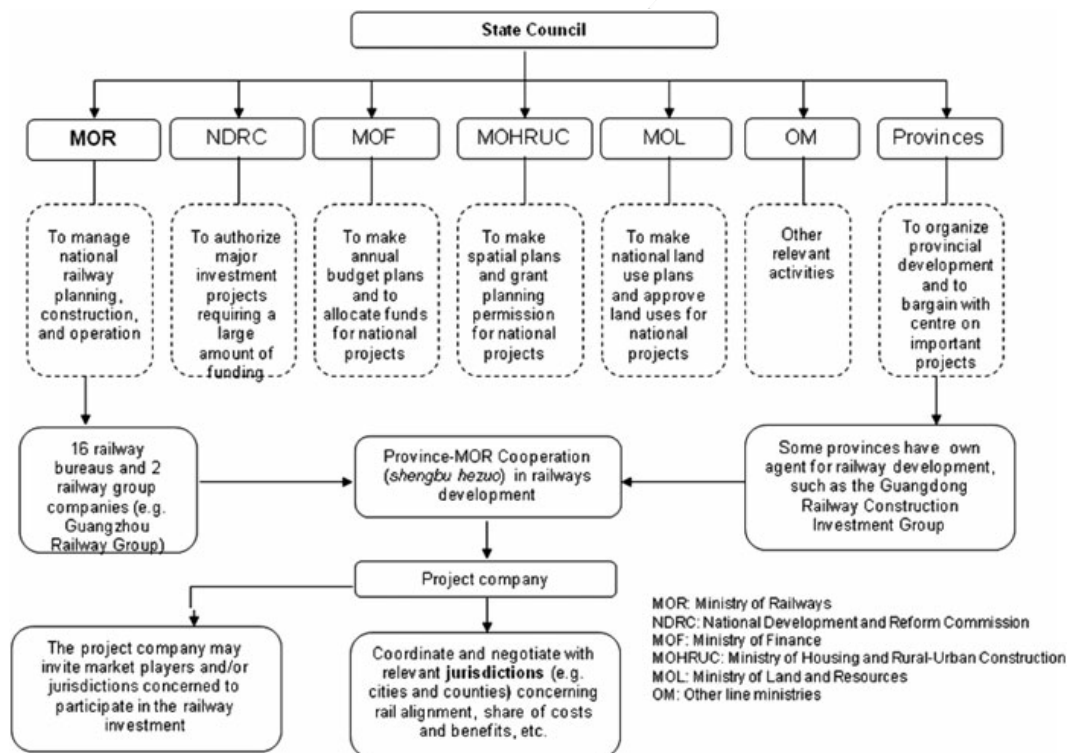
Source: Planning Department of the Government of Hong Kong SAR, ‘Plans for cooperative development of transportation’, in Planning Study on the Co-ordinated Development of the Greater Pearl River Delta Townships (Hong Kong, China: Department of the Government of Hong Kong, 2009), Ch. 5.

Given the stated goal of ‘the prioritization of transport infrastructure promoting regional functional integration’,⁵⁸³ the Pearl River Delta Townships Coordinated Development,

Planning and Governance Office (which is implementing the Pearl River Delta Townships Regulation) is fostering institutional integration within the region. An example of the partnerships being forged under these structures is best given by considering the most prioritized infrastructure investment – the high-speed intercity rail in the region. There are 16 intercity railway lines operating or under construction in Guangdong province to enhance the connection within the Greater Pearl River Delta, the rest of Guangdong province and other provinces in the Pan-PRD region (Figure 11.7).⁵⁸⁴

The Guangzhou–Zhuhai Line was the first high-speed intercity railway built in Guangdong province and also the first joint-venture line in the Pearl River Delta. Although there are no statutory clauses in China’s Railway Law (implemented since 1991) for the funding of railways, joint-venture projects are increasingly used for regional public infrastructure projects to alleviate the rising financial burden on the ministry responsible (up to 2013, this was the Ministry of Railways; it was succeeded by the State Railway Administration and the China Railway Corporation under the Ministry of Transport).

Figure 11.8 Institutional Arrangements for Railway Development in the Pearl River Delta through Province–Ministry Cooperation



Note: The Ministry of Railways has been dissolved and merged into State Railway Administration and China Railway Corporation under Ministry of Transport.

Source: J. Xu and A.G.O. Yeh, ‘Interjurisdictional cooperation through bargaining: The case of Guangzhou–Zhuhai Railway in the Pearl River Delta, China’, *The China Quarterly* 213 (2013): 130–51.

Three major dimensions of relations are involved in the process of intercity railway provision. First, there are inter-ministry conflicts between the National Development and Reform Commission and the Ministry spearheading the development of railway infrastructure (the Ministry of Railways and its successors). The Commission wants to promote diversification of funding sources for regional infrastructure provision while the ministry is reluctant to reduce its influence in the projects. Second, there are tensions between the provincial government and the ministry in terms of the decision-making on the location of train stations, route design and alignment, carriage standards, etc. Third, inter-city politics among the nine Pearl River Delta cities complicate land acquisition and decisions on the level of control of joint-venture lines.^{585,586}

11.7.2 Strategy for the Development of Partnerships

While the partnerships developed so far have been important, a more strategic approach to partnership development could be taken. Such an approach would focus on the key economic development objectives and set out to establish relationships with partners in potential markets or commodity suppliers, and with collaborators with the technology related to priority sectors. Thus, other port cities in the APEC region are natural partners as sources of raw materials and/or markets that link to substantial existing or potential hinterlands. Examples include Lima/Callao (links to Brazil), Portland (links to US markets) and Brisbane (links to Australian markets and commodities).

11.7.3 Action Agenda for Development

From the above discussion, it is apparent that key areas of focus for a regional strategy for partnership development should be:

- Environmental infrastructure investment, particularly in the wastewater sector to augment current efforts and in building resilience
- Developing and implementing on sustainable basis investments in ‘soft infrastructure’, e.g. health and education
- Sustainable urban finance. e.g. property tax, cost recovery and PPP
- Low carbon planning and finance
- Developing international city-to-city economic links, especially in areas that the Pearl River Delta wants to prioritize, such as education (with partners such as Australian cities), automotive (with partners such as US cities), and heavy industry (with partners such as Korean cities)
- Establish a more formalized regional planning body capable of guiding development.

11.7.4 Potential APEC partnerships

Through APEC, a more effective public–private dialogue can be fostered. This could include linking public–private groupings in the Pearl River Delta with other dialogue organizations (e.g. groupings in Sydney and Portland). This can be done by fostering an APEC-endorsed approach to developing a strategy such as the one discussed above, and to promoting the strategy so that the vision is shared by public, private and community stakeholders.

11.8 CONCLUSIONS

The Pearl River Delta is a dynamic, globally important region undergoing rapid change. In the last decade, various developments – structural reforms to the central and local government; the opening of the economy to greater competition and FDI; and internal migration – have significantly changed the socioeconomic structure and governance of the region. However, it faces many challenges in managing its continuing rapid urban development, and the associated transport, social and environmental problems. There is widespread recognition and understanding of these challenges, and the need for collective action by government, business and communities to address these. Partnerships and other collaborative initiatives and efforts are important for developing a viable approach to sustainable development.

Sustainability is a strong underlining principle of the region's development objectives, but not necessarily of its implementing organizations. Operational policy and decision-making processes of provincial and local government, business and communities are sometimes at odds with the concept. In the area of local economic development, the region has developed a wide range of partnerships between government, business and institutions that do not necessarily make up a coherent whole. As the PRC economy cools, unemployment rates threaten to rise and investment to slow in many sectors. This situation will test the flexibility and adaptability of the region and the effective performance of such partnerships will be key to a successful response to such circumstances.

Urbanization is a major challenge to the sustainable development of the region. Rising wealth drives lower density, more energy inefficient housing and the use of cars. There is a pressing need for the region to focus on the greater integration of component cities while retaining high-density development along corridors, between urban nodes and within cities. Decentralization of employment, investment and services through planning support for polycentric city development is essential if the city is to develop more sustainable land-use, employment, transport and urban services delivery systems. Social problems, particularly those relating to migrants and encroachment on rural communities, are potentially significant and are a concern for the future sustainable development of the region. Similarly, its environmental problems are a competitive disadvantage.

The Pearl River Delta has the beginnings of an effective governance structure. More effective coordination of local governments will be needed to achieve the ambitious goals for the region set out by the PRC government. It is necessary to develop a structure that will enable local bodies to act uniformly in the interests of the region, to improve the coordination of planning and infrastructure and to make the region's economy more competitive. Better asset management systems are needed to provide a basis for more effective financial management. Such a governance structure is also the basis for improved use of partnerships underpinning the development of the region, and these partnerships need to be better focused.

Thus, while the performance of the Pearl River Delta in putting in place the needed support for sustainable development is impressive, significant challenges are emerging, particularly in the areas of fiscal, social and environmental sustainability. Key lessons learnt relate to the significance of central and local governments working together to build

the enabling environment and the logistics components of strategic infrastructure as a basis for productive and complementary domestic and international private-sector investment.

Key areas that need to be addressed are clear. Innovation systems need to be bolstered. Significant investment in human capital development is needed to enhance productivity and to support higher value-adding industry. Strategic infrastructure other than logistics, particularly social and environmental infrastructure, needs to be further developed as a high priority. In terms of governance, there is a need to coordinate better the response to these challenges across public and private sectors. A focal point for evidence-based prioritization of development programmes across the three dimensions of sustainable development – i.e. economic competitiveness, social development and environmental improvement – is needed to ensure continued growth on a sustainable trajectory. Such a focal point would have the capacity to break through bureaucratic silos which currently stifle attempts at coordinated development, but need not be a ‘supra-provincial’ entity mooted in some quarters.